A Vision to 2035 and Beyond

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Abstract

For more than three decades, GTAP has delivered on its three principal areas of activity: (i) lowering barriers to high quality quantitative analysis of global economic issues, (ii) conducting impactful research, and (iii) serving as a platform for discussion and debate. In so doing, GTAP has underpinned a vast array of analytics and ultimately decisions by national, regional, international, and private institutions.

GTAP leadership believes that GTAP's fundamental philosophy-- collaboration in domains of mutual benefit, such as data development, combined with an open marketplace for ideas in analytics and a strong commitment to training and capacity building-- has withstood the test of time. Indeed, this philosophy applied to GTAP's three principal activity areas is likely more relevant now than ever.

The vision set forth here builds on a tradition of ambition and innovation. To start, key trends in economywide analytics are identified. Economywide models remain very valuable tools for analysis of an array of issues. At the same time, the leading edge of analytics has been and continues to trend towards deployment of modular approaches that enable a flexible fusion of best-in-class models, often with economywide models at the economic core. Looking forward, GTAP has a role in facilitating capabilities to flexibly pull together suites of models, tailored to the issue in focus, alongside its traditional role of advancing economywide modeling.

Turning to data, GTAP will double-down on its network-based approach to assembling the gold-standard of globally reconciled economywide data. Priorities include faster and more flexible data construction processes, open access data policies (with revenue replacement), and an open-source approach wherein GTAP gradually and carefully transitions from an assembler of data products to a provider of data services.

For these analytical and data visions to be realized at the scale commensurate with global challenges, stepped-up training efforts will also be required. GTAP believes that it is very well positioned to build capacity and develop high-level skills through the development and implementation of a high-quality and comprehensive series of online courses.

Finally, an exciting research agenda remains crucial to attracting and retaining the highly skilled staff and collaborators that will ultimately underpin the success of the invigorated approach to analytics, data, and training outlined above. GTAP will also build on its considerable successes in serving as a platform for discussion and debate through its annual conference, the now highly ranked *Journal of Global Economic Analysis,* and regular policy and technical seminars.

This expanded and holistic vision must be accompanied by a robust business model. Motivated by GTAP's proven consortium approach, GTAP believes that forming a group of Associates who provide baseline financial support to building capabilities and leveraging network effects in countries currently classified as low- and middle-income presents a promising way forward.

Executive Summary

Founded in 1992, the Global Trade Analysis Project (GTAP) supports an international network of more than 32,000 individuals engaged in quantitative analysis of pressing global challenges with emphasis on economywide analytical approaches. Guided by a philosophy of collaboration in domains of mutual benefit combined with an open marketplace for ideas in analytics as well as a strong commitment to training and capacity building and supported by a consortium of 30 prominent national, international, and private institutions, GTAP aims to generate the public goods necessary to better position researchers, analysts, and decision-makers throughout the world to confront global economic challenges.

GTAP engages in three broad areas of activity. First, GTAP lowers barriers to the conduct of high-quality, rigorous analysis of global issues through provision of data, models, and training. Second, GTAP conducts research on pressing issues with global ramifications. Third, GTAP serves as a global platform for interaction, discussion, and dissemination of novel approaches and new ideas.

GTAP is coordinated by the Center for Global Trade Analysis at Purdue University. The Center is widely regarded as a successful example of a university-based locus for global economic analysis and engagement. GTAP-related analytics are a regular feature in the world's most prestigious scientific journals and inform a large array of decision-making processes by governments, international organizations, and private entities around the world. Building on a methodological core focused on global economywide modeling, issues addressed by GTAP Network members include (but are not limited to) trade and industrial policy, energy transitions, climate change, economic development, biodiversity preservation, pollution abatement, agricultural and food/dietary policies, and circular economy.

This document sets forth a forward-looking vision for GTAP that builds on this record of success. To frame the context within which GTAP looks to the future, we identify current trends in modeling for knowledge discovery and decision-making. With these trends identified, a vision for GTAP is set forth in terms of analytics, data, training, and GTAP's role as a platform. With this vision in hand, business models for realizing the new elements of the vision are considered.

In analytics, GTAP identifies the movement towards deployment of modular modeling approaches that enable a flexible fusion of best-in-class models as an important trend in cutting-edge analytics. Three examples help to illustrate the attractions of modular approaches.

a. In analysis of the recent tariffs imposed by the USA, global economywide models provide substantial insight into the likely impacts on real economy variables such as production, trade, relative prices, tariff revenue, and welfare. At the same time, standard economywide models are silent on financial variables such as inflation, interest rates, and consequent implications for capital flows. In addition, standard economywide models typically lack the effects on the composition of firms that are in focus in New Quantitative Trade models (NQTM). A fusion of economywide and macroeconomic and/or NQTM models provides more comprehensive and coherent analytics.

b. Staying with the recent trade landscape, global economywide models show that retaliatory implementation of tariffs by China on US agricultural products shifts Chinese imports towards Brazil. Global economywide models tend strongly to be national in focus. Hence, they do not provide much insight into, for example, the implications for land use change of this increase in demand for agricultural products from Brazil. A fusion of a global economywide model with a Brazil focused gridded model of the agricultural sector enables important insights into the environmental impacts of such trade diversion.

c. For energy transitions, economywide approaches are valuable due to the far-reaching and intersectoral impacts of a transition to a low- or zero emissions economy. Nevertheless, the relatively simple energy production representations in a standard global economywide model do not capture the complex specificities of energy production. Linked energy-economywide approaches enable a rigorous representation of energy production structures within an economywide framework.

GTAP expects this trend towards modular approaches in cutting-edge research to continue. We label this modular approach an integrated assessment network (IAN). Looking forward, the Project has a role in facilitating capabilities to

flexibly pull together suites of models that are well-suited to addressing the issue at hand. The choice of mode of application of models comprising an IAN depends on circumstances including the needs for and resources available to conduct the analysis. In many instances, only one component model of an IAN, such as a global CGE model utilized in a standalone fashion, will be the appropriate modeling choice.

From the perspective of the Center, a further attraction of the IAN approach is that it imposes a threshold beyond which detailed analytics should take place within one or more relevant specialized models (e.g., global macro, climate, country macro, country CGE, energy, food/ag, biophysical/environment and/or household microsimulation). This allows the Center to: (i) maintain focus on its core strengths in global economywide modeling, (ii) build on the growing competence of Center staff in gridded partial equilibrium analytics of the food-agriculture-environment nexus, and (iii) continue to cultivate relationships and linkages with established analytical groups specialized in areas (beyond the two analytical domains listed in points (i) and (ii) above) to support network members to flexibly and effectively apply an IAN approach.

Turning to data, the continued focus on global economywide modeling as a core strength permits GTAP to build on existing strengths and ongoing positive trends. In its role as an assembler of data, GTAP views itself as having evolved in a manner analogous to long-run human development. It began as a "hunter-gatherer" operation, exploring the world and harvesting what data could be found. It then proceeded to an "agricultural" phase where it prepared the ground for data to be produced in concert with partners, harvested the data at a point in time, and then processed it to make it palatable for its community of users. GTAP is now in an "industrial" phase where data are obtained, processed, and distributed on a continuous basis leveraging a global supply chain of collaborators who supply intermediate data inputs.

GTAP's next stage of evolution involves becoming principally a provider of "services." To make this successful, GTAP aims to deepen and expand the network effects that underpin GTAP's history of success. Much will not change. GTAP will continue to coordinate the process of acquiring relevant component data sets; develop, document, and maintain code streams for processing data; and make available a fully documented, best possible picture of the global economy including relevant extensions and satellite accounts first to consortium members (for beta version testing) and then to the public.

GTAP envisions a deliberate and careful transition towards a service provider model that methodically expands from an initial small, known, and trusted core of collaborators. This transition towards GTAP as a service provider involves four major initiatives:

a. Faster data builds, relying upon modern, supported, and publicly available software.

b. Design of greater flexibility into the build process such that GTAP is well-positioned to develop and document processes and procedures that facilitate the creation of bespoke datasets better suited to addressing the issue in focus.

c. An open access data policy aimed at expanding the network. A policy of open access for data would have to be accompanied by a shift in the GTAP business model to accommodate the loss of database sales revenue (discussed below).

d. A transition towards an open-source model beginning with a coalition of willing consortium members.

The idea is that the package of four initiatives described above:

a. stimulates an expanding set of providers to contribute high quality and easy to incorporate component data sets to the GTAP community on a timely basis;

b. allows for more skilled eyes to review, implement, and improve the data build process, including application of artificial intelligence;

c. aligns with identified trends towards modular modeling approaches;

d. increases the frequency of fully detailed data releases allowing for up-to-date analysis;

e. facilitates engagement of low- and middle-income countries in the network; and

f. fosters innovation.

Training. For these modeling and data visions to be realized at the scale commensurate with the global issues at hand, stepped-up training efforts will also be required. A consensus among consortium members and the broad GTAP Network exists that the supply of highly skilled economywide modelers is not keeping up with demand. Instead, uncertain and inadequate supply is almost surely attenuating demand as leading institutions hesitate to undertake the investments necessary to build an economywide modeling capacity.

The sources of the current supply dearth include:

a. The relatively small and geographically dispersed demand for skilled economywide modelers, which challenges residential approaches to graduate education.

b. The advanced state of economywide analysis, which now requires more time to acquire the leading-edge skills.

c. The increasing concentration of economywide skills in institutions that are strongly research, rather than teaching/training, oriented.

d. The short duration of training programs offered outside of the few formal course offerings in graduate-level university programs. These are unable to confer the required depth and breadth of skills in the absence of significant supplementary training and mentoring.

GTAP believes it is very well positioned to take major steps towards alleviating this supply constraint through the development and implementation of a high-quality, comprehensive, and online course series, building on more than three decades of experience in teaching/training economywide modeling to thousands of short-course participants and hundreds of students enrolled in PhD level courses.

