

Integrating SEA into Decisionmaking: An Economic Approach

by Dan Biller

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The structure of the presentation: we will have an introduction first; we will discuss the environment multidimensions; we will go into the economic conceptual framework that can be used for strategic environmental assessments; and we will conclude.

One of the best definitions that I ever saw on environment is the one that the Webster Dictionary has. It has basically two definitions:

One, it says that it is circumstances, objects, or conditions by which one is surrounded. That means everything surrounding one. And the second is the aggregate of social and cultural conditions that influence the life of an individual or a community. So in this one in particular, you have already an addition of social and cultural aspects.

As we can see, it is difficult to define the environment as any one single phenomenon or characteristic. While biologists and ecologists may look at the environmental issues from a biodiversity or a natural resource angle, engineers may approach it as a pollution issue. Other disciplines have different perspectives. A few points, though, are clear, and they are quite complex. One, environment issues are cross-sectoral, impacting nature and human beings as part of nature. Environment problems seldom impact a single sector and are difficult to isolate, often affecting a multitude of agents.

Therefore, a complete environmental analysis is multidisciplinary and participatory, translating into the involvement of different experts and stakeholders.

While projects often have first-order impacts, for example, you can discuss a bridge affecting a mangrove, this seldom is the full story. As we know, higher-level decisions and planning may be needed to address the second and third tiers of impacts, which can be quite more significant than the first one.

The potential impacts related to the economy and the environment extend well beyond the project level. And the issue then becomes accounting for those second and third tiers, which requires integration and can be significant.

So you may ask what would an economist be interested in on environmental issues. Why would an economist care about the environmental issues? And as we discussed, while biologists look

at, for example, natural resources or biodiversity issues and engineers look at the pollution issues, for an economist we want to transform those environmental processes into an economic and social process. We're really looking into the welfare issue.

So if we look at the economic conceptual framework for strategic environmental assessments, basically we are looking to a quite complex figure that has to include, in terms of factors, macroeconomic factors, microeconomic factors, economic growth factors, also market failures or what economists call market failures. We'll talk a little bit later about this. It has to include public goods, information, and externalities.

The agents involved are the civil society, markets, governments, and all of this has to be taken into account in a good strategic environmental assessment. So, as I mentioned, we will be looking at each of those factors.

Now, where to use this framework that we briefly presented and we're going to detail in a moment. Well, the planning process has several levels. Basically we're talking about policies, and policies are primarily a road map with defined objectives that set priorities, rules, and mechanisms for implementation, usually done in the start of a government period. In the case of China, for example, one could argue that the five-year plans are both determined policies and plans.

The second term is plans. Plans setting specific priorities, options, and measures for resource allocation according to resource constraints following sectoral, national, or global policies.

We also can use this framework in programs, that is, an agenda with defined goals to be implemented, translated into activities and projects within the policy and planning frameworks.

And, finally, we can use this in projects as well, which would be defined as a detailed proposal, scheme, or design of a development action indicating an investment schedule.

So, moving now back to the specifics on the economic conceptual frameworks for SEAs, for strategic environmental assessments. I first want to talk to you about growth factors.

So, the key question under growth factors here is economic growth, growth versus environmental quality. What are the trade-offs? Are they really substitutes? Can they be complements? Those are the key questions that we're addressing here.

The use of this analysis would be in policies, plans, and programs, less, of course, in projects because it's quite macro. The tools would be a situation assessment, and as the second definition of Webster indicates, we need a broader understanding of capital, of social, cultural issues.

Let's look at capital. What is capital? Capital is equal, the manmade capital plus the human capital, plus the natural capital, plus the social capital. Manmade capital is the usual idea that we have of capital. This includes machinery and other produced goods. Human capital usually refers to the skills and knowledge embodied by humans. Natural capital is the traditional natural capital, including natural resources and the environment's assimilation capacity. Finally, social

capital can be defined as the interaction between individuals, between institutions, and among them.

These forms of capital may or may not be substitutable among themselves. And basically what we are doing is following the definition of Webster and attempting to depart from a certain baseline.

In this sense, it is very important to keep the notion of time and, therefore, using the appropriate discount methods. I'm not going to go into detail of discount methods, but just to give you an idea.

In the most simple form, human capital in the future depends on today's investment on human capital, that is, what you learn today when you go to university, for example, today's stock of human capital, what you have, and its depreciation.

