Strengthening national capacities to use modelling tools for sustainable development policies

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TIAS-IISD WEBINAR: BEYOND SDG INDICATORS
PART 2: INTEGRATED MODELS SUPPORTING IMPLEMENTATION, STRATEGY DEVELOPMENT AND TRANSITION PLANNING

TUESDAY, 12 APRIL 2016
3 – 5 PM GMT (4 - 6 PM CET, 10 - 12 AM EST)

Agenda 2030

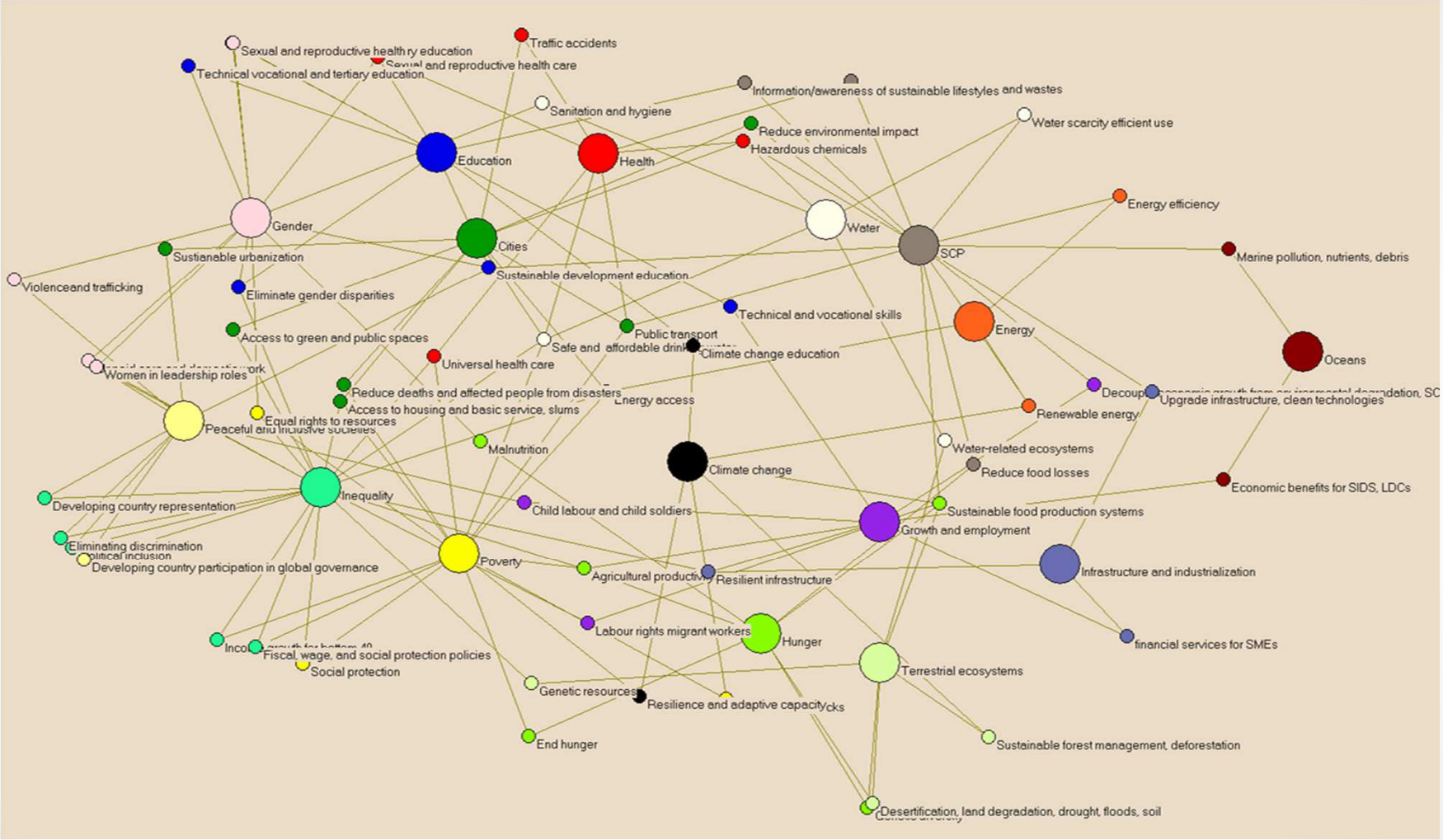
- 17 Sustainable Development Goals with 169 associated targets which are integrated and indivisible.