GTAP proposes to proceed in a modular format. Module 1 (80 hours of time commitment) groups together participants who aspire to be modelers with individuals whose aim is to be savvy consumers of sophisticated research for decision-making, including but not limited to economywide modeling. Module 2 (240 hours) focuses on basic economywide modeling skills, data, and technical issues with the aim of producing strong research assistants/associates. Module 3 (320 hours) generates skilled modelers. Participants who successfully complete module 3 assessments become "GTAP certified economywide modelers". The time commitment to become a certified modeler, about 640 hours, is commensurate with the task.

Creating a very high quality, comprehensive online training program is not enough to assure success. To succeed, talented and ambitious people must be attracted to the program. Fortunately, there is much that is attractive. People with strong economywide modeling skills grapple with important issues and frequently do so within high-profile and respected institutions. To provide potential students with a near term vision of a career path and to hone the skills of those of who have completed the full course, GTAP will work to facilitate engagement of certified modelers in a young scholars program (or similar) with relevant institutions for a defined period (3-6 months). Essentially all GTAP Consortium have indicated interest in the proposed young scholars program.

In terms of GTAP's role as a platform, GTAP stimulates discussion and debate via an annual conference, the *Journal for Global Economic Analysis* (JGEA), a virtual technical seminar series, and engagement with social media. The conference attracts about 200 scholars and practitioners from around the world. The most recent conference was held in Kigali in June 2025 and featured Akinwumi Adesina, President of the African Development Bank, as a keynote speaker. The 2026 conference will be held in Japan in the same venue as the signature of the Kyoto Protocol. Articles from the JGEA are among the most cited in the economics literature in the world in the past ten years. Aligned with its virtual technical seminar series, GTAP, jointly with the WTO, convened two sessions (to allow for attendance of network members at a

reasonable hour) of a technical workshop focused on analyzing the recent tariffs of the USA including the issue of tariff rate uncertainty. More than 90 leading analysts from around the world attended.

Looking forward, a new element that capitalizes on GTAP's ability to attract interesting speakers and recognizes the value consortium members derive from opportunities to interact with one another is being added. GTAP envisions a virtual policy seminar series targeted at consortium members and other selected guests. GTAP is pleased to share that the inaugural policy seminar has been agreed. The Director-General of the World Trade Organization, Ngozi Okonjo-Iweala, will present on the new global trade landscape.

GTAP's business model must evolve to support this new vision. Three major points underpin thinking on the evolution of the GTAP business model. First, stability and predictability are highly valued. Maintaining the fundamental GTAP business model wherein revenues from consortium fees, database sales, conferences, and training provide a solid baseline of support is a priority. Second, an exciting research agenda, funded principally via contracts and grants, remains crucial to the ability of the Center to attract and retain the highly skilled staff and collaborators that ultimately underpin success. Finally, as a global project, GTAP recognizes that its business model must evolve along with global conditions. Since the early 1990s when GTAP started, there has been a pronounced shift in economic weight across the global economy towards low- and middle-income countries. For example, growth in world trade is increasingly being driven by trade flows amongst emerging economies; and approximately 67% of global greenhouse gas emissions are currently sourced from low- and middle-income countries. In the aggregate, policy and investment decisions in low- and middle-income countries are likely to be the largest single factor in shaping global economic and environmental outcomes over the course of the 21st century.

Four new business model elements are considered in the main body, with the first three relatively large and recognizing the growing weight of low- and middle-income economies. These new model elements are: (i) open-access and open-source data, (ii) the comprehensive training program, (iii) country communities, which builds on new elements (i) and (ii), and (iv) an ongoing effort to establish a formal GTAP presence in Europe (GTAP-EU). GTAP is seeking supplementary funding to support all four new business model elements. These are treated in turn. Finally, a holistic approach to financing the new elements of GTAP's vision to 2035 and beyond is proposed.

For open-access and open-source (element i), GTAP seeks funds to replace database sales revenue (allowing a move to open access) and support an evolution to an open-source approach. Replacing all database sales revenue and supporting a move to open source would require a long-term commitment of approximately $800,000 per year. A more focused approach that targets open-access to qualified network members in countries classified as low- and middle-income in 2025 (and supports an evolution to open source globally) would require considerably less, about $450,000 per year. The imperative of long-term commitment to replacing database sales revenue is emphasized. In GTAP's view, a combination of a shift to open access and an evolution towards open source is by far the best approach for meeting data needs in countries and globally to 2035 and beyond and would constitute an extraordinarily impactful use of a moderate level of funding.

For a high-quality comprehensive course (element ii), development and implementation would require an up-front investment of approximately $800,000 in total. Once the course is developed and becomes known, course fees should make it self-sustaining, including an allocation for ongoing course development. The comprehensive course enables institutions within countries to confidently invest in modeling capacity; realize much greater value from the public goods that GTAP already provides in the form of data, models, seminar series, specialized courses, conferences, the JGEA and more; and develop sophisticated country or region focused analytical frameworks. Within two to four years, GTAP would aim to be graduating approximately 100 skilled modelers per annum (under a sustainable business model) with potentially huge implications for the ability of countries worldwide to confront 21st century challenges.

Turning to country communities (element iii), many countries express interest in engagement with GTAP. Today, most middle-income countries and many low-income countries now possess the human capital and institutional wherewithal to build highly competent and influential modeling groups to support decision-making within top institutions. Building on the comprehensive course, GTAP could usefully help to fashion a vision for a healthy economywide modeling ecosystem within interested countries and play a role in helping to bring about that vision. Importantly, this positions country

communities to make significant contributions back to the GTAP Network in data, models, tools, and more, drawing upon the country-level expertise of each community.

Required investment levels to establish healthy country communities would vary by country. Very roughly $100,000 per country per annum over three to five years (depending on existing capacity with the potential for longer durations in countries with very low initial capacity) would allow for the establishment of the desired ecosystem including a functional business model that maintains a healthy ecosystem without external support.

Finally, the establishment of GTAP-EU (element iv) aims to enhance GTAP's presence and collaborations within Europe and beyond. In the near term, commitments to fund activities by a future GTAP-EU would speed the establishment of GTAP-EU.

The business model discussion above depicts an ‘a la carte’ approach to funding the new elements of the GTAP vision. A more holistic approach may be preferred. Taking motivation from the GTAP Consortium, it may be worthwhile to explore the idea of organizing a group of GTAP Associates. The Associates group would focus on capacity building in low- and middle-income economies. A sufficiently large group of Associates would allow GTAP to embark upon all of the inter-related new elements of the GTAP vision.

For example, should 10 or more institutions with capacity building objectives commit to becoming GTAP Associates at $50,000 per year, this would enable open access to qualified individuals and institutions operating in countries classified as low- and middle-income in 2025, speed movement towards open-source data, help fund the development and implementation of the comprehensive course, and (once the course becomes self-sustaining) allow for the ideas set forth for country communities to be operationalized.

1. Introduction

Founded in 1992, the Global Trade Analysis Project (GTAP) supports an international network of more than 33,000 individuals engaged in quantitative analysis of pressing global challenges with emphasis on economywide analytical approaches. A consortium of leading national, international, and private institutions provides baseline financial support and strategic advice.

Guided by a philosophy of collaboration in domains of mutual benefit, such as data development, combined with an open marketplace for ideas in analytics as well as a strong commitment to training and capacity building, GTAP aims to generate the global public goods necessary to better position researchers, analysts, and decision-makers throughout the world to develop locally appropriate solutions to global challenges and, in this way, help realize shared global goals. In this, GTAP is widely regarded as having been successful (Akridge and Hertel 2025). GTAP-related analytics are a regular feature in the world's most prestigious scientific journals and inform a large array of decision-making processes by governments, international organizations, and private entities around the world.

This document sets forth a forward-looking vision for GTAP that builds on this record of success. The document's principal proximate goal is to set the stage for productive interaction, discussion, and debate amongst GTAP staff, advisory board members, and other key stakeholders. Following these discussions, the text will be appropriately modified and updated with a view to serving as a guidepost for strategic direction, allocation of resources, and decision-making including efforts to mobilize required resources to deliver more completely and effectively on GTAP's aims.

In this document, we focus on GTAP's role in developing analytical frameworks, assembling the underlying data, training people, conducting research, and fostering productive discussion and debate at global, national, regional and local levels. The remainder of this document includes seven sections. Section 2 describes the current activities of GTAP. Section 3 provides some descriptive statistics on the GTAP Network and an overview of how members of the GTAP Network leverage the activities of GTAP to advance their own missions and objectives. Section 4 examines recent trends in research and policy analytics, presents a set of interlinked modeling frameworks that both reflect recent trends and project them into the future, and sets forth the role GTAP within this modern context. With trends in analytics in hand, section 5 describes the data required to underpin existing and emerging analytical frameworks and the mode for assembling these data, including institutional linkages and the specific roles of GTAP. Section 6 focuses on training the analysts of the future. Section 7 examines GTAP's role as a platform for discussion and debate. Section 8 summarizes the current GTAP business model and takes an 'a la carte' approach to the resource requirements for the new element of the GTAP vision. Finally, section 9 sums up and considers holistic business models.

In the future-oriented sections beyond sections 2 and 3, emphasis is on new ideas and new modes of operations. However, before proceeding to the new, it is important to emphasize what will not change. First, GTAP firmly believes that the fundamental guiding philosophy of collaboration in domains of mutual benefit combined with an open marketplace for ideas in analytics and a strong commitment to training and capacity building is likely more relevant today than at any other point in time during the last three decades since GTAP was established. Second, GTAP aims to maintain and further develop our tradition of innovation and high ambition. Finally, there is no reason to modify GTAP's principal activity areas (section 2) or the basic principles of the GTAP business model (section 8).

2. What does GTAP do?

GTAP engages in three broad areas of activity.

