T21

INTEGRATED DEVELOPMENT MODEL

Introduction and Purpose of Threshold 21

Need for Comprehensive, Integrated Planning

When envisioning a progressive future with comprehensive development, countries generally emphasize the process of economic development and target higher Gross Domestic Product as an outcome. Yet, countries also want to see the environment stay healthy so that there is clean air, clean water, plentiful energy, and biodiversity. They also understand the importance of addressing education and health care, lowering unemployment, and reducing poverty. These goals may sometimes be seen as conflicting, where addressing one will complicate the other. Yet ways can be found to ensure that progress can be made on all goals.

In developing comprehensive national plans, countries formulate strategies to achieve these visions. Examples include Poverty Reduction Strategies (PRSs) and plans to meet the Millennium Development Goals (MDGs). These strategies must then be converted into operational plans and budgets. The plans, strategies, and budgets must be comprehensive and be underpinned by rigorous quantitative analysis to ensure that resources are allocated effectively.

In brief, planning must take into account the interdependent and integrated nature of economic and other development processes. Economic growth, for instance, requires a healthy and educated workforce. A healthy and literate workforce requires adequate investment in social services. If planning does not consider the links between economics, society, and the environment, opportunities will be missed for yielding the desired results within real budget and time constraints. Unintended impacts may stifle progress and cause a country to move away from its vision rather than toward it.

Socio-economic systems are complex. A mental representation of the reality cannot adequately comprehend all of the elements involved. The use of sectoral models in isolation can provide preliminary material for a comprehensive plan but still need to be integrated in a robust analytical framework. Typically, each agency or stakeholder participating in the planning process will have its own model, focusing on their own priorities and sectors, and rarely considering the impact on, or needs of the other sectors. Building a framework that considers the full range of interconnected factors that can help decision-makers evaluate different options and compare results is a major challenge to effective planning. When implemented, such a framework forms the basis for rational discussions among stakeholders, and provides a common framework or 'language' for examining the implications of the different approaches. National development planning efforts such as MDG-based PRSPs, all require such an integrated approach.

T21: Analytic Support for Comprehensive, Integrated Planning

Threshold 21 (T21) is designed to support comprehensive, integrated planning and is a valuable quantitative tool for policy testing, monitoring, and evaluating results. Once a country identifies its vision,

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and key goals are determined, T21 generates scenarios describing the future consequences of the proposed strategies. Users can quickly trace changes in outcomes back to the assumptions and polices that produced those changes. This capability helps users identify vital leverage points and key assumptions.

T21 supports comparative analysis of different policy options, in order to identify the set of policies that tend to move the system more rapidly towards the stated goals. This process also deepens understanding of development challenges in the different sectors and how they interact, so that planners can better explain what is likely to happen, and why. Several countries have already adopted T21 as the best tool to support their PRS analysis and to design strategies to achieve the MDGs.

Features of Threshold 21

T21 is built to support an integrated and comprehensive medium to long-term planning process. The model is customized for a country based on the T21 Starting Framework, which can be readily modified and adapted to address country-specific issues. The Starting Framework has been developed and field tested for more that twelve years, and has the following key characteristics:

- integrates economic, environmental and social elements using a system dynamics approach;
- helps create sustainable development strategies and policies by simulating possible impacts of alternative policy choices and strategic options;
- facilitates transparency, participation, and consensus building by encouraging open consultations with diverse stakeholders and external development partners within a common framework and an easy-to-understand interface;
- flexible and can be customized to address the unique needs of individual countries through the use of a modular design where existing sectors can be modified and new sectors can be added;
- produces output for policy documents including a national budget, national development plans, the Country Assistance Strategy (CAS), the Poverty Reduction Strategies (PRSs) or UN Development Assistance Framework (UNDAF); and
- generates nearly all of the MDGs indicators.

In order to facilitate full appropriation of the tool, the Millennium Institute builds local capacity for continued use of T21 for development analysis and planning through a process of training and partnership based on technology that is easy to understand, use and adopt.

