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CORPORATE PROFILE



MILLENNIUM INSTITUTE

Millennium Institute (MI) was established in 1983 as a not-for-profit development research and service organization with headquarters in Virginia, USA. Over the last two decades, MI has provided professional consulting on development issues to governments, national planning institutions, international organizations and multinational companies. MI's expertise in simulation modeling techniques complements the vast field experience in macro analysis of economic, social, and environmental issues. We work with clients to develop dynamic macro economic models that support comprehensive and integrated scenario analysis of global, regional, and national development challenges such as poverty reduction, economic growth, climate change and global warming, and peace-building in post conflict regions.

MI has developed macroeconomic models for over 20 countries in Africa, Asia, America, Caribbean, and Europe, and trained experts in these countries to use the models. These countries have benefited from a better understanding of the long-term implications of policies, the feasibility of critical assumptions about economic growth and poverty alleviation, and better understanding of the cross-sector impact of policies. Many have used the models for producing poverty reduction strategies, developing policy and programs to meet the Millennium Development Goals, and measuring the impact of these policies and programs.

Quality control is provided by MI's Board of Trustees, a senior policy advisor, and a director for modeling and analysis. Together, they ensure that all of MI's work are performed to the best possible standards, and are in line with its mission and goals.

One of MI's chief priorities is to achieve intergovernmental agency status. International status furthers MI's potential to deliver through research, advanced training, capacity building and dissemination of knowledge, the institutionalization of systemic and integrated approach to medium and long term planning for the resolution of pressing challenges of global sustainable development that are of concern to countries the world over.

VISION AND MISSION

As the world is becoming more complex and interdependent, decision-makers need better tools to help them understand the functioning of the social, economic and environmental systems in order to make policy decisions that promote sustainable development. MI's mission is to help people and organizations enhance their insight and decision-making in complex systems to achieve sustainable development, and to promote a global sense of shared responsibility about our common future. Our objectives are to:

- Develop and disseminate advanced analytical tools that support prospective and holistic strategic planning dialogues at community, national and global levels.

- Build a network of supporters and partners across the globe to inspire, promote, endow, and implement holistic integrated planning.

- Increase capacity among a broad range of partners to promote sustainable development using modern tools and communication means, and establishing centers of excellence in System Dynamics and modeling around the world.

KEY COMPETENCIES

Macroeconomic Modeling and Analysis
Energy and Climate Change Modeling
HIV/AIDS Modeling
Education Sector Modeling
Population Modeling
Development Economics
Environmental economics
Operations Research
Econometric Modeling

BRIEF INTRODUCTION OF THRESHOLD 21 MODEL

The T21 model is a dynamic scenario analysis tool designed to support development of a comprehensive, integrated, and long-term roadmap for sustainable development. T21 integrates in a single framework, the economic, the social, and the environmental aspects

of development. It covers a broad range of issues that countries the world over face on the path to sustainable development, including poverty, environmental degradation, education, healthcare, economic growth, and demographic shifts. The model's comprehensiveness and level of aggregation make it ideally suited to support broad analysis of different governmental strategies, and also serve as a complement to budgetary models and other short-medium term planning tools.

T21 is useful at four levels of the development planning process:

(i) First, the participatory process of the model's development provides insights on the coherence and consistency of objectives, hypotheses, and data used for policymaking across sectors.

(ii) Second, the base run simulation of the model provides insight into the key development issues a country might face in the future.

(iii) Third, the alternative scenarios it presents based on policy propositions provide an understanding of how different strategic choices or external conditions can impact future development, and how sectoral policies synergistically interact.

(iv) Fourth, the resulting strategic plan provides a clear basis for improved decision making and action in the various sectors, as well as for monitoring and evaluation of performance and results over time.

T21's capability and versatility makes it a great tool for implementing the Paris Declaration on Aid Effectiveness:

- Ownership: T21's analytical capability gives countries the ability to develop comprehensive development scenarios thereby exerting leadership over and ownership of their development agenda. It also fosters in-country ownership this agenda, through the participatory process of its development, which involves bringing together people of different backgrounds, roles and interests, to develop and articulate a common vision of development.

- Alignment and Harmonization: Scenarios produced with T21 helps countries make a compelling case for priorities and foster donor alignment with their strategies. Furthermore, it enhances donor harmonization by clarifying a country's overall situation, particularly the cross-sector relationships to show opportunities for the pooling of resources and the optimum potential contribution best suited for each donor.

- Managing for Results and Mutual Accountability: T21's capability to measure results vs. initial commitments and goals permits factual results-based management and enforces mutual accountability.