GTAP lowers barriers for conducting high-quality, rigorous analysis of global issues. GTAP does this in three ways:

Data - GTAP assembles, reconciles, documents, and makes publicly available a suite of databases that are widely regarded as the gold standard for global economywide analysis. The core economic data for version 12, which is available to consortium members in pre-release form and expected to be available to the public in final form early next year, provides a complete depiction of global economic activity across 65 sectors in 145 countries and 18 aggregate geographical regions, plus 13 extensions and satellite data accounts (see Table A1 in Appendix A for a list of extensions and satellite accounts).

Models, tools, and software - GTAP develops and makes open source a suite of cutting-edge and fully documented models and tools and collaborates with leading analytical software providers as well as open-source programming communities in the application of these models.

Training – Through GTAP-U, GTAP offers regular training courses, ranging from introductory to advanced, to build the capacity of network members to undertake analysis using GTAP data, models, and software.

GTAP conducts research on pressing issues with global ramifications.

While the bulk of GTAP-related research is conducted by GTAP Network members, the Center for Global Trade Analysis, which is the administrative home for GTAP based at Purdue University (hereafter referred to as 'the Center'), boasts one of the largest groups of top-flight economywide modelers in the world. This unique concentration of skill is buttressed by sector expertise, notably in trade, food systems and the environment. Guided by the GTAP Consortium and a distinguished GTAP Scientific Council of leading academics, researchers affiliated with the Center, often in collaboration with other network members, address a wide range of issues and policy areas including trade and industrial policy, energy transitions, climate change, economic development, biodiversity preservation, pollution abatement, agricultural and food/dietary policies, and circular economy.

GTAP serves as a platform for interaction, discussion, and dissemination of novel approaches and new ideas to address global challenges.

GTAP brings together thought leaders at the Annual Conference on Global Economic Analysis[1], fosters innovation through the peer-reviewed *Journal of Global Economic Analysis*[2], hosts a virtual seminar series, and maintains an active presence on social media.

[1] The 28th annual conference was held in June of 2025 in Kigali and organized in collaboration with the United Nations Economic Commission for Africa (UNECA – a consortium member). It gathered 172 participants from around the world over three days and featured Dr. Akinwumi Adesina, President of the African Development Bank, as the opening plenary speaker. The program for the 28th conference can be found here. The new environment of 2025 combined with higher travel costs to Kigali, particularly from the Americas and Asia, kept 2025 conference participation below the average of more than 200.

[2] The JGEA is highly ranked relative to peer journals. For example, Research Papers in Economics (RePEc), which is arguably the leading calculator of impact factors (based principally on citations) for journals in economics and related fields, ranks JGEA 30 of 3000 (accessed July 18 2025). This is just below *The Econometrics Journal* of the Royal Economics Society of the United Kingdom and at the top 1% of all journals in economics. This ranking is based on simple impact factors over the last 10 years.

3. Who are GTAP Network members and what do they do?

Under the broadest definition of a GTAP Network member—having an account on the GTAP website—there were 32,851 network members as of July 28, 2025. Within this large group, there are 7,230 individuals who are recorded as having contributed to the Project by purchasing the database, contributing to the database, attending a course and/or conference, and so forth.

The GTAP Network can be less rigorously but more tightly defined as institutions and individuals who are currently interfacing with the Center and leveraging GTAP activities and products on a regular basis. The Center estimates that this group comprises about 1000 individuals including staff and collaborators of consortium members and of the Center; database, software, and tool contributors; regular attendees to the GTAP conference and/or technical seminars; and researchers who contribute papers to the *Journal of Global Economic Analysis.* This group is actively leveraging GTAP to conduct research and/or facilitate decision-making.

Finally, there is a group comprised of individuals and institutions who have purchased, pirated, or downloaded free versions of the GTAP Data Base but do not otherwise interface significantly with the Center. Less than half of the more than 500 institutions and individuals who have purchased version 11 of the GTAP Data Base over the past 2.5 years are known to the Center due to a history of engagement with the Center and the GTAP Network more broadly. The other approximate half of data purchasers work independently (though likely using GTAP models and tools). The Center makes no attempt to estimate the number of people who use the data without purchasing a license.

The following sub-sections aim to paint a picture of the GTAP Network relying on groups for whom information is available.

3.1 Network members

Table 1 shows some basic features of GTAP Network members illustrating all network members and contributing members. Some noteworthy aspects of the table include:

- the strong participation from Asia in the network overall and among contributing members,
- the relatively high number of students who are network members,
- the relatively small share of members and contributors from low- and lower middle-income countries (China is an upper-middle income country currently), and
- the relatively high share of contributing members from government or private entities.[3]

[3] Private includes all private for profit and some private nonprofit. For example, trade associations are included as private nonprofits. Private nonprofits dedicated to research, such as many independent research institutes, are included in the research group as are both public and private universities.

Table 1: Descriptive statistics for the GTAP Network.

	GTAP Network Members		Contributing Members	
Regional Distribution	Count	Percent	Count	Percent
Africa	3,480	11%	1,128	15%
Asia	14,088	43%	2,283	31%
Europe	7,108	22%	1,865	25%
North America	5,832	18%	1,511	20%
Oceania	888	3%	293	4%
South America	1,455	4%	300	4%
Country Status	Count	Percent	Count	Percent
Upper middle and High-income	26,822	82%	6,195	84%
Low- and Lower middle-income	6,029	18%	1,185	16%
Institutional Affiliation	Count	Percent	Count	Percent
Research	22,011	67%	4,352	59%
Government or private	10,840	33%	3,028	41%
Professional Status	Count	Percent	Count	Percent
Professional	18,049	55%	5,680	77%
Student	14,802	45%	1,700	23%

3.2 Consortium members

The Center is kept abreast of the activities of consortium members due to its regular interactions including an annual report on GTAP related activities submitted by consortium members to the Center. Figure 1 shows consortium members and the geographic distribution of their office headquarters. Table 2 lists consortium members by five organizational categories.

Figure 1: GTAP Consortium members.

Essentially all consortium members have interests in global trade and trade policy, but there is great diversity within this broad category. Examples of key issues recently highlighted by consortium members include the new trade landscape driven by policy shifts in the USA, industrial policy, services trade, resilience of supply chains, critical minerals, carbon

border adjustment mechanisms, trade and technology diffusion, physical risks posed by climate change, long-term implications of climate change for growth and development, energy transitions, food trade and food security, natural capital, biodiversity, and pollution abatement.

3.3 GTAP Data Base purchasers

A bit more than 500 individuals/institutions have ordered version 11 of the GTAP Data Base. Table 3 provides summary information on purchasers (a few orders are pending). Of these, slightly more than two thirds are affiliated with independent research institutions, principally universities, but also autonomous research institutes and think tanks. The remainder, a bit less than one third, are purchased by agencies within governments and private sector firms, principally government agencies. Sales of version 11 of the database are distributed across 72 countries. Geographically, the largest number of datasets are sold to countries who form a part of the European Union. Other major purchasers include China, United States, Japan, United Kingdom, Australia, South Korea, India, Brazil, Canada, and Indonesia.

Table 2: Consortium members by organizational category.

National	International Organization - Global	International Organization - Focused
CEPII, France	FAO, Rome	ADB, Manila
DBT, UK	IMF, DC	DG Trade - EC, Brussels
DEFRA, UK	ITC, Geneva	JRC - EC, Seville
ESRI, Japan	UNCTAD, Geneva	ERIA, Jakarta
Global Affairs Canada	World Bank, DC	IADB, Washington DC
USDA-ERS, USA	WTO, Geneva	OECD, Paris
EPA, USA		UNESCWA, Beirut
Commerce Dept, USA		UNECA, Addis Ababa
USITC, USA		

Research	Private for profit
IFPRI, Washington DC	Infinite Sum Modeling
MIT CS3, Cambridge	KPMG
Thünen Institute, Braunschweig	McKinsey Global Institute
Wageningen, The Hague	

Table 3: Profiles of database v11 purchasers.

	GTAP 11 Data Base Purchasers	
Regional Distribution	Count	Percent
Africa	17	3%
Asia	230	47%
Europe	119	24%
North America	77	16%
Oceania	26	5%
South America	22	4%
Country Status	Count	Percent
Upper middle and High-income	442	90%
Low- and Lower middle-income	49	10%
Affiliation Type	Count	Percent
Research	337	69%
Government and private	154	31%

Overall, network effects have been and remain crucial to the success of the Project. The network is large and healthy but also extraordinarily diverse in terms of topical interests and geographical focus. The network is also unified in its demand for quality and innovation thus permitting network members to operate at the frontiers of research and to facilitate deliberate decision-making by governments and private agents.