Design of Threshold 21

T21 has evolved over the past 20 years from extensive research and application by the Millennium Institute. It is based on the best and/or most broadly respected sector models, which have been adapted and integrated in its framework.

Independent reviews confirm that T21 possesses sound economic foundations and performs better than the other integrated models currently available. Experts at the World Bank, UNDP, and The Carter Center examined T21 closely and determined it is very well suited for MDG analysis and PRS and other planning exercises.

Figure 1 presents a conceptual overview of T21, with linkages between the economic, social, and environmental spheres. Within each sphere are sectors that interact with each other and with sectors in the other spheres.

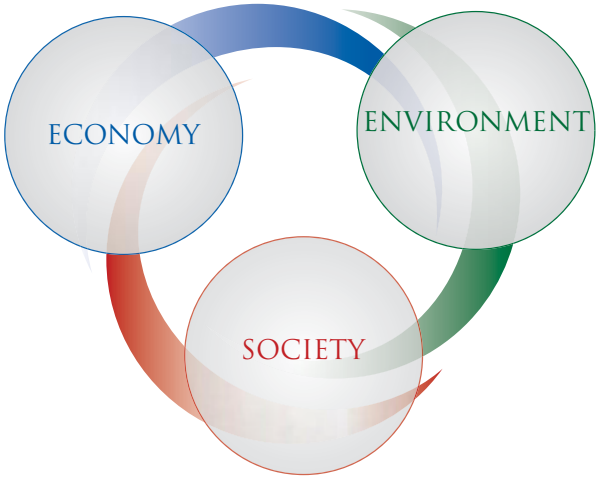

Figure 1

The **Economy** sphere contains major production sectors (agriculture, industry and services), which are characterized by Cobb-Douglas production functions with inputs of resources, labor, capital, and technology. Specific issues, such as the sugar industry, micro-credit, transportation, agricultural extension, livestock, and hydro power, are included production sub-sectors. A Social Accounting Matrix (SAM) is used to elaborate the economic flows and to balance supply and demand in each of the sectors. Demand is based on population and

per capita income and distributed among sub-sectors using Engle's Curves. This helps calculate relative prices, which are the basis for allocating investment among the sectors. The government sector generates taxes based on economic activity and allocates expenditures by major category. Public expenditure impacts on the overall economic performance and on the delivery of public services. Standard IMF budget categories are employed and key macro balances are incorporated into the model. The Rest of the World sub-sector comprises trade, current account transactions, and capital flows (including debt management).

The **Social** sphere contains detailed population dynamics by sex and age cohort; health and education challenges and programs; basic infrastructure; employment; and poverty levels and income distribution. These sectors take into account, for example, the interactions of income, healthcare and adult literacy rates on fertility and life expectancy, which in turn determine population growth. Population determines the labor force, which shapes employment. Education and health, together with other factors, influence labor productivity. Employment and labor productivity affect the level of production from a given capital stock. An HIV/AIDS sector is also included, which shows the possible evolution of infections, the impacts of the disease on population and productivity, and the effects of different treatment programs. Food sufficiency and nutrition, reproductive health, and vocational training are also addressed.

The **Environment** sphere tracks pollution created in the production processes and its impacts on health, and eventually on production. It also estimates the consumption of natural resources – both renewable and non-renewable – and can estimate the impact of the depletion of these resources on production and other factors. It also examines the effect of soil erosion and other forms of environmental degradation and their impact on other sectors, such as agricultural productivity and nutrition. Additional issues addressed are fossil fuel use, forest depletion, land and water degradation, air and water pollution, and greenhouse gas emissions.

Customizing T21 for a Country

T21 country models are customized based on the T21 Starting Framework, a set of interconnected sectors combined into a rigorous macroeconomic framework. The sectors and their interrelations aim at representing the fundamental mechanisms that are responsible for socio-economic development.

T21 is highly flexible and can be easily adapted to address country specific issues during the model's customization process. This customization takes place in close cooperation with a team of country experts from the office or agency where the model will be institutionalized, and often from other groups (usually civil society or academic institutions) that are also interested in contributing to the analysis. This assures that the design of the model structure and calibration represents the local understanding of the socio-economic system and the primary issues for strategic analysis.