- *"It is accepted by all countries and is applicable to all, taking into account different national realities, capacities and levels of development and respecting national policies and priorities. These are universal goals and targets… They are integrated and indivisible and balance the three dimensions of sustainable development."*

  Source: outcome document of the United Nations summit for the adoption of the post-2015 development agenda

- **No single model can address such complexity; no single model can easily be adapted to address countries' priorities.**

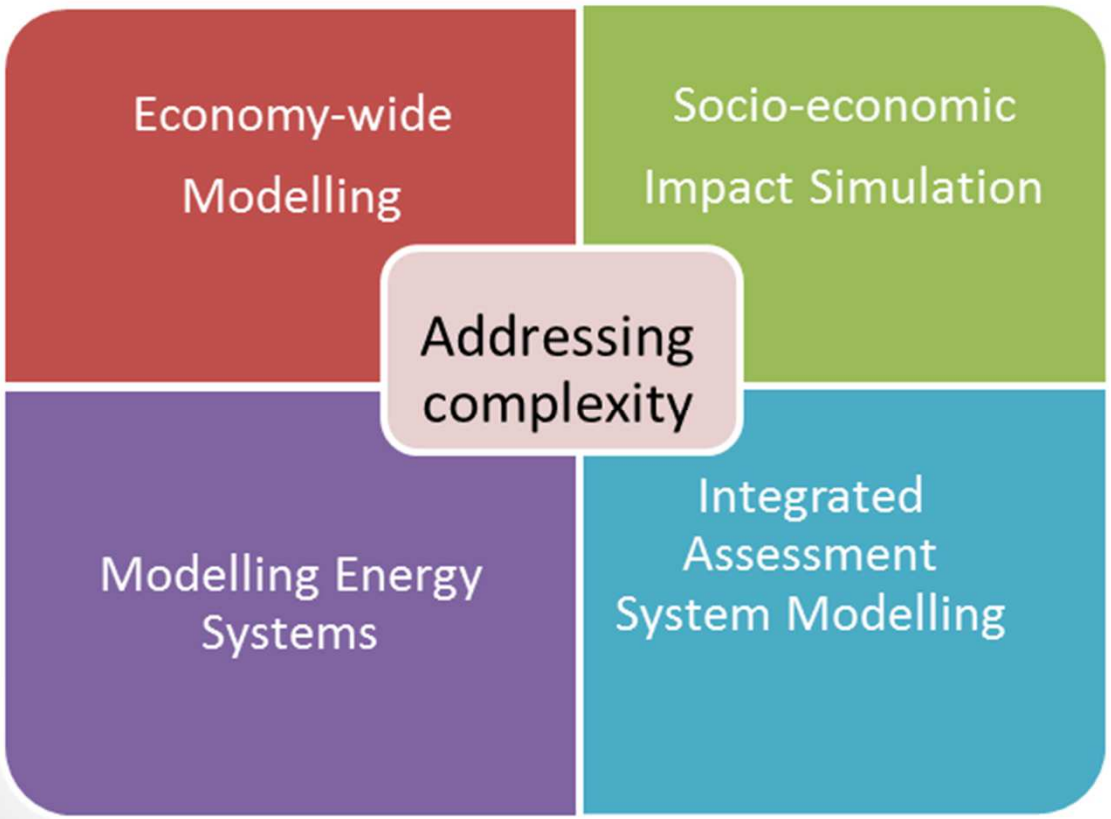
Interrelations



Source: David Le Blanc, “Towards Integration at Last? The SDGs as a Network of Targets”, Rio+20 Working Paper 4.

