



The Center for Global Trade Analysis

Strategic Plan - *Short-Range* 2004 – 2007

November 10, 2004

Humble Beginnings: A History

November 10, 2004

The Birth of GTAP

In the mid-1980s, Dr. Tom Hertel became disillusioned with how CGE modeling was being conducted in Europe and North America. Not only was the data unavailable publicly, there was no way to verify the results that economists were presenting at professional conferences. His frustration led him to consider whether to continue in the field of CGE modeling or move on to another area. After reading papers by Drs. Alan Powell and Peter Dixon, Hertel went to Australia in 1990 on a Fulbright Scholarship to conduct research with the IMPACT Project. In the course of this sabbatical, Powell explained to Hertel the basics behind the IMPACT philosophy: data, training and open-source modeling, supported by econometrics.

Dr. Ken Pearson met the Hertel family and became an instant friend and tacit host. Hertel and Pearson translated a GAMS-based trade model into GEMPACK, and in the process sought to *mend the family tree* of CGE modeling, bringing together the so-called “Levels” and “Linearized” Schools of CGE modeling. They concluded that each approach had its strengths and its limitations, but that the fundamental answers do not differ if the two are properly implemented.

In addition to working with IMPACT in Melbourne, Hertel undertook a project with the Australian Industry Commission (now called the “Productivity Commission”), under the direction of John Zeitsch. In Canberra, Hertel met Robert McDougall, the architect of the SALTER model and data base. From these interactions, Hertel learned about its structure and also grew to appreciate McDougall’s tremendous analytical capabilities – an appreciation that would translate later into a job offer at Purdue University.

One of the big problems facing the SALTER project was the inconsistency of bilateral trade data and the need for reconciliation, prior to incorporation into a global CGE model. Fortunately, this was an issue that some of the Purdue staff had spent some time on. In particular, then-graduate student Marinos Tsigas, Professor James Binkley with Hertel had worked on an approach to trade data reconciliation. In exchange for the reconciliated trade data, SALTER shared its core I-O tables with the Center for Global Trade Analysis (hereafter Center), and the first GTAP Data Base was on its way. Subsequently, Mark Gehlhar, then a graduate student with the Center, took over the task of reconciliating the trade data and has since vastly improved on the early approaches. His work on this topic now defines the state of the art in this area.

In December 1991, Hertel organized a session at the International Agricultural Trade Research Consortium (IATRC) meetings on CGE modeling. Alan Powell came over to give a presentation based on the IMPACT approach to CGE modeling and policy analysis and to assist Hertel recruit consortium members. After one of many late nights, the acronym GTAP (Global Trade Analysis Project) was born.

1991 was also the year that one of the other key figures in GTAP lore, Judy Conner, appeared on the scene. Upon his return from Australia, Hertel met Judy Conner, one who loved to be busy; they hit it off and began working together. At the time, Judy was working for several faculty members, but as the project grew, so too did the demands on Judy’s time. Eventually the Center bought out all of her time, and she has subsequently led the project administration.

The Growing Years

The following year – 1992 – was an intense period of model and data base development. Hertel, his graduate students, and collaborators from other institutions were busy putting all the pieces together. This is when McDougall’s FIT program became famous (or infamous) at Purdue! This program was a tool he had developed for the SALTER project that *fitted* the national data bases to international targets. Much of

the work was very crude. For example, the tariff data were extracted by hand from various issues of the *WTO Trade Policy Reviews*. (Afterwards, the individual responsible, Bradley McDonald, knew the material so well that he was subsequently hired by the WTO.)

In 1993, the Center began offering the first week-long GTAP Short Course, in DOS. The data base, model, and applications were all released at once, leading to severe burn-out for everyone except Judy, who was ready to march on. Participants in this first course included many who are still active in the project.¹ Authors were invited to submit proposals for studies to be included in a book documenting the GTAP Data Base and model. In December, these papers were presented at the International Agricultural Trade Research Consortium meetings, and they formed the core of the so-called “GTAP book,” published by Cambridge University Press three years later.

Being economists interested in maximizing social welfare, the GTAP staff made the first data base available free of charge. The one hitch was that one could only get a 10x10 aggregation, which was roughly the size of most large models in those days. In the wake of this experiment, the Center found that there was infinite demand for their product offered at a zero price, and were overwhelmed with aggregation requests. There was also another troubling negative externality: researchers did not take the data base seriously. This was the first of many failed experiments from which the GTAP staff learned valuable lessons. The version 2 GTAP Data Base carried a healthy price!

