**2242-14**

# Joint ICTP-IAEA Workshop on Uncovering Sustainable Development CLEWS; Modelling Climate, Land-use, Energy and Water (CLEW) Interactions

***30 May - 3 June, 2011***

## Integrated Assesments the Path to Political Economic Analysis

LANGLOIS Lucille Marie
*International Atomic Energy Agency IAEA*
*Planning and Economic Studies Section, PESS*
*Dept. of Nuclear Energy NE, Wagramerstrasse 5*
*P.O.Box 100, A-1400*
*Vienna*

# INTEGRATED ASSESSMENTS
# THE PATH TO POLITICAL ECONOMIC ANALYSIS

Lucille Langlois
lmlanglois@gmail.com

Title says WHY – also a bit about how

DEFINITION

An integrated assessment (IA) provides a **common analytical framework and a common statistical basis** for exploring the effects of changes in social goals or in policy; in supply, demand and price of labor and resources, **for a set of interested parties or on more than one system**.

Integrated analysis is an important part of sustainable development planning.

IA users are broad:

-Each system has competing interests

-Multiplication of specialized interests and agencies: different mandates, missions, agendas, goals, ideas, prism for viewing operations and future of external or competing systems (even within electricity sector).

-If you want a logical agreement on a way forward, then competing agencies and parties need single coherent and neutral common substantive basis for negotiating and reconciling differences (cost-effectiveness, environmental protection)

-not limited to CLEWS universe.
This talk is a mixture of IA on a single system and also for multi—system analysis

Assessments can be integrated across technologies (e.g. on an electricity system), systems (CLEWS), services (multipurpose project), boundaries (multinational projects), interests (e.g. environmental integration; investment risk reduction)

BACKGROUND

**The idea is not new**. Any responsible planner interested in orderly and efficient development, will do some form of IA. ( Mertz, von Miller, Niagara ,turn of last century; WB, **EIAs;** US BRecl 1800s-now: water, power, defense, development, recreation)

The problem for today has been very well described by others in the past couple of days. To summarise:

*Growing demand* for resources for a growing world population and for economic development. Scarcity **and** distribution problems. Competing and impinging demands and supply. No one system/industry/country can assume unconstrained access to supply or demand. (Aral Sea; exporting electricity to neighbors; water rights, land claims)

*More complicated synergies*. Energy, agricultural and water systems and needs are increasingly cross-border, regional, national and international or multinational in scope. Their respective interactions with each other and with the general economy, becomes more and more important. (EIAs)

*Expanding systems* will tend to impinge on each other – no longer operate in isolation.

Making political, policy and investment decisions in this climate requires balancing multiple factors and interests; informed decision making requires some understanding and explanation of the options, their consequences and trade-offs across the social and political spectrum.

Besides balancing interests, decision makers need to be able to explain the consequences, who is affected and how, to an increasingly vocal and active public.

The discussion of models in the past 2 days has just served very much to emphasize the modern dilemma of political economic and integrated analysis:

namely that the need for a broad analytical scope runs counter to the enormous need for detail in constructing complex system models.

I have been very impressed with the amount of detail that has gone into some excellent models.

But I was also reminded of a number of issues that would require political economic and integrated analysis:

-Transboundary issues for water: 263 basins; 273 aquifers, 145 countries
-parallel situation for oil and gas reservoirs: China Sea, North Sea, Sakhalin (problem since war 1907)
-Aswan Dam and flooding
-Biomass: ethanol/sugar;   bagasse/coal,waste
Water use and crop choices

-Another example: Fishing rights – Managing the Commons

On Monday we talked about expanding the scope of analysis on your own system. Today we should talk about expanding analysis by linking systems.

First, I cannot emphasize enough that you need to know your system very well before you try to link it to another system
A model is a great educational tool. You need to use it to educate yourself. Push it and poke it and play with it yourself, to understand how your system operates and what influences it.
Remember models are made to generate insights, not magic answers.

Assuming you have done some homework to be familiar with you own system, let us consider how to broaden analysis beyond you own system.

Otherwise, you can't know how to link up to other systems.

**HOW TO PREPARE FOR AN IA - RIGOROUS COHERENCE**

**The mechanics are not new**. The statistical and modeling techniques used for multi-system IA are largely the same as for single system analysis.

These may be packaged in different form (MCDA, CLEWS), but they are not unfamiliar.

However, the application of these tools is different:

-Optimisation of multiple vs. single priorities
-Identify trade-offs over larger scale
-Common logical and statistical framework to explore/reconcile competing supplies and demands

**What other tools do you need most?**

**rigorous coherence**
**logical consistency**
**critical thinking**
**open-minded humility**

Any melding of analyses MUST have a logically consistent common and consonant ground as to definitions, statistics and data, assumptions and boundaries. Otherwise you are comparing apples and oranges, and your IA is useless.

IA requires a willingness to see the other person's needs and accept the value of their goals. Just because my optimisation has a different focus from yours, does not make either of them wrong.

ON THE OTHER HAND, you cannot accept unquestioningly and at face value and without examination, the credibility or utility of the input you receive from others. You need to know and understand the make-up of the definitions, assumptions and boundaries of the other system models.

**Harmonisation – Mozart, Schoenberg, Chinese folk songs**

Unless inputs and assumptions are made consonant, or the differences accounted for and their consequences considered, the analysis is uncertain and not integrated and the results are not credible or reproducible.

What needs to be harmonized?