EXAMPLES OF RECENT WORK*

T21 has been applied effectively in several countries around the world. Donors such as UNDP, UNEP, CIDA, the World Bank, Liechtenstein Development Service, and the Carter Center supported these country projects. Some examples of recent applications with emphasis on the environment include:

UNEP Green Economy Report (Ongoing): MI is working with UNEP on its Green Economy Report project. MI is developing of a comprehensive global and national sectoral models that demonstrates how investments and policies that shift societies to a green economy will contribute to macroeconomic performance, generate high quality jobs, and reduce poverty, while also promoting efforts to mitigate global warming and adapt to climate change. The analysis provided by the model will serve as a scientific underpinning for the reports focused on the following sectors: Agriculture, Fishery, Forestry, Water, Energy, Industry, Transport, Cities, Tourism, and Waste.

UNEP Division of Early Warning and Assessment (Ongoing)
MI customized the T21-China model to examine ways to reduce greenhouse gas emissions from the cement and iron and steel industries through use of current and new technologies. The model also examined the water and land sectors, and provided trade-offs with a view to provide analysis on the issue of resource efficiency. The outcome of this pilot project will be presented as a case study in the UNEP Asia Pacific State of Environment Report 2010.

Africa Environmental Outlook Report (2006): T21 was used by UNEP to prepare the African Environmental Outlook 2, a report that highlights Africa's environmental asset and how it can be harnessed to support the continent's sustainable development. Analysis conducted with T21 provided scenarios that offered guidance to policy makers for addressing threats to, and converting opportunities provided by the environment into practical policies and actions. This work is being extended for use on the next Global Environment Outlook Report (GEO-5) to be prepared by UNEP.

Bhutan (2002): The Bhutan model investigated the impacts of climate change on agriculture and food production. Specifically, the model addressed the impact on crop yield, hydropower generation, and land use for horticulture export under various policy scenarios. The analysis concluded that the negative impact of climate change would be food shortage, reduction in hydropower generation, and lower revenues to the government from this sector. Hydropower being a major source of public revenues, this loss would diminish the capacity of the government to provide public and social services, and to fund required adjustment to the climate change. The project was implemented under the

* MI's models are based on the Threshold 21 (T21) Starting Framework, a generic structure that represents a broad range of issues that countries the world over face on the path to sustainable development, for example, poverty, economic growth, education, healthcare, demographic shifts and environmental degradation.

Netherlands Climate Change Studies Assistance Program (now Netherlands Climate Assistance Program).

Denmark (2008): The Lolland model examined the impacts of renewable energy mega projects on the local economy and environment. Lolland Municipality (island in Southern Denmark) is a showcase example of the regeneration of a remote and peripheral area through renewable energy technologies. The model explores different scenarios about whether and how to develop and expand projects related to renewable energy and climate adaptation, and to evaluate the impacts of the construction of a bridge connecting Denmark to Germany. It also supports project design and evaluation by allowing for real time modifications of undefined cost/benefit parameters of projects, and supports exploration of the local consequences and synergies of implementing these projects.

The model has proved to be a useful tool for evaluating the impact of the various energy initiatives on the territory, and relative link to the economic sector and local community. It is currently being used to support local decision-making, with a view to incorporating it into educational projects, as well as to develop further energy-related and economic scenarios.

USA (2008-2009): The USA model was customized for several studies: one to examine the effects of the CAFE fuel efficiency standards, and another to show how increases in energy prices associated with comprehensive and mandatory cap-and-trade climate policy proposals being considered by the U.S. Congress would affect the competitiveness of U.S. energy-intensive industries in the long term, and the opportunities to mitigate adverse cost impacts to improve economic performance under different policy scenarios. The preliminary findings of the latter showed that climate policies that price CO_2 could have significant impacts on the competitiveness of these industries over the next two decades if regulations are applied only in the United States, and no corresponding action is taken to invest in advanced low- and no-carbon technologies or otherwise mitigate the cost impacts. The findings of the fuel efficiency standards showed clearly that the policy would lead to higher GDP growth. With more fuel efficient autos, people would spend less on gas, which is imported at the margin, and more on other local goods. The higher demand led to more production and GDP. This helped get the law passed.

Mozambique (2003-2007): MI customized T21 for Mozambique in 2003 to support preparation of a PRSP for the World Bank and operationalization of Agenda 2025, the national document that outlines the goals for Mozambique's development. Simulations performed with the model showed the impact new road construction projects would have on HIV prevalence, the impact of increased land under irrigation on water pollution, and the consequences of possible natural disasters on the economy of Mozambique, based on the experience of past major floods.

Working with the Ministry of Planning and Development, Ministry of Energy, and the National Statistics Office in 2006, T21's environment sphere was expanded to study the

links between poverty and environment and help the Ministry of Planning and Development advocate a more substantive inclusion of environmental considerations in the national dialogue and development planning process. Several policy scenarios were tested, which confirmed that proper management of Mozambique's resources would help to improve the living conditions in Mozambique, while still protecting the environment from pollution and excessive land degradation.