However, the data base sales revenue did not prove to be sufficient to cover the data base production costs, and another funding mechanism needed to be found. After lengthy discussions, the idea of a Consortium of leading agencies surfaced. This proved to be a critical innovation in the history of GTAP. Consortium members are represented on the GTAP Advisory Board, which meets annually to provide input into the strategic direction of the data base and model should be updated. They also discuss training courses and conferences, as well as funding new Center research. In addition, they network with other like-minded groups because many have common goals.

The first Consortium member was the World Bank (represented by Martin), quickly followed by the Australian Productivity Commission (Phillippa Dee), the Australian Bureau of Agricultural and Resource Economics (ABARE-Vivek Tulpule), and the Economic Research Service (USDA/ERS-Matt Shane). In addition, Alan Powell, the grandfather of GTAP, was included as an At-Large board member with the goal of representing the public interest.

Getting this proposed institutional arrangement approved by Purdue University was extremely challenging, as their first inclination was to tax it with 52 percent overhead, the same way all government funds are treated. Dr. Wally Tyner, then-Agricultural Economics Department chair, provided leadership through the institutional maze, which was invaluable in making the Consortium idea a workable reality. At the 2nd Consortium meeting, the four members had doubled to eight; at the 3rd, it was 12; and at the 4th the total number had risen to 16 Consortium members!

Another key innovation for GTAP grew out of Visiting Professor Randy Wigle’s sabbatical at Purdue University in the early 1990’s. He was working with HTML language, which would later form the backbone of the World-Wide Web. It took Wigle several months to get Hertel to look at this new software, but when Wigle finally cornered him and explained the potential, a light went on for Hertel, who agreed that it is the perfect technology to disseminate information about GTAP and to promote the

¹ Course participants included Drs. Will Martin (World Bank), Inkyo Cheong, Kevin Hanslow, Jong-Hwan Ko, Alan Matthews, Zhi Wang, Erly Texeira, Donald MacLaren, George Frisvold, Rod Tyers, Tom Wahl, Lionel Hubbard, and Yongzheng Yang. Instructors included: Marinos Tsigas, Robert McDougall (author of the famous Uses and Abuses talk), Brad McDonald (our link to the WTO), Ken Pearson, and a number of graduate students: Mark Gehlhar, Karen Huff, and Randy Wigle (author of the only serious after dinner speech in our history).

global network. This led to his commissioning Wigle to produce the first GTAP web site, which soon became the life-blood of the project.

The Uruguay Round

The Uruguay Round (UR) negotiations were a catalyst in moving the GTAP Data Base and model forward. Using version 2 of the data base with new protection data, then-graduate student Betina Dimaranan and Hertel developed one of the first major Uruguay round policy applications. This modified data base was used by the majority of the authors contributing to the influential volume, edited by Martin and Winters, which assessed the impact of the final Uruguay Round agreement. While the estimated gains from the UR were initially very far apart (\$50 billion vs. \$500 billion), once authors began to use the same data base, they narrowed considerably, and the remaining differences were readily tracked to differences in model structures. This change represented a great leap forward in serious global policy analysis within a CGE framework.

The years 1994-1995 brought critical changes to the Center and its work. With the initiation of GTAP Data Base Version 3, McDougall joined the Center and took over data base production. Dr. Martina Brockmeier spent her sabbatical year at the Center, which led to a 1995 short course in Germany. That special course motivated new EU consortium alliances, plus a workshop in which authors – mostly from the EU – presented their general equilibrium analyses.

Not everything that the Center initially tried continues today. Given the success of the short courses, some in the network expressed interest in learning more about the model and pressed for an advanced short course. In the fall of 1996 and 1997, the Center sponsored an advanced short course. However, enrollment was modest, and participants pointed out that most managers would prefer to send individuals to present their own work, as opposed to take more training. In 1998, the First Annual Conference on Global Economic Analysis was conceived at Purdue University.

The Center also continued to offer courses overseas, and in January 1998, the Center conducted a special South African Short Course with support generated by Dr. Will Masters at Purdue University. Relative to other Purdue-based short courses, the course participants' preparation level varied more widely. Hertel remarked that it would be nice if they all had access to some of the preparatory training at Purdue before they entered the course. This experience gave Melanie Bacou, the Center's illustrious Webmaster, the idea of putting together a web-based course based on the Hertel graduate course in applied GE analysis. This web-based course was initially offered on an experimental basis, and it has subsequently become a core part of the curriculum. As a consequence, there has been a huge jump in the quality of learning and discussion at the annual short courses. That 7-week web course now enables course participants to arrive for the one-week, on-site intensive course at a much higher, more consistent level, thereby increasing the level of exchange among instructors and participants.

