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Futurism for Economic Valuation

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Abstract
Over the last decades, human beings have degraded natural resources faster and more broadly than in any comparable period of time in human history. There is a major concern about natural resources degradation caused largely by the development. We have other needs beside natural resources. The valuation methods tell us although many individuals benefit from development plans that lead to natural resources degradation or the loss in ecological services, the costs borne by society of these development plans are often higher. It is a kind of cost-benefit analysis (CBA).Unfortunately; externalities are not included in CBA classic studies. A full economic evaluation approach is essential to determine the monetary value of environmental properties. It is used to calculate the net social benefit of a land use or a development project. Ecosystem valuation represents the method of stating a price for ecosystem goods or services. The "economic valuation"(EV) as an effort to allocate quantitative values to the goods and services offered by environment and natural resources, whether or not market prices are available to help us. We anticipate EV will replace with CBA in the environmental studies management like environmental impact assessment procedure because its capabilities.

1. Economic Valuation Definition

The "economic value" is a measure of what the maximum amount an individual is willing to give up in other goods and services in order to obtain some good/goods, or service/ services. This measure of welfare is formally expressed in a concept called willingness to pay (WTP). Thus, the lost value from the degraded environment is the maximum amount individuals are willing to pay to have a state where that same area is free of pollution. As this theory rely to people so a common difficulty in understanding economic valuation is distinguishing between what something is valued at by individuals and what its economic value really is.

The phrase "valuing the environment" is a contentious one. The main debatable issue is whether it is actually possible to put a monetary value on natural resources and the environment. This is not a major problem when one prices fish resources, oil reserves or tin exports whose use is excludable (World Bank, 2005). But, is it technically possible or ethically sound to place a value on "clean water" or "the beauty of a rangeland" that have not any market?

Economic valuation involves the monetary measurement of a change in an individual's well being due to a change in environmental quality (Sathirathai, 2000, Bulow, 2007). Barbier in 1997 stated: We can define economic valuation as the attempt to assign quantitative values to the goods and services provided by environmental resources, whether or not market prices are available to assist us.

In the other word, many of the goods and services provided by environment are crucial, but not always quantifiable in monetary terms. Many of these goods and services are not traded in the market place and so do not have an obvious price or commercial value (Hejazi, 2012). The danger is that if these without-price values are not included in the decision-making process, the final decision may favor outcomes which do have a commercial value. Hence, decision makers may not have full awareness of the consequences for biodiversity conservation (Bennet, 2005).

One of the most important reasons we have to do "economic valuation" is many of natural resources and environment parts are complex and multifunctional, and it is not obvious how the many goods and services provided by these resources affect human welfare. In some cases, it may be worthwhile to degrade environmental resources; in others, it may be necessary to "hold on" to the mentioned resources. Finally economic valuation provides us with a tool to assist with the difficult decisions involved.

Loss of natural resources and the environment also is an economic problem because important values are lost. Perhaps, some values lost for all time, when these resources are degraded. Each option for the natural resources and environment to leave it in its natural state let it to degrade or convert it to another use has implications in terms of values gained and lost. The decision as to what use to follow for a given environmental resource, and eventually whether current rates of resource loss are "excessive" can just be made if these gains/losses are properly analyzed and evaluated (Barbier, 1997). It requires all of the values that are gained or lost under each resource use option are carefully considered. It is related to another concept, "total economic values" or (TEV).

Finally, economic valuation is a procedure with is estimated by money as a unit of account. It is for determine values for an entire society and we have to aggregate from members of society in a sampling during a survey and a product and services when has "value" just when the individuals distinguish they are valuable and

unfortunately we have to accept some incorrect results. It is while most of them have not special information about natural resources and environment. The estimation process of environmental values can be used to justify and make a decision how to allocate public spending on conservation, preservation or restoration initiatives. It compares the benefits of alternative study proposals. Also it maximizes environmental benefits per unit spent.

2. Economic Valuation Background

The "environmental valuation" has origin in United States. It relates in 1902 in the river and harbor act project. The mentioned project needed a panel of engineers for statement on the desirability of the army corps of engineer's river and harbor projects by accounting for the cost and benefit analysis. After ten years, the plan of social justification for projects came out as a topic. For example, the flood control act of 1936 authorized federal participation in flood control plans if the estimated benefits of those projects went over the costs evaluated. The principle was both to justify projects and to help decision maker who have to pay for such studies. But the really beginning of cost and benefit analysis relates to after Second World War. The attempts continued for project justification during decade five of ninety century. For example, a federal interagency committee produced the Green Book, an attempt to codify on general principles of project justification.