Building analytical capacity for sustainable development policies

- UN-DESA/DPAD builds capacity in the use of modelling tools, and transfers these tools to inform policy decisions



- Bolivia
- Costa Rica
- Kyrgyzstan
- Nicaragua
- Paraguay
- Uganda

A long term process

2006-2015

20 countries

2015-2017

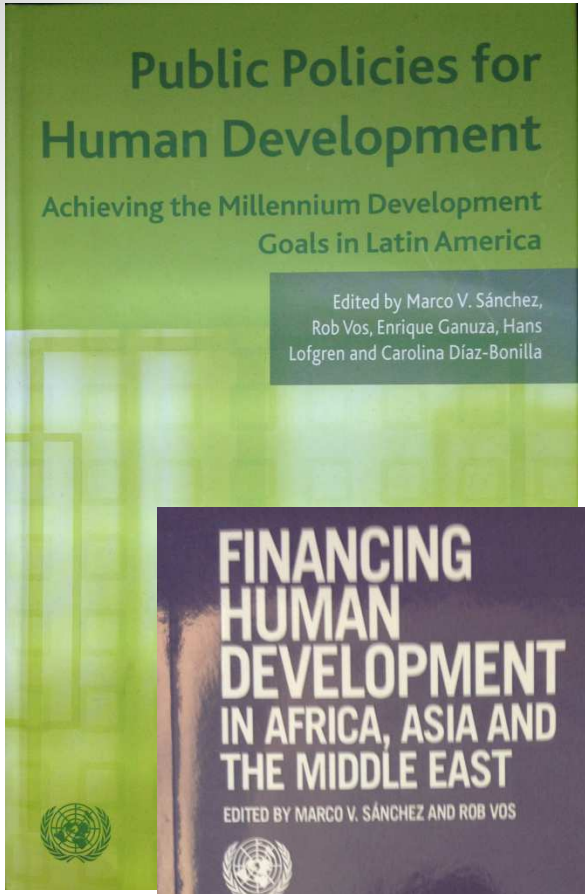
- Bolivia
- Costa Rica
- Kyrgyzstan
- Nicaragua
- Paraguay
- Uganda