The year 1999 brought additional important changes: Dr. Terrie Walmsley began her Purdue post-doc, having graduated from Monash University and been supervised by Powell. She began interacting with then-graduate student Elena Ianchovichina and McDougall, who had developed the GTAP dynamic model. In 2000, Walmsley helped to organize the GTAP Dynamic Course, with Ianchovichina and McDougall. Meanwhile, then-graduate student Ken Itakura began working with his Japanese connections, METI (Ministry of Economy, Trade and Industry), that led to several important projects utilizing the Dynamic GTAP model, plus building support for GTAP in Japan.

There has also been a sustained effort in global climate change mitigation analysis, supported by the U.S. Department of Energy as well as the US Environmental Protection Agency. This interest has funded a series of researchers, including Drs. Gerard Malcolm, Truong P. Truong, Jean-Marc Burniaux and Huey-Lin Lee. These individuals have contributed to the GTAP-E Model and Data Base, which emphasizes energy use and CO₂ emissions. With current support from the US-EPA, Dr. Lee has extended this model

to include the emissions of non-CO₂ gases as well as net emissions associated with land use and land use change.

Dimaranan joined the Center staff in 2000, after completing her dissertation at Purdue University. She took over the process of data base construction and documentation, and she has taken this to a new level of professionalism. She and McDougall make a great data base team and have since released versions 5.0 and soon-to-be-released 6.0 together, breaking new ground and extending the project in creative ways that serve the constituency exceptionally well.

After the Taiwan Advisory Board Meeting, Hertel was convinced that the Center management needed to grow because he could no longer do it all on his own. In fall 2003, after a three-year stint at the University of Sheffield in the UK, Walmsley returned to Purdue as Associate Director for the Center, leading short course and Center management. A few months later, visiting scholar Dr. Sandra Rivera began the Center's strategic planning effort during her year away from the U.S. International Trade Commission (Washington DC). Both have collaborated significantly in moving the Center Strategic Plan forward, making the plan a living document.

In May 2004, the third special short course in Buenos Aires, Argentina began a long-awaited GTAP entry into Latin America. Sponsored by the Inter-American Development Bank (IADB), it enabled the Center to connect with critical policy makers and economists needed to improve the regional data. Graduate students Ernesto Valenzuela and Carlos Ludena were critical in the execution of the course, offering assistance in language skills for participant selection, managing the web course, and helping participants get the first few lectures under their belt in their native language. After just three months, the course has inspired several input-output tables for the next data base release as well as a variety of proposals for collaborative projects.

With Hertel spending his sabbatical year at the World Bank, Tyner and Walmsley are operating as Co-Directors to manage the Center and GTAP activities over the next year. Tyner's experience as Agricultural Economics Department Chair plus his international trade negotiation experience will help move the Center forward during this year.

GTAP Today and Beyond

GTAP today has an air of religious fervor about it. The network began small. However, many of the early "disciples" have remained intimately involved and committed to the project. Many professionals attending a GTAP course and/or conference become aware of what the Center and its GTAP Data Base/Model have to offer, and return to their organizations to sell it. To date, over 400 individuals from 53 countries have completed the GTAP Short Courses. What was a limited lingo shared by a few people in a handful of countries has spread to 3200 network participants spanning over 110 countries.

Ultimately, it is the people in the network who make GTAP and the Center what they are today. It is every person who has attended a GTAP Short Course or presents a paper at the Global Economic Analysis Conference. It is the dedicated board members who consistently support the mission of the Center with their membership. And especially, it is the vision of the Center, collaborating to bring better ways of framing and understanding economic issues, together.

Conference on Global Economic Analysis History (1998-present)

[Seventh Annual Conference](#) (June 17 - 19, 2004) *The World Bank; Washington DC, USA*
[Sixth Annual Conference](#) (June 12 - 14, 2003) *Scheveningen, The Hague, The Netherlands*
[Fifth Annual Conference](#) (June 5-7, 2002) *Taipei, Taiwan*
[Fourth Annual Conference](#) (June 27-29, 2001) *Purdue University; West Lafayette IN, USA*
[Third Annual Conference](#) (June 27-30, 2000) *Monash University; Melbourne, Australia*
[Second Annual Conference](#) (June 20-22, 1999) *Danish Institute for Agricultural and Fisheries; Economics, Copenhagen, Denmark*
[First Annual Conference](#) (June 8-10, 1998) *Purdue University, West Lafayette IN, USA*

CENTER FOR GLOBAL TRADE ANALYSIS STRATEGIC PLAN October 2004

OUR MISSION

The Center for Global Trade Analysis is the publicly funded, university-based home for GTAP (Global Trade Analysis Project), a global network of researchers and policy makers conducting quantitative analysis of international policy issues. Our purpose is to improve the quality of global economy-wide analysis through education and by developing analytical data bases, economic models, and innovative methodologies. Our unique institutional structure enables us to foster collaboration among academia, public sector, and private sectors worldwide.