A community's or individual's future social capital depends on the total fact of choices made by others who are the members of the community's or individual's social network, on the community or individuals themselves. So we're looking at the impact done by others on a community or on an individual themselves. It also depends on their respective current stock of capital, of social capital, and its depreciation rate.

This is a very simple definition of what is human capital and social capital, but it needs to be taken into account when one analyzes growth factors.

Finally, one should always look at technological assessments because, as we're looking primarily at the medium and the long run in the case of strategic environmental assessment, over time you can have technological innovations.

An example that I can cite to you is the Irish National Development Plan from '94 to '99. It attempted to do an SEA, and I urge you to have a look on it.

Turning to now the macroeconomic factors, again, the key question here would be what are the impacts of macroeconomic policies on environmental quality. The use would be policies, plans, and to a lesser extent, programs and projects. Why? Because macroeconomic factors at the level of programs and projects, particularly projects, are pretty much a given.

Now, I can give you an example of a certain impact. Suppose a country has a currency exchange rate devaluation. This may bring significant structural changes in the economy; in other words, relative prices would change, which in turn will impact well beyond its stated goals of, let's say, aligning the different prices in the economy. It will improve international trade, most likely, but may also have other impacts on different natural resource exportation.

One example is that for a country that is well endowed with forests, with natural forests, with an overvalued exchange rate, it may not be feasible to export timber. With a devaluation, timber exports may become profitable, increasing deforestation.

So, again, the tools that one would use are, first of all, start with a situation assessment for each policy action (for example, devaluation of a local currency), build a national impact matrix that provides the transmission channels (for example, the prices, quantities, access rights, direct and indirect, short- and long-term both positive and negative effects on the poor that are linked to environmental issues, as well as direct and indirect, short- and long-term both positive and negative effects on the environment itself). This action impact matrix would also have its assumptions and its indicators.

If possible, we should quantify the monetary costs and benefits, even of non-market goods and services. So, for example, we want to know what sort of impact devaluation may have on deforestation and what sort of impact this may cause in the welfare of the population.

The SEA would also then suggest mitigation measures, implementation, and a monitoring plan. Examples include, as I mentioned, trade reform, decentralization reforms, and different structural adjustments.

Note that these types of policies and plans are normally composed of both macroeconomic measures, like interest rate changes, trade measures, like devaluation, and microeconomic measures, for example, tax reforms and tax rate changes.

So now turning to the microeconomic factors, the key question here would be what are the impacts of pricing sectoral policies on environmental quality all the way through what are the impacts of a project on individual preferences related to environment? So the use of strategic environmental assessment that take into account microeconomic factors extends well beyond the policies. It goes policies, plans, programs, and projects.

I can give you an example for this. A tax or a subsidy on fuel can act as either a disincentive or an incentive to pollute, or to substitute less or more polluting inputs. A subsidy for reforestation may be so attractive that it pays to cut native forests and reforest. Those are the sorts of issues that one should take into account when analyzing microeconomic factors on strategic environmental assessments.

So, first you start with a situation assessment, that is, finding the baseline. One should also understand the impacts, both positive and negative, in the same way one builds an action impact matrix that provides the transmission channels to prices, quantities, access rights, et cetera, analyze both direct and indirect, short- and long-term positive and negative effects on the poor linked to the environment, and directly or indirectly on the environment itself, assumptions and indicators. So just to give you the scheme. The road map is more or less the same as with the growth factors and macroeconomic factors. One should also assess costs, benefits, and participatory mechanisms.

A very interesting example I can give you happened in Costa Rica. For example, by doing a computer-generated model, scholars have shown that increasing the stumpage fees would, in fact, decrease deforestation in the first round, but displaced labor from the forest sector into the agricultural sector would actually increase deforestation overall. Why? Because the displaced labor would clear land to engage in agriculture.

So suggesting mitigation measures, implementation, and monitors becomes very important, and engaging participatory mechanism would help for these sort of issues. Once again, as I mentioned before, this is very linked to the macroeconomic factors.

Now, we analyze these three factors separately: the macro, the micro, and the growth factors. Now I wanted to talk together about public goods, information, and externalities. The reason for that is that those are mainly market failures. That is the market cannot signal the true social costs and benefits involved with those three sources of market failure.