Papua, Indonesia (2002): Working in collaboration with Conservation International and the local Papua government, MI customized T21 for Papua to analyze alternative development strategies and help decision-makers determine a strategy that promotes economic development of Papua, without impacting the environment negatively. T21 was used to test the impact of various policy scenarios on the national development, in particular, the GDP and GNP[1]; employment; external debt; and biodiversity. It determined that although the exploitation of natural resources would generate more provincial income, it would not improve the incomes of Papuans, as the profits would go elsewhere, while the pollution and other negative impacts would adversely affect the prospects for Papua. The model showed how focusing on improving local infrastructure and businesses would do much better for the province. The governor is still using the model to support his position.

GOVERNANCE

MI is governed by a 8-member Board of Trustees, comprising members who have excelled in their field of endeavors, and who bring a unique skill set in international development, system dynamics and thinking, organizational development, and knowledge management, to govern the institute. The board has responsibility for the formulation of policies on the research, capacity development and institution building programs and the administration of the organization. An Advisory Council, which advises the board on strategic and technical issues, support the activities of the board. The current members are:

John D. Shilling, Chair, is retired from the World Bank, where for nearly 30 years he held a number of senior positions. He headed the Bank's efforts in sustainable development, laid basis for a new Environment Strategy and a World Development Report on sustainable development. He worked extensively in economic analysis and policy assessments in macroeconomics, environmental sustainability, capital flows and financial markets, and risk assessment, especially in North Africa and Asia. More recently, Dr. Shilling consults with NGOs, including WWF and CI, the World Bank, the UN, and others on environmental economic issues. He has served on the Boards of the Kenan-Flagler Business School Sustainable Enterprise Program (UNC) and The Mountain Institute. He is currently on the Boards of the Center for Resilience at OSU and the Piedmont Community

[1] GNP is the amount of production that remains in the country, or province in this case, after net payments abroad.

Foundation. Dr. Shilling holds a Ph.D. in Economics from MIT, and an A.B. in Philosophy and Economics from Stanford University.

Katharine Esty, Chair Emeritus and Vice Chair, an organizational psychologist by training, was the founder of Ibis Consulting Group, Inc. an organizational development and diversity consulting firm. Her expertise is in large systems change, culture change initiatives, diversity and the future search methodology.

Dr. Esty received her Ph.D. in Social Psychology from Boston University and her Bachelor of Arts from Smith College, where she was elected to Phi Beta Kappa. She is a 15-year member of NTL Institute and served as Chair of the Board of the Millennium Institute and the Williston Northampton School.

Rob Wiles, Treasurer, has over thirty years experience in international development and humanitarian assistance, both at an operational and policy levels. He served in various capacities with the Canadian Agency for International Development (CIDA), most recently as its senior organizational development adviser. In 2003, Mr. Wiles was Recipient of the President's 'Award of Excellence 2003,' an award presented to employees for exceptional contribution to CIDA's mandate.

Mr. Wiles received his education from Gonzaga University in Spokane, WA, where he was awarded Bachelor and Master of Arts degrees in Philosophy/Science; and from Harvard University, where he was award a Master of Arts in Public Administration.

Carlson Boucher has several decades of experience in the international development field with the United Nations and World Bank. He served in numerous capacities, including Barbados' Permanent Representative to the United Nations, and Director of the World Bank . He holds an M.A. in Development Economics degree from University of Sussex, and is a recipient of the Companion of Honor of Barbados national award.

Rolf Carriere spent over three decades at the United Nations working on various development issues. He served as UNICEF Representative in Indonesia, Bangladesh and Myanmar, and most recently, Executive Director of Global Alliance for Improved Nutrition (GAIN). Now retired, Mr. Carriere is still passionate about development and works on issues of global governance, nonviolence and civilian peacekeeping and their interface with spirituality.

Erling Moxnes is a Professor of System Dynamics at University of Bergen, where he also teaches several courses in System Dynamics. He holds a PhD in Engineering Sciences from Dartmouth College, and in 2000, won the Jay Forrester Award for the best contribution to the field of System Dynamics for the period 1995 – 2000.

Andrew P. Sundberg, is the managing director of Consultex S.A, a Geneva-based international consulting firm he founded in 1972. He was a consultant to the International Labor Organization, the United Nations Center for Science and Technology for Development, the United Nations Department on Transnational Corporations and Management Development, the West German Ministry of Foreign Aid, and USAID.

Mr. Sundberg holds a Bachelor of Science in Engineering from the U.S. Naval Academy, and a Bachelor and Master of Arts in Philosophy, Politics and Economics from Oxford University, where he studied as a Rhodes Scholar.