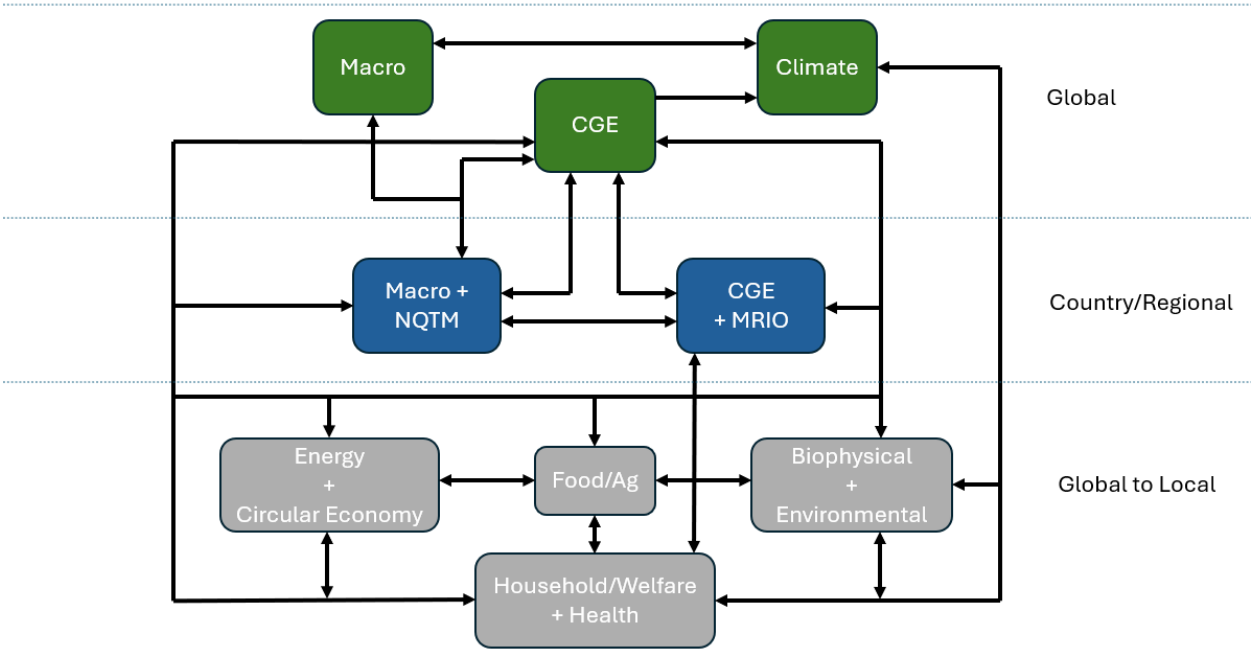
4. Analytical frameworks for the future

To frame the context within which GTAP looks to the future and to outline how the Project will achieve its aims over the long run, we discuss current trends in modeling analytics for knowledge discovery and decision-making. This will allow the role of GTAP within overall trends to be more precisely defined.

4.1 Trends towards an Integrated Assessment Network

The GTAP view of existing trends is summarized in the schematic presented in Figure 2. The figure depicts what we are calling an "integrated assessment network" (IAN) rather than a single large integrated assessment model (IAM). The idea is that research has been and will continue to trend towards deployment of modular approaches that enable a flexible fusion of best-in-class models brought together to respond to the issue at hand.

Figure 2: An integrated assessment network.



Note: CGE is computable general equilibrium, NQTM is new quantitative trade model, and MRIO is multi-region input-output.

In many cases, the most sensible approach may be to deploy a single model. For example, a global CGE model (green box in the center of the global layer), such as the GTAP global economywide model operating on its own. This is an excellent choice for first stage analysis of the recent tariff hikes by the United States and others. At the same time, a global CGE model is not well suited to addressing the full slate of issues confronting the global economy presently. The implications of recent tariff hikes for key variables such as inflation, interest rates, and concomitant implications for capital flows/trade balances are best handled by a macroeconomic model. In addition, while a global CGE approach does provide insight into the implications for distributional, more detail can be of substantial value. On the production side, an important empirical regularity is that exporting firms tend to be more productive. New Quantitative Trade Models (NQTM) track compositional changes in the structure of production that may have important implications for total factor productivity, both in terms of levels and trends. On the demand side, decision-makers in a particular country may want a more granular analysis of distributional issues across households (by sub-national region, for example) than is produced by GTAP's standard global CGE framework.

As such, the cutting-edge of analytical sophistication is increasingly relying upon the development and deployment of suites of modeling frameworks. For some pressing global issues, integrated analytical approaches are effectively a requirement due to their inter-disciplinary character.

Experience is accumulating within GTAP and elsewhere in the flexible application of modular approaches. Three further illustrative examples follow.

1. In food systems analysis, Wang (2024) developed and implemented a framework that links the GTAP global economywide model with a gridded agriculture/food/environment model (SIMPLE-G). This approach builds upon rapid developments in remotely sensed data and artificial intelligence to meet the need for fine-scale representations of Agriculture, Forestry and Land Use (AFOLU) processes in the development of solutions. In an application focused on the production response of Brazil to increases in border tariffs by China on US exports of agricultural products, Wang analyzes changes in production and land use at fine grid scales illuminating where and how Brazilian agriculture could respond to increased demand from China without increased deforestation.

2. In energy systems analysis, hard-linked and soft-linked economywide and energy sector models are now widely applied. A recent example includes soft-linking of the global CGE model ENVISAGE (a GTAP model) with the global energy system model KYNESIS and the atmospheric source-receptor model TM5-FASST for the assessment of the climate-policy impacts across a range of sustainable development goals (SDG) indicators (Chepeliev et al. 2024). This application identifies mitigation policies that generate co-benefits across 11 of 13 Sustainable Development Goals (SDGs). The authors conclude that co-benefits, notably gains in air quality, outweigh mitigation costs by more than a factor of two, thus changing previously identified trade-offs into synergies.

   At the country level, advanced CGE and energy system models are hard-linked and are equipped to endogenously capture critical tipping points such as large-scale transition to renewable energy sources and rapid electrification of transport within a detailed dynamic economywide framework. For example, in an application to South Africa, Hartley et al (2025) use a framework co-developed with GTAP staff and find that, while least cost pathways generate significant reductions in emissions, more ambitious emissions reductions impose costs. These costs can be substantially alleviated through greater external financing of the relatively high up-front costs of low emissions technologies.

3. The Organization for Economic Cooperation and Development (OECD) is developing a high-profile report tentatively entitled “Environmental Outlook on the Triple Planetary Crisis: Stakes, Evolution and Policy Linkages”, which is expected to be published in the Fall of 2025. The ‘triple crisis’ is defined as the interacting effects of climate change, biodiversity loss, and pollution. The OECD is actively collaborating with the Netherlands Environmental Assessment Agency (PBL) to couple OECD’s in-house ENV-Linkages model, for which GTAP data sit at the economic core, with PBL’s IMAGE environmental modelling framework. GTAP expects to engage with the OECD to elaborate an action-oriented follow-on report detailing robust policy responses to the triple crisis.

GTAP views the trends towards modular approaches as fundamentally sound and applicable to the broad GTAP Network including all consortium members. The role of GTAP in lowering barriers to high quality research within an IAN framework and in conducting research are addressed in the next two sub-sections.

4.2 The role of GTAP in lowering barriers to high quality research within an IAN framework

A core GTAP focus has been, and remains, in global CGE analysis—the green CGE box in the global layer in Figure 2. In addition, as part of sectoral expertise in food systems and natural resources, GTAP staff are also leading advances in gridded partial equilibrium approaches that span the grey Food/Ag and Biophysical and Environment boxes in the global to local-layer of Figure 2 via close engagement with the Global-Local-Global Analysis of Systems Sustainability Network of Networks (GLASSNET), which is also housed at Purdue University. GTAP has a role in advancing the research frontier in these two domains of the IAN framework in Figure 2.

Importantly for the Center, the IAN approach implies a threshold beyond which detailed analytics should take place within one or more relevant specialized models (global macro, climate, country macro, country CGE, energy, food/ag, biophysical/environment and/or household microsimulation). Rather than expanding the GTAP global economywide core

to meet constantly expanding demand for more granular analysis across a large array of research domains, the Center will aim to lower barriers to high quality analysis by focusing on global economywide analysis, gridded partial equilibrium approaches to food systems and the environment, and facilitating the IAN modular approach illustrated in Figure 2. Ideally, the other modeling groups comprising a healthy IAN will serve as sources of data and modeling frameworks linking to GTAP, enhancing the ability of all network members to develop advanced analyses deploying the IAN framework depicted in Figure 2. Desired features of the modeling groups forming a part of a flexible analytical suite, and thus underpinning a modular approach, include:

1. The groups maintain models that can be run independently and generate sufficient value in their standalone form to allow for a stable business model that finances maintenance as well as model improvement and innovation.

2. The individuals comprising the groups engaged in each box of Figure 2 form a reasonably coherent research community that sees linkages to other model communities as adding value.

3. The effort necessary to link across frameworks is more than offset by an enhanced ability to rigorously and comprehensively analyze key issues.

Modeling groups who meet these *desiderata* already exist in every box in Figure 2, and each model box typically contains multiple such groups. As the applications listed above help to illustrate, the schematic in Figure 2 is an unfolding reality with ample scope to improve the component frameworks in Figure 2, to expand the number of contributors, and to better facilitate their productive interaction.

4.3 The future role of GTAP in research[4]

As noted in section 2, researchers associated with the Center constitute a large group within a specialized area. Some implications of the vision for analytical frameworks summarized in Figure 2 for in-house research within the Center are as follows.

1. Ongoing development of the core global economywide frameworks with a focus on the principal advantages of economywide analysis. These are:

    a. *Comprehensiveness*. Economywide models have strong advantages when issues span sectors and countries/regions with varying implications for different household groups.

    b. *Rigor.* Accounting constraints and Walras' law constrain the solutions space, sometimes surprisingly tightly, making economywide models highly desirable for the analysis of larger and longer-term shocks.

    c. *People.* Economywide models address human economic welfare in a manner consistent with fundamental welfare theory rendering them well-suited for examining implications for the distributional impacts of policies on households and people. The ability to adequately elucidate the implications of alternative sustainable pathways for development prospects and human welfare is crucial for policy impact and goal achievement.

2. Continued development and integration of gridded frameworks, such as SIMPLE-G, that recognize that, while problem drivers are often global, solutions are often local, especially for inter-linked human/environmental issues.

3. The skills of research staff housed within the Center remain specialized methodologically but topically diverse such that sufficient expertise in domains of key interest to the GTAP Network—trade, industrial policy, development, food and agriculture, energy transitions, climate change impacts and adaptations, circular economy,

[4] This exposition focuses on GTAP's role in facilitating high quality analysis across the full GTAP network. The topical focuses of the research program/vision for the Center are being developed in collaboration with the recently formed GTAP Scientific Council.

biodiversity, and pollution—is present to properly undertake the three activity areas described in section 2 of this document.

4. Building on the diverse skills harbored in the Center, advance the cutting edge of the development of flexible and modular modeling frameworks as depicted in Figure 2.

5. Researchers housed within the Center make special efforts in research areas that deliver wide benefits to the broad GTAP Network including model intercomparison, best-in-class representation of economic behavior, and model validation.

