ENVIRONMENTAL ECONOMICS FOR EVIDENCE BASED POLICY

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IEEM: A New Natural Capital–Based Decision Making Platform

IEEM

Integrated Economic-Environmental Modeling

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NATURAL CAPITAL

Accounting – What's Missing?

The Latin American and Caribbean (LAC) region's unique natural capital underpins its wealth, drives its economies, and is the foundation of future economic growth. In conventional public policy and investment frameworks, natural capital is not measured and therefore not accounted for in decision making. As defined by the late economist David Pearce, valuing natural capital is either "implicit or explicit; it cannot fail to happen at all." Thus, by not accounting for natural capital in our decision making, we implicitly assume it has a value of zero. History has shown that this undervaluation of natural capital in public policy and investment decision making results in the degradation and loss of natural capital, generating unforeseen economic, social, and environmental costs to society.

Traditional public policy and investment decision-making frameworks do not account for natural capital.

THE SOLUTION

IEEM (State-of-the-Art Decision Making)

To make better-informed decisions it is necessary to broaden the scope of our analytical tools to more accurately represent and define the relationships between the three pillars of national wealth– manufactured capital, human and social capital, and natural capital. Created with support from the Inter-American Development Bank's BIO Program, the Integrated Economic-Environmental Modeling platform **(IEEM) advances the state of the art in decision-making frameworks** enabling policy makers to understand the full range of economic and environmental implications of public policy and investment alternatives.

Utilizing the standards defined by the first international System of Environmental Economic Accounting (SEEA), data organized under the IEEM platform is compatible with the economy-wide frameworks that are regularly used to measure economic performance. IEEM integrates environmental resource-specific modules, such as forestry, energy/emissions, and fisheries modules to capture the dynamics of environmental resource supply and use.

WHY CHOOSE IEEM?

IEEM is built to quantitatively represent how environmental resources are used in productive economic processes and in turn, how these processes impact the environment in terms of emissions and waste. While conventional economic impact analysis quantifies the effects on standard indicators such as GDP, income, and employment, IEEM goes one step further, capturing impacts on indicators reflecting stocks of environmental resources, environmental quality, and wealth, such as genuine savings.

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IEEM is a state-of-the-art policy tool enabling evidence-based analysis of natural capital wealth in an economy-wide framework.

While a country's natural capital accounts present a snapshot of past natural capital use, IEEM is the first forward-looking platform that integrates natural capital accounts and enables us to ask 'what if' questions to estimate how the economy and environment are impacted. IEEM sheds light not only on how public policies may affect nationally defined development priorities, but can be used to measure the degree to which policies make progress toward achieving global commitments such as the United Nations Sustainable Development Goals (SDGs) of ending poverty, protecting the planet, and ensuring prosperity for all.

To sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss (UN goal 15) it is first necessary to determine the effects of policies on natural capital and incorporate anticipated impacts into the national balance sheet.

IEEM IN ACTION

Guatemala Fuelwood Strategy

To demonstrate the efficacy and analytical capacity of the IEEM platform, we applied it to the critical national issue of fuelwood scarcity and forest degradation in Guatemala, a country with one of the most comprehensive natural capital accounts in the LAC region. The IEEM platform captured how depletion and degradation of the natural resource base and emissions profiles, under the National Strategy for Sustainable Production and Efficient Use of Fuelwood, affected national wealth and prospects for future economic growth, reflected in the indicators generated by IEEM. The fuelwood strategy was informed by Guatemala's natural capital accounts and multi-year studies that revealed issues with illegal logging and the detrimental impacts of fuelwood use.

As the primary source of national energy use (57%) in Guatemala, fuelwood is becoming increasingly scarce (10 million cubic meters deficit). Inefficient usage has caused increased respiratory illness (31%), 5000 premature deaths annually, and a 1% loss of GDP. Simulating a 25% increase in fuelwood efficiency through the implementation of more efficient cookstoves, IEEM analyzed the net income effects on poorer households in various scenarios. Results showed that by the year 2025, incomes would increase by 0.19% for an efficiency scenario and 0.30% in an efficiency + health scenario. This latter scenario included positive health impacts that would arise from more efficient household fuelwood use.