OUR CORE VALUES AND BELIEFS

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.
- *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 insights.
- Avoiding duplication in data production is efficient.
- Collaboration enhances individual efforts.
- Having more trained users enriches policy debates.

OUR VISION OF THE FUTURE

In 2014, GTAP is an exceptionally vibrant network of global economic policy analysts, with more than 10,000 individuals in 150 countries making contributions. The GTAP Data Base and models are used in research centers throughout the world, leading to ever greater transparency in global economic analysis.

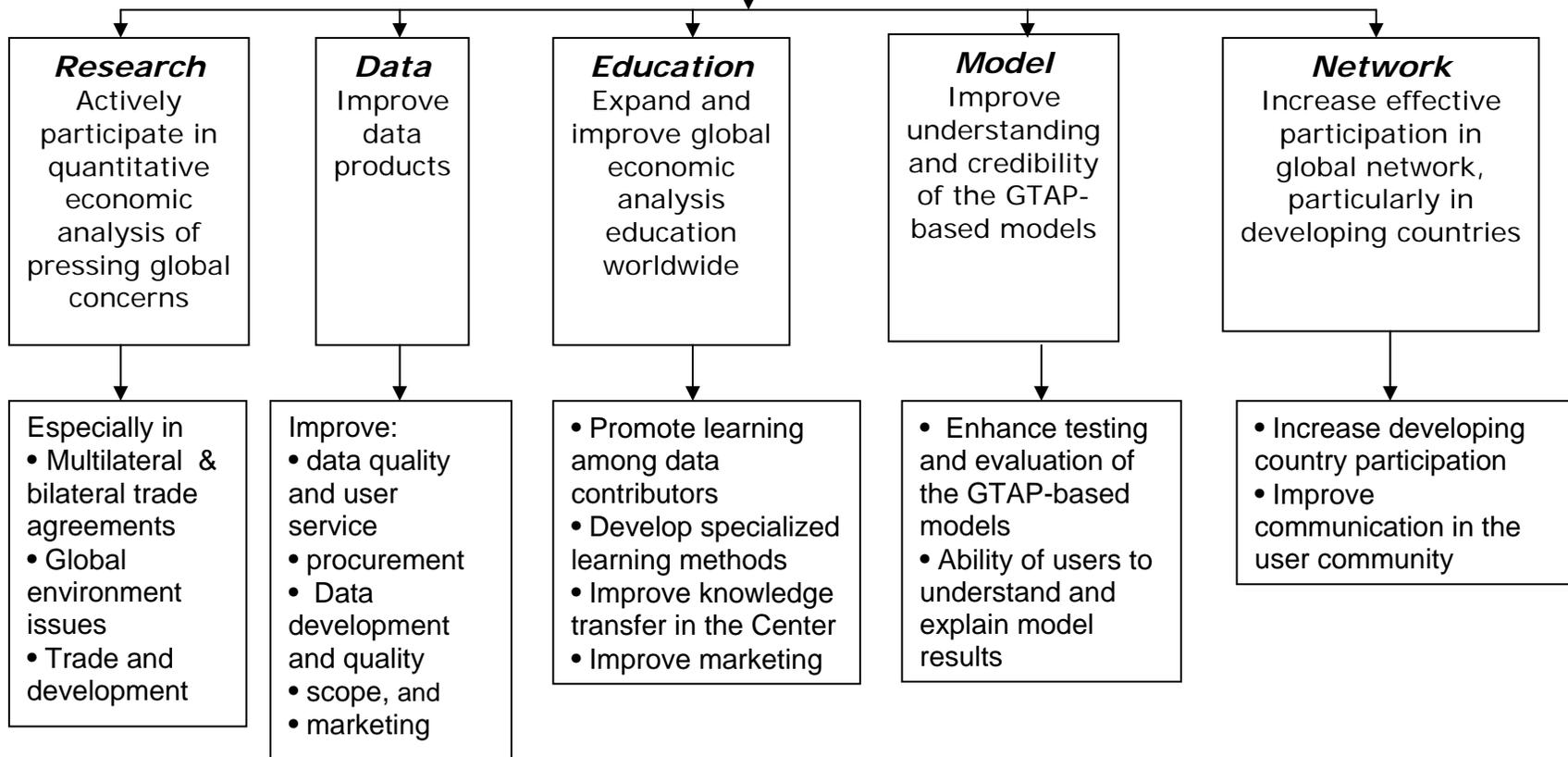
GTAP-based results are influential among decision makers. After 10 years of intensive model validation efforts, GTAP-based models are widely accepted in the professional literature. Indeed, editors of leading journals actively seek out GTAP-based papers on contemporary policy issues.

