



The Global Trade Analysis Project: Report, Issues, and Future Directions

**Background Paper for the GTAP Advisory Board Meeting
West Lafayette, IN, USA
June 5-6, 2017**

By:

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**Center for Global Trade Analysis
Purdue University**

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June 4, 2017

Dear GTAP Advisory Board Members,

To say the least, it has been an interesting year. While some have suggested that the political changes we have witnessed since June 2016 are likely to diminish demand for analysis of global economic issues, I believe the contrary will be true. Despite turbulence in the policy arena, the Center has pursued its goal of providing a sound analytical foundation for assessing global economic issues. On the data front, we can highlight two major advances. First is incorporation of the new EU-28 input-output tables, which required significant efforts for both the Center and our EC counterparts. Second, is the first pre-release of version 10 with the new 2014 base year. The second pre-release is scheduled before June's Board Meeting and will include additional features as well as the 2004, 2007 and 2011 (and 2014) reference years. We have also been working on a revision of the standard GTAP Model as previewed last year. If all goes to plan, the new model will be rolled-out in June with the model description in an article in the next issue of the *Journal of Global Economic Analysis* (JGEA).

The JGEA has gotten off to a good start, though for ranking purposes we still need to await the delivery of 1-2 more issues to measure its longer-term success. Nonetheless, word is getting around and we have a backlog of articles in the pipeline. As well, it would still be desirable to receive more contributions related to teaching and software/coding examples to improve the potential outreach and to meet some of the initial objectives of the Journal. On the instructional side, our courses have been doing very well in terms of enrollment and feedback. We offered the first mini-course, in what we hope to be a large set of GTAP-U offerings, on preferential trade agreements. This was conceived and implemented by Mary Burfisher, to whom we owe deep gratitude. Despite the enthusiasm of our hosts for this summer's short course in Cartagena, for financial reasons we had to move it back to Purdue. Delivering courses off-campus remains a financial challenge as we do not want other activities cross-subsidizing our courses.

We had several staffing changes over the past year. Maksym Chepeliev from the Ukraine's Institute for Sciences has joined the data team as a research economist and Sue Bennett was hired to replace Wendy Kincaid. You will have an opportunity to meet them both in June. We can also congratulate this year's GTAP-based soon-to-be minted doctors—Caitlyn Carrico and Luis Peña. Last summer we saw the arrival of Russel Hillberry, who joined the faculty of the Department of Agricultural Economics in the area of international trade. Russ is a Research Associate of the Center. We were also very pleased by the nomination of Wally Tyner to be a Fellow of the American Association for the Advancement of Science. Finally, we will see a change at the top of our hosting Department. Jayson Lusk, current president of the Agricultural and Applied Economics Association will be taking over from Ken Foster. Ken has been a strong supporter of the Center during his tenure and we look forward to working with Jayson in the coming years.

We are ever grateful to the continued support of our Board Members—including our new member representing China's Development Research Center of the State Council. We are delighted to have our first national government Board Member from a developing country. We continue to pursue other opportunities to strengthen and diversify the Board. Our agenda is full for the next 12 months and we hope to provide you with ever better tools to support your vital work. Let me finish by saying that it is an honor to be directing this endeavor as we celebrate our collective 25th year, and to thank Tom for his incredible foresight and persistence.

Sincerely,



Dominique van der Mensbrugghe, Ph.D.
Research Professor and Director of GTAP
Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University

Executive Summary

The list below highlights a number of important accomplishments in the Center during the past year. Detailed discussion follows in the subsequent report.

Data Base and Models Updates/Releases

- Board-Only data releases
 - GTAP 9.2 Data Base – January 2017
 - Including new and updated IO tables
 - Module improvements
 - GTAP 9.2 Satellite Data Base – April 2017
 - Land Use—using updated data
 - GTAP 10 Data Base Pre-release 1—March 2016
 - New reference year 2014 and update of macro, trade, and tariff data inputs
 - Trade and tariff now uses new ISIC and CPC concordance
 - GTAP 10 Data Base Pre-release 2—May 2017
 - Multi-year IOT allocation and disaggregation of sectors and new sector labels
 - Energy data, APT, domestic support, and income/factor taxes
 - Introducing Irrigation Water into GTAP Data Base Version 9
- Modeling work
 - GTAP Model facelift
 - GTAP-E-Power: An Electricity-detailed Economy-wide Model

Network

- Two offerings of GTAP 101
- Inaugural offering of GTAP PTA
- 24th Annual Short Course held in West Lafayette
- 2016 Conference and Board Meeting held in Washington DC
- 2019 Conference proposal (Poland) submitted for consideration

Research Projects

- *Journal of Global Economic Analysis* launched, with two releases
- Strong external funding for selective research activities in the Center aimed at advancing the frontiers of GTAP-related data, modeling and policy analysis
- Specifics on projects detailed throughout this report

Staffing

- August 2016 - Maksym Chepeliev hired as Research Economist
- February 2017 - Sue Bennett hired as Operations Coordinator

GTAP Advisory Board Representatives and Other Meeting Attendees

GTAP Consortium Agency Representatives

- **Asian Development Bank** (Mandaluyong City, Philippines)
Juzhong Zhuang - jzhuang@adb.org (absent)
- **Centre d'Etudes Prospectives et d'Information Internationales** (Paris, France)
Jean Fouré - jean.foure@cepii.fr
- **Development Research Center of the State Council** (Beijing, China)
Shantong Li - lishantong333@126.com
- **Economic and Social Research Institute, Cabinet Office** (Tokyo, Japan)
Shinji Yoshioka - shinji.yoshioka@cao.go.jp (absent)
- **Economic Research Service, US Department of Agriculture** (Washington DC, United States)
Gopinath Munisamy - gmunisamy@ers.usda.gov
- **European Commission, DG Trade** (Brussels, Belgium)
Lucian Cernat - lucian.cernat@ec.europa.eu (absent)
Zornitsa Kutlina-Dimitrova - zornitsa.kutlina-dimitrova@ec.europa.eu
- **European Commission, Joint Research Centre** (Seville, Spain)
Bert Saveyn - bert.saveyn@ec.europa.eu
- **Food and Agriculture Organization of the United Nations** (Rome, Italy)
Aziz Elbehri - aziz.elbehri@fao.org
- **Inter-American Development Bank** (Washington DC, United States)
Paolo Giordano - paolog@iadb.org (absent)
- **International Food Policy Research Institute** (Washington DC, United States)
David Laborde - d.laborde@cgiar.org
- **International Trade Centre** (Geneva, Switzerland)
Anders Aeroe - aeroe@intracen.org
- **KPMG Australia** (Canberra, Australia)
Laurent Creteigny - lcreteigny@kpmg.com.au
- **MIT Joint Program on the Science and Policy of Global Change** (Cambridge, United States)
Sergey Paltsev - paltsev@mit.edu
- **National Graduate Institute for Policy Studies** (Tokyo, Japan)
Kenichi Kawasaki - k-kawasaki@grips.ac.jp
- **Organisation for Economic Co-operation and Development** (Paris, France)
Frank van Tongeren - frank.vantongeren@oecd.org (absent)
Rob Dellink - rob.dellink@oecd.org
- **Productivity Commission** (Melbourne, Australia)
Patrick Jomini - pjomini@pc.gov.au (absent)
- **Research Institute of Economy, Trade and Industry** (Tokyo, Japan)
Mitsuhide Hoshino - hoshino-mitsuhide@rieti.go.jp (absent)
Kenichi Kawasaki - k-kawasaki@grips.ac.jp

- **The World Bank** (Washington DC, United States)
Maryla Maliszewska - mmaliszewska@worldbank.org
- **Thünen Institute of Market Analysis** (Braunschweig, Germany)
Janine Pelikan - janine.pelikan@thuenen.de
- **United Nations Conference on Trade and Development** (Geneva, Switzerland)
Ralf Peters - ralf.peters@unctad.org (absent)
- **United Nations Economic and Social Commission for Western Asia** (Beirut, Lebanon)
Mohamed Hedi Bchir - hedi.bchir@gmail.com (absent)
Mohamed Abdelbasset Chemingui - cheminguim@un.org
- **United Nations Economic Commission for Africa** (Addis Ababa, Ethiopia)
Stephen Karingi - Skaringi@uneca.org
- **University of Hohenheim** (Stuttgart, Germany)
Martina Brockmeier - martina.brockmeier@uni-hohenheim.de (absent)
Kirsten Urban - kirsten.urban@uni-hohenheim.de
- **US Department of Commerce** (Washington DC, United States)
Chris Rasmussen - chris.rasmussen@trade.gov (absent)
Natalie Soroka - natalie.soroka@trade.gov
- **US Environmental Protection Agency** (Washington DC, United States)
Richard Garbaccio - garbaccio.richard@epa.gov (absent)
- **US International Trade Commission** (Washington DC, United States)
Marinos Tsigas - marinos.tsigas@usitc.gov (absent)
William Powers - william.powers@usitc.gov
- **Wageningen Economic Research** (The Hague, The Netherlands)
Hans van Meijl - hans.vanmeijl@wur.nl
- **World Trade Organization** (Geneva, Switzerland)
Roberta Piermartini - roberta.piermartini@wto.org (absent)
Bob Koopman - robert.koopman@wto.org

Member at Large

- **Joseph Francois** - joseph.francois@gmail.com
World Trade Institute

Guests of the Board

- **Pierre H Boulanger** - pierre.boulanger@ec.europa.eu
European Commission, Joint Research Centre
- **Mark Gehlhar** - mgehlhar@osmre.gov
US Department of the Interior, Office of Policy Analysis and Budget
- **Mark Horridge** - mark.horridge@gmail.com
Centre of Policy Studies, Victoria University
- **Jan J. Michalek** - michalek@wne.uw.edu.pl
University of Warsaw

GTAP Advisory Board Meeting Agenda

Monday, June 5

Dauch Alumni Center, Prusiecki Banquet Room
403 West Wood Street, West Lafayette, IN 47907

8:30-9:00am	Welcome Coffee
9:00-10:30am	Welcome and Overview (Chair: Hans van Meijl) 9:00-9:30 Overview and Issues (Dominique van der Mensbrugge) 9:30-10:00 Discussion 10:00-10:10 Policies Shaping the Next 25 Years (Dominique van der Mensbrugge) 10:10-10:30 Discussion
10:30-11:00am	Coffee Break
11:00am-12:20pm	The GTAP Data Base: Updates on Core Components (Chair: Maryla Maliszewska) 11:00-11:20 GTAP 9.2 and 10 Data Bases (Angel Aguiar) 11:20-11:30 Discussion 11:30-11:35 EU Tables (Angel Aguiar and Bert Saveyn) 11:35-11:40 Discussion 11:40-11:45 New Sectoral Breakout (Robert McDougall and Angel Aguiar) 11:45-11:50 Discussion 11:50-11:55 Incorporation of Energy Subsidies (Maksym Chepeliev) 11:55-12:00 Discussion 12:00-12:10 Update on Quality Control (Angel Aguiar) 12:10-12:20 Discussion
12:20-1:30pm	Lunch
1:30-2:35pm	Education, Outreach, and Strategic Communication (Chair: Kenichi Kawasaki) 1:30-1:40 Education Plan (Roman Keeney and Mary Burfisher) 1:40-1:50 Discussion 1:50-1:55 Journal of Global Economic Analysis (Thomas Hertel) 1:55-2:05 Discussion 2:05-2:10 Network Outreach and Mentoring (Ginger Batta) 2:10-2:20 Discussion 2:20-2:25 GTAP Network, the Next 25 years (Dominique van der Mensbrugge) 2:25-2:35 Discussion
2:35-3:00pm	Coffee Break
3:00-4:00pm	New Developments at the Interface of Data and Modeling (Chair: Rob Dellink) 3:00-3:15 GTAP Model Facelift (Thomas Hertel) 3:15-3:30 Discussion 3:30-3:45 Mainstreaming AEZ/Land Use Database (Uris Lantz Baldos) 3:45-4:00 Discussion
4:00-5:30pm	Parking Lot: Other Data and Modeling Issues (Chair: Laurent Cretegny)
6:30pm	Dinner La Scala , 312 Main Street, Lafayette, IN 47901 <i>*See map following the agenda for further details.</i>