To talk about this, I would like first to define the total economic value of the environment. Basically the total economic value of the environment can be broken down into two main values: the use values and non-use values. The use values would be direct use values, indirect use values, option and quasi-option values. And the non-use values would be existence and bequest values.

Looking specifically at a typical environmental issue, such as biodiversity, one could see that the direct extractive use values would be projects of commercial value, for example, food, plants. In the case of China there are several uses of biodiversity resources: herbal medicine, forest products, et cetera, non-timber forest products, et cetera. Direct non-extractive use values would include ecotourism, education, recreation, and the development of new pharmaceuticals. Indirect uses would be the services provided by ecosystems, such as water supply, flood control, and soil conservation. Those are the things, for example, when we discussed deforestation, that have to be taken into account as well.

An option value is the option of using these different values in the future. Finally, existence or bequest values, that is, non-use values, is the pleasure that one gets from the mere existence of biodiversity and what future generations could get out of this. For example, knowing that a panda bear is in China exists. I have never seen a panda bear. I probably will not see ever a panda bear in my life except in a zoo, but that doesn't mean that the pandas have no value for me. Quite the contrary.

So going back to the market failures, the key question becomes markets in part reflect use values, resulting for direct enjoyment of a good. But many environmental issues are linked to non-use values as well, as we described, without markets. So how do we capture these values, both use and non-use values?

I think that it's time now for us to go back and look at the information, externalities, and public goods issue. Basically information is a market failure because markets do not transmit readily information to all agents, and you have problems of asymmetric information. Some economic agents know more about certain things than other do, and that may then generate market failures.

In terms of externalities, basically what we're talking about are unintended impacts of one action on others. They can be both positive and negative. They can be both in this generation and across generations. The unintended impacts, as I mentioned, could be positive or negative. For example, if I smoke in the room, I may affect others that do not smoke in the room, but I don't

necessarily intend to impact them. I like to smoke. Or if we look at the positive impact, I may use a certain perfume that is pleasing to others. I make my choices without necessarily thinking how I would impact others. I don't want to impact them negatively, but I also do not necessarily want to impact them positively.

If we look at public goods, basically public goods have two characteristics. They have to be non-rivaling consumption and non-excludable. So in the case of the existence of the panda bears, well, nobody can exclude me from enjoying the existence of the panda bears, unless, of course, the panda bears are made extinct. And my amount of pleasure does not take the supply of others. Others enjoy equally.

Let us contrast that with a private good, which is both rivaling consumption and excludable. If I go to the market and I buy, say, an organic orange or an orange, pretty much this is my orange. I bought it. The owner of this orange, until I paid him, excluded me from enjoying that orange. I have to pay to enjoy it. Once I buy it, there is one less orange in the market for others to enjoy. So a private good is both rivaling consumption and excludable.

You have something in between, for example, the club goods, like national parks. You can exclude people from enjoying it, for example, by charging fees. But once they pay, they are in, it becomes non-rivaling consumption. Or open-access resources, which are non-exclusive but rivaling consumption. International fisheries are a clear example of an open-access resource.

So you have several valuation methods trying to incorporate and capture, or at least analyze and give more precise approximation of the benefits and costs associated with environmental goods and services.

As I said, the use values are partially reflected in the market, while the non-use values are not reflected in the market, and they depend primarily on different methods to be able to be assessed or investigated.

So, again, in terms of situation assessment, one needs to understand the role of information when doing a strategic environmental assessment, the issues related to externalities and public goods. One needs to do valuation, hopefully, to assess the non-market net benefits, and from that one suggests mitigation measures, implementation, and monitoring. Several examples exist on using valuation methods to address market failures, or at least to learn more about market failures.

So, in conclusion, environmental and natural resources or environmental and natural resource policy really are composed of three different components. One is the policy itself, which uses instruments in its application, for example, command and control, markets, economic instruments like taxes and tradable permits.

Now, if we look at the overlap, the intersection between environmental and natural resource policies and instruments, we're really talking about the legal framework, how to implement and regulate these policies. If we look at the intersection between these instruments and valuation, valuation is really a good tool to help on instrument design. In other words, you may not be

perfectly or precise, but you are approximately right by engaging in valuation, trying to design, for example, an affluent charge.

If we look at the intersection between environmental and natural resource policies and valuation, what we get out of this is priority setting. It helps you to establish priorities.

Finally, all three of them overlap in one aspect, which is the information provision.