Assumptions and boundaries
Definitions,
Statistics and data

Statistics and data

Not simple matter - statistics even on one system are notoriously difficult to regularize and make consistent)

Definitions

- diversity of definitions used to categorize data even within one government agency or company (fuel categories, water used (cooling water/consumed (irrigation).

Timing

For integrated analysis, time horizons are trickier. How do you reconcile and explain the consequences of the choices for time horizons, where crop choices may have annual impacts while investment in generation or dams is longer term? How do you deal with the different time horizons of foreign aid investors and local populations? (cashews and firewood)

[Fallacy of short term profits: adequate investor reward for risk; bureaucrats and politicians shorter term, but still invest in infrastructure]

**DO NOT UNDERESTIMATE THE IMPORTANCE OF HAMORNISATION**

**BROADENING THE SCOPE**

**As discussed on Monday, boundaries, assumptions, and definitions can limit or broaden the analysis**.

Broadening the scope in any analysis means incorporating previously external considerations, or incorporating as variables previously exogenous assumptions.

The effects of exogenous factors, political changes and human vagaries are multiplied in IA and their consequences may reach outside the initially impacted system. .

You need to reconcile into a single analysis the different boundaries (e.g., territorial, industrial, actors, time horizons) that different systems have.
You need to make them coherent.
You need to know where to draw the line.
Whose criteria do you use and to whose benefit?
How can the different systems' goals and needs best be met?

These are things you need to decide or negotiate as you define among yourselves the scope of your integrated analysis.

It might help if you think about integrated analysis in terms of Input-Output analysis: everyone's demand is someone else's supply, and everyone's supply is someone else's demand. This idea can help organize and structure your inquiries.

What are the dangers of too narrow a scope?

-incomplete analysis
-poor policy or decision making,
-inefficient or counterproductive institutional changes and
-wasted investment.
-(generating for export, water rights)

**Incorporating new factors and elements**

Identifying cross-system (and previously external) factors is a major element in integrated analysis. Once you have identified them, they can generally be incorporated or reflected in the model as changes in supply, demand or price, or as constraints.

And here I need to make a digression about optimization models. Most models use supply, demand and price to optimize either for least cost or maximum efficiency in reaching some goal or for some set of choices. It could be least cost energy supply or employment or most efficient irrigation and crop choice combinations. This is fine.

In any case, the model makes some assumptions about rational behavior: that people will in fact seek rational outcomes, and that these respond to rational economic signals about resource use. These results are generally used to suggest rational actions that are economically or physically efficient.

Take for example, economic models that assume that accurate pricing will result in rational economic decisions. The problem with this is that it assumes a perfect market, which exists in theory only. It assumes unfettered movement of goods, perfect knowledge on the part of market participants about pricing, supply and demand options. None of this exists. None of it ever has. WHY?

One of the main reasons, and the problem I want to discuss, is how the basic relationships of supply, demand and price are often invisibly skewed by regulation. I think one of the biggest problems today lies in the fact that there is not one aspect of modern political and economic life that is not in some way skewed by regulation.

Regulatory interference also skewsdecicions and ideal optimization analysis. I can say this as a former regulator and I have seen some of the disasters that have come from assuming good market responses to bad incentives. Moreover, regulation on one system can affect other systems as well.

Consider the following types of regulation that alter economic behavior: taxes (steel shortages), customs charges and regulations, licensing (power and price), import and export quotas, caps of all kinds (price (inter- and intrastate gas in US; economic viability (price caps in California) and especially subsidies. Subsidies are tricky. They deliberately skew supply and demand and especially investment decisions. But they often create perverse incentives, and they often do not end up going to the people intended to get them.

Here are some examples: sugar (US (7X price and Europe), ethanol (land, crops, coal, waste, fertilizer), wind energy (already discussed), domestic oil or coal production (coal often for employment: Germany and Spain), water rights, use of genetically modified plants, urban development schemes, crop choices (monoculture in US – diet, water, diversity, fertilizer and pollution), transport (RR and canals), subsidies that favor export vs. subsistence farming, or conflicting subsidies, such as foreign aid exporting technology for the green revolution vs. export subsidies for grain and import quotas against foreign food imports; introduction of alien species (especially fish); and susubsidies for fishing that run directly contrary to international efforts to manage the commons, a most difficult but crucial task. I already mentioned on Monday the dilemma for wind power from conflicting regulations. The list is endless.

You cannot change these things. And you cannot know all of them. But wherever possible, you need to be aware of them and to reflect them in your model. They are real constraints. If you don't see how they constrain your system, you can't quantify how or how much they affect supply, demand or price. Ignoring them will result in unrealistic results.

When you are linking to other systems, remember that the subsidies on other systems may in fact favor or be detrimental to the supply and demand equations on your own system.

**CLEWS AND IA**

CLEWS bypasses the need to create a single model to analyse separate systems. It greatly facilitates the mechanics of doing an IA among different systems.

CLEWS does NOT, however, excuse you from ascertaining the consonance of the models being married

CLEWS does not allow you to accept all inputs and assumptions uncritically

CLEWS does NOT excuse you from thinking, from using common sense, from checking the logical coherence of your results (the laugh test), the reproducibility of the data, the analysis or the results

In the end the quality of your IA cannot be mechanically derived. It can only come from thoughtful questioning, critical evaluation of inputs, and a strong dose of common sense.

One final note: a case study that I would love to see CLEWS tackle is Haiti. It has an amazing history of the detrimental interaction of land, water, crops and energy. A CLEWS andlysis and a proposal to turn things around would be fantastic.