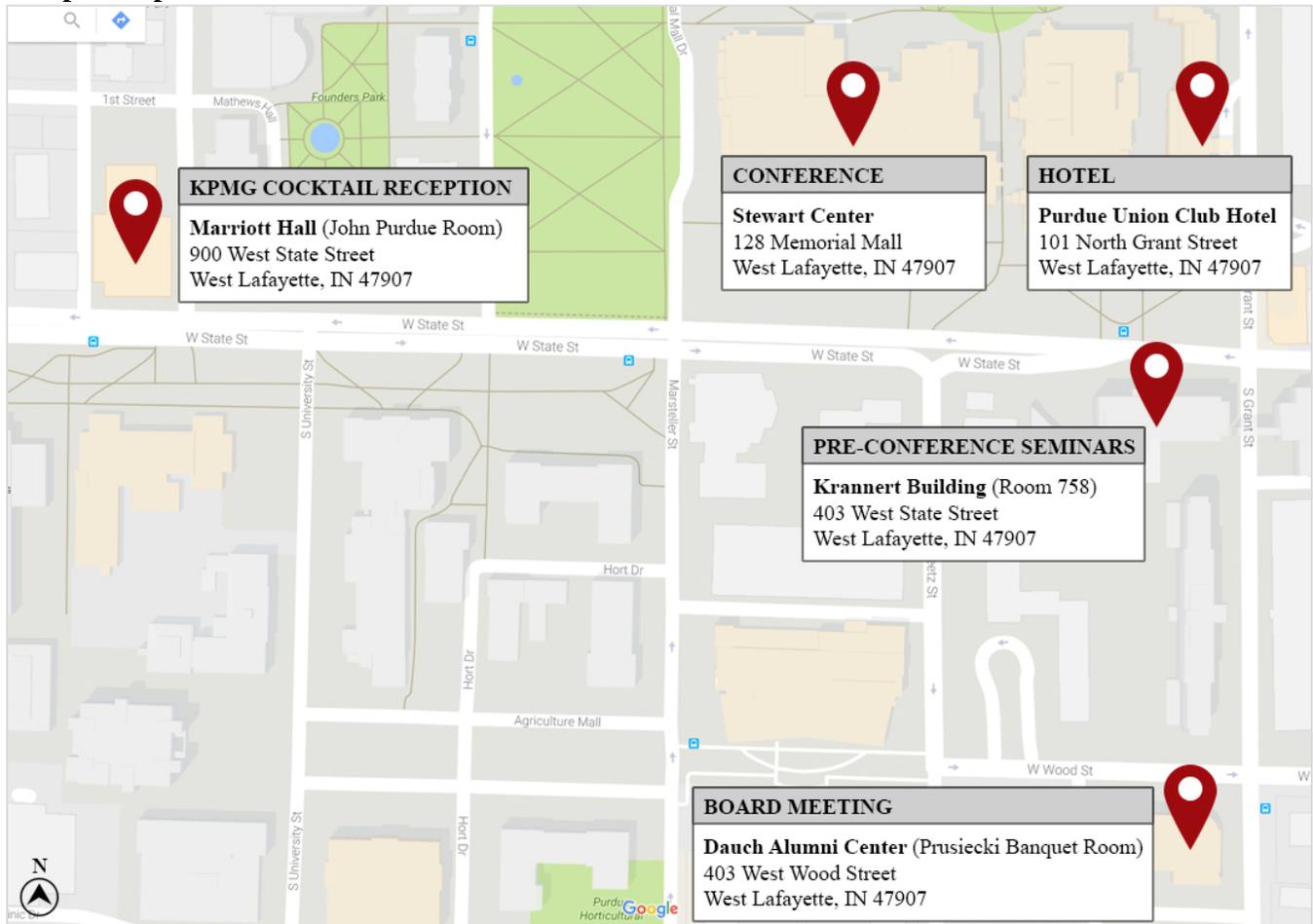
GTAP Advisory Board Meeting Agenda

Tuesday, June 6

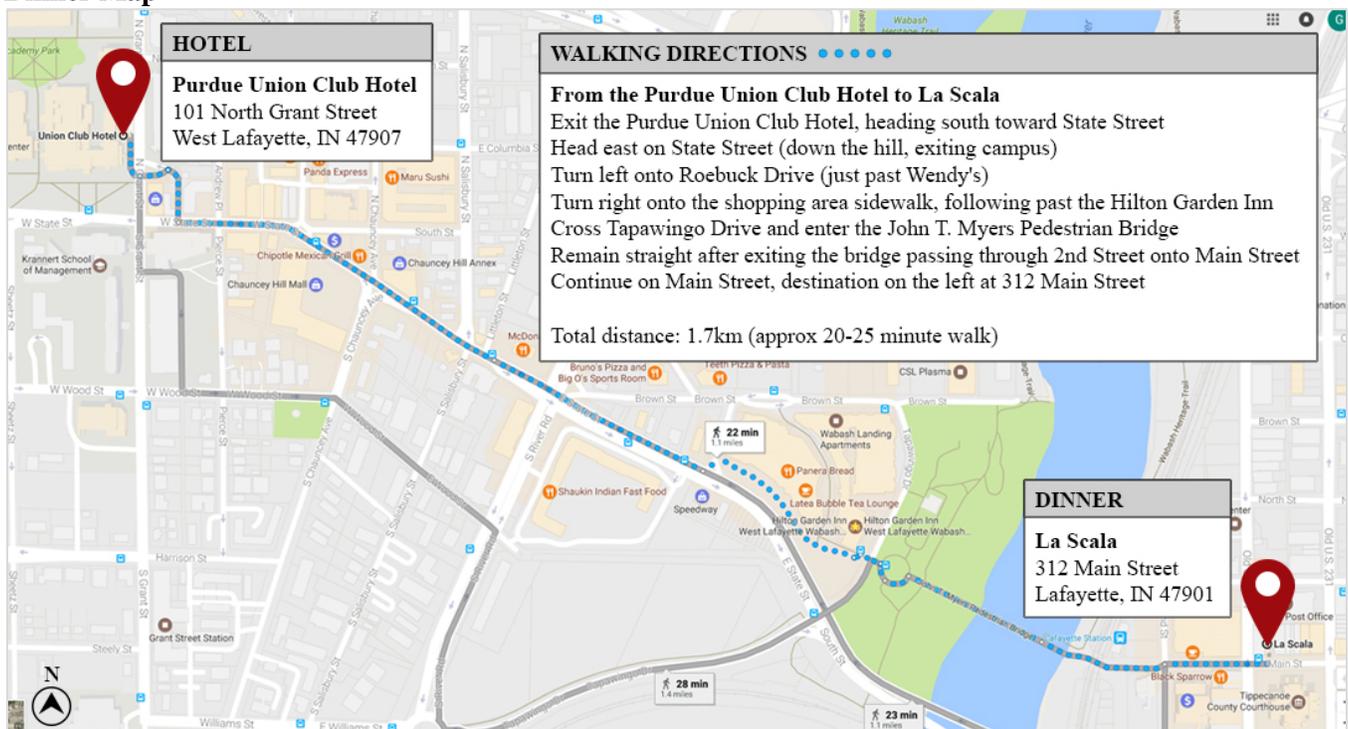
Dauch Alumni Center, Prusiecki Banquet Room
403 West Wood Street, West Lafayette, IN 47907

8:30-9:00am	Welcome Coffee
9:00-10:00am	New Developments at the Interface of Data and Modeling (Chair: Gopinath Munisamy)
	9:00-9:15 Ag-Incentives Database (David Laborde)
	9:15-9:30 Domestic Support (Pierre H Boulanger)
	9:30-9:45 Discussion
	9:45-9:50 Global EPAs Research Consortium Update (Kenichi Kawasaki)
	9:50-10:00 Discussion
10:00-10:30am	Coffee Break
10:30-11:30am	The Network (Chair: Janine Pelikan)
	10:30-10:35 2017-2020 GTAP Research Fellow Nominations (Kenichi Kawasaki)
	10:35-10:45 Discussion: Voting, Future Committee Selection
	10:45-10:50 2017 Conference Report (Ginger Batta)
	10:50-11:00 Discussion
	11:00-11:05 2018 Conference Report (Dominique van der Mensbrugge)
	11:05-11:15 Discussion
	11:15-11:20 2019 Conference Proposal (Jan J. Michalek)
	11:20-11:30 Discussion and Vote
11:30am-12:45pm	Priorities for Forthcoming Year (Chair: Stephen Karingi)
	11:30-11:40 Center Finances (Dominique van der Mensbrugge)
	11:40-11:50 Discussion
	11:50-12:15 Revisit Priorities for Next Year (Dominique van der Mensbrugge)
	12:15-12:45 Discussion
12:45-2:00pm	Lunch
2:00-3:30pm	Additional Meetings (Chair: Bob Koopman)
	2:00-2:45 Reconciling Bilateral Trade: An Update (Mark Gehlhar)
	2:45-3:30 Services Trade: Recent Developments (Joseph Francois)
4:00-6:00pm	Pre-Conference Seminars (Krannert Building, Room 758) (Chair: Sergey Paltsev)
	4:00-5:00 GTAP Model Facelift Dominique van der Mensbrugge and Erwin Corong
	5:00-6:00 Global to Local Analysis of Systems Sustainability Uris Lantz Baldos and Thomas Hertel
	<i>*See map following the agenda for further details.</i>
7:00-9:00pm	KPMG Australia Anniversary Cocktail Reception (John Purdue Room, Marriott Hall) <i>*See map following the agenda for further details.</i>

Campus Map



Dinner Map



Mission and Goals

Our Mission

To provide leadership in economic policy analysis by fostering collaboration to achieve better data and research outcomes.

We value:

- International collaboration because it increases quality of data and analysis.
- Objectivity and transparency because they are crucial to our data work and analysis.
- Discovery because improving methodology leads to better policy analysis.
- Learning because it creates critical vibrancy both within the Center and in the expanding network and improves the quality of analysis undertaken.
- Engagement because it helps us serve policy analysts and decision makers with better data and analysis.

We believe that:

- Better data leads to better policy analysis, which leads to better policy.
- Reconciling data makes data better.
- CGE modeling provides useful policy insights.
- Avoiding duplication in data production is efficient.
- Collaboration enhances individual efforts.
- Having more trained users enriches policy debates.