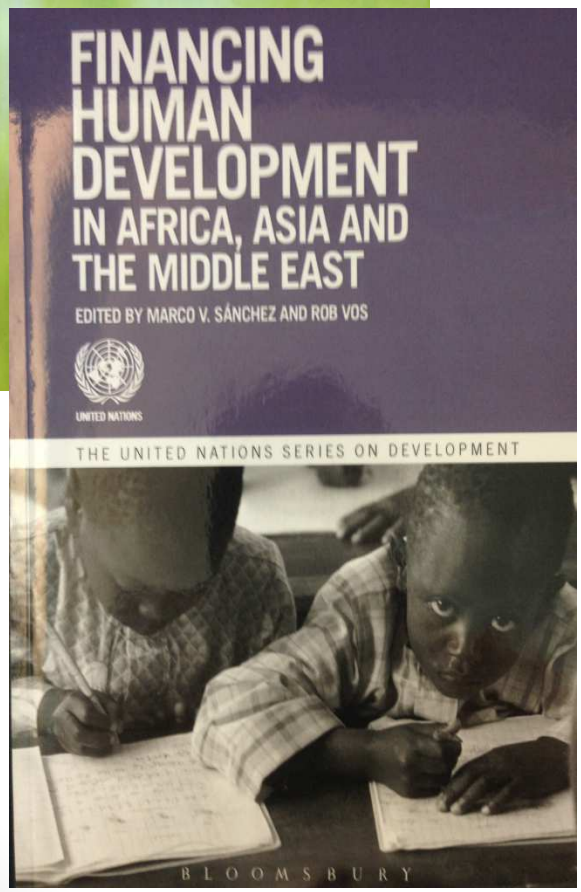
Implementation modality

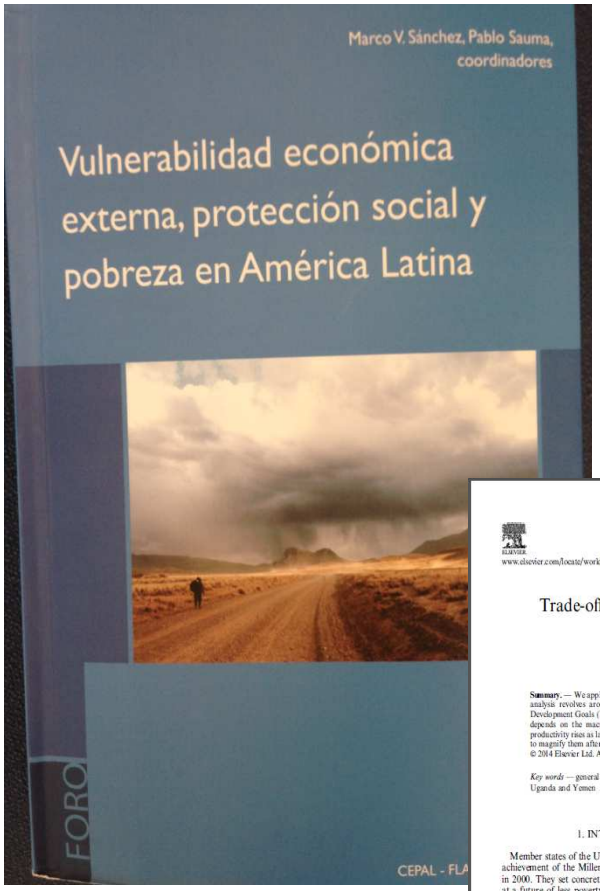
- Government demand for modelling tools that possess relevance for policy making
- **Trainees:** qualified technical staff in government; *generators* of modelling-based evidence
- **Trainers:** UN-DESA/DPAD staff mostly
- **Policy makers:** users of modelled-based evidence
- Missions/workshops & technical support
  - Scoping mission: defines policy issues
  - Training workshops: transfer of knowledge and tools; generally three to four; telecommunication in between
  - “Clinics” in countries if needed
  - Final workshop: discussion of outputs (policy notes) with policy makers.

Building from past experience (2006-15)

- Integrated assessment of economic and social policies
  - economic growth and macroeconomic trade-offs of financing social policies
- Computable General Equilibrium (CGE) models
  - coherent financing strategies to achieve the MDGs (MAMS)
  - social protection policies to offset external shocks (MACEPES)
- Complemented with microsimulation models
  - poverty and inequality analysis
  - household surveys
- Statistical and quantitative techniques to calibrate models







www.elsevier.com/locate/worlddev

World Development Vol. 62, pp. 14–29, 2014
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http://dx.doi.org/10.1016/j.worlddev.2014.04.012

Trade-offs and Payoffs of Investing in Human Development

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Summary. — We apply a general equilibrium model to quantify economic and social payoffs from investing in human development. The analysis revolves around scenarios of public spending that allow four developing countries to meet targets of the Millennium Development Goals (MDGs). Public spending rises significantly to meet the targets by 2015. The ultimate effect on aggregate demand depends on the macroeconomic trade-offs of the financing source. The supply effect is that production factors accumulate and productivity rises as larger numbers of better-educated workers become employed. The magnitude of the GDP growth gains and options to magnify them after 2015 are identified.

Key words — general equilibrium, macroeconomic analyses of human development, Millennium Development Goals, Latin America, Uganda and Yemen

1. INTRODUCTION

Member states of the United Nations resolved to pursue the achievement of the Millennium Development Goals (MDGs) in 2000. They set concrete targets to be met by 2015, aiming at a future of less poverty, hunger and disease, better education, gender equality, greater prospects of survival for children and mothers, and a more sustainable environment. Much progress has been made since then, but this has been uneven across and within countries (United Nations, 2012). Some countries have witnessed human development setbacks as a result of the global financial crisis (United Nations, 2011, Box 1.3).