With these trends for analytical frameworks in mind, the next section addresses associated data futures.

5. Data Futures

5.1 Background

Before looking forward, it is helpful to first look backward. Over the past three plus decades, GTAP has evolved in a manner analogous to long-run human development. It began as a "hunter-gatherer" operation, exploring the world and harvesting what data could be found. It then proceeded to an "agricultural" phase where it prepared the ground for data to be produced in concert with partners, harvested the data at a point in time, and then processed it to make it palatable for its community of users. GTAP is now in an "industrial" phase where data are obtained, processed, and distributed on a continuous basis leveraging a global supply chain of intermediate inputs. In addition, structurally new versions of the data are accompanied by historical updates such that a fully consistent time series of data accompanies each major data release. For example, the GTAP 12 database will contain a fully consistent series of snapshots of the global economy for the years: 2004, 2007, 2011, 2014, 2017, and 2019 plus a special preliminary release with a 2023 reference year to evaluate recent trade issues.[5]

5.2 Looking forward

GTAP's next stage of evolution involves becoming principally a provider of "services" that facilitates the production of data relevant to the problem at hand, rather than as a provider of discrete sets of data products *per se.* The transition from a manufacturer to a service provider aims to deepen and expand the network effects that underpin GTAP's success. Before proceeding, it is important to emphasize that, under all circumstances, GTAP will continue to coordinate the process of acquiring relevant component data sets; develop, document, and maintain code streams for processing data; and make available first to consortium members and then to the public a fully documented best possible picture of the global economy including relevant extensions and satellite accounts. A transition to becoming a provider of services does not substitute for this priority. Rather, it is designed to enhance the quality of this best possible snapshot of the global economy and increase the frequency of updating.[6]

GTAP envisions a deliberate and careful approach that methodically expands from an initial small, known, and trusted core of collaborators. The transition towards GTAP as a service provider involves four major initiatives.

1. *Faster data builds.* GTAP is updating all data build stream codes to rely on modern, supported, and publicly available software. The benefits of this are many. Two are in focus here. First, the update is increasing the speed of the build process for the core economic modules by a factor of approximately five due to an array of efficiency gains combined with an enhanced ability to parallel process. Second, the update facilitates collaboration/engagement with network members because it relies exclusively on widely known and used software packages.

2. *Bespoke datasets.* The second initiative builds upon the first. In data, GTAP's principal value added involves transforming publicly available data that are dispersed and inevitably inconsistent into a coherent picture of the global economy in a format that economywide modelers can readily use. For this exercise, GTAP takes an information theoretic approach that applies all available information, respects known constraints (e.g., total exports globally cannot exceed total imports globally), while imposing no additional unjustified information. This has been and remains the best-in-class approach to producing a single best possible snapshot of the global economy represented by one, fully consistent dataset.

   However, this is not always the best approach for every user and for every problem. Mathematically, the information theoretic approach described above tends to alter smaller flows proportionately more in the process of

[5] The details of the GTAP dataset are carefully documented and publicly available. Details for version 11 are here.

[6] For many consortium members and database users, real-time analysis of announced/considered policies with the most up-to-date data, user-friendly tools, and AI options such as visualization and write-up assistance are the top priority.

reconciling inconsistent information. In many applications, a particular sub-set of relatively small flows are important. For example, to pursue analytics that support the ongoing development and implementation of the African Continental Free Trade Area (AfCFTA), the United Nations Economic Commission for Africa is particularly interested in trade between African nations as well as trade between African nations and the rest of the world, yet initial trade flows along these routes are often quite small and hence subject to more adjustment than would be ideal for analytics focused on the AfCFTA.

Other groups are interested in the implications of a shift in the reliance of China on agricultural imports away from the USA to other exporters. These groups will focus on the accuracy of these highly relevant trade flows. These are just two examples of analyses within the GTAP Network that have very different focusses and hence different key data requirements.

Broadly, the best possible single representation of the global economy may not coincide with the best possible representation of the global economy for a specific purpose, even starting from the same information set. Importantly, users for specific purposes are often motivated to obtain additional information specific to the issues in which they are most interested. For these reasons, many users of GTAP data modify the data to better suit their specific purposes.

With a faster and more flexible build process in hand, GTAP is well-positioned to develop and document processes and procedures that facilitate the creation of bespoke datasets better suited to addressing the issue in focus. When network members bring new information to bear to develop a bespoke version of the GTAP Data Base, this constitutes a potential first step towards an improved version of the baseline GTAP Data Base in future. To begin implementing this, GTAP would make this service available to eligible network members (for a fee to cover incremental costs) on a pilot basis and move forward based on experience (also see initiative 4).

3. *Open access.* Since the early 1990s when GTAP started, there has been a pronounced shift in economic weight across the global economy towards (what were at the time) low- and middle-income countries, with substantial implications for sustainability, the environment, and the economic landscape. For example, approximately 67% of global greenhouse gas emissions are sourced from low- and middle-income countries (for a user friendly view, see Our World in Data). In addition, growth in world trade is increasingly being driven by trade flows amongst emerging economies (see McKinsey Global Institute, 2025 for a very recent analysis). In the aggregate, policy and investment decisions in low- and middle-income countries are likely to be the largest single factor in shaping global economic and environmental outcomes over the course of the 21st century. GTAP acknowledges this shift, which must be reflected in improved data (and model) development for these countries.

   While GTAP maintains a graduated pricing policy designed specifically to favor institutions and individuals working in low- and middle-income settings, data prices clearly remain an obstacle in low resource settings (see the descriptive statistics in section as well as Table A2 in Appendix A for database pricing). As emphasized, GTAP relies on network effects. Individuals and institutions who become users are much more likely to eventually become contributors. An open access policy for data would expand the network with the strong likelihood that the greatest stimulation of positive network effects would occur in low- and middle-income economies. A policy of open access for data would have to be accompanied by a shift in the business model to accommodate the loss of database sales revenue. This is addressed in section 8.

4. *Open source.* With initiatives one and two in hand (plus, ideally, initiative 3), GTAP would be well positioned to begin a transition to an open-source model. This fourth initiative would complete GTAP's evolution from a manufacturer of data to a provider of data assembly services. The proposal is to evolve deliberately and carefully towards an open-source model beginning with a coalition of willing consortium members. The idea is that, over time, this coalition extends to a greater number of consortium members and to an expanding number of database contributors. A key goal is to reinforce and expand network effects such that members of the network have incentives to work to improve/update the data within a context where all members of the network eventually derive benefits from this work and innovation.

The idea is that the package of four initiatives described above:

a. stimulates an expanding set of providers to contribute to the GTAP community high quality and easy to incorporate component data sets on a timely and regular basis;

b. allows for more skilled eyes to review, implement, and improve the data build process, including application of artificial intelligence;

c. aligns with modern modeling trends as discussed in section 4;

d. increases the frequency of fully detailed data releases allowing for up-to-date analysis;

e. facilitates engagement of low- and middle-income countries in the network; and

f. fosters innovation that has not yet even been considered.

For these modeling and data visions to be realized at the scale commensurate with the global issues being confronted, stepped-up training efforts will also be required.

6. A Vision for Training

6.1 Background and motivation

How many skilled economywide modelers (with capacity to operate at global, regional, national, and sub-national scales and to interface with other models as in the schematic in Figure 2) does any given country need? The answer is likely no more than a dozen. Despite this relatively limited scale of demand, a near total consensus across consortium members and throughout the GTAP Network is that supply is not keeping up with demand, as demonstrated by the ongoing vacancies at many GTAP member institutions.

Furthermore, uncertain and inadequate supply is almost surely attenuating demand. Ministries of finance, central banks, planning authorities, line ministries, research institutes, universities and even some international institutions as well as sophisticated private sector actors are often unwilling to undertake the substantial investment necessary to install an economywide modeling capacity when prospects for maintaining and building upon that capacity are costly and uncertain. This attenuation of demand is likely most pronounced in low- and middle-income countries where resources are tightest, capabilities to train new modelers most limited, and opportunities for impact potentially greatest.

Moreover, the capacity to train a new generation of modelers for the future appears to be static or in global decline. For example, in the United Kingdom, despite a distinguished tradition in this field, GTAP leadership is unaware of a single tenured academic economist with a joint teaching/research appointment and a focus on economywide modeling. In the United States, the number of academic economists actively engaged in training/mentoring aspiring economywide modelers is also in decline.

Before proceeding to our training vision for the future, it is important to consider the sources of the current supply dearth. Four factors are highlighted.

1. *The demand for skilled economywide modelers is, as already noted, both relatively small and geographically dispersed*. In Europe, the United States, and China, annual demand for newly trained and highly skilled economywide modelers entering professional positions might, on an annual basis, be in the range of 10-25. In Japan, perhaps five to 10. In places like Indonesia, Egypt, South Africa, and Colombia, somewhere in the range of one to five. Outside of Europe, the USA, and China, these numbers are inadequate to support a formal graduate level university class. For Europe, the USA, and China, all aspirants must congregate in one university to generate a normal sized graduate level class. But they do not. Even at Purdue University, which is likely the largest locus of economywide activity and training in the world, the graduate level class in economywide modeling is only offered every other year to assure adequate student numbers.

2. *The state of the art is now more advanced*. Accordingly, it takes more time to acquire the skills necessary to be close to the state of the art. The level of complexity and inter-disciplinary nature of the issues being addressed also create strong incentives for researchers to operate within a team or larger group.

3. Following from point 2, economywide modeling skills have concentrated in *institutions that are strongly research, rather than teaching/training, oriented*. The strong research orientation of the members of the GTAP Consortium is illustrative in this regard. In university settings, global trends away from ‘hard money’ and towards ‘soft money’ are also likely also important. The latter (soft money) typically does not support broad and long-term training objectives.[7]

[7] For example, consortium members based in university settings--MIT and Waginengen-- are important contributors to research and policy debates but do not have broad based training as part of their operating models.