Goals:

1. **Data Goal:** To Improve the quality of data products through:
 - a. Improving the quality of contributed I-O data
 - b. Addition and improvement of other datasets
 - c. Monitoring of data quality using comparison programs
 - d. Version control and documentation
2. **Research Goal:** To actively participate in quantitative economic analysis of pressing global concern in the areas of Trade and Development and Global Environmental Issues
3. **Model Goal:** To promote further development of GTAP-based models
4. **Education Goal:** To expand and improve education for global economic analysis worldwide
5. **Staffing Goal:** To actively seek and encourage talented staff and graduate students
6. **Collaboration Goal:** To actively seek opportunities for fostering collaboration with institutions around the world
7. **Communication Goal:** To facilitate communication amongst members of the network as well as between the Center and key stakeholders

Center Staff, Research Associates, Graduate Students and Visitors

Center Staff and Research Associates

- **Angel Aguiar**, *Research Economist and Data Base Construction Specialist*
Angel works with the macro datasets and contributors of the regional I-O data for the GTAP Data Base. He collaborates on special data modules to improve the GTAP Data Base and satellite data sets such as GDYN and GMig2. Angel has also been managing the construction of the GTAP Data Base 10. Angel also teaches in the annual GTAP Short Course and leads the bi-annual GTAP Dynamic Short Course. He undertakes economic research using the GTAP framework.
- **Zeynep Akgul**, *Post-doctoral Research Associate*
Zeynep is a Post-Doctoral Research Associate at the Center for Global Trade Analysis and a Visiting Scholar at the U.S. International Trade Commission. Her primary research interests include Computable General Equilibrium (CGE) modeling for international trade policy analysis with an emphasis on firm heterogeneity implementations with the GTAP Model. She has developed the firm heterogeneity module GTAP-HET, which incorporates consumer love-of-variety, endogenous productivity changes, as well as endogenous firm entry/exit into domestic and export markets. She is currently working on the empirical aspects of firm heterogeneity models where she focuses on estimation/calibration of key parameters, such as the shape parameter of productivity distribution and the elasticity of substitution amongst varieties.
- **Uris Baldos**, *Post-doctoral Research Associate*
Uris is part of the Center's management oversight committee, contributes to the Annual GTAP Short Course and GTAP Dynamic Short Course, advises graduate students, maintains the GTAP-AEZ database framework, and leads model and database improvements for the SIMPLE model of global agriculture. His research interests are on the broad issues surrounding the global farm-food-environment nexus, local-global telecoupling and on global gridded modelling.
- **Ginger Batta**, *Senior Program Manager*
Ginger manages the proposal phase, logistics, finances, participant relations, execution, and reporting for all events including the GTAP Conferences, Advisory Board Meetings, Short Courses, Dynamic Short Courses, GTAP 101, and GTAP PTA courses. She also manages the sales, distribution, licensing, and reporting for all GTAP products as well as handles general communication with the GTAP Network.
- **Sue Bennett**, *Operations Coordinator*
Sue assists the Center with university research account processes from proposal to reconciliation and closing; facilitates the tracking and reporting of Center finances and Consortium billing; formats the GTAP Data Base Documentation and online paper series; and assists the Director on general administrative tasks.
- **Mary Burfisher**, *Senior Education Advisor*
Mary leads the GTAP 101 and PTA Courses as well as advising the Center on education-related items.
- **Maksym Chepeliev**, *Research Economist*
Maksym works on integrating energy subsidies to the GTAP Data Base and development of the substitution elasticities data base. He is also working on agricultural producer support estimates and agricultural production targeting for GTAP 10 Data Base. Maksym is managing GTAP users support activities. He undertakes economic research using GTAP framework.
- **Erwin Corong**, *Research Economist*
Erwin works on integrating domestic margins into the GTAP Data Base and modeling framework. He also runs the construction programs for the GTAP Data Base and contributes in updating the GMig2 satellite Data Base. Erwin is currently streamlining the GTAP Data Base construction programs (i.e., program and data separation) and updating its documentation. Together with the data team, Erwin is

helping prepare the new guidelines for contributing IO/Supply-Use Tables—in light of expansion in the number of GTAP sectors and domestic margins being incorporated into the GTAP Data Base. During the past year, Erwin has also contributed to the GTAP Model ‘facelift’.

- **Hao Cui, *Post-doctoral Research Associate***
Hao (David) Cui is a post-doctoral research associate with the Department of Agricultural Economics. His current research area is energy economics, with a focus on biofuels, indirect land use change and GHG emissions.
- **Jeremy Douglas, *Web and Information Technology Specialist***
Jeremy is responsible for the design, development, and maintenance of the GTAP website.
- **Alla Golub, *Research Economist***
Alla is a Research Economist at the Center working on analysis of energy and climate change mitigation policies. Alla writes competitive grant proposals and serves as principal and co-principal investigator on several projects. Alla also teaches in the GTAP Short Courses and produces the GTAP Dynamic Model (GDyn) Data Base.
- **Thomas Hertel, *Executive Director and Distinguished Professor***
Thomas focuses on strategic issues and new research directions for the Center, as well as Consortium member development. He also supervises graduate students and is heavily involved in a number of trade and environment-related projects at the Center. He is currently spearheading a Purdue University, Discovery Park ‘Big Idea’ initiative aimed at facilitating global, gridded analysis of sustainability issues related to land and water systems.
- **Russell Hillberry, *Faculty Research Associate***
Russell is an Associate Professor with the Department of Agricultural Economics and a Research Associate of the Center. He works in the fields of international trade and economic geography. His current research focuses on the impact of trade facilitation measures and the spatial organization of international production chains.
- **Roman Keeney, *Faculty Research Associate***
Roman is an Associate Professor with the Department of Agricultural Economics and Research Associate of the Center. He works on agricultural policy and leads the instruction of the Annual Short Course in Global Trade Analysis.
- **Jing Liu, *Post-doctoral Research Associate***
Jing is a post-doctoral scholar at the GTAP center. She contributed to developing the 30 arc-min SIMPLE-on-a-Grid global model, which was applied to study the impact of sustainable irrigation on global food security and land use change. Jing is currently working on the 5 arc-min SIMPLE-on-a-Grid model to incorporate the grid-cell level nutrient leaching and yield responses to fertilizer application and irrigation. This finer resolution grid-resolving model will be used to study the sustainability of agriculture in the US.
- **Robert McDougall, *Senior Research Economist***
Robert works on special projects which significantly improve the GTAP Data Base and Models. This year he has been working on energy, agricultural I-O, and tax data and the handling of I-O tables in the GTAP Data Base construction program.
- **Krishnamurthy Sriramesh, *Senior Advisor for Strategic Communications***
Sriramesh advises the Center on communications and outreach strategy.

- **Shanxia Sun**, *Post-doctoral Research Associate*
Shanxia is a post-doctoral scholar at the Center for Global Trade Analysis. She contributes to the development of the biomass co-firing model for the coal-fired power plants in the US. She is developing supply functions of alternative sources of biomass and investigating the co-firing potential for each power plant. She also studies the changes in land use and agricultural sustainability induced by biomass co-firing.
- **Farzad Taheripour**, *Faculty Research Associate*
Farzad is a Research Associate Professor with the Department of Agricultural Economics and Research Associate of the Center. He has developed data and models to introduce bio-fuels into the GTAP framework and link the GTAP Model with water and energy models. He also has accomplished a major revision of the natural gas sector in the GTAP Data Base. He works on emissions due to land use changes associated with the production of first and second generations of bio-fuels.
- **Wallace Tyner**, *Senior Policy Advisor and Professor*
Wally advises the Center on policy. Most recently, he has been spearheading a number of large research projects and proposals in the areas of energy, climate change, and biofuels.
- **Dominique van der Mensbrugge**, *Director and Research Professor*
Dominique oversees the day-to-day activities of the Center, as well as focusing on new initiatives in development of the GTAP Data Base and models and policy applications. He also supervises graduate students, in the context of his ongoing research on trade, development and the environment.

*Graduate Students*¹

- **Caitlyn Carrico** (USA)
Caitlyn Carrico is a doctoral candidate specializing in international trade. Her research focuses on global supply chains, economic integration, and labor issues.
- **Iman Haqiqi** (Iran)
Iman is a PhD student in the Department of Agricultural Economics. He has worked on agricultural producer support estimates and agricultural production targeting for GTAP 9 Data Base. He is responsible for constructing and development of GTAP Water Data Base. He is also working on CGE modelling of water, irrigation, and land use.
- **Kayenat Kabir** (Bangladesh)
Kayenat is a PhD student in the Department of Agricultural Economics. She provides email support for the Center addressing queries from GTAP Data Base and model users. She is currently collaborating to analyse policy scenarios of undocumented migration into the US using the GMig (GTAP migration) module; will be editing the bi-annual *Journal of Global Economic Analysis*; and will serve as the teaching assistant for the upcoming GTAP Short Course.
- **Verena Mecklenbrauck** (Germany)
Verena is a PhD student in the Department of Agricultural Economics. She is currently working on a project to re-estimate the demand elasticities for the GTAP Data Base.
- **Luis Moises Peña-Lévano** (Peru)
Luis is a PhD candidate specializing in international agricultural trade in the Department of Agricultural Economics. Luis, together with his advisors Dr. Taheripour and Dr. Tyner produce a version of the land use data base using GTAP 9. They are currently developing a new expansion for the GTAP-BIO model, which incorporates forest carbon sequestration entitled GTAP-BIO-FCS. His current research involves

¹ See supplementary materials (www.gtap.agecon.purdue.edu/events/Board_Meetings/2017/supp_material.asp) for CVs.

the analysis of the economic benefits and costs of mitigating climate change. Recently, he is studying the role of forest sequestration as a mitigation methods and its impact on food security. He also examines the extent to which climate change and livestock interact. In addition, he compares costs and benefits of forest carbon sequestration and biofuels as GHG reduction policies.

- **Guolin Yao** (China)
Guolin is a PhD candidate in the Department of Agricultural Economics. Guolin and her advisors Dr. Hertel and Dr. Taheripour work on an NSF project about complex dynamics of telecoupled human and natural systems through examining economic and environmental spillover impacts of soybean international trade focusing on China, US, and Brazil. This research aims to alter the GTAP-BIO model and its data base to distinguish between GM and Non-GM soybeans. Guolin will use the modified model to examine recent evolutions in production, consumption, and trade of soybean across the world.
- **Xin Zhao** (China)
Xin is a PhD candidate in the department of Agricultural Economics. He works on a project funded by the Federal Aviation Administration, which aims to develop techno-economic, and life-cycle analysis of alternative aviation biofuels supply chains. Xin and his advisors Dr. Taheripour and Dr. Tyner are responsible to introduce aviation biofuels into the GTAP-BIO data base and examine induced land use changes due to these biofuels. This research is expected to develop a new land supply module for the GTAP-BIO model.

Visitors to the Center

- **Edward J. Balistreri**, Colorado School of Mines (United States)
- **Andrés Escobar**, Universidad de Cartagena (Colombia)
- **Ken Itakura**, Nagoya City University (Japan)
- **Bjorn Lomborg**, Copenhagen Consensus Center and Copenhagen Business School (Denmark)
- **Shunli Yao**, Institute for Applied International Trade (China)

Objectives and Accomplishments

Progress towards Goals over the Past Year

Below is an assessment of our progress towards the core objectives outlined last year in the Board Meeting summary:

1. Data Goal: To Improve the quality of data products

Tasks	Responsibility
Improving the quality of contributed I-O data (core)	Aguiar
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Work with contributors to improve I-O tables (EU, US, others) 	Aguiar, grad student
<i>Ongoing. 30 I-O tables were introduced, among these 28 EU tables.</i>	
<ul style="list-style-type: none"> Multi-year Input-Output Tables 	Aguiar
<i>To be implemented in 2nd pre-release of GTAP 10.</i>	
<i>Secondary Priorities</i>	
<ul style="list-style-type: none"> Document the guidelines for contribution of Supply and Use tables 	Corong
<i>Ongoing: to be rolled out by 3rd pre-release of GTAP 10. Current progress to be presented during the board meeting</i>	
<ul style="list-style-type: none"> Implementation of the dwellings module 	McDougall
<i>Progressing. Expected to be included in next pre-release.</i>	
Addition/Improvement of Datasets used in GTAP Data Base (core)	Aguiar
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Implementation of sector disaggregation 	Aguiar, McDougall
<i>Completed. The build is now setup to display more sectors, but it is based on less detailed data inputs. Overtime we expect to introduce more detailed IO tables that provide us with better cost structures.</i>	
<ul style="list-style-type: none"> Domestic Margins 	Corong, McDougall
<i>Progress on track: GTAP model with domestic margins and associated version 9.2 Data Base to be presented during the conference. Domestic margins will be included in 3rd pre-release of GTAP 10.</i>	
<ul style="list-style-type: none"> Data and methodological improvements in commodity and income/factor taxes 	McDougall
<i>Commodity tax improvements included in 9.2, income factor taxes expected in v10.</i>	
<ul style="list-style-type: none"> Export subsidies update 	van der Mensbrugge
<i>Part of this year objectives. Expected in 3rd pre-release of GTAP 10.</i>	
<ul style="list-style-type: none"> Improved Agricultural Production data (FAO and OECD consistent) and AG-IOT 	McDougall
<i>Part of this year objectives. Expected in 3rd pre-release of GTAP 10.</i>	