Business as usual is not proving enough to achieve the pace of progress necessary to meet international agreed development goals by 2015 in many developing countries. Additional policies are needed. Studies for 27 developing countries, documented in Sánchez and Vos (2013) and Sánchez, Vos, Ganuza, Lofgren, and Díaz-Bonilla (2010) estimate that to be put on full track to meet a set of MDG targets by 2015, countries would have needed significant stepping up of public spending and more rapid and sustained economic growth. Achieving more rapid economic growth in the midst of a depressed world economy is proving a significant challenge for many developing countries. And, as these studies also show, given existing financing constrains, accelerated human development investments needed up to 2015 would overstretch countries' public finances with potential short-term macroeconomic hardships that might undermine the badly needed economic growth.

In defining the human development investments they should pursue, governments need to estimate not only public-spending requirements and the macroeconomic implications of financing them, but also the potential social and economic rewards. The aforementioned studies provide rigorous estimates for simulation periods until 2015, the year by which most MDG targets are expected to be met. Nonetheless, estimations of how soon long-term rewards of human development interventions can materialize and the degree of their significance are less known. Gains from investing in human development take time to materialize. Capital may be accumulated relatively quickly but it takes time for better education and health outcomes to translate into social outcomes and human capital that produces higher labor productivity (and economic growth), if only because children need to go through one or more educational cycles and improved child and maternal health care today will pay off in terms of healthier students and workers several years from now. Equally important, countries need to identify the set of policies that can give coherence to the multiple tasks of ensuring that such long-term rewards can effectively materialize, which implies also sustaining sound human development levels, economic growth, employment creation, and macroeconomic balances.

Understanding the potential long-term rewards of human development investments and complementary policies necessary to ensure that they will materialize and at what macroeconomic costs is crucial to define national development strategies. This understanding is relevant to the post-2015 development agenda, a process led by the United Nations to help define the future global development framework that will succeed the MDGs. Against this backdrop, this paper aims to answer two fundamental questions: What economic and social gains associated with investments in human development made in the context of pursuing MDGs can developing countries realistically expect? What other policies would contribute to ensure that such gains do materialize?

Finding coherent and rigorous answers to these questions requires the use of an economy-wide modeling framework. The aforementioned studies for 27 developing countries apply the *Maquette* for MDG *S*imulations (MAMS) in order to assess feasible financing strategies to achieve a number of MDG targets by 2015. MAMS is a dynamic-recursive, Computable General Equilibrium (CGE) model (Lofgren, Cicowiez, & Díaz-Bonilla, 2013). It is innovative in the sense

* The authors are grateful to Diyora Kabulova for her support in compiling key literature and Marcelo Lafleur for his valuable comments. They also thank all those who provided comments to previous versions of the paper presented at the Development Policy Seminar hosted by the Development Policy and Analysis Division of the United Nations Department of Economic and Social Affairs in New York, on April 23, 2013, and at the Annual Conference of the Human Development and Capabilities Association (HDCA) held in Managua, Nicaragua, on September 9–13, 2013. Views and opinions expressed are those of the authors and do not necessarily reflect those of the institutions to which they are affiliated. Final revision accepted: April 17, 2014.

Examples of results: *Uganda*

- Key conclusions from modelling exercise:
  - Social service provision not always the best policy to accelerate MDG achievement
  - Larger improvements in the MDGs are more strongly associated withy public investment in physical infrastructure (e.g. rural feeder roads).
  - Public infrastructure investment is an important driver of household income growth, with knock-on implications for the other MDGs.
- **Investment in physical infrastructure is at the core of the Government's strategy to deliver its Vision 2040**

Examples of results: *Bolivia*

- *Agenda Patriótica 2025* is Bolivia's development vision. It was launched in January 2012.
- Economy-wide model helped estimate requirements in terms of GDP growth, government budget and financing for implementation of programs and plans.
- Conclusion:
  - Bolivia would need to grow by 7% per year (much more than in the past) to avoid excessive reliance on public spending.
  - Even so, some MDG targets would not be achieved by 2025.
  - Tax revenues (rather than foreign debt) would need to be mobilized to support programs.