KEY PERSONNEL

MI's team consists of highly experienced professionals that meet the following qualifications:

a. Over thirty years experience in macroeconomic planning and budgeting in developing countries;

b. Over ten years experience developing macroeconomic models and demonstrated ability to prepare policy briefs, analytical reports, and undertake technical research;

c. Doctoral and masters degrees in Economics/development planning and Systems Engineering, with integrated results-based management as one of the areas of expertise;

d. Excellent communication skills and fluent in English (comprehension, written, and spoken);

e. Capacity to work in a multi-cultural environment, and ability to create a team-based participatory work.

Summary Bio of Key Staff

Dr. Hans Herren (President) is an internationally recognized scientist who lived for 27 years in Kenya, Benin and Nigeria, and worked across Africa in agriculture, health and environmental research and capacity development. He holds numerous awards that recognize his distinguished and continuing achievements in original research for sustainable development, among them The World Food Prize, which he was awarded in 1995.

Dr. John Shilling (Senior Advisor) recently retired from the World Bank, where he led economic analysis and country modeling activities and headed country operations in a number of developing countries. He worked on linking environmental issues to sustainable economic development and was the primary initiator and major contributor to

the World Development Report on Sustainability. Dr. Shilling is currently Chairman of the Board of the Millennium Institute, helping to enhance and apply the Threshold 21 model.

Dr. Weishuang Qu (Director of Modeling and Analysis) provides direction and leadership for all of MI's modeling and has been intimately involved in the development of the T21 model since its inception in 1994. He developed MI's generic T21 model, and has applied it to many countries, including: Bangladesh, Bhutan, China, Italy, Jamaica, Malawi, Mozambique, Tunisia, and the United States. He also leads MI's work with General Motors and has customized MI's M3 transportation model for Brazil, China, India, Mexico, Poland, Russia, South Africa, South Korea, Thailand, and USA, as well as MI's Multi-Entity Gaming (MEG) model for five entities in southwestern Balkans. Dr. Qu holds doctoral and Master of Science degrees in Systems Engineering from the University of Wisconsin-Madison and a Master of Science degree from the Graduate School of the University of Science and Technology of China.

Dr. Matteo Pedercini (Deputy Director for Capacity Development and Modeling) holds a PhD and a Masters in System Dynamics from the Univeristy of Bergen, Norway, and a Masters in Economics/Business Administration from the LIUC University, Italy. His research interests include development planning, System Dynamics, resource-based analysis, and scenario analysis. Dr. Pedercini has consulted for several governments and international agencies in the field of development planning, and has created numerous models to support medium- and long-term strategic planning. He has been teaching at the University of Bergen and at the University of Malawi, and has published in various peer-reviewed journals (including *Socio-Economic Planning Sciences*, *Simulation and Gaming*), in the *Working Papers Series* of the *University of Bergen*, in the proceedings of many international conferences, and has collaborated on official strategic documents for several sub-Saharan countries.

Andrea Bassi (Deputy Director for Project Development and Modeling) specializes in energy and environmental issues and his work focuses on, but it is not limited to, MI's Threshold 21 (T21) model. His studies in the energy sector have gained visibility in all continents and have led MI to collaborating with leading political, academic and professional institutions, especially in the U.S. Mr. Bassi has been the principal investigator of a number of energy related projects, including T21-USA, North America, Ohio (EPA Industrial Ecology Project), and Ecuador (validation of the Stern Report). His work on energy issues is currently used by Rep. Roscoe Bartlett (U.S. Congress), the US National Commission on Energy Policy (NCEP), Ohio State University, University of North Carolina, Middlebury College, ASPO-USA, and others. Mr. Bassi is currently a Ph.D. candidate in System Dynamics at the University of Bergen, Norway, where he received a M.Phil. in System Dynamics in 2006. He also holds a M.Sc. in Business and Economics from LIUC, Università Cattaneo Castellanza, Milan, and the post graduate certificate, "Building Models in Ecology and Environment" from the Catedra UNESCO of the Universidad Politecnica de Catalunya, Barcelona.

DONORS AND CLIENTS

A sampling of MI's donors and clients are:
World Bank
UNDP
UNEP
UNICEF
Canadian International Development Agency
Swedish International Development Agency
Carter Center
Government of Jamaica
General Motors
Conservation International
Government of Netherlands
Principality of Liechtenstein
Liechtenstein Development Service
Mauritius Research Council
Rockefeller Foundation
BioVision Foundation
Charles Stewart Mott Foundation
Beldon Fund
Tidewater Research Foundation
Changing Horizons Fund
Association for the Study of Peak Oil & Gas USA
SolarQuest
Ohio State University, USA
Swiss Centre for Applied Studies in International Negotiations (CASIN)