<ul style="list-style-type: none"> Energy module updates: Better disaggregation of ‘rest of’ regions in IEA and implementation of subsidies 	McDougall
<i>Part of this year objectives. Expected in in 2nd pre-release of GTAP 10.</i>	
<i>Secondary Priorities</i>	
<ul style="list-style-type: none"> Examine possibility of targeting trade balances 	McDougall
<i>Deferred</i>	
<ul style="list-style-type: none"> Examine the availability of NSO data (production, etc., by year) to update I-O tables as part of FIT process (when redo FIT) 	Aguiar
<i>Long term goal. While we are in the lookout for consistent for the world, there is no concrete information that we have obtained.</i>	
<ul style="list-style-type: none"> Examine integration of biofuels into standard data base 	Aguiar, McDougall, Taheripour
<i>No progress being done here.</i>	
<ul style="list-style-type: none"> Domestic support, PSE database for Latin America and Africa – MAFAP 	van Tongeren, Balié
<i>Updated to the regional coverage done in previous version. Working on new regions is work for this coming year.</i>	
<ul style="list-style-type: none"> Baseline/forecast tool for updates 	Resource dependent
<i>Started. We will be using the Shared Socioeconomic pathways.</i>	
<ul style="list-style-type: none"> Agricultural Production Targeting 	Chepeliev
<i>Done for 9.2.</i>	
Addition/Improvement of Satellite Data (core)	Aguiar
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Plan about new satellite datasets (e.g. MRIO, Land Use) 	Carrico, Baldos
<i>MRIO development has been revisited. New construction methods have been tested and compared so as to identify the method, which (A) retains the most possible information from the BEC concordance system and (B) maintains a clean, replicable approach.</i>	
<i>The GTAP 9 Land Use Data Base is currently under review and is expected to be released to the board in the near future.</i>	

2. Research Goal: To actively participate in quantitative economic analysis of pressing global issues

Tasks	Responsibility
Firm Heterogeneity	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> USITC project to further develop policy application 	Akgul
<i>The GTAP firm heterogeneity (GTAP-HET) paper was published in the Journal of Global Economic Analysis in the inaugural issue (June 2016).The USITC project started on May 31, 2016 and focuses on further development of GTAP-HET model and parameterization. One paper related to the project has been concluded and is scheduled to be released as a USITC working paper before Summer 2017. The paper titled “One Model to Rule Them All? The Importance of Firm</i>	

<i>Heterogeneity in CGE Modeling of The Gains From Trade” examines the new gains from trade under firm heterogeneity, discusses whether welfare gains under Melitz, Krugman and Armington models are equivalent or not, and summarizes the recent advancements in CGE implementations of firm heterogeneity. The second paper of the project is under preparation and focuses on estimating the shape parameter of Pareto distribution and elasticity of substitution across varieties by using firm-level data. It is expected to be finalized before Summer 2017. The USITC project will be extended for an additional year, until May 30, 2018.</i>	
Trade and Development	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Continue to publish papers on trade, poverty, migration/labor and global supply chains 	Staff and Grads
Global Energy and Environmental issues	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Continue to publish papers on energy and environmental issues with a special focus on the land-water-energy-climate nexus 	Staff and Grads

3. Model Goal: To promote further development of GTAP-based models

Tasks	Responsibility
Technical and Working Papers	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> “A facelift for the GTAP Model” 	van der Mensbrugge
<i>The facelift is nearly completed and we anticipate a roll-out of the new version of the standard GTAP Model in June. The most important innovation is the introduction of a ‘make’ matrix that allows for the separation of production activities from marketed commodities. Many modelers have added this feature to GTAP to deal with multi-product activities such as ethanol, and/or to incorporate a commodity produced by multiple activities (such as electricity). In addition to this major addition, part of the facelift has been designed to streamline and extend some features of the standard model. The treatment of taxes has been harmonized, investment expenditures have been separated from activity accounts, key elasticities have been rendered more flexible and natural resources are now explicitly sector-specific resources. An article describing the new standard GTAP Model is under preparation for the JGEA and we expect it to be available before the board meeting. The new model code will be available at the same time, as well as the newly structured database.</i>	
<ul style="list-style-type: none"> “Reconciling additivity with the CES and CET functional forms” 	van der Mensbrugge
<i>We continue to study the use of the so-called additive forms of the CES and CET (ACES/ACET) and comparing their implementation and model results with the traditional CES/CET. One of our graduate students is currently implementing the ACET to look at land-use allocations—assessing not only the issue of transformability and additivity, but assessing as well differences in land productivity and the capacity for multi-cropping.</i>	
Software	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Software suite for the standard GTAP Model in GAMS: aggregation, filtering, Altax and comparative static simulations 	van der Mensbrugge
<i>The suite has been developed and is currently undergoing testing at the Center and externally (OECD, World Bank, FAO, UC Berkeley). The aggregation package is relatively straightforward and mimics the functionality of the GEMPACK-based GTAPAgg. The filtering routine, a process</i>	

of selectively deleting small value flows from a database, is based on a program originally developed by Tom Rutherford, further developed by Wolfgang Britz, with some additional adjustments made by Center staff. The Alvertax routine emulates the original Alvertax methodology (Malcolm 1998). The suite has been designed to service both the standard GTAP Model in GAMS and the Envisage Model, both maintained at the Center.

4. Education Goal: To expand and improve global economic analysis education worldwide

Tasks	Responsibility
Education Plan	Various
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> 2016 GTAP Short Course (Purdue) 	Keeney, Batta, Douglas
<i>A very successful course was offered at Purdue in August 2016 to 30 participants. One participant was offered a fellowship to help reduce costs so she could attend.</i>	
<ul style="list-style-type: none"> GTAP 101 Course(s) 	Burfisher, Batta, Douglas
<i>Two successful offerings of GTAP 101 were held in 2016. Demand for this course remains strong and graduates are continuously feeding into the standard short course.</i>	
<ul style="list-style-type: none"> GTAP PTA Course 	Burfisher, Batta, Douglas
<i>The inaugural offering of the GTAP Preferential Trade Agreements (PTA) Mini-Course, "Applied Policy Analysis: Mini-course on Preferential Trade Agreements", was held in late 2016. Feedback on this course was positive and Mary Burfisher will offer the course again in late 2017.</i>	
<ul style="list-style-type: none"> Further investigate development of online mini-courses on special topics 	Burfisher, van der Mensbrugge, Hertel
<i>GTAP 101 continues to be a great success. Mary Burfisher has recently initiated another online course on regional trade agreements. There is scope for more courses such as these, but the key to success is having a champion who is committed to developing and delivering the materials.</i>	
<i>Secondary Priorities</i>	
<ul style="list-style-type: none"> Develop and implement an "Alumni Outreach/Continued Learning Initiative" for short course graduates 	Keeney, Batta, Douglas
<i>Not much progress was made on this front as higher priority was given to evaluating a new course schedule for 2017.</i>	

5. Staffing Goal: To actively seek and encourage talented staff and graduate students

Tasks	Responsibility
Recruitment and Hiring	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Career path development 	van der Mensbrugge
<i>This is still under development and remains a priority.</i>	
<ul style="list-style-type: none"> Development of a structured program for mentoring graduate students 	Akgul, Carrico, Hertel, van der Mensbrugge

<i>In September 2016, the Center held the inaugural GTAP Orientation for New Researchers to introduce incoming researchers to the Center personnel and resources. The orientation was an all-day event, consisting of eight sessions. During these sessions, GTAP Faculty, Research Economists, and Affiliates shared their experiences in data building, model development, and research in economics.</i>	
• Replacement of Badri Narayanan	van der Mensbrugge
<i>Maksym Chepeliev was hired as the Center's new Research Economist and started with the Center in August 2016</i>	

6. Collaboration Goal: Actively seek opportunities for fostering collaboration with institutions around the world.

Tasks	Responsibility
GTAP Conferences and Board Meetings	Batta, van der Mensbrugge
<i>Primary Priorities</i>	
• 2017 Conference and Board Meeting (West Lafayette, IN, USA)	Batta, van der Mensbrugge
<i>Planning for both events has run very smoothly. Ginger Batta will present an update at the board meeting on the conference.</i>	
• 2018 Conference and Board Meeting (Cartagena, Colombia)s	Batta, van der Mensbrugge
<i>The conference program committee will meet over lunch during the conference in West Lafayette to discuss plenary speakers, organized sessions, and funding. Logistical planning is already underway and will continue through the event.</i>	
• 2019 Conference Proposal (Warsaw, Poland)	Batta, van der Mensbrugge
<i>The Faculty of Economic Science, University of Warsaw prepared and submitted a proposal for the 2019 conference to be held in Warsaw. This proposal was circulated to the board in December 2016. Further information on this proposal will be presented during the board meeting.</i>	
• 2020 Conference Proposal (Tokyo, Japan)	Batta, van der Mensbrugge
<i>The Center for Global Trade Analysis is already in communication with the National Graduate Institute for Policy Studies (GRIPS) to prepare a proposal to hold the 2020 Conference in Tokyo. This proposal will be circulated to the board for consideration in late 2017.</i>	
Seek partners/funding opportunities for collaboration (core)	Various
<i>Primary Priorities</i>	
• IAMC & EMF	van der Mensbrugge
<i>Dominique van der Mensbrugge attended the annual Integrated Assessment Modeling Consortium Annual Workshop, hosted by the Energy Research Institute in Beijing in December 2016. A few things to note from this year's meeting. (1) There was increasing emphasis on the Sustainable Development Goals (SDGs), rather than a more limited focus on climate change. There were a number of presentations on the water/land/food nexus as well as on income distribution. (2) For the first time there were representatives from a Central Bank. One of the key concerns is financial stability of banks that may be over-exposed in climate-sensitive areas. (3)</i>	

<i>Work is beginning on scoping for the next IPCC report, the 6th Assessment Report or AR6. There were a few sessions on model documentation. Many research sponsors are now insisting on the use of open source software and full documentation. We continue to monitor the activities of the Energy Modeling Forum.</i>	
• AGRODEP	van der Mensbrugge
<i>The AGRODEP network continues its work in Africa and we continue to be on its steering board and monitor its activities.</i>	
• AgMIP	van der Mensbrugge
<i>Dominique van der Mensbrugge is part of the steering committee of the global economic modeling team of the Agricultural Intercomparison and Improvement Program (AgMIP). He attended the annual meeting of the full AgMIP network held in Montpellier, France in July and attended a meeting of the global economic modelers in Tsukuba in November. The broad theme of the July meeting was preparation for a report on CGRA that all AgMIP teams are expected to participate in as well as preparing inputs for the IPCC's report on the 1.5°C target. The global economic modeling team meeting in Tsukuba focused on modeling the SSPs and potential work for the 1.5°C report. In the case of the former, the various teams are fleshing out the specifics of the various SSPs in terms of agriculture including baselines with and without climate shocks as well as potential mitigation scenarios.</i>	
• ADB	Corong, van der Mensbrugge
<i>No updates on this collaboration.</i>	
• Improving services data and modeling	van der Mensbrugge, McDougall
<i>No updates on this item.</i>	
• Other potential partnerships/collaborations	Hertel, van der Mensbrugge
<i>The Center has been successful in raising funds for our energy-land-water research agenda. This involves spatially explicit, gridded modeling with funding from USDA, DOE and Purdue University's Discovery Park.</i>	