Examples of results: *Costa Rica*

- Economy-wide model produced a very low "primary completion rate": on average, 61.6% for the period 2000-2009
- A thorough analysis showed there was a high repetition rate in first grade (about 12%).
- Issue began to be studied and discussed within the Ministry of Education.
- Subsequently, there was a reform: reading and writing skills began to be assessed at the end of second grade, not in first grade.

Policy discussion at the highest level (examples)

- Policy notes presented to and discussed with the President of Costa Rica and her complete cabinet
- Policy notes regularly discussed within the Ministry of Planning and Economic Development in Bolivia and then used to inform cabinet discussions
- Capacities used to inform; the NDP-2 in Uganda, the Poverty Status Report 2014 and the MDG Report for Uganda 2013

Questions became broader; more challenging (2015-17)

- Energy ministries can plan supply to satisfy energy demand, but is it going to be affordable?
- Economy ministries can identify industry and services niches and opportunities, but will there be reliable electricity?
- Agriculture ministries can propose promotion schemes for small farmers and reduce poverty, but will there be water?
- Large investment projects can create jobs and simultaneously disrupt livelihoods, how to advance social inclusion?

Focus on energy first

- CGE model with energy details (CGE-E)
  - Energy treated as an input
  - Generation, distribution and transmission
- Integrated energy systems (OseMosys)
  - as stand alone
  - soft linking with CGE-E
- Analysis seeks to ponder policy options
  - achieving sustainable energy
  - finding optimum energy system configuration in countries
  - estimating costs of, and assessing incentives for promoting sustainable energy
  - identifying investment needs for sustainable energy
  - assessment of economic and human development impacts of all the above