4. The relatively more efficient training programs that are offered, such as the training courses of GTAP-U, are invariably *too short in duration* to confer the required depth and breadth of skills in the absence of very significant supplementary training and mentoring.[8]

Due to the interacting effects of these and other factors, current institutional arrangements are not producing the flow of skilled economywide modelers required.

6.2 A comprehensive course

GTAP believes that it is very well positioned to take major steps towards alleviating this supply constraint through the development and implementation of a high-quality, comprehensive, and online course series. Careful consideration and work will be required to develop the new curriculum. At the same time, GTAP has a large volume of course content to draw upon, building on more than three decades of experience in teaching/training economywide modeling to thousands of short-course participants and hundreds of students enrolled in PhD level courses. Current ideas are as follows. GTAP proposes to proceed in a modular format.

Module 1 groups together participants who aspire to be modelers with individuals whose aim is to be savvy users of sophisticated research for decision-making, including but not limited to economywide modeling. By the end of module 1, participants should demonstrate an understanding of the classes of issues that economywide models are well suited to address, familiarity with key literature, the ability to deploy basic economic theory for policy analysis, and some intuition of how economywide models work.

Module 2 focuses on basic economywide modeling skills, data, and technical issues. As such, module 2 will focus, in terms of analytics, on building up simple CGE frameworks from first principles, analyzing macroeconomic adjustment, social accounting matrices, and multiplier analysis. In terms of data, the course will cover input-output tables, trade data, agricultural commodity production data, household survey data, protection data, tax data, multi-region input-output, energy data, relevant gridded data, an overview of biophysical models, data splitting and balancing procedures, data management, the GTAP build stream, and the basics of numerical optimization procedures. A working knowledge of GAMS or GEMPACK is likely to be a prerequisite to module 2.[9] Participants who successfully complete module 2 will qualify as strong research assistants/associates.

Module 3 aims to convert strong research assistants/associates into skilled (but still junior) modelers. This module will be divided into two parts. The first provides a PhD level treatment of the fundamentals of economywide modeling. Upon successful completion of a mid-module assessment, participants proceed to delve more deeply into areas in which they wish to specialize. Possible areas might include dynamics, economic growth, labor markets, household micro-simulation and welfare analysis, new quantitative trade models, imperfect competition, public finance, Melitz models, risk and uncertainty, macroeconomic effects and links to macroeconomic models, trade and industrial policy, linking with models at the grid scale, energy transitions, biodiversity, and pollution.[10] Students who successfully complete module 3 assessments become "GTAP certified CGE modelers".

Table 4 summarizes the current idea of three modules. As emphasized at the outset, the critical human resource shortage is in the availability of highly skilled modelers. The proposed approach requires about 640 hours of time commitment (32 weeks at 20 hours per week) from participants who aim to complete all three modules. With this level of commitment, a

[8] This does not imply that the current GTAP-U course series is not useful or should be abandoned. The current set of GTAP-U courses play a particular role.

[9] By the end of module 2, participants will be expected to attain strong proficiency in one of these two higher order computer languages and a working knowledge of the other.

[10] Initial 'alpha' and 'beta' versions of the course will focus on a limited number of specialized areas that remain to be determined (see the proposed process paragraph near Table 1). With time and growing enrollments, it will be possible to add more areas allowing participants a greater array of choice in specialization.

skilled and motivated individual can be expected to successfully complete all modules and be positioned to contribute substantially to work-flows in key institutions.

The modular structure recognizes that not all participants wish to complete all modules and some may not prove capable. The modular approach permits the comprehensive course to: (i) meet the needs of those wishing to be savvy consumers and/or strong research assistants/associates, (ii) provide recognition of meaningful accomplishment upon successful completion, and (iii) provide an opportunity for both participants and GTAP to assess the wisdom/desirability of proceeding to the next step. The mid-term assessment in module 3 simply recognizes that continuing to specialize is not worthwhile if the fundamentals have not been adequately absorbed.

Table 4: Comprehensive course structure.

Module	Hours	Objective
1	80	Savvy consumer with intuitive grasp of modeling.
2	240	Excellent research assistant/associate.
3	320	GTAP certified CGE modeler.

To develop the online curriculum, the following process is envisioned. GTAP will form an overall steering committee, co-chaired by the founder of GTAP, Tom Hertel, and the Director of GTAP, Channing Arndt, that includes leading researchers in economywide analysis who have also devoted considerable time and effort to teaching/training. This steering committee will form separate committees of individuals whose charge is to outline curriculum for each module. Once the outline of the approach is agreed across the steering committee and all module committees, these module committees will then assign individuals or small groups of individuals to develop the detailed curriculum for each week of each module including assessment criteria and approaches. A separate group of at least three experts in adult learning via distance technologies will provide oversight and technical assistance in the development of detailed course materials with an emphasis on integrating participants into effective communities of learners. This group of online learning experts must approve all materials as reflecting the state of the art in online learning. The steering and module committees assure that the most relevant topics are covered and that modules are tightly interwoven and mutually reinforcing.

It is expected that, upon certification as an economywide modeler, some graduates of the comprehensive program will have formal links to institutions with the wherewithal to provide ongoing mentorship opportunities. Another group of certified modelers will be looking to land a job at a relevant institution. A third group may be affiliated with an institution with weak modeling capacity. For the latter two groups in particular, an additional step (a module 4) is planned. GTAP will work to facilitate engagement of certified modelers in a young scholars program (or similar) with relevant institutions for a defined period (3-6 months). Certified modelers would be expected to play a substantive role in producing a competent analysis of a relevant issue and would expect to be compensated sufficiently by the hosting institutions to cover reasonable travel and living expenses over the period. Essentially all GTAP Consortium have indicated interest in the proposed young scholars program in line with this vision for a module 4.

Finally, once the course becomes established, GTAP will consider the idea of organizing a career fair around the GTAP conference. Many potential employers already attend the GTAP conference on a regular basis, and recent graduates of the comprehensive course should be interested in the contents of the conference. Formalizing the opportunity for employers and GTAP certified modelers to meet one another potentially provides a valuable service and drives up the value of the GTAP conference overall.

6.3 Success factors

The success of an ambitious training initiative such as the one described above depends on two major factors. First, a high-quality program must be developed and implemented. This factor has been the principal focus thus far.
Second, talented and ambitious people must be attracted to the program. Module 4 both seeks to hone the skills of participants who have made the effort to complete the program and to provide potential students with a near term vision of

the nature of the work in which they might engage and the institutions that might be interested in employing those with demonstrated modeling skills. The idea of a career fair targets similar objectives via a different mode.

Overall, while efforts to attract highly qualified students presents challenges that should not be underestimated, the fundamentals are strong. GTAP certified modelers make themselves eligible for attractive careers. People with strong economywide modeling skills grapple with important issues and do so within well-known and respected institutions. In sum, there is a compelling case to invest in building a career in economywide modeling. It is, nevertheless, necessary to make the case to potential candidates. The career fair and other publicity on social media and the listserv will help to get the word out that these are great opportunities.

7. GTAP's Role as a Platform

As highlighted in section 2, GTAP serves as a platform for discussion and debate via the annual conference, the JGEA, a virtual technical seminar series, and other activities such as engagement with social media. To complement the technical seminars that feature in the current virtual seminar series, GTAP envisions a virtual policy seminar series targeted at consortium members and other selected guests. The policy seminar series capitalizes on GTAP's ability to attract interesting speakers and recognizes the value consortium members derive from opportunities to interact with one another. To foster open communication, the policy series will follow a modified Chatham House rules format, encouraging wide ranging discussions without the sharing of specific statements/attributions outside the meeting. GTAP Consortium member representatives will be requested to invite a limited number of their staff to each policy seminar. GTAP will also identify selected guests. The aim is that the audience is composed of individuals who will benefit from the discussion and can contribute to it.[11]

GTAP is pleased to share that the inaugural policy seminar has been agreed. The Director-General of the World Trade Organization, Ngozi Okonjo-Iweala, will present on the new global trade landscape.

[11] Timing will be an issue. Due to differing time zones, it is not possible to schedule events at convenient times for all consortium members. The Center will aim to assure a balance of time choices such that times are not always deeply inconvenient for one subset of consortium members. Policy seminars may have a global or regional focus. In the case of the latter, timing will be set to align with topical focus where possible.

8. Current and New Business Models

As noted, a functional business model has been a key element of GTAP's success over the course of three decades. The future GTAP business model must accommodate the visions set forth in sections 4-7 if they are to be realized.

8.1 Current situation

Compared with its impact, the Center's total budget is strikingly modest. Seventeen faculty and staff members are associated with the Center (see a list of all personnel including bios and links to CVs here). In addition, the Center currently supports four graduate students in pursuit of a PhD and one in pursuit of an MS. Not all listed personnel devote full-time activity to the Center. Current full-time equivalents (FTE) are approximately 15. Personnel costs are by far the largest cost category comprising about 75% of direct costs. The Center's current salary and fringe benefit costs come to about 2.2 million USD per annum.

The Center benefits from five streams of revenue.

Currently, 30 institutions are members of the GTAP Consortium. Each consortium member contributes $20,435 USD annually in *consortium fees*, generating an expected annual income of $613,050 USD.[12]

Database sales constitute the second stream. Database revenues are cyclical with revenue concentrated in the year immediately following the release of a new version of data and tailing off in the year immediately prior to a new release. Database releases have recently followed an approximate three-year cycle generating approximately $400,000 per annum on average. GTAP believes that, with fee increases (see Table A2), an increase in periodicity of new releases to once every two years, and the revival of interest in trade and industrial policy as a consequence of the new international landscape, the expected revenue from database sales will rise to approximately $600,000 per annum on average.
The next two revenue streams relate to *courses and the annual conference*, which each generate about $115,000 per annum. The final stream, consisting of *research contracts and grants*, covers all remaining costs. This stream currently represents a bit more than 50% of total revenues.