7. Communication Goal: To facilitate communication amongst members of the network as well as between the Center and key stakeholders

Tasks	Responsibility
Improve user support system	
<i>Primary Priorities</i>	
• GTAP-L, gtapsupport, contactgtap: Continue offering support	Haqiqi, Batta, Chepeliev, Kabir
<i>Support has been given as usual, through gtapsupport, contactgtap and GTAP-L. Iman Haqiqi in 2016 and Maksym Chepeliev in 2017 answered inquiries sent to the gtapsupport address and Ginger Batta handled those sent to the contactgtap address.</i>	
Strategic Communication	
<i>Primary Priorities</i>	

<ul style="list-style-type: none"> Continue to build upon the 2014 strategic meeting working with Sriramesh Krishnamurthy and his graduate students to document the ‘social network’ provided by GTAP 	Hertel
<i>This has been held up due to health issues in Sriramesh’s family.</i>	
<ul style="list-style-type: none"> Publish second issue of the Journal of Global Economic Analysis 	Hertel, Winchester
<i>This was successful and we are now working on the third issue. After three issues, Thomson-Reuters will evaluate the Journal for the all-important matter of being indexed with the Web of Science.</i>	
<ul style="list-style-type: none"> Initiate implementation of a GTAP wiki for data and model 	van der Mensbrugge
<i>We have initiated an assessment of our needs and evaluating potential platforms. The data team had a one-day workshop to discuss the Center’s current software and documentation platform—including improved access and documentation of our contributed data. In parallel with the model facelift, we hope to be able to transfer much of our documentation to a more transparent and easier to access web platform.</i>	

Proposed Activities over the Next Year and Beyond

The goals and objectives are discussed in detail below. Here we include a summary of the proposed objectives for the coming year.

1. Data goal: To improve the quality of data products

Tasks	Responsibility
Improving the quality of contributed I-O data (core)	Aguiar
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Work with contributors to improve I-O tables (US, others) 	Aguiar
<ul style="list-style-type: none"> Compare IOT with data base to work with contributor on where the largest adjustments occur 	Aguiar
<ul style="list-style-type: none"> Energy subsidies integration to the GTAP Data Base 	Chepeliev, McDougall
<ul style="list-style-type: none"> Development of the substitution elasticities data base (secondary priorities/satellite data) 	Chepeliev
<i>Secondary Priorities</i>	
<ul style="list-style-type: none"> Finalize the guidelines for contribution of Supply and Use tables including domestic margins (Ongoing work with current progress to be presented during the board meeting. Document will be made available in the GTAP website by 3rd pre-release of GTAP 10) 	Corong
<ul style="list-style-type: none"> Finalize the implementation of the dwellings module 	McDougall
Addition/Improvement of Datasets used in GTAP Data Base (core)	Aguiar
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Services Trade 	McDougall
<ul style="list-style-type: none"> Program data separation (Work will shift to full gears this summer. Expected to be operational by the latter half of 2017) 	Corong
<ul style="list-style-type: none"> Data and processing improvements in commodity and income/factor taxes 	McDougall
<ul style="list-style-type: none"> Export subsidies update 	van der Mensbrugge
<ul style="list-style-type: none"> Improved Agricultural Production data (FAO and OECD consistent) and AG-IOT 	McDougall
<ul style="list-style-type: none"> CDE parameters 	van der Mensbrugge

<i>Secondary Priorities</i>	
<ul style="list-style-type: none"> Examine possibility of targeting trade balances 	McDougall
<ul style="list-style-type: none"> Examine the availability of NSO data (production, etc., by year) to update I-O tables as part of FIT process (when redo FIT) 	Aguiar
<ul style="list-style-type: none"> Examine integration of biofuels into standard data base 	Aguiar, McDougall, Taheripour
<ul style="list-style-type: none"> Domestic support, PSE database for Latin America and Africa – MAFAP 	van Tongeren, Balié
<ul style="list-style-type: none"> APT integration into FIT and other industry targeting 	McDougall
Addition/Improvement of Satellite Data (core)	Aguiar
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Domestic Margins: special version for GTAP 9 and 10 (GTAP version 9.2 Data Base with domestic margins to be presented during the conference and will be made available to the Board. Domestic margins will be included in 3rd pre-release of GTAP 10.) 	Corong
<ul style="list-style-type: none"> Energy Subsidies: special version for GTAP 9 and 10 	Chepeliev

2. Research Goal: To actively participate in quantitative economic analysis of pressing global issues

Tasks	Responsibility
Global Energy and Environmental Issues	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Continue to publish papers on energy and environmental issues with a special focus on the land-water-energy-climate nexus 	Staff and graduate students

3. Model Goal: To promote further development of GTAP-based models

Tasks	Responsibility
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Consolidate changes in new standard GTAP Model. Combine new standard model with some of the model variations (GTAP-E, GDyn). 	van der Mensbrugge, Aguiar, Chepeliev, Corong, McDougall

4. Education Goal: To expand and improve global economic analysis education worldwide

Tasks	Responsibility
Education Plan	Various
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> 2017 GTAP Short Course (Purdue) 	Keeney, Batta, Douglas
<ul style="list-style-type: none"> GTAP 101 Courses 	Burfisher, Batta, Douglas
<ul style="list-style-type: none"> GTAP PTA Course 	Burfisher, Batta, Douglas
<ul style="list-style-type: none"> 2017 Dynamic Short Course (Purdue) <ul style="list-style-type: none"> <i>Deferred to 2018</i> 	Aguiar, Batta, Douglas
<ul style="list-style-type: none"> Update instructional materials for GTAP Short Course for new standard model 	Keeney, Aguiar, Chepeliev, Corong,

	McDougall, van der Mensbrugge
<i>Secondary Priorities</i>	
<ul style="list-style-type: none"> Further investigate development of online mini-courses on special topics 	Burfisher, van der Mensbrugge, Hertel
<ul style="list-style-type: none"> Continue development and implementation of an “Alumni Outreach/Continued Learning Initiative” for short course graduates 	Keeney, Batta, Douglas
<ul style="list-style-type: none"> Investigate potential incorporation of our courses with Purdue/FutureLearn 	van der Mensbrugge, Hertel, Keeney, Burfisher, Aguiar

5. Staffing Goal: To actively seek and encourage talented staff and graduate students

Tasks	Responsibility
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> Continue to implement the new program to mentor our graduate students. 	van der Mensbrugge
<ul style="list-style-type: none"> Look into the possibility of hiring a part-time web designer for the GTAP wiki 	van der Mensbrugge

6. Collaboration Goal: Actively seek opportunities for fostering collaboration with institutions around the world.

Tasks	Responsibility
GTAP Conferences and Board Meetings	Batta, van der Mensbrugge
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> 2017 Conference and Board Meeting (West Lafayette, IN, USA) 	Batta, van der Mensbrugge
<ul style="list-style-type: none"> 2018 Conference and Board Meeting (Cartagena, Colombia) 	Batta, van der Mensbrugge
<ul style="list-style-type: none"> 2019 and 2020 Conference Proposals 	Batta, van der Mensbrugge

7. Communication Goal: To facilitate communication amongst members of the network as well as between the Center and key stakeholders.

Tasks	Responsibility
Improve user support system	
<i>Primary Priorities</i>	
<ul style="list-style-type: none"> GTAP-L, gtapsupport, contactgtap: Continue offering support 	Aguiar, Batta, Chepeliev, Corong, Douglas, Kabir

The GTAP Data Base and Other Data Projects: Progress and Future Objectives

In this section, we concentrate on the centerpiece of the Global Trade Analysis Project, the GTAP Data Base. In the first sub-section, we list version 9 releases, followed by a section focusing on release 10.

GTAP 9 Data Base

- In May 2015, the GTAP 9 Data Base, with three reference years was released to the public. Then in August 2015, the GTAP Power Data Base was released for all reference years (Peters, 2015).²
- In October 2015, the following data sets were released: GDYN, GMIG, GTAP-E, and Non-CO2 emissions data— all of which are consistent with the standard GTAP format.
- **Post-release: The GTAP 9.a Data Base (April 2016)** Addressed some issues identified by the data team. Namely a processing error that lead to significantly understating the 2011 domestic support in EU27 member countries and low capital stock level for a few countries
- **Post-release: the GTAP 9.1 Data Base (May 2016)** Included several updates: 1 new table (Tajikistan) and 7 updated tables (Switzerland, Uganda, Philippines, Costa Rica, Tunisia, New Zealand, and India). Updated income and factor taxes, international margins, and services trade data
- **Post-release: the GTAP 9.2 Data Base (January 2017)** Included 29 updated I-O tables; 28 correspond to EU countries. Special thanks to our contributors from the European Commission (the JRC and DG TRADE) for this important update and in particular to our colleagues Jose M. Rueda-Cantuche (JRC) Tamas Revesz (JRC and Corvinus University of Budapest) and Zornitsa Kutlina-Dimitrova (DG TRADE). This release also included module improvements to better capture taxes in the I-O tables.

The GTAP Data Base: Priorities for Future Releases

This sub-section outlines a few priority areas for the public release of version 10 Data. We also provide a revised release schedule. **The 4 reference years** of version 10 will be **2004, 2007, 2011** and **2014**. Below, we also provide a list of a few items we are currently considering to further improve the GTAP Data Base in either version 10 or beyond. We would be interested in hearing from the board on the extent to which these should be prioritized.

GTAP 10 Data Base

For version 10, we will have at least **141 regions** and expect to update I-O tables from the following countries: US, India, Canada, and Korea, among others. As we increase the number of years in the GTAP Data Base, it is important that we improve the cost structure associated with each reference year by allocating I-O tables that have reference year near if not the same as that of the GTAP Data Base, if such IO table is available to us from our inventory of I-O tables.

Last year, we proposed that version 10 would have 7 more services sectors and 3 more manufacturing sectors. Subsequent to the Board Meeting, we discovered that in terms of services we would find difficulties arising from trade statistics. We will continue to try to maximize the number of sectors but working alongside experts pushing the frontiers of trade in services.

In addition, in version 10 we will introduce and explicitly account for domestic trade and transport margin flows. The following is a list of other issues to be addressed in version 10 cycle:

² Additional funding was provided by the following institutions: European Commission, US EPA, MIT, and OECD.