The GTAP Data Base remains at the core of the Center. The open-source institutional arrangement by which the data base is now assembled has spawned rapid growth, with active collaboration in more than 100 countries. It is now possible for national agencies in any one of those countries to scrutinize key assumptions, rebuild the data base, and propose modifications to the official GTAP data base. Half of our courses are now conducted in developing countries. The 50 consortium members meet regularly through teleconferences to contribute ideas and to help keep the Center's efforts focused on our vision.

Center for Global Trade Analysis Strategic Plan

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The Center for Global Trade Analysis is the publicly funded, university-based home for GTAP (Global Trade Analysis Project), a global network of researchers and policy makers conducting quantitative analysis of international policy issues. Our purpose is to improve the quality of global economy-wide analysis through education and by developing analytical data bases, economic models, and innovative methodologies. Our unique institutional structure enables us to foster collaboration among academia, public sector, and private sectors worldwide.

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SUMMARY OF THE CENTER GOALS AND SUPPORTING STRATEGIES:

To achieve our vision, we are working toward the future with five goals.

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

Multilateral and bilateral trade agreements

1. Further develop the Dynamic GTAP Model.
2. Improve treatment of trade preferences and their utilization.
3. Enhance analysis of trade agreements' treatment of foreign investment in services.
4. Enhance analysis of labor migration.

Global environmental issues

1. Enable integrated assessment of climate change mitigation policies in an economy-wide setting.
2. Develop a dynamic framework that characterizes land use and net green house gas emissions in agriculture and forestry.
3. Develop an IPCC-consistent emissions baseline.

Trade and development

1. Enable household-disaggregated analysis within the GTAP framework.
2. Encourage network members to contribute household surveys to the GTAP Data Base, and conduct trade/development analysis for their respective economies.

Data Goal: To improve data products.

1. Improve data quality and user service.
2. Improve data procurement.
3. Improve data development efficiency and quality by distributing data construction program.
4. Expand scope of data base.
5. Improve marketing of data base.

Education Goal: To expand and improve global economic analysis education worldwide (both within and outside the network).

1. Promote learning among data base contributors.
2. Use workshops and web-based products to provide specialized learning.
3. Improve communication, learning, and transfer of knowledge within the Center.
4. Improve marketing of GTAP courses.

Model Goal: To improve understanding and credibility of the GTAP-based models.

1. Enhance testing and evaluation of the GTAP-based models.
2. Further enhance the ability of users to understand and explain model results (*long range*).

Network Goal: To increase effective participation in the global network, particularly in developing countries.

1. Obtain funding from donor agencies for developing country participants.
2. Conduct more courses and conferences in developing countries.
3. Review pricing to enable greater developing country participation.
4. Foster communication within the GTAP network and beyond.



**Center for Global Trade Analysis
Strategic Plan / Short-Range
2004 - 2007**

PATH TOWARD THE FUTURE: The Center's five short-range goals are detailed with strategies to achieve each goal, and associated Action Plans (Objective, Timeline, Resources and Metrics)

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

Multilateral and Bilateral Trade Agreements

1. Further develop the Dynamic GTAP model

<i>Action Plan: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
1.1 Refine and update the GTAP baseline	Sept. 2004	TW, KI	Completion of preliminary baseline prior to October course
	Sept. 2005		Updated baseline available to consortium members
1.2 Revise and finalize Run-GDyn software	Dec. 2005	TW, RM, KI	<i>Run-GDyn</i> software finalized
1.3 Develop aggregation facility for dynamic model	Sept. 2005	TW, RM, KI	<i>GDynAgg</i> finalized
1.4 Prepare and execute Dynamic GTAP Short Course	Oct. 2005	TW, RM, KI	Successful completion of course
1.5 Document and build welfare decomposition program into <i>RunGDyn</i>	April 2005	TW	Paper and welfare decomposition programs in <i>RunGDyn</i>
1.6 Complete Dynamic GTAP book	Aug. 2005	TW, RM, KI	Submission to publisher