The interactive customization process helps build domestic capacity and transfer full use and management of the model to the country. The process unfolds over about one year or more, with the first three or four months devoted to the initial customization of T21 for country review during a capacity building workshop. Through several iterative stages of model refinement, capacity building, and consultation, the country has a chance to shape the model, add and modify sectors, and integrate the use of the model into key policy analysis, planning, and consensus-building processes.

T21 Application Experiences

To date, about twenty T21 models have been customized for both industrialized and developing countries. Several more are under preparation. Some examples of customizations include:

China: General Motors and the Chinese government used T21 to examine opportunities for investment in the transportation industry. They developed a 'win-win-win' strategy that projected increased auto sales for GM, increased revenue for the government, and increased employment and limited environmental impact for the people of China.

Italy: The national environmental agency used T21 to analyze how the Italian government could comply with its Kyoto Protocol greenhouse gas commitments

without hindering the economy. A report was produced, which outlined alternative strategies the government could follow to meet its objective.

Malawi: T21-Malawi was originally institutionalized with the National Economic Council (NEC) for strategic planning and analysis. The NEC adapted T21 to analyze strategies for reaching Malawi's Vision 2020 goals. The NEC and Millennium Institute developed an HIV/AIDS sector, added it to T21, and expanded the Agriculture sector to include new commodities. The NEC drafted a Policy Framework Paper (PFP) for the IMF based on T21 analysis, and the IMF approved the PFP in December 1999. T21 is now based in the Ministry of Economic Planning and Development in Cooperation with Chancellor College of the University of Malawi. T21-Malawi was further developed with support from UNEP-Nairobi to serve as an example in the African Environment Outlook 2 (AEO2) with an emphasis on land, air, and water.

Mali: The Office of the President of the Republic of Mali, in partnership with The Carter Center, engaged MI to customize T21 for Mali to underpin a range of strategic documents including the MacroEconomic Framework and the PRSP, with an eye to the MDGs. Through an Interagency Modeling Committee, country representatives have received extensive training and provided strong input for the model's customization. The Committee intends to continue applying the model in future planning and building local capacity to use it.

Mozambique: The Ministry of Planning and Development, in partnership with The Carter Center, engaged MI to customize T21 for Mozambique to support the national visioning process, Agenda 2025 and to underpin key documents such as the PRSP and a comprehensive national development plan. Working closely with civil society (the Mozambique Debt Group) and local universities, T21-Mozambique has been customized to address mega-projects, roads, HIV & AIDS, the MDGs, and most recently with support from SIDA and UNDP, environmental mainstreaming.

Northern Somalia: T21-Somaliland was used as a tool for building a common development framework across stakeholder groups (including clan leaders, local NGOs, government ministries, and international NGOs). The local tribal group worked with MI staff to customize the model to fit the specific needs of the region. The group formed a multi-stakeholder team to conduct further analyses for Northern Somalia's future development and to conduct workshops around the model for broad-participation in the planning process.

United States of America: T21-USA model retraces the last 25 years of social, economic and environmental development in the US, and tests and compares several policies that could change the development path of the country. The simulation results show that a continuation of these policies would lead the US to become increasingly dependent on foreign sources of resources, especially energy, and to continue to contribute disproportionately to the world's stream of waste and pollution. The Changing Horizons Fund and Tidewater Research Foundation supported development of T21-USA.

Summary

T21 is a quantitative tool for integrated, comprehensive development planning. Its purpose is to support the broad process of medium- to long-term development planning by deepening understanding of the key structural relations, and enhancing the analysis of development strategies. T21 can provide insight into the potential impact of development policies across a wide range of sectors and reveal how different strategies interact with one another to achieve planned goals and objectives.

The major strengths of T21 are in its ability to integrate a broad range of sectors and issues; its flexibility for customization; its ability to strengthen capacity in development analysis and planning; its ability to facilitate transparency and participation; and its capacity to provide informed analysis for policy documents.

Each application of T21 is customized to meet the specific planning and analysis needs of the country or region.