1. **Commodity tax fixes** - One of the most important fixes required in the GTAP Data Base is for the defect in our international data-targeting module, wherein many of the commodity tax rates from the I-O tables have been zeroed out. This requires some significant changes in our 'FIT' module, which is designed to target numbers from international sources for trade, tariff and energy datasets. *Status: Completed from 9.2 onwards.*
2. **Agricultural I-O tables** - We employ a global agricultural Input-Output dataset synthesized by Everett Peterson for disaggregating agricultural sectors in the contributed I-O tables. The currently used dataset was developed during the construction of version 5 data base and hence is quite outdated. Everett Peterson has updated this dataset for the years 2004, 2007 and 2011; we expect to incorporate this in version 10. *Status: Expected to be part of 10 pre 3 updates.*
3. **Dwellings** - In version 8 data cycle, Angel Aguiar had developed a module that deals with dwellings data across the world. For the lack of official data sources, this attempt was not pursued further. We expect to work on this and incorporate it in the GTAP 10 Data Base. *Status: Expected to be part of 10 pre 2 updates.*
4. **Data and methodological improvements in Income/factor taxes** - There are some methodological defects in the way we process this dataset. We intend to rectify the situation by improving the methodology and updating the tax rates, using the IMF Government Financial Statistics dataset. *Status: Expected to be part of 10 pre 3 updates.*
5. **Agricultural export subsidies** – We are exploring options for external collaboration on collating the data for agricultural export subsidies and incorporating the data in the standard build process of the GTAP Data Base. *Status: Expected to be part of 10 pre 3 updates.*
6. **Tariff Data** - It is highly desirable to have as much consistency as possible for the sources and methodologies used for data for all the reference years. For GTAP 10 we are using consistent tariff data for the three more recent years (2014, 2011, and 2007) and at the HS level. *Status: Part of 10 pre 1 updates.*
7. **Merchandise Trade Data** – As with Tariff data, a consistent database greatly enhances the quality of the time series data base we are gradually building and that for both tariff and trade data sets we are now using new classification and concordances. In addition to these, our contributor Mark Gehlhar has improved the methodology constructing reconciled data at the HS level and removing re-exports for 50+ countries with a consistent methodology for 229 countries and all reference years. *Status: Part of 10 pre 1 updates.*
8. **Services Trade Data** – The new International Monetary Fund's Balance of Payments and International Investment Position Manual (BPM6) is making us reconsider the sourcing and processing of services trade data. Our new proposed classifications for services fits ISIC Rev.4 comfortably, but we have already received feedback that the new classification splits too finely for trade statistics. On what secondary sources we might seek to use for release 10, the question is completely open, but we hope to be able to take advantage on initiatives developed at the OECD/WTO/World Bank. *Status: Part of 10 pre 3 updates.*
9. **Energy** - few improvements in the construction of energy volumes, prices, taxes and emissions datasets are expected in the version 10 data cycle. One issue needs special attention. Malawi, Mauritius and Uganda have significant oil sectors. In the construction process, we revise the energy sector to conform better to IEA data, which records data for these countries not individually, but as part of "Rest of Africa." Therefore, "Rest of Africa" produces and exports oil in significant quantities. We apportion those flows, with other energy flows, among "Rest of Africa" member countries according to GDP shares. The problem with this approach is that the production and exports actually belong to Chad and Equatorial Guinea, which are not separately identified in our data base, but end

up reassigned to other countries like Uganda. We plan to bring in data from other sources (such as UN commodity production statistics) to improve our disaggregation of the IEA energy balance data countries and avoid this problem. *Status: Part of 10 pre 2 updates.*

10. **Energy subsidies from OECD** - The energy subsidies committee has had ongoing discussions over email about the possibilities of including OECD energy subsidies data in the standard GTAP Data Base. *Status: Part of 10 pre 3 updates.*
11. **Domestic Support** - It is desirable to extend the coverage of domestic support to more countries from Africa and Latin America. *Status: Expected to be part of 10 pre 3 updates.*
12. **Agricultural Production Targeting** - Agricultural production targeting was introduced to improve the consistency between the GTAP Data Base and the European I-O tables, as well as the OECD protection expenditures. This agricultural production targeting is currently done prior to the database construction process itself and is susceptible to human error as files are transferred between staff members. Since agricultural production targeting is still desired by board members, we have decided that it should be included in the main build process (i.e. automated) in the future so that such errors can be reduced. *Status: Update expected to be part of 10 pre 2, module merge expected for part of 10 pre 3.*
13. **Set Labeling** - Some of you may have noticed that a couple of the 3-letter country codes are identical to existing 3-letter sector codes. While this does not seem to result in any big issues for GAMS or GEMPACK users, it can affect the ordering of countries when some lesser-known GAMS programs are used. As a result, we will change our commodity codes in version 10. *Status: Part of 10 pre 2 updates.*
14. **Changes in Construction Programs** - Apart from the changes in methodologies, we also expect to make major changes in the data construction programs. The most important of these is to separate programs and data to avoid possibilities of confusions and mix-ups arising from multiple reference years in the data base, while also making sure that we use exactly the same set of programs for all years. *Status: Part of 10 pre 3 updates.*

Targeting Production Data

It is our understanding that annual production data exists for a selection of industries. We are considering adjusting the regional data (I-O Tables) to match production by sector for the reference year. This would help update the country data for any structural changes, particularly for those I-O tables that have older reference years. It could also assist us in addressing the African energy issue discussed above.

Trade Balances

We are also considering targeting outside data on trade balances which can presently diverge from 'official' sources due to the bilateral trade reconciliation procedure used in GTAP. This would allow us to better match all the components of GDP, but would require scaling of the balance discrepancies.

Schedule for version 10

Below is the updated schedule for the GTAP 10 Data Base. The first pre-release was available to the Board in March 2017, the second pre-release is expected to be available before the 2017 board meeting and the third pre-release is expected for December 2017. The final release candidate is expected to be made available to the Board by May 2018.

Version 10: Pre-release Schedule (aim for the first week of listed month)

Board Release	Updates	When?	Actual
Pre-release 1	Macroeconomic data, Merchandise Trade, Tariff, Commodity tax fixes, New labelling	Nov. 2016	Mar. 2017
Pre-release 2	Multi-year IOT allocation, Disaggregation of sectors, Energy data and module fixes, Domestic support updates, Dwellings	May 2017	
Pre-release 3	Export Subsidies, CDE parameters, Other FIT module fixes, Agricultural IOT and production targeting, Services trade data, Domestic margins, Domestic Support for new regions	Dec. 2017	
Final release		May 2018	

Research and Model Development: Progress and Future Objectives

Research Goal: To actively participate in quantitative economic analysis of pressing global concern in the areas of Trade and Development, Energy-Economy Interactions, Land Use and Climate Change

Model Goal: To promote further development of GTAP-based models

Further development of the standard and dynamic GTAP Models continue to be core research activities for Center staff. Related to this theme, the following activities were conducted this year.

Core Funded Projects

Introducing water into the GTAP Data Base

- **Staff Involved:** Iman Haqiqi, Jing Liu, Thomas Hertel, Farzad Taheripour, and Dominique van der Mensbrugge
- **Description:** We have leveraged the significant work done at the Center over the last five years on land- and water-use to develop a database of water use at the national level that includes sector-specific water use in crops (rainfed and irrigated crops) and aggregate water use in livestock, industry and municipal (the latter three based on data from FAO's Aquastat database). This database has been integrated into the OECD's Env-Linkages model as well as the Center-based Envisage model.
- **Status:** The database has been prepared for GTAP V9 and the OECD Env-Linkages and Envisage model have been tested with the new database.

Updating the Standard GTAP Model

- **Staff Involved:** Erwin Corong, Thomas Hertel, Rob McDougall, and Dominique van der Mensbrugge
- **External Collaborators:** Marinos Tsigas, US-ITC
- **Description:** The standard GTAP model has undergone a thorough facelift, the first since 2003. The core of the model can have the exact same functionality and behavior of the existing model. The major extensions include: 1) a 'make' matrix that allows for the separation of activities and commodities. The default 'make' matrix is diagonal as in the classic model. 2) Investment expenditures have been extracted from production activities and treated similarly to public expenditures. 3) Sets have been modified and to some extent simplified. New sets (and variables) have been added to separate endowments from commodities. 4) Regional indices have been added to the key elasticities to allow for more user flexibility. 5) The production nest has been modified to include an aggregate intermediate demand bundle. 6) The treatment of taxes has been harmonized. All taxes are evaluated relative to a basic price. 7) The supply of natural resources has been converted to a sector specific resource (instead as a sluggish factor with a very low transformation elasticity.)
- **Status:** The TABLO code has been implemented and tested in-house. The documentation has been written and has been submitted to the JGEA for the May/June issue. Before a formal release, we plan to have external reviewers further test the new code. N.B. The facelift will have many downstream implications: new interface with the database, modifications of GTAP model extensions (e.g. GTAP-E, GDyn, etc.), new course materials, etc.

Externally Funded Projects

Agriculture towards 2080: Projecting global food security

- **Staff Involved:** Dominique van der Mensbrugge, Erwin Corong, Kayenat Kabir, Iman Haqiqi, and Verena Mecklenbrauck
- **External Collaborators:** Lorenzo Bellu (FAO), Katerina Kavallari (FAO), Marc Mueller (FAO)
- **Description:** Since the 1970s the FAO has produced occasional long-term outlooks for food and agriculture, often referred to as the AT reports (Agriculture towards...). The latest update was issued

in 2012. Since then, the FAO has been developing a partial equilibrium model—known as GAPS—to enhance the projection methodology though maintaining the same degree of commodity and country specification. One of the purposes of this project is to complement GAPS with a CGE model to assess additional long-term indicators agriculture and food indicators—notably the rural/urban terms of trade, agricultural employment and incomes.

- **Status:** Work has commenced.

Assessing the long run sustainability of US agriculture

- **Staff Involved:** Uris Baldos, Thomas Hertel, and Jing Liu
- **External Collaborators:** Staff from Purdue’s Agronomy Department, Navin Ramankutty (UBC), and Chris Kucharik (U. Wisconsin)
- **Description:** Gridded analysis of US agriculture, nested within a global model. Focus is on nitrogen fertilizer use and groundwater depletion.
- **Status:** Funding from USDA and the Mellon Foundation. Currently in year two. The following year we will hold an event at the National Press Club in Washington, D.C.

Complex Dynamics of Telecoupled Human and Natural Systems

- **Staff Involved:** Thomas Hertel, Farzad Taheripour, and Guolin Yao
- **External Collaborators:** Michigan State University
- **Description:** It aims to examine interactions among human and natural systems. The GTAP group examines recent evolutions in the soybeans production, consumption and trade.
- **Status:** In progress

The contribution of glyphosate to agriculture and potential impact of restrictions on use at the global level

- **Staff Involved:** Wally Tyner and Farzad Taheripour
- **External Collaborators:** None
- **Description:** The goal is to use GTAP-BIO model and examine the economic and land use impacts of restricting glyphosate.
- **Status:** In progress

Dynamic-stochastic analysis of land use in the context of long run uncertainties

- **Staff Involved:** Alla Golub and Thomas Hertel
- **External Collaborators:** Yongyang Cai and Brent Sohngen (Ohio State University)
- **Description:** We focus on long run, socially optimal paths for R&D, forestry management and land use in the context of demographic, climatic and macro-economic uncertainties.
- **Status:** Funding from NSF and USDA.

Fine-scale analysis of the land-water-energy nexus under climate change

- **Staff Involved:** Uris Baldos, Iman Haqiqi, Thomas Hertel, Jing Liu, and Shanxia Sun
- **External Collaborators:** Staff from Stanford, Penn State and the University of New Hampshire
- **Description:** Gridded analysis of climate impacts and vulnerability to extreme events in the Midwestern US.
- **Status:** Currently in the first year of a five year project

Global to Local Analysis of Systems Sustainability (GLASS)

- **Staff Involved:** Uris Baldos, Thomas Hertel, Jing Liu, Dominique van der Mensbrugge
- **External Collaborators:** Purdue Faculty from Agronomy, Climate Science, Computer Science, and Engineering
- **Description:** Set up infrastructure for global, gridded analysis of sustainability and put GLASS on a path to long run financial sustainability.
- **Status:** Starts in May 2017 and runs for two years.

Land Use Decision Making Under Uncertainty

- **Staff Involved:** Alla Golub and Thomas Hertel
- **External Collaborators:** Yongyang Cai (Ohio State University)
- **Description:** Dynamic stochastic analysis of land use related issues, GHG emissions and sustainability
- **Status:** Second year of 5 year project. One of the issues analyzed is impact of uncertainty in future growth of per capita income on decisions to invest in agricultural R&D, while factoring in the long time lag in response of agricultural productivity to R&D expenditures. A global dynamic forward looking model of land use with endogenous investments into agricultural R&D to improve agricultural productivity, and uncertain economic growth is developed. The uncertainty is quantified using economic experts' opinions regarding probability distribution of the long-run economic growth using the survey results reported in Christensen et al. (2016). A paper based on this analysis is submitted to an academic journal and will be presented at this year Annual Conference on Global Economic Analysis. Earlier analysis of optimal agricultural R&D spending in the face of uncertainty in future population, income and climate change, with uncertainty characterized using Shared Socio-Economic Pathways (SSPs), is submitted for publication as well.