Research Goal (continued)**2. Improve treatment of trade preferences and their utilization**

<i>Action Plan: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
2.1 Extend econometric work on preference utilization and administrative costs and incorporate into model	Dec. 2005	TW, graduate students	Technical paper combining modeling of preference utilization, rules of origin, and econometrics

3. Enhance analysis of trade agreements' treatment of foreign investment in services

3.1 Refine Bilateral FDI data base provided by Philippa Dee	Dec. 2005	TW, graduate students Philippa Dee	Data available to board on web site
3.2 Develop model for liberalization of FDI in services sectors with Philippa Dee	Dec. 2006	TW, graduate students, Philippa Dee	Technical paper posted on GTAP web site

4. Enhance analysis of labor migration

4.1 Develop data base of bilateral flows	Dec. 2005	TW, Alan Winters, Ron Skeldon, Chris Parsons	Data available to board on web site
4.2 Develop a model for bilateral labor movements	Dec. 2005	TW, Alan Winters, graduate student	Two Papers on web site: model and application
4.3 Develop model for analysis of outsourcing	Dec. 2004	TW, Aaditya Mattoo	Papers completed

Global Environmental Issues**1. Enable integrated assessment of climate change mitigation policies in an economy-wide setting**

1.1 Finalize the greenhouse gases (both CO ₂ and non-CO ₂) emissions and forest carbon sequestration data base	Dec. 2004	HL, TH, RM	Greenhouse gases emissions and forest carbon sequestration in data base
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Research Goal (continued)

Action Plan: Objective	Timeline	Resources	Metrics
1.2 Finalize the data base on global usage of land, by agro-ecological zone	Dec. 2004	HL, TH, RM	Global usage of land, by agro-ecological zone, in data base and technical paper completed
1.3 Calibrate to marginal abatement costs (MACs) based on the Stanford Energy Modeling Forum (EMF) data base	Dec. 2004	HL, TH, RM	Marginal abatement costs in data base
1.4 Finalize GTAP-EL (Energy and Land Use): a comparative static model for integrated assessment	Dec. 2004	HL, TH, RM	Completed GTAP-EL, documented through a GTAP Technical Paper posted on web site
1.5 Integrated assessment of climate change mitigation policies	June 2005	HL, TH, RM	Journal article submitted
2. Develop a dynamic framework that characterizes land use and net green house gas emissions in agriculture and forestry			
2.1 Extend Dynamic GTAP to include energy (G-Dyn-E)	Feb. 2005	HL, TH, RM, TW	Dynamic GTAP includes energy
	June 2005	HL, TH, RM, TW	Book chapter drafted, reviewed and complete
2.2 Incorporate land use change in G-Dyn-E	Dec. 2005	HL, TH, RM, TW	Land use change included in G-Dyn-E
2.3 Incorporate forestry and vintages in G-Dyn-E to capture the dynamics of forest management and carbon sequestration	Dec. 2005	HL, TH, RM, TW, Brent Sohngen	Forestry and vintages in G-Dyn-E (contingent on EPA funding)
3. Develop an IPCC-consistent emissions baseline			
3.1 Produce GTAP emissions baseline according to scenarios established by the workgroups organized by IPCC (e.g., SRES and TAR)	Dec. 2005	HL, TH, RM, TW	GTAP emissions baseline produced and made available to consortium

Research Goal (continued)**Trade and Development****1. Enable household-disaggregated analysis within the GTAP framework**

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
1.1 Survey current work in field	2004	TH, graduate students	Published survey article
1.2 Organize and execute Trade and Development Conference in The Hague	Dec. 2004	TH, graduate students	Trade and Development Conference held in The Hague
	2005	TH, graduate students	Conference proceedings published in a book
1.3 Develop model with disaggregated household-level data	2005	TH, graduate students	Completed technical paper posted on web site
1.4 Expand household survey country coverage from 15 to 30 countries	2005	World Bank (?), TH, graduate students	Household data base that includes 30 countries completed
1.5 Share outcomes of the household-level work with the widest possible audience	2007	TH, graduate students	Journal articles published

2. Encourage network members to contribute household surveys to the GTAP Data Base, and conduct trade/development analysis for their respective economies

2.1 Establish uniform standards	2006	TH, graduate students	Publish uniform standards paper in Technical Paper series
2.2 Hold workshop on contributing household survey data	2006	TH, graduate students	First workshop in June 2005 attached to a conference
2.3 Build a reconciled household data base	2007	TH, graduate students	Reconciled household survey usable with GTAP Data Base