Consortium fees and database sales have been remarkably stable over the years. For the current set of consortium members, the average duration of membership is more than 16 years. There are no current consortium members registering dissatisfaction with the value proposition that GTAP provides, and there are good prospects for new consortium members. Database sales enjoy a reasonably steady client base of more than 500 institutions/individuals. Finally, network members make considerable in-kind contributions to the overall Project such as (but not limited to) data, tools, and software.

As noted, this relatively stable funding baseline is supplemented by contracts and grants, which constitute the main source of financing for research activities conducted by the Center. Like all research institutions, the Center has a strong preference for larger, more flexible, and longer-term research grants, though this is easier said than done.
The Center seeks to preserve this fundamental business model wherein revenues from consortium fees, database sales, conferences, and training provide a solid baseline in support of all three activity areas described in Section 2. At the same time, an exciting research agenda, funded principally via contracts and grants, remains crucial to the ability of the Center to attract and retain the highly skilled staff and collaborators that ultimately underpin success in all three areas of activity. Nevertheless, to realize the new elements of the vision to 2035 and beyond, new business model elements will be required.

8.2 New business model elements

Four new business model elements are considered here. The first three are relatively large and pertain to the new elements discussed in sections 4-7. These three are worldwide in scope but also recognize the growing weight of low- and middle-

[12] The consortium fee has not been increased since 2016. The Center is in discussion with consortium members about an appropriate increase for 2026 and a regular schedule of increases thereafter.

income economies in global economic activity. The final one is ongoing and relates principally to better serving GTAP Network members in Europe. GTAP is seeking supplementary funding to support all four new business model elements. These are treated in turn including an estimate of additional resource requirements on an element-by-element basis.

8.2.1 Open-access and open-source data

The motivations for moving to open-access and open-source approaches were detailed in section 5. At its heart, the goal is to expand the network effects that GTAP relies upon to generate the highest quality possible global public goods, notably in the form of a fully reconciled and comprehensive global data set (including satellites and extensions). Low- and middle-income countries are crucial to effectively confronting global challenges. At the same time, institutions and researchers in low- and middle-income countries are resource constrained. While GTAP has made considerable efforts to engage with low- and middle-income and has experienced considerable success in this domain, database fees still constrain network effects, especially in these crucial regions of the world.

An open access model has long been a GTAP objective. However, database sales have been and remain an important, stable, and long-run revenue source for the Center. Hence, replacement revenue is essential. Replacement of database revenue requires a long-term commitment by a funder or group of funders to match or exceed expected database sales revenue for an extended period. In addition, the shift to open access and a new revenue source should not affect the governance of GTAP, notably data development priorities. The Advisory Board, composed of consortium members, has been and should remain the channel for advice to the Director on the evolution of the data. A funder (or funders) offering to cover lost database sales revenue would be welcome to join the consortium, but that (those) funding institution(s) would have no greater weight in making database development decisions than any other consortium member.

Turning to open source, the first step involves speeding the build process including the potential incorporation of modes for building bespoke data sets aimed at specific issues as discussed in section 5. The second step involves a thoughtful and careful evolution towards an open-source approach. Incremental funding would accelerate the development of a more flexible build code stream that allows for the creation of bespoke data sets and the move towards an open-source approach.

In GTAP's view, a combination of a shift to open access and an evolution towards open source (including the capacity to quickly develop bespoke data sets) is by far the best approach for meeting data needs in countries and globally to 2035 and beyond and would constitute an extraordinarily impactful use of a moderate level of funding. Replacement of all database sales plus a funding increment to speed the steps towards an open-source approach would require a long-term commitment of approximately $800,000 per annum. A less comprehensive approach aimed at providing open access to institutions and qualified individuals in countries classified as low- or middle-income in 2025 would require a lower resource commitment of around $450,000 per annum.[13]

8.2.2 Training vision

The development and implementation of a high-quality comprehensive course, supplementing (not replacing) the existing courses under GTAP-U, would require up-front investment in terms of course development, initial implementation, and the effort necessary to mobilize demand. Unlike the transition to open access/source, the development of a comprehensive online course only requires a fixed-term up-front investment. Once the course is developed and becomes known, course fees should make it self-sustaining, including an allocation for ongoing course development.

The Center is in search of a group of funding institutions and willing consortium members to cover these up-front investment costs. A potentially promising mode for doing this would be to develop and deliver an Alpha version of the course to 20-30 participants. With the experience gained, one could revise and deliver a Beta version to an additional 20-

[13] Under the current model, low- and middle-income country are very likely to be the fastest growing element of database sales. If the focus is uniquely on replacement of revenue of countries classified as low- and middle-income in 2025, accounting for replacement of likely growth in revenue becomes more important.

30 participants. The total cost of developing and implementing the course (all three modules) two times (Alpha and Beta versions) with roughly 20-30 participants in each of the Alpha and Beta versions is estimated at about $800,000. This works out to no more than $20,000 per initial participant.[14]

If a willing group of funders, consortium members and other interested institutions could cover costs for two cohorts of 20-30 participants and the same willing group were able to help identify 20-30 promising participants,[15] Alpha and Beta versions of the course could be developed and delivered. With the combined experience from the Alpha and Beta versions, GTAP would be able to broadly advertise, accept applications, and charge for a regular comprehensive course delivered online to 2035 and beyond.

As noted in section 6, a key element to making a comprehensive course self-sustaining is for participants to be able to see a career vision following the investment of time and funds in the comprehensive course. Hence, while the placement of young scholars into active institutions (module 4) is not part of the certification process, it is an important part of the business model, especially at initial stages when the comprehensive course lacks an established placement track record. When a compelling career vision is in place, GTAP believes that many talented candidates will be willing to invest time and money to acquire the necessary skills.

Within two to four years, GTAP would aim to be graduating approximately 100 skilled modelers per annum (under a sustainable business model) with potentially huge implications for the ability of countries worldwide to confront 21st century challenges.

8.2.3 Country communities

As noted in section 6, there are clear cases where major institutions within countries decide not to invest in economywide modeling capacity because of concerns about their ability to maintain that capacity. Hence, an available comprehensive course would be of value as it assures an ability to bring in trained people at a known and reasonable cost. An efficient pipeline of trained people is an important (though not only) element for establishing a healthy analytical ecosystem where economywide modeling skills can deliver on their promise in making better policy and investment decisions.

Many countries express interest in engagement with GTAP. GTAP staff have, in the past six months, discussed in-person the potential for engagement with key personnel representing top-level institutions from Brazil, Ethiopia, India, Indonesia, Kenya, Morocco, Saudi Arabia, South Africa (via Zoom and planned in-person for October), and Uganda. For example, in India, the Director of GTAP recently presented at Centre for Social and Economic Progress and met for more than an hour with Suman Bery, the Vice Chairperson of NITI Aayog (this position has the rank and status of a Cabinet Minister) to discuss the roles GTAP might play in helping to formulate strategic directions for India in a new trade landscape.

As a second example, two institutions in South Africa—The Economic Policy and International Cooperation Department of the National Treasury (EP-NT) and the South African Reserve Bank (SARB), have a history of applying economywide models to an array of policy issues and of engagement with GTAP staff.[16] EP-NT and SARB maintain ties with modeling groups based in South African universities and independent research organizations such as the Energy and Industrial Systems Research Group at the University of Cape Town and the Bureau for Food and Agricultural Policy.

Nevertheless, the key institutions in both countries have been candid about their difficulties in recruiting highly skilled economywide modelers. While decision-makers in both contexts are well aware of the value that strong economywide modeling capabilities bring to their ability to deliver on development objectives in a context of climate change, they also recognize the risks posed by the lack of a reliable training pipeline.

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[14] This is below the cost for many online master's degrees in economics in the US.

[15] The identification of promising participants is not likely to be difficult, especially if most costs are covered. It just needs to be thoughtfully and deliberately done.

[16] For example, the South African Reserve Bank (SARB) deployed the modeling framework described in Hartley (2025) to conduct a financial stability review under climate change. The team charged with writing the report received the annual Heads of Department (HOD) award (a SARB internal recognition) for "exceptional initiative and thought leadership in developing South Africa's first climate risk stress-testing framework." Members of the team are candidates for the Governor's award later in 2025.

The suggestion is that these and other governments consider a broad approach wherein consortium membership is one element of an effort to build a healthy ecosystem for economywide modeling. Elements beyond consortium membership might be:

a. Formally or informally committing to purchasing 1-3 places in the GTAP comprehensive course per year for a period (perhaps three to five years).

b. Build on relationships (such as with CSEP in India and EISRG and BFAP in South Africa as well as others) to facilitate a flow of high potential candidates into these course slots. Slots should also be allocated to interested and motivated faculty members at relevant universities to foster capacity within the university system.

c. Engagement to clarify roles within the ecosystem such that data and modeling work within the country-level ecosystem is mutually reinforcing, builds on the international data and model frameworks provided by the broad GTAP Network, and ultimately returns public goods to the global network.

Overall, most middle-income countries and many low-income countries now possess the human capital and institutional wherewithal to build highly competent and influential modeling groups supporting decision-making within top institutions. The approach described above is also relevant in many high-income contexts. The exact way forward would depend on each country case. The main point is that GTAP could usefully help to fashion a vision for a healthy economywide modeling ecosystem within interested countries and play a role in helping to bring about that vision.[17] The comprehensive course is an important element that enables institutions within countries to confidently invest in modeling capacity; realize much greater value from the public goods that GTAP already provides in the form of data, models, seminar series, specialized courses, conferences, the JGEA and more; and develop sophisticated country or region focused analytical frameworks. Importantly, this positions country communities to make significant contributions back to the network in data, models, tools, and more, drawing upon the country-level expertise of each community.