Livestock industry, land intensification, and biofuel production

- **Staff Involved:** Wally Tyner and Farzad Taheripour
- **External Collaborators:** None
- **Description:** The goal is to introduce substitution between land and animal feed rations in livestock industry in GTAP-BIO model.
- **Status:** Will begin soon

Managing Wealth of Carbon Intensive Nations

- **Staff Involved:** Dominique van der Mensbrugghe and Erwin Corong
- **External Collaborators:** Grzegorz Peszko, Alexander Golub, Anne Schopp, John Rogers (World Bank)
- **Description:** A number of low and middle-income countries have historically developed a comparative economic advantage in energy and carbon intensive sectors, whether extractive, energy or manufacturing and have traditionally been more concerned about the impact of climate change policies than they are about the impacts of climate change. This study aims to explore a large range of development paths for these countries, under various policy environments, to elucidate development policies that are robust over most of the potential range. The World Bank's Envisage model is providing a set of scenarios subject to a number of exogenous assumptions to highlight the challenges and opportunities for this set of countries. Future work will focus on Monte Carlo-type analysis and robust decision making under uncertainty.
- **Status:** The final report is currently under review.

Modeling, Parameterization, and Applied Policy Analysis with GTAP Firm Framework

- **Staff Involved:** Zeynep Akgul and Thomas Hertel
- **External Collaborators:** David Riker (USITC)
- **Description:** The USITC project focuses on further development of GTAP-HET model and parameterization.
- **Status:** The USITC project started on May 31, 2016. One paper related to the project has been concluded and is scheduled to be released as a USITC working paper before Summer 2017. The paper titled "One Model to Rule Them All? The Importance of Firm Heterogeneity in CGE Modeling of The Gains From Trade" examines the gains from trade under firm heterogeneity, discusses whether welfare gains under Melitz, Krugman and Armington models are equivalent or not, and summarizes the recent advancements in CGE implementations of firm heterogeneity. The second paper of the project is under preparation and focuses on estimating the shape parameter of Pareto distribution and

elasticity of substitution across varieties by using firm-level data. It is expected to be finalized before Summer 2017. The USITC project will be extended for an additional year, until May 30, 2018.

Techno-Economic and life-cycle analysis of alternative aviation biofuels supply chain

- **Staff Involved:** Wally Tyner, Farzad Taheripour, and Xin Zhao
- **External Collaborators:** Several organizations and government agencies
- **Description:** The goal is to develop techno-economic and life-cycle analyses for aviation biofuels. The GTAP group examines land use implications of producing these biofuels.
- **Status:** In progress

Will Global Change Jeopardize the US Forest Carbon Sink?

- **Staff Involved:** Thomas Hertel and Alla Golub
- **External Collaborators:** Brent Sohngen and Yongyang Cai (Ohio State University)
- **Description:** US forests offset 10-15% of gross national GHG emissions. However, recent projections by the US Forest Service suggest that this sink may be in jeopardy as a consequence of the confluence of climate change, biofuels, growing population and rising incomes. Existing research on this topic suffers from serious limitations, failing to accurately model climate impacts on forestry, link regional and global drivers, capture key economic responses to global change, incorporate uncertainty, and capture the interplay between forestry, agriculture and energy sectors. This project remedies these gaps through novel stochastic dynamic programming analysis of land use, forestry and agriculture. The analysis provides new tools to assess pressing policy issues, including the effects of climate change on land use, and optimal dynamic adaptations to climate change in the agricultural and forestry sectors.
- **Status:** Ongoing. A paper analyzing optimal timber management decisions (which are irreversible decisions unless one harvests and replants forests) when taking into account uncertainty in future population and income growth and climate impacts on forests will be presented at this year Conference on Global Economic Analysis. A global dynamic forward looking model of land use with detailed representation of forests is developed. Uncertainty in future climate, population and income is represented with Shared Socio-Economic Pathways (SSPs). We examine optimal timber management decisions across the five SSPs, characterized by SSP-specific global population, income, change in global surface temperature and carbon dioxide concentrations, and then use the Min-Max Regret criterion to determine the set of decisions that are robust to future climate, as well as economic and demographic uncertainties.

Publications

- Akgul, Z., Villoria, N.B., and Hertel, T.W. (2016). GTAP-HET: introducing firm heterogeneity into the GTAP model. *Journal of Global Economic Analysis*, (1):111-180.
- Baldos, U.L.C. and Hertel, T.W. (2016). Debunking the ‘new normal’: why world food prices are expected to resume their long run downward trend. *Global Food Security*, 8:27-38.
- Britz, W. & van der Mensbrugghe, D. (2016). Reducing unwanted consequences of aggregation in large-scale economic models -A systematic empirical evaluation with the GTAP model. *Economic Modelling*, 59, 463-472.
- Burfisher, M.E. (2017). Introduction to computable general equilibrium models. 2e. *Cambridge University Press*.
- Dhoubhadel S., Taheripour F., and Stockton M. (2016). Livestock demand, global land use change, and induced greenhouse gas emissions. *Journal of Environmental Protection*, 6(7): 985-995.
- Haqiqi I., Taheripour F., Liu J., and van der Mensbrugghe (2016). Introducing irrigation water into GTAP

- data base version 9. *Journal of Global Economic Analysis*, 1(2): 116-155.
- Henderson, B., A. Golub, Pambudi, D., Hertel, T., Godde, C., Herrero, M., Cacho, O., Steinfeld, H., and Gerber, P. (2017). The power and pain of market-based carbon policies: a global application to greenhouse gases from ruminant livestock production. *Mitigation and Adaptation Strategies for Global Change*. doi: 10.1007/s11027-017-9737-0.
- Hertel, T., W. (2016). Food security under climate change. *Nature Climate Change* (6):10-13.
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- Hertel, T.W. and Baldos, U.L.C.. (2016). Attaining food and environmental security in an era of globalization. *Global Environmental Change*, 41:195-205.
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- Liu, J., Hertel, T., and Taheripour, F. (2016). Analyzing future water scarcity in CGE models. *Water Economics and Policy*, 2(2), 1650006.
- Mahaffey, H., Taheripour, F., and Tyner, W. (2016). Evaluating the economic and environmental impacts of a global GMO ban. *Journal of Environmental Protection* 7(11): 1522-1546.
- Peters, J. C. and Hertel, T.W. (2016). Achieving the clean power plan 2030 CO2 target with the new normal in natural gas. *Energy Journal* 38 (5).
- Peters, J. C. and Hertel, T.W. (2016). The database-modeling nexus in integrated assessment modeling of electric power generation. *Energy Economics* 56:107-116.
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Taheripour, F., Hertel, T., Narayanan, B., Sahin, S., Markandya, A. and Mitra, K. (2016). Economic and land use impacts of improving water use efficiency in irrigation in South Asia. *Journal of Environmental Protection* 7(11): 1571-1591.

Taheripour, F., Mahaffey, H., and Tyner, W. (2016). Evaluation of economic and land use impacts of substituting non-GMO crops for GMO in the US. *AgBIOForum*, 19(2): 156-172.

Presentations

Akgul, Z., Hertel, T.W., and N.B. Villoria, N.B. (2016, June). Heterogeneous firms, non-tariff measures and US beef trade. *Organized Session Presentation at the 19th Annual Conference on Global Economic Analysis*, Washington D.C.

Akgul, Z. (2016, June). Firm heterogeneity in international trade policy analysis: GTAP Implementation. *Seminar at the United States International Trade Commission (USITC)*, Washington D.C.

Cai, Y., Golub, A., Hertel, T., and Judd, K. (2017, January). Developing agricultural r&d policy in the face of future uncertainties. Presented at the *Allied Social Sciences Association Annual Meeting*. Chicago, IL.

Cai, Y., Golub, A., Hertel, T., and Judd, K. (2016, June). Agricultural r&d policy under climate and economic uncertainty. *Paper presented at the Annual Conference on Global Economic Analysis at Purdue University*, West Lafayette, IN.

Cai, Y., Golub, A., Hertel, T., Judd, K., and Sohngen, B. (2016, August). Will global change jeopardize U.S. forest carbon sink?. *Presented at the USDA-NIFA AFRI Project Directors Workshop*. Boston, MA.

Chepeliev, M, McDougall, R., and van der Mensbrugghe, D. (2017, March). Global energy subsidies and CO2 emissions. *Presented at The World Bank*. Washington, DC.

Dhoubhadel, S., Taheripour, F., and Stockton, M. (2016, July). Livestock demand, global land use change, and induced greenhouse gas emissions. *Presented at the 2016 Agricultural and Applied Economics Association Meeting*. Boston, MA.

Golub, A. and Narayanan, B. (2016, August). Global economic impacts of russian restrictions on food imports. *Presented at the Agricultural and Applied Economics Association Annual Meeting*. Boston, MA.

Haqiqi, I., Taheripour, F., van der Mensbrugghe, D. (2016, June). Climate change, food production, and welfare. *Presented at the 19th Annual Conference on Global Economic Analysis*. Washington DC.

Henderson, B., Golub, A., Pambudi, D., Hertel, T., Godde, C., Herrero, M., Cacho, O., Steinfeld, H., and Gerber, P. (2016, December). Global potential for greenhouse gas mitigation in ruminant livestock sectors. *Presented at the International Agricultural Trade Research Consortium Annual Meeting*. Scottsdale, AZ.

Hertel, T.W. (2016, February). Climate change, agricultural trade and food security. *Presented at the annual meetings of the American Association for the Advancement of Science*. Washington, D.C.

Hertel, T.W., (2017, April). Based on joint work with U.L.C. Baldos, Food and environmental security in an era of globalization. *Presented at the University of Massachusetts Amherst*. Amherst, MA.

Hertel, T.W., (2017, March). Based on joint work with U.L.C. Baldos, Food and environmental security in an era of globalization. *Presented at North Carolina State University*. Raleigh, NC.

- Hertel, T.W. (2017, January). Based on work with Uris L.C. Baldos, Global change and the challenges of sustainably feeding a growing planet. *Presented at the IFPRI Policy Seminar*. Washington, D.C.
- Hertel, T.W. (2016, November). Based on work with Uris L.C. Baldos, Global change and the challenges of sustainably feeding a growing planet. *Presented at the National Conference on Food and Agri-business*. Indianapolis, IN.
- Hertel, T.W. (2016, November). Based on work with Liu, J., Baldos, U.L.C and others, Water scarcity and climate change. *Presented in an OCP side meeting on Water and Climate Change, COP-22 meetings*. Marrakech, Morocco.
- Hertel, T.W., based on work with Liu, J., Baldos, U.L.C. and others (2016, November). “Sustainable irrigation in the global food system”, *Plenary paper presented at the UCL Conference on Water Sustainability*. University College London.
- Hertel, T.W., based on work with Baldos, U.L.C., Liu, J., Ramankutty, N. and Wada, Y (2016, October). Estimating the real cost of food. *Presented as an organized session contribution, Global Land Project Meetings*. Beijing, China.
- Hertel, T.W., based on work with Yao, G., and Taheripour, F. (2016, October). Economic insights into telecoupling. *Symposium presentation at the Global Land Project Meetings*. Beijing, China.
- Hertel, T.W., based on work with Baldos, U.L.C. (2016, October). Food and environmental security in an era of globalization. *Seminar presented at Renmin University*. Beijing, China.
- Hertel, T.W., based on work with Baldos, U.L.C. (2016, March). Food and environmental security in an era of globalization. *Seminar presented at the IRI-THYS Center, Humboldt University*. Berlin, Germany.
- Hillberry, R. (2017, February). Expediting trade: impact evaluation of an in-house clearance program. *Seminar presented at Indiana University Dept. of Economics*. Bloomington, IN.
- Hillberry, R. (2016, September). The nitty gritty of international trade: the trade facilitation agreement of the WTO. *Presented at Marquette University*. Milwaukee, WI.
- Mahaffey, H., Taheripour, F., and Tyner, W. (2106, July). Economic and environmental impacts of a global GMO ban. *Presented at the 2016 Agricultural and Applied Economics Association Meeting*. Boston, MA.
- Peña-Lévano, L., Taheripour, F., and Tyner, W. (2106, July). Climate change interactions with agriculture, forestry sequestration, and food security. *Presented at the 2016 Agricultural and Applied Economics Association Meeting*. Boston, MA.
- Taheripour, F. (2016, September). Induced land use change at the extensive and intensive margins. *Presented at the Bio-Economy: Technology and Policy Path Forward*. Rutgers University, New Brunswick, NJ.
- Taheripour, F. (2016, September). Water in computable general equilibrium models: GTAP-BIO-W development and some applications. *Presented at the MIT Joint Program on the Science and Policy of Global Change*. Massachusetts Institute of Technology.
- Taheripour, F., Hertel, T., and Sahin, S. (2016, July). Economic and land use impacts of improving water use efficiency in South Asia. *Presented at the 2016 Agricultural and Applied Economics Association Meeting*. Boston, MA.