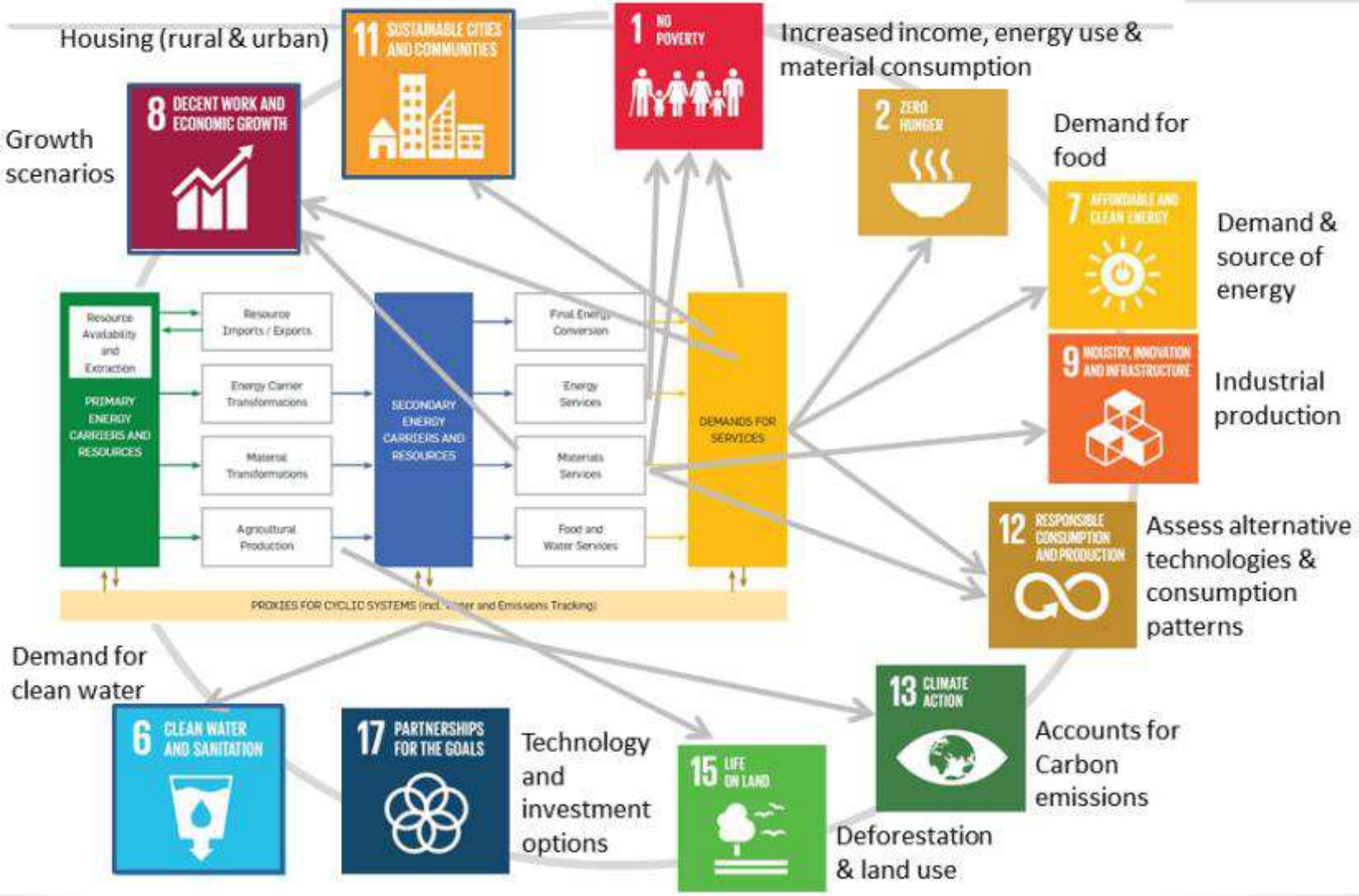
Bolivia energy modelling

- OSeMOSYS was transferred to the Government.
- Workshops to simulate scenarios using OSeMOSYS
- Economic and Social Policy Analysis Unit (UDAPE) of the Ministry of Development Planning carried out analysis on the development of the energy sector and its contribution to climate change.
- This analysis was included in Bolivia's Intended Nationally Determined Contribution (INDC).
- On 12 October 2015, UNFCCC formally received Bolivia's INDC. The INDC came in advance of the COP21 conference in Paris.
- Currently the economic feasibility of the energy pathways projected for the INDC are being analyzed using the CGE-E.

Today the focus is on integrated assessments

- Interplay of climate, land-use models, water resource models and energy systems models (CLEWS).
- The methodology basically iterates the results from various models until convergence is achieved, thereby providing a unifying framework to simultaneously assess policy decisions
  - promotion of renewables
  - preservation of biodiversity
  - agricultural expansion
  - emissions' control.
- Various scenarios and a good selection of drivers, simplifies the task of looking at the inter-relations among various dimensions of development.

Linking CLEWS and 2030 Agenda for SD



Other modelling tools and future tools development

- Electrification modelling tool for Africa
  - Uses open geo-spatial data
  - Simulates the provision of universal access to electricity by 2030 with the least cost technology option in 44 African countries.
  - Estimates the total cost of achieving universal access to electricity for various technology options and for each locality defined by a 10 by 10 kilometer range.
  - Provides a first insight into energy planning that accounts for local characteristics and several technological options.
- CGE-E is being further developed to include human development module
- “Soft” and “hard” linking of CLEWS and CGE-E.

A web-platform to make modelling tools widely available

- https://unite.un.org/analytics/desa/modellingtools
- Led by UN-DESA and powered by the United Nations Office for Information and Communication Technologies (UNOICT).
- Principles guiding construction, update and expansion:
  - make widely available a suite of tools, as no single model provides answers to all challenges posed by sustainable development;
  - provide open and transparent documentation of models contained in the website
  - create a community of practice for continuous updating of the models and able to provide state-of-the-art knowledge in policy areas relevant to sustainable development

In sum, our key principles

CAPACITY DEVELOPMENT

- Demand driven; emerging from national policy priorities
- Focused on informing policy decisions
- Continuous interaction with policymakers
- Centered on training/learning of policy analysts in government ministries and institutions
- Full transfer of analytical tools
- Effective communication of results

MODELING TOOLS

- A suite of models. No single model can cover all relevant issues
- Openness. Open source software
- Transferable. Ownership
- Transparent. Make data and code available.
- Open for validation from scientific and development practitioner's community

Thank you!