Data Goal: To improve data products

1. Improve data quality and user service

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
1.1 Develop and apply data comparison programs for the final data base and for intermediate datasets (Data comparison programs are useful to illustrate changes in the data between releases and to discover data errors)	Starting 2006, annually	BD, RM	<p>Comparison program developed and applied for global data</p> <p>Comparison programs applied to 1 large or 2 small modules annually</p> <p>Applied to new modules 1 year after integration</p> <p>Report and standards document produced</p>
1.2 Shorten gap between data release, published documentation and web-based ancillary documentation	Starting 2004	BD, RM, JC	<p>Published GTAP 6.0 Data Base documentation released at the same time as public release</p> <p>Ancillary web-based documentation completed 6 months after published documentation</p>
1.3 Release data in alternative formats	2007	BD, RM	GTAP 7.0 Data Base released in GAMS format
1.4 Identify and create ad hoc expert groups for different data base aspects	Starting 2004, annually	BD, RM	With help from outside experts, an activity report created on at least 1 aspect of data base, beginning with protection
1.5 Critically review and revise methods for filling in missing data	Starting 2005, annually	BD, RM	<p>Methods for filling in missing data applied to 1 large or 2 small modules a year</p> <p>Methods for filling in missing data applied to new modules 1 year after integration</p> <p>Documentation produced for each module completed</p>

Data Goal (continued)

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
2. Improve data procurement			
2.1 Improve evaluation of incoming data	Starting 2004	BD, RM, TW	Method for evaluating incoming data improved and implemented Report covering internal consistency and relevant comparisons for each incoming dataset (both I-O tables and international datasets) produced
2.2 Review quality of existing I-O tables and identify needed I-O tables	Starting 2005, every 2 years	BD, RM, TW	I-O table contributions actively pursued by identifying best and potentially most reliable contributors Report presented at Board Meeting identifying I-O tables needing upgrading.
	2007	BD, RM, TW	New or updated I-O tables for 10 countries identified in each data base release, starting with GTAP 7
2.3 Establish relationships with potential contributors of non-I-O data	Starting 2005, every 2 years	BD, RM, TW	Non-I-O data set report produced at regular intervals, first FAO and later others as opportunities arise
2.4 Regularly review data procurement policies (e.g., terms and conditions for data contributors, IPR concerns)	Starting 2006, every 2 years	BD, RM	Data procurement policy report produced and updated
3. Improve data development efficiency and quality by distributing data construction program			
3.1 Review and apply programming principles and standards	2006	BD, RM	Revised principles and standards document produced
3.2 Make I-O check programs available to contributors	Dec. 2005	TW, GM	I-O check programs available on GTAP web site to data contributors.

Data Goal (continued)

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
3.3 Data and program separation in construction process	2005	BD, RM	Separation accomplished
3.4 Switch to publicly available software (e.g., GNU make)	2007	BD, RM	Switch to publicly available software complete
4. Expand scope of data base			
4.1 Integrate self-employed labor from household (HH) survey data	2005	BD, RM	Integrated HH survey in data base
4.2 Integrate taxes (income taxes, commodity taxes, revenue reconciliation in protection)	2006	BD, RM	Integrated taxes in data base
4.3 Develop multi-year data base (two points)	2007	BD, RM	Multi-year data base completed for GTAP 7
5. Improve marketing of data base			
5.1 Improve CD-ROM packaging to provide more information and instructions	2004	BD, RM, JC	CD-ROM packaging improvement completed Positive stakeholder feedback
5.2 Develop policies and pricing for data base and software. (e.g., release frequency; contents of data package; terms and conditions for general customers; consortium member privileges)	Starting 2005, every 2 years	BD, RM, WT, JC	Revised strategy and pricing standards document completed and posted on web site

Data Goal (continued)

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
5.3 Present (or publish) papers that highlight the GTAP data base in non-GTAP conferences (journals)	Starting 2005, annually	BD, RM	One paper presented or published annually
5.4 Coordinate with governments or professional associations of selected target countries to promote the GTAP Data Base	Starting 2005, every 2 years	BD, RM	A new target country identified, pursued, and contacted
5.5 Ensure that GTAP Data Base is listed in appropriate web directories	2005	GM	Web site listings achieved reported

Education Goal: To expand and improve global economic analysis education worldwide globally (both within and outside network)

1. Promote learning among data base contributors

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
1.2 Use e-mail discussion groups to promote learning among I-O contributors	2006	TW	Web based discussion group for I-O contributors implemented
1.4 Build a repository of I-O construction tools & documentation for both GEMPACK and GAMS	2007	TW, GM	Programs documented and available for download on web site (contingent on funding)