- Taheripour, F., Hertel, T., and Sahin, S. (2016, June). Land use and economy-wide impacts of improving water use efficiency in South Asia. *Presented at the 19th Annual Conference on Global Economic Analysis*. Washington DC.
- van der Mensbrugghe, D. and J. Peters (2016, June). Volume preserving CES and CET formulations. *Presented at the Annual Conference on Global Economic Analysis*. Washington, DC.
- van der Mensbrugghe, D., T. Hertel and U. Baldos (2016, June). Climate change impacts on the production factor land and implications for growth. *Workshop presented at the Potsdam Institute for Climate Impact Research*. Potsdam, Germany.
- van der Mensbrugghe D., R. Roson and M. Sartori, (2016, June). Climate change impacts in an economic model. *ISI-MIP Cross Sectoral Workshop on “Economic Costs of Climate Change Impacts: 1.5°C—Necessary but too expensive?” Potsdam Institute for Climate Impact Research*. Potsdam, Germany.
- van der Mensbrugghe, D. (2016, September). A reflection on Laudato Si’: On care for our common home. *Presented at the Courtyard of the Gentiles: Towards a More Human and Just Economy, Pontifical Council for Culture and Italian Embassy to the Holy See*. Rome, Italy.

Education and Network

Additions to the GTAP Paper Series

The following were added to the GTAP Working and/or Research Memoranda Series in the past year.

Working Papers

- **Extending the GTAP framework for public procurement analysis**
by Aguiar, Angel, Caitlyn Carrico, Thomas Hertel, Zekarias Hussein, Robert McDougall and Badri Narayanan
GTAP Working Paper No. 82

Journal of Global Economic Analysis

- Vol 1, No 1 released in June 2016 and included the following papers:
 - Advances in Methods and Theory*
 - **Modern Trade Theory for CGE Modelling: The Armington, Krugman and Melitz Models**
by Peter B. Dixon, Michael Jerie and Maureen T. Rimmer
 - **GTAP-HET: Introducing Firm Heterogeneity into the GTAP Model**
by Zeynep Akgul, Nelson B. Villoria, Thomas W. Hertel
 - Advances in Data and Parameters*
 - **An Overview of the GTAP 9 Data Base**
by Angel Aguiar, Badri Narayanan and Robert McDougall
 - **The GTAP-Power Database: Disaggregating the Electricity Sector in the GTAP Database**
by Jeffrey C. Peters
 - Advances in Software*
 - **Using R to Extract Data from the World Bank's World Development Indicators**
by Dominique van der Mensbrughe
- Vol 1, No 2 released in December 2016 and included the following papers:
 - Advances in Methods and Theory*
 - **GTAPinGAMS: Multiregional and Small Open Economy Models**
Bruno Lanz and Thomas Rutherford
 - Advances in Data and Parameters*
 - **Estimation of Climate Change Damage Functions for 140 Regions in the GTAP 9 Database**
Roberto Roson and Martina Sartori
 - **Introducing Irrigation Water into GTAP Data Base Version 9**
Iman Haqiqi, Farzad Taheripour, Jing Liu, and Dominique van der Mensbrughe
 - Advances in Software*
 - **GTAP-E-Power: An Electricity-detailed Economy-wide Model**
Jeffery C. Peters

Courses

The Center continues to examine ways in which it educates network members. Demand for the standard GTAP Short Course remained steady for past few years, partially driven by the addition of newly developed course applications, as well as the offering of fellowship assistance. Smaller demand was present in 2017 resulting the course being relocated from Colombia to Purdue University in order for the Center to be able to cover costs. The GTAP 101 Course, now into its eighth offering, continues to be in high demand and feeds graduates into the standard short course as planned. The GTAP PTA Course received positive feedback after its first offering and will be held again in 2017. Unfortunately, due to low turnout of qualified applicants, the 2017 Dynamic Short Course was cancelled. The Center plans to revamp the course content and offer the course again in the upcoming years.

2017 Course Offerings

- GTAP 101 – April 10 – May 28 and September 18 – November 5
- GTAP Short Course – July 15-20
- GTAP PTA – October 23 – November 26
- Dynamic Short Course – October 6-11 (*deferred to 2018*)

Ongoing Educational Goals

- Further investigate development of online mini-courses on special topics
- Continue to develop and implement an “Alumni Outreach/Continued Learning Initiative” for short course graduates

Conferences

Proposals for the conferences below (when available) can be accessed at:

https://www.gtap.agecon.purdue.edu/events/Board_Meetings/2017/supp_material.asp

Conference Travel Funding Opportunities

- **Ken Pearson Travel Funds** - In 2017, the Centre of Policy Studies, Victoria University, graciously endowed travel funds for one participant, in the name of the late Ken Pearson, in recognition of his many contributions to the GTAP Network.
- **Alex Meeraus / Thomas Rutherford Travel Funds** - In 2017, the GAMS Development Corporation awarded one participant with travel funding, in honor of Alex Meeraus and Thomas Rutherford.

The purpose of both funding opportunities is to provide a program to support the participation of promising young researchers at the annual GTAP conference and encourage their contribution to the use and further development of analytical software for CGE modelling.

Eligible candidates are early career researchers, within five years of the start of their career, and active in undertaking applied model-based analyses of real world problems using either GEMPACK or GAMS. It is also required that candidates have a paper accepted into the conference.

For the 2017 Conference, 24 individuals applied for consideration, and after deliberation by the funding committees, comprised each of a CoPS/GAMS and GTAP designee, as well as a member of the conference program committee, the following recipients were named.

Ken Pearson Funds

Sudarshan Chalise
PhD Scholar, Griffith University
Australia

Alex Meeraus / Thomas Rutherford Funds

Qiaomin Li
Lecturer, Northwest University
China

2017 Conference (West Lafayette IN, United States)

Ginger Batta will present an update on preparations for the 2017 conference at the board meeting.

2018 Conference (Proposed: Cartagena, Colombia)

The Economics and Social Research Department, Faculty of Economic Sciences, Universidad de Cartagena will host the 2018/21st Annual GTAP Conference in Cartagena, Colombia. Andrés Escobar, Universidad de Cartagena will present an update to the board on this conference.

2019 Conference (Proposed: Warsaw, Poland)

The Faculty of Economic Science, University of Warsaw prepared and submitted a proposal for the 2019 conference to be held in Warsaw. This proposal was circulated to the board in December 2016 for comments. Further information on this proposal will be presented at the board meeting followed by a formal vote.

2020+ Conferences

The Center for Global Trade Analysis is already in communication with the National Graduate Institute for Policy Studies (GRIPS) to prepare a proposal to hold the 2020 Conference in Tokyo. This proposal will be circulated to the board for consideration in late 2017.

If anyone has interest in hosting a future conference, or knows of a potential partnership, please contact Dominique van der Mensbrugge or Ginger Batta.

Research Fellows

At the 2014 Advisory Board Meeting, it was decided to open the nomination process for GTAP Research Fellows to also accept submissions from network members who, in the past five years, have contributed to the GTAP Data Base, and/or presented a paper at the annual conference. In March 2017, Ginger Batta issued a call for nominations, which was sent to 614 GTAP Network members. The criteria for nomination remained unchanged from previous years. At the Advisory Board Meeting, Kenichi Kawasaki, GTAP Research Fellows Committee Chair, will report on the committee's recommendations for awardees and invite a vote from the board. The GTAP Research Fellow Committee includes Kawasaki (Chair), Tom Hertel and Stephen Karingi.

GTAP Network, Website and Usage Reports

Reports on the GTAP Network, website and usage may be found at:

https://www.gtap.agecon.purdue.edu/events/Board_Meetings/2017/supp_material.asp

Center Finances and Staffing

Finances

To be discussed at the meeting.

Staffing

Staffing Goal: To actively seek and encourage talented staff and graduate students

Allocation of Resources over the Next Year

An overview of how individuals are funded and all the activities they will spend their time over the next 12 months is detailed below. As you see, many of the Center's staff are externally funded (not supported by consortium funds or data base sales).

Staff Member	Status	Allocation						
Angel Aguiar	100% core	Work with I-O contributors	Documentation	I-O Educational Materials	Data Base (macro data, dwellings, I-O disaggregation, protection, trade,)	Oversee release schedule	Research	Short Courses
Zeynep Akgul	100% projects	Further development of GTAP-HET, the firm heterogeneity module of GTAP	Estimation/calibration of key parameters in firm heterogeneity model	Review of CGE models with firm heterogeneity	Research projects			
Uris Baldos	100% projects	GTAP-AEZ model and database maintenance	SIMPLE model, web app and database development	Research on Food-Land-Water Nexus				
Ginger Batta	100% core	Program Mgmt (proposals, finances, logistics, participant relations, execution)	Product Management (sales, distribution, licensing, reporting)	General Network Communication	Promotional Materials	General Center administrative duties		
Sue Bennett	100% core	Assist with grants	Consortium memberships and invoicing	Center finance tracking and reporting	General Center administrative duties			
Maksym Chepeliev	100% core	Integration of energy subsidies to GTAP Data Base	Support of GTAP Model and Data Base users	Data Base (APT) and satellite data (SSPs, Non-CO2 update, substitution elasticities database)	Documentation	Research	Short Course	
Erwin Corong	100% core	Integration of domestic trade, transport, wholesale and retail margins into data base and model	Data Base (running data construction programs for GTAP Data Base)	Updating Satellite Data (GMig2)	Streamlining GTAP DB construction programs (program and data separation); updating documentation	“Guidelines for contributing IO / Supply-USE Tables”	Short Courses	Research
Jeremy Douglas	100% core	Website						
Alla Golub	100% projects	Dynamic Model GTAP-E Model PE land use model in GAMS	Energy and Environ research	Satellite data (GDyn-E data base documentation)	Grad student supervision	Document GTAP-E and GDyn-E models	Short Courses	
Thomas Hertel	25% core except where funded by projects	Assist with Conference	Research	Grad Student Supervision	Assist/guide development of land use data and models for GTAP	Support development of GTAP-HET, the Melitz version of GTAP	Editing the <i>Journal of Global Economic Analysis</i>	Assist in Recruitment of Board Members
Jing Liu	100% projects	SIMPLE-on-a-Grid	Research on food-land-water nexus					
Robert McDougall	100% core	Data Base Issues (Taxes, Energy and Agricultural I-O)	Mentoring of data team	Documentation	Changeover from Opus to GNU Make.	Research	Short Courses	
Dominique van der Mensbrugge	50% core	Managing the Center and relations with the Advisory Board	Model development	Research	Scenario development	Grad student supervision	Short Courses	