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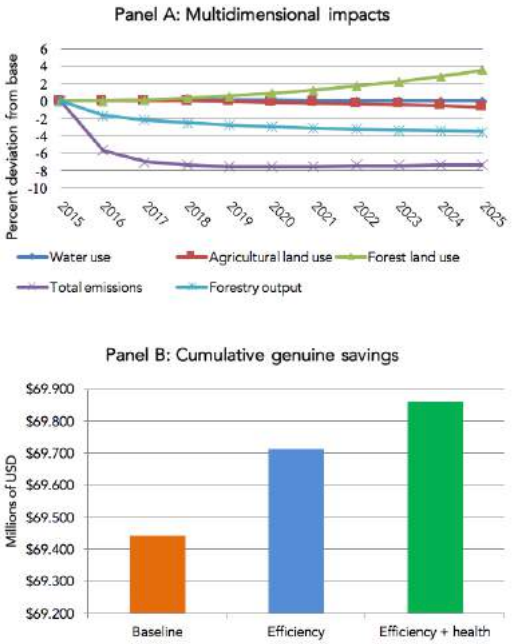

Panel A illustrates some of the multi-dimensional impacts captured by IEEM which previously would have required more than one model to capture. Panel B demonstrates how IEEM can be used to estimate policy impacts on wealth with the indicator of genuine savings. The efficiency + health scenario results in an increase in wealth over the business as usual scenario of US$415 million by the year 2025.

Additionally, by 2025 IEEM projected a 0.30% increase in private consumption, an indicator of well-being. The CO_2 emissions also declined by 7% for the overall economy and by 13% for the poorest households. Other indicators included energy consumption, agriculture and forest land use, water consumption and changes to natural capital stocks, as well as standard indicators such as impacts on GDP, household income, and employment.

By accounting for the environmental dimensions of income and wealth, the IEEM platform's advanced tools for evidence-based policy and public investment analysis indicated that the fuelwood strategy contributed positively to the natural capital pillar of the country's wealth. The fuelwood scenario demonstrates how decision makers, through IEEM, can more accurately analyze the current and potential impacts of the fuelwood strategy and inform future debate around fuelwood, forestry, and other potential public policy and investment scenarios.

IEEM OVER TIME

Once an IEEM is created its enormous value to policy makers comes by asking–how else can it be applied? In Guatemala, the IEEM could assess the El Niño-induced drought, examine the impacts of potential interventions, and evaluate strategies for achieving SDGs (e.g., will a given policy halt deforestation, restore degraded forests, or preserve inland freshwater ecosystems and their services). It could also be used to examine alternative measures and trade-offs to achieve commitments under the Paris Agreement or a country's Intended Nationally Determined Contributions (e.g, how will a policy affect emissions now and over time).

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THE FUTURE OF EVIDENCE-BASED POLICY

Harnessing state-of-the-art analyses, IEEM defines critical relationships between the environment and the economy and when used for public policy and investment analysis, produces results that could not previously be obtained through a single modeling framework. IEEM generates indicators that capture the multi-dimensionality of wealth and well-being, as well as the standard indicators that reveal impacts on GDP, income, and employment. Building upon the foresight of Professor Pearce, IEEM explicitly accounts for natural capital thereby overcoming what has been referred to as the invisibility of nature. It is our goal to promote the development and institutionalization of IEEM in countries around the world in order to tip the policy-making paradigm towards one of evidence-based policy design.

Policy makers can understand the full range of economic and environmental implications of public policy and investment.

EVIDENCE-BASED POLICY MAKING CONTINUUM

Traditional Analysis
(Invisibility of nature, Natural Capital undervalued)

Policy Decisions
(Natural capital not included, Static, Incomplete)

Natural Capital
(Degradation and Depletion)

National Wealth
(Economic, social, environmental losses / incomplete balance sheet)

IEEM
(Accounts for natural capital future and present, Dynamic, Forward-looking)

Natural Capital
(Protected, Leveraged, Economic representation)

Policy Decisions
(Reflect multidimensionality of wealth, e.g. UN Sustainable Development Goals and Paris Agreement)

National Wealth
(Increased prosperity, Complete balance sheet)

For more information on IEEM, please contact Onil Banerjee, obanerjee@gmail.com