2. Use workshops and web-based products to provide specialized learning

2.1 Hold Dynamic Course every 3 years, if demand dictates	Oct. 2005	TW, JC	Dynamic Course held
2.2 Hold specialized workshops in advanced modeling topics, in conjunction with conferences	2006	HL, TH, TW, JC	First workshop held
2.3 Build multimedia (Web/CD-ROM) modules	2006	GM	Four modules completed and packaged

3. Improve communication, learning and transfer of knowledge within the Center

3.1 Hold orientation seminar for incoming students	Sept. 2004	TW, SR, graduate students, JC	Orientation seminar conducted for graduate students In yearly feedback reviews, positive graduate student feedback obtained
3.2 Hold technical workshop to get new students up-to-speed	Sept. 2005, annually	TW, HL	Technical workshop/training session held for new students In yearly feedback reviews, positive graduate student feedback obtained
3.3 Create systematic mentoring program	Sept. 2004, annually	TW, SR, graduate students	Each graduate student assigned a student or Center staff mentor in their first year In yearly feedback reviews, positive graduate student feedback received

Education Goal (continued)

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
3.4 Proactively assist graduate students with career development	June 2005	TW, TH, graduate students	Review CVs of graduate students
	June 2005	TW, JC	Produce book of graduate student CVs and distribute to board members
	June 2006, annually	TW, TH, graduate students	At least 1 student completed a short-term project, possibly with a consortium member
3.5 Offer GTAP staff training (self-study or review courses) in econometrics, GAMS, programming languages	Starting 2004, annually	BD, RM, TW, HL	At least one person on GTAP staff completes self-study or review courses in econometrics, GAMS, and/or programming language
3.6 GTAP staff attend professional workshops/conference (other than GTAP)	Starting 2005, every 2 years	BD, RM, HL	At least 1 Center staffer attended (non-environmental) workshop or professional conference
3.7 Participate in international environmental conferences and workshops (e.g., Energy Modeling Forum)	2005, annually	HL, TH, RM, TW	At least 1 Center staffer participates in an international environmental conference or workshop
4. Improve marketing of GTAP courses			
4.1 Increased use of Internet and e-mail discussion groups to advertise courses	Starting July 2004	JC, MB	All courses and conferences advertised on appropriate web sites and discussion lists

Model Goal: To improve understanding and credibility of the GTAP-based models

1. Enhance testing and evaluation of the GTAP-based models

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
1.1 Determine usage of GTAP-based papers in refereed journals	March 2005	GM, TH	Baseline measured and established
1.2 Experiment with time series data for GE testing and evaluation exercises	2007	TH, Joe Francois, Channing Arndt	Workshop/conference session on this topic held
1.3 Collaborate with econometricians on parameter estimation for standard model	2007	TH, David Hummels, graduate students	Two additional papers posted on the GTAP web site
1.4 Estimate key parameters for dynamic GTAP-based model	2006	TW, Elena Ianchovichina, graduate students	Parameters estimated and methodology published on the web
1.5 Conduct stochastic simulation for specific commodity markets; validation based on higher moments of price distribution	2005	TH, graduate students	Working paper available on the web

Network Goal: To increase effective participation in the global network, particularly in developing countries

1. Obtain funding from donor agencies for developing country participants

<i>Action Plans: Objective</i>	<i>Timeline</i>	<i>Resources</i>	<i>Metrics</i>
1.1 Develop a funding plan with specific targets for numbers of developing country participants and possible funding sources	Dec. 2004	WT, TW, graduate students	Completion of funding plan
1.2 Secure funding for developing country participants	June 2005	WT, TW, graduate students	Contracts in place for developing countries participant funding

2. Conduct more courses and conferences in developing countries

2.1 Hold periodic conferences in developing countries	2007	WT, TW, TH, JC	First conference held in developing country
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3. Review pricing to enable greater developing countries participation

3.1 Develop a new pricing model for developing country participants for courses, conferences, software and data base access	June 2005	WT, JC, BD, RM	New pricing model implemented
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4. Foster communication within the GTAP network and beyond

4.1 Produce Annual Report for external audience	April 2005	WT, JC, TW	Report available in print and electronic format
4.2 Produce annual report for GTAP audience	Nov. 2005	WT, JC, TW	Report available in print and electronic format and sent in annual mailing
4.3 Produce GTAP-L Newsletters	Aug. 2004, twice annually	JC, BD, GM	GTAP-L Newsletters sent to network every 6 months