After the environmental progress which began in the late of 1960, the environmental pollution control was of particular worry. The economics society also, was prepared and wants to play a role. Unfortunately, the economic view had little force on the preliminary surge of legislation for pollution monitoring. The environmental valuation did not really come into its own until the 1980. It owes to the national environmental policy act in the United States as amended through 1982 which required the applying of cost benefit analysis in environmental impact statements.

Additional environmental legislation, gave natural resource trustees the right to claim damages for injuries to natural resources and environment which result from the release pollutants and other hazardous materials like oil and wastewater into ocean, estuaries, lakes and openly owned rivers, or terrestrial habitats. The natural resource and environmental damage assessment procedure clearly calls for the measurement of interim lost values of damaged natural resources and environment.

Then during the 1980-1990, attention in environmental valuation continued to develop. Even the interest has continued into the 1990s. Many of this attention relates to environmental pollution from oil industries. Additionally, relatively recent legislative permissions, through amendments to existing legislation, have strengthened the requirement of net economic benefit analysis as part of management and regulatory programs (Lipton, 1995).

3. Economic Valuation Practical Application

3.1Economic Valuation and Cost Benefit Analysis

The economic valuation like cost benefit analysis (CBA) is an economic tool. It produces information intended to get better the quality of public policies. In the CBA process the quality refers to an estimation of the communal welfare which a policy expresses to the community. The policies reduce welfare are in two categories: first a priori inferior to those that improve well being, and second policies that improve welfare a great deal are superior to those which improve it just marginally. Conceptually, the cost benefit analysis could be used to rank policies on the foundation of their developments or decrease in welfare. For obtaining a useful cost benefit analysis and appropriate for decision maker, one have to find that the index of social welfare used in the cost benefit analysis studies is a reasonably good metric by which to measure the well being of a society (Korppi, 1977). Actually, cost benefit analysis is defined according to the satisfaction of wants, or preferences. If something considers a want, so it supposes a benefit and in contrast if it detracts from wants, so it supposes as a cost. Subsequently, anything is a benefit that increases human welfare, and another thing is supposed as a cost that reduces human welfare. In other word, there is a comparison between gains and losses. Fundamentally, it is the balance between them; of course whatever the equilibrium point defines that gain side becomes larger is more pleasure. The gain is defined by welfare for economist; it is stated by looking at preferences people. As a result in some techniques refer to individual's opinion and in the economic valuation method it will be gave details in complete the name of this process is willingness to pay or WTP that will be explained in later sections. In fact the cost benefit analysis is fulfilled not only useful for environmental economic but also for each decision making for most of economic projects.

The results of the economic valuation studies can serve as an input to a cost and benefit analysis. It assesses if a policy or a project represents a socially efficient apply of resources. Therefore, the overall purpose of economic valuation and cost benefit analysis is to provide information to political and administrative decision makers and/or the broader public about the economic desirability of different project or policy alternatives (Johansson, 1991).

Table 1. Financial Analysis and Economic Analysis Differences

Points	Financial Analysis	Economic Analysis
Viewpoint	Individual, firm or household	Society as a whole
Objective	Increase in individual, firm or household profit or income	Increase in welfare
Benefit	Revenue	Any kind of satisfaction or increase in welfare, including monetary revenue
Benefit measurement	Monetary value	WTP or WTA measurement
Cost	Cost	Any kind of dissatisfaction or decrease in welfare, including monetary costs
Cost measurement	Monetary value	Opportunity cost
Value	Net change in monetary revenue	Net change in welfare

Adapted from: Suliman (2006)

The economic cost and benefit analysis (CBA) provides better framework for evaluating the holistic effectiveness of every projects alternatives. It is carried out by incorporating the environmental costs and benefits of land use activities. The financial values are not enough for evaluation all environmental impacts. They are also inadequate representations of the welfare of society. In financial analysis, environmental impacts of projects are considered just when they directly affect revenue streams or cost outlays of the project concerned (Table1).

3.2. Estimating Economic Values

The concept of "value" was described in the initial section in the present chapter. It is included different types. The "total economic value" or (TEV) covers all of them. According to Rogers et al. (2002), Raucher et al. (2005), and Turner et al. (2004) TEV is that any good or service is constituted of different attributes, some of which are concrete and easily estimated, while others may be more difficult to quantify. TEV is the sum of different values (Figure 3.1).

Figure 1. Component of Total Economic Valuation
(Adapted from: Lee, H.C., and Chun, S.Y., 1999)

Costanza R. (2000) offered a comprehensive list of ecosystem functions and services. They defined ecosystem services as "flows of materials, energy and information from natural capital stocks". They combined also with constructed and human capital services to make human welfare. We present a summary of the values of environmental goods and services like Table 2.