The funding estimated for the development of the comprehensive course (section 8.2.2) would enable this vision of forming country communities to be pursued in a limited number of cases. Financial commitments to the course beyond the course development phase in focus in the section above plus an increment to cover other elements of country engagement would facilitate productive two-way engagement (GTAP provides training and supports selected analytics while countries make available relevant data, models, and tools to GTAP) on a continuing basis and permit engagement with a greater number of countries. Required investment levels would likely vary by country. Very roughly $100,000 per country per annum over three to five years (depending on existing capacity with the potential for longer durations in countries with very low initial capacity) would allow for the establishment of the desired ecosystem including a functional business model that maintains a healthy ecosystem without external support.

8.2.4 GTAP-EU

The Center is in the process of obtaining permission from the Board of Trustees of Purdue University to establish GTAP-EU. GTAP-EU aims to be a foundation of public interest based in Brussels, Belgium. In seeking to establish GTAP-EU, the Center notes that, of 30 GTAP Consortium members, 12 are based in Europe (two of those in the United Kingdom). Two units of the European Commission—the Trade Directorate based in Brussels and the Joint Resource Centre based in Seville—are among these 12.

GTAP-EU is designed to enhance:

[17] GTAP staff have, in the past six months, discussed the potential for engagement along the lines outlined in this section with key personnel representing top-level institutions from Brazil, Ethiopia, India, Indonesia, Kenya, Morocco, Saudi Arabia, South Africa (via Zoom and planned in-person for October), and Uganda. For example, in India, the Director of GTAP recently presented at Centre for Social and Economic Progress and met for more than an hour with Suman Bery, the Vice Chairperson of NITI Aayog (this position has the rank and status of a Cabinet Minister) to discuss the roles GTAP might play in helping to formulate strategic directions for India in a new trade landscape. Strong potential demand clearly exists in these and many additional countries.

- GTAP's presence in Europe,
- Ties to EU-based consortium members by having a closer physical presence,
- Funding by enabling full participation in European Commission sponsored research,[18]
- Research by deepening collaborations with counterparts in universities and research institutions throughout Europe,
- Educational reach by holding GTAP-U courses in Europe, and
- Recruitment by engaging the labor market for highly specialized skills available in the EU.

GTAP – EU is also expected to facilitate work in Africa, the Middle East, and Asia, due to closer proximity in time zone. GTAP expects to establish GTAP-EU with existing resources. Nevertheless, firm commitments, especially longer-term commitments, to fund activities by a future GTAP-EU would help to speed the process by buttressing the business case that the Center is making for GTAP-EU to Purdue administration and ultimately to the Purdue Board of Trustees.

[18] Partners not based in the EU are typically limited to $165,000 in large Horizon-type projects.

9. Summing up and a Holistic Business Model

9.1 Summing up

For more than three decades, GTAP has delivered on its three principal areas of activity: (i) lowering barriers to high quality quantitative analysis of global issues, (ii) conducting impactful research, and (iii) serving as a platform for discussion and debate. In so doing, GTAP has underpinned a vast array of analytics and ultimately decisions by national, regional, international, and private institutions as they grapple with global issues. GTAP leadership believes that GTAP's fundamental philosophy-- collaboration in domains of mutual benefit, such as data development, combined with an open marketplace for ideas in analytics as well as a strong commitment to training and capacity building-- has withstood the test of time. Indeed, this philosophy applied to GTAP's three principal activity areas is likely more relevant now than at any time in the past three decades.

GTAP aims to continue to generate the global public goods necessary to better position researchers, analysts, and decision-makers throughout the world to develop locally appropriate solutions to global challenges and help realize shared global goals. GTAP aims to build on a tradition of ambition and innovation. The vision set forth in this document reflects this spirit. It is driven by an overall question: What are trends at the cutting edge of research that can lead to locally appropriate solutions to solutions to global challenges? The response is a trend towards flexible modular approaches, as depicted in Figure 2. GTAP leadership regards this trend as sound and deserving of support. With this trend in mind, this document delved into the implications for research, model and tool development, data, training, and GTAP's role as a platform resulting in the following three fundamentals of the 2035 vision.

1. Maintain focus in three core analytical domains:
    a. Global economywide (CGE) modeling (the green CGE box in the global layer of Figure 2);
    b. Gridded partial equilibrium modeling comprehending food, agriculture and the environment (a fusion of the food/ag and the biophysical and environment boxes in the global to local layer of Figure 2) building on the SIMPLE-G framework and the relationships developed via GLASSNET; and
    c. Advancing and facilitating modular approaches to inter-disciplinary issues to realize the potential of an effective Integrated Assessment Network.
2. Expand network effects in three principal ways:
    a. Continue to cultivate relationships and linkages with established analytical groups specialized in areas outside of the two core domains specified above;
    b. Move expeditiously to open access (with revenue replacement) and evolve towards open source for data; and
    c. Leverage GTAP's many assets to develop and deliver an ambitious and comprehensive training program in economywide analysis.
3. Recognize the importance of low- and middle-income economies to the achievement of shared global goals. Tangible modes for advancing this recognition include (but are not limited to):
    a. Prioritizing countries defined as low- and middle-income in 2025 in pursuing open-access data policies;
    b. Assuring that promising young scholars from low- and middle-income have access to the comprehensive training program and that the program is attuned to the analytical needs of these individuals and the institutions they are likely to serve: and

c. Developing country communities that both strive for healthy analytical ecosystems within countries and foster productive exchange and collaboration across countries.

The trend towards an Integrated Assessment Network (IAN) motivated the GTAP vision. And, a compelling and exciting research program is crucial to attracting and retaining the highly skilled researchers who are key to the success of GTAP. Nevertheless, at this juncture in time, the operational lynchpin for realizing this vision at a scale commensurate with the challenges confronting the global community is the comprehensive training. The synergies derived from improved network effects via open-access and open-source data policies are greatly leveraged as the number of modelers and modeling groups expand, especially those with the skills to creatively manipulate models, data, or both.

9.2 A holistic business model

Section 8 took an 'a la carte' approach to associating business models with the new elements of the GTAP vision. A more comprehensive approach may be preferred. Taking motivation from the GTAP Consortium, it may be worthwhile to explore the idea of organizing a group of GTAP Associates. While the GTAP Consortium focuses on data and analytics, the Associates group would focus on capacity building in low- and middle-income economies. A sufficiently large group of Associates would allow GTAP to embark upon all of the inter-related new elements of the described in this vision document.

For example, should 10 or more institutions with capacity building objectives commit to becoming GTAP Associates at $50,000 per year, this would enable open access to qualified individuals and institutions operating in countries classified as low- and middle-income in 2025, speed movement towards open-source data, help fund the development and implementation of the comprehensive course, and (once the course becomes self-sustaining) allow for the ideas set forth for country communities (section 8.2.3) to be operationalized.

Benefits to Associates could be:

a. An annual report of capacity building activities,

b. An annual virtual meeting where the report and implications for future priorities are discussed,

c. Attendance at GTAP conferences, and

d. Invitations to policy seminars.

10. References

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11. Appendix A

Table A1: GTAP Extensions and Satellite Data Sets.

	v9	v10	v11	v12
GDyn	X	X	X	X
GMig2	X	X	X	X
GTAP-E	X	X	X	X
GTAP-Power	X	X	X	X
Land Use and Land Cover	X	X	X	X
Circular Economy			X	X
MRIO		X	Forthcoming	X
Energy Subsidies		X	Implicit in standard data	
APT		X	Implicit in standard data	
CO2 Emissions	X	X	X	X
Energy volumes	X	X	X	X
Non-CO2 Emissions	X	X		
Air Pollution		X		
Complementary GHG Emissions (Non-CO2 + Air Pollution)			Included in standard release	
Food Balance Sheets		X	X	X
Bilateral Time Series Trade Data		X		X
Non-Tariff Measures			Forthcoming	X

Table A2: GTAP Data Base Pricing (USD)

	Standard Price (High and Upper-Middle Income Economies)				**Lower-Middle Income Price**				**Low Income Price**			
	v9	**v10**	**v11**	**v12**	**v9**	**v10**	**v11**	**v12**	**v9**	**v10**	**v11**	**v12**
Private Sector (for profit)												
New	$5,940	$6,240	$6,240	$10,000	$3,560	$3,740	$3,740	$5,980	$2,380	$2,500	$2,500	$4,000
Upgrade	$3,830	$4,060	$4,060	$6,500	$2,300	$2,430	$2,430	$3,890	$1,530	$1,630	$1,630	$2,090
Private Sector (non-profit)												
New	$5,940	$6,240	$6,240	$8,000	$3,560	$3,740	$3,740	$4,790	$2,380	$2,500	$2,500	$3,200
Upgrade	$3,830	$4,060	$4,060	$5,200	$2,300	$2,430	$2,430	$3,110	$1,530	$1,630	$1,630	$2,090
Government												
New	$5,940	$6,240	$6,240	$8,000	$3,560	$3,740	$3,740	$4,790	$2,380	$2,500	$2,500	$3,200
Upgrade	$3,830	$4,060	$4,060	$5,200	$2,300	$2,430	$2,430	$3,110	$1,530	$1,630	$1,630	$2,090
Library Academic												
New	$4,400	$4,620	$4,620	$5,800	$2,640	$2,770	$2,770	$3,460	$1,760	$1,850	$1,850	$2,310
Upgrade	$2,340	$3,000	$3,000	$3,750	$1,400	$1,800	$1,800	$2,250	$940	$1,200	$1,200	$1,500
Multiple Academic												
New	$2,200	$2,310	$2,310	$2,900	$1,320	$1,390	$1,390	$1,740	$880	$920	$920	$1,150
Upgrade	$1,170	$1,500	$1,500	$1,880	$700	$900	$900	$1,130	$470	$600	$600	$750
Single Academic												
New	$1,160	$1,220	$1,220	$1,500	$700	$730	$730	$910	$460	$490	$490	$610
Upgrade	$580	$790	$790	$990	$350	$470	$470	$590	$230	$320	$320	$400