IDB

IEEM Integrated Economic-Environmental Modeling

Guatemala - Forest and fuelwood: how NCA modeling helps decision-makers

Onil Banerjee, *Inter-American Development Bank*
Martin Cicowiez, Universidad Nacional de La Plata
Renato Vargas, CHW Guatemala
Mark Horridge, Victoria University

Natural Capital Accounting for Better Policy

Hague (NL), November 22-23, 2016.

IDB Commitment: economic development and equity

PHYSICAL CAPITAL

Manufactured goods/assets

HUMAN CAPITAL

Knowledge society

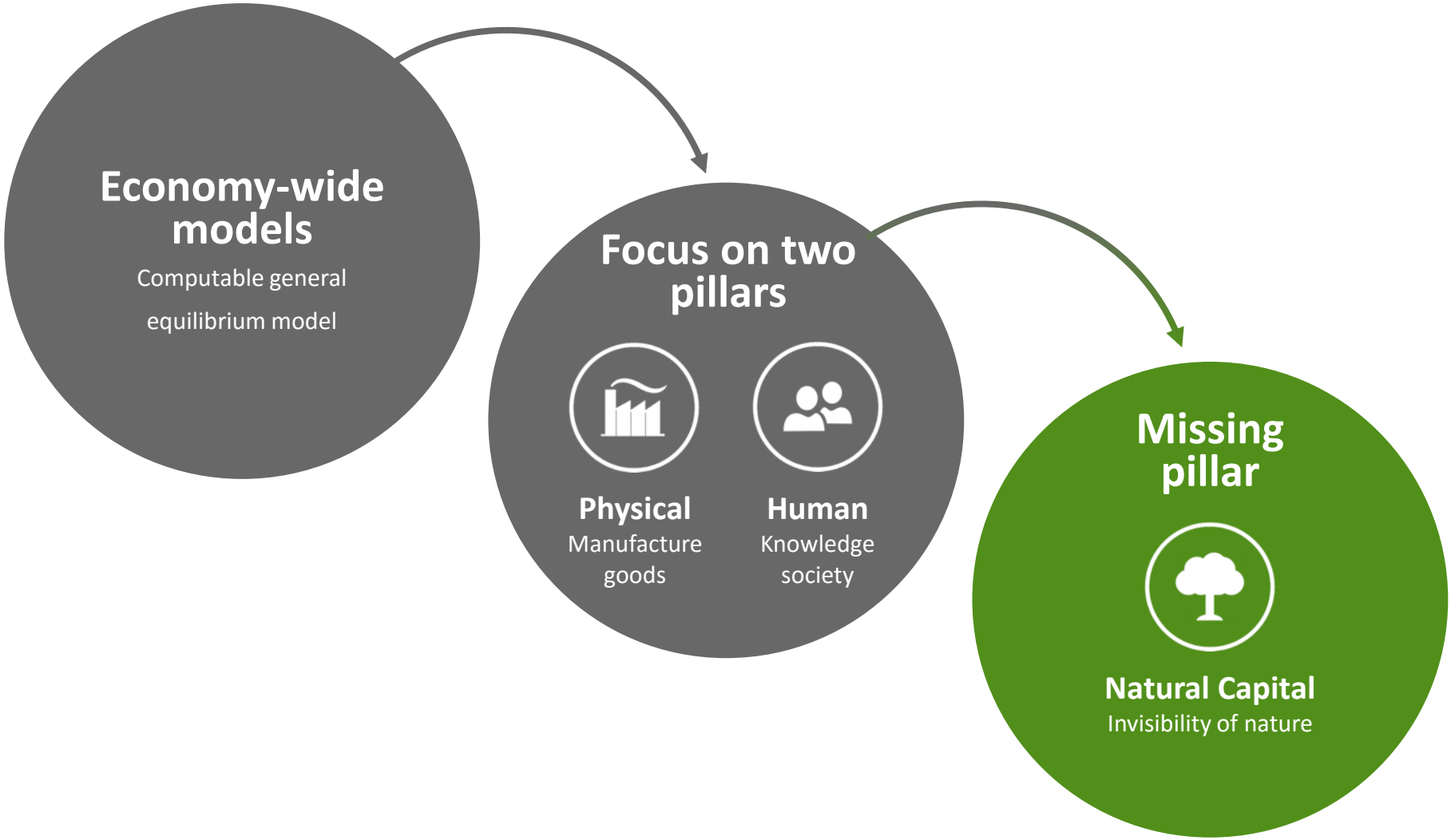
NATURAL CAPITAL

Biodiversity ecosystem services

Three pillars of wealth, underpin prospects for economic growth

Net worth and the national balance sheet

Conventional public policy and investment analysis



Policy makers need tools that account for natural capital

Solution

Integrated-Economic-Environment-modeling IEEM

Conventional economic impact analysis

Effects on standard indicators such as GDP, income, and employment.

IEEM

Reflects stocks of environmental resources, environmental quality, and wealth, such as genuine savings

IEEM - Why it works?