Table 2. Environmental Goods and Service Values

Value Category	Service/function	Examples
Ecosystem (indirect use)	Gas regulation: regulation of atmospheric chemical composition	CO_2/O_2 balance, O_3 for UVB protection, and SO_X levels
	Climate regulation: regulation of global temperature, precipitation and other biologically mediated climatic processes at global or local level	Greenhouse gas regulation, DMS production affecting cloud formation.
	Disturbance regulation: capacitance, damping and integrity of ecosystem response to environmental fluctuations	Storm protection, flood control, drought recovery and other aspects of habitat response to environmental variability mainly controlled by vegetation structure.
		Water regulation; Provision of water for agricultural (such as irrigation) or industrial (such as milling) processes or transportation.
	Erosion control and sediment retention wetlands	Prevention of loss of soil by wind, runoff, or other removal processes, storage of silt in lakes and weathering of rocks and the accumulation of organic materials
	Soil formation	
	Nutrient cycling	
	Pollination: movement of floral gametes	Nitrogen fixation; N, P and other elemental or nutrient cycles Provision of pollinators for the reproduction of plant populations Keystone predator control of prey species, reduction of herbivore by top predators
	Biological control: dynamic regulations of populations	
	Refuge: habitats for resident and transient populations wintering grounds	Nurseries, habitats for migratory species, regional habitats for locally harvested species, or over
Direct use	Food production	Production of fish, game, crops, nuts, fruits by hunting, gathering subsistence farming or fishing
	Raw materials	The production of lumber, fuel or fodder
	Genetic resources: unique biological materials and products ornamental species (pets and horticultural varieties of plants)	Medicine, products for material science, genes for resistance to plant pathogens and crop pests
	Providing opportunities for recreational activities	Ecotourism, sport fishing, and other outdoor recreational activities
	Water supply: retention and storage of water	Provision of water by watersheds, reservoirs and aquifers
	Waste treatment	Waste treatment, pollution control, detoxification
Non-use	Existence value: value from knowledge of continued existence. Bequest value: use and non-use values of environmental legacy; value accruing to a person from knowing that the good will be available in its current condition for future generations	Habitats, species, genetic, ecosystem Habitats, prevention of irreversible change
Option	Potential benefits from the direct and indirect uses of an environmental good	Potential visits to a natural area; biodiversity; conserved habitats
Others	Cultural: providing opportunities for non-commercial uses	Aesthetic, artistic, educational, spiritual, and/or scientific values of ecosystems

when we intend to choose sound method among different methods first we should ask our self:"what is the type of values in our case study?" and then we can select suitable method like Figure 2. When we choose our economic valuation method we should know, the meaning of "an appreciate approach" is not "a method without weakness". We compare different methods with each other in Table 3.5. We conclude there is not any method has pure strength or pure weakness.

Figure 2. Economic Estimation Methods in Economic Valuation
(Adapted from: Richardson, L.,(2009) and Loomis, J.B., 1987)

4. Comparative Study of Economic Valuation Techniques

There are two broad classes of methods assess the economic values of natural resources. First: revealed preference methods seek natural experiments to estimate the demand function for an environmental good. Second: stated preferences methods. The most advantage of stated preference methods is that we can ask respondents for willingness to pay regardless of whether they make use of the hypothetical commodity or not . Thus, we are able to find both of use and non-use values. We compare different techniques in both of mentioned

methods in Table 3.

Table IV. Strengths and Weakness of Various Economic Valuation Techniques

Method	Applicable for	Importance	Strengths and Weakness
Market price Method	Direct use values, especially wetland products	The value is estimated from the price in commercial markets (law of supply and demand)	Market imperfections (subsidies, lack of transparency) and policy distort the market price.
Damage cost avoided, replacement cost or substitute cost method	Indirect use values: coastal protection, avoided erosion, pollution control, water retention	The value of organic pollutant or any other pollutant's removal can be estimated from the cost of building and running a water treatment plant (substitute cost). The value of flood control can be estimated from the damage if flooding would occur (damage cost avoided)	It is assumed that the cost of avoided damage or substitutes matches the original benefit. But many external circumstances may change the value of the original expected benefit and the method may therefore lead to under- or over-estimates. Insurance companies are very interested in this method.
Travel cost method	Recreation and tourism	The recreational value of a site is estimated from the amount of money that people spend on reaching the site.	This method only gives an estimate. Over-estimates are easily made as the site may not be the only reason for traveling to that area. This method also requires a lot of quantitative data.
Hedonic pricing method	Some aspects of indirect use, future use and non-use values	This method is used when wetland values influence the price of marketed goods. Clean air, large surface of water or aesthetic views will increase the prices of houses or land.	This method only captures people's willingness-to-pay for perceived benefits. If people are not aware of the link between the environment attribute and the benefits to themselves, the value will not be reflected in the price. This method is very data intensive.
Contingent valuation method	