- **Standardized results** built on SEEA framework.
- **Brings natural capital accounts to life** asks 'what-if" questions.
- Natural capital accounts alone are just a **"snapshot of national income flow."**
- Once created policy maker can investigate multitude of **public policy and investment questions.**

Economy environment interactions

Environment

- Mineral and Energy Resources
- Land
- Soil Resources
- Timber Resources
- Aquatic Resources
- Water Resources

Provisioning ecosystem services (raw materials for production)

Non-provisioning ecosystem services

Effluents and Emissions

Environmental investments

Economy

Production

Firms

PRODUCTS

EMPLOYMENT

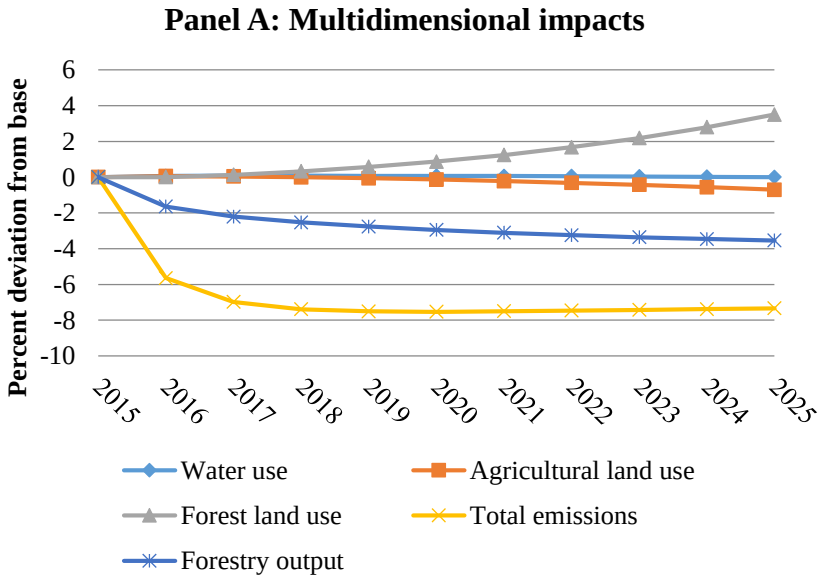
Households

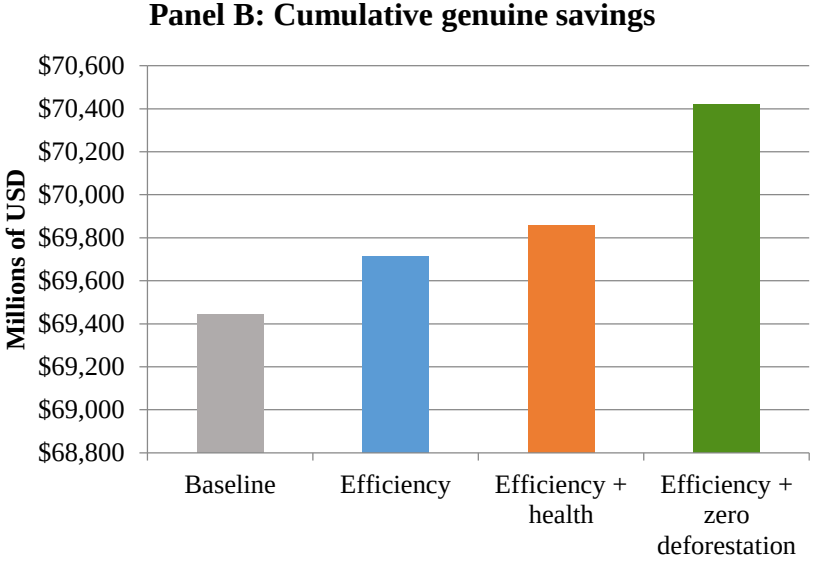
Consumption

Fuelwood scarcity and forest degradation in Guatemala

- Guatemala: Comprehensive natural capital accounts (in LAC)
- Inefficient household fuelwood usage = increased respiratory illness (31%), 5000 premature deaths annually, and a 1% loss of GDP.
- Simulating 25% increase in fuelwood efficiency; positive health impacts; zero deforestation.
- How depletion and degradation of the natural resource base and emissions profiles affects national wealth and prospects for future economic growth?

IEEM - National balance sheet includes natural capital





- Multidimensional impacts, previously required various models to capture (panel A).
- Impacts on GDP, employment, income; natural capital stocks and environmental quality.
- Increase in genuine savings of US$415 million above baseline levels in 2025 (panel B).

IEEM Applications?

- Assess El **Niño-induced drought** and examine impacts of **potential interventions.**
- Evaluate strategies for **achieving SDGs** (e.g., will a given policy **halt deforestation, restore degraded forests, or preserve inland freshwater ecosystems** and their services)
- Examine measures to achieve **Paris Agreement** (e.g, how will a policy affect **emissions** now and over time, offer **transparency** and **accountability**).

Goal for IEEM: Tip policy making paradigm towards evidence-based policy design.

- Provide policy and decision makers state-of-the-art tool to account for natural capital and national wealth, present and future.

- Impacts of economic activity on natural capital and how changes to natural capital stocks affect economic growth prospects.

Evidence-based policy analysis that accounts for the relationship between 3 pillars of wealth

Policy maker - can understand full range of economic and environmental implications of public policy and investment alternatives.

IDB

I E E M Integrated Economic-Environmental Modeling

Thank you.

Acknowledgements: Netherlands Ministry of Foreign Affairs and the World Bank-led WAVES Global Partnership.

For more details: Onil Banerjee, Inter-American Development Bank
Tel: 1-202-942-8128 onilb@iadb.org

Banerjee, O., Cicowiez, M., Horridge, M. and Vargas, R. 2016. A Conceptual Framework for Integrated Economic-Environmental Modelling. Journal of Environment and Development, 425(3), 276-305.

Banerjee, O., Cicowiez, M., Vargas, R. and Horridge, M. 2016. The Integrated Economic-Environmental Modelling Framework: An Illustration with Guatemala's Fuelwood/Forest Sector. Inter-American Development Bank Working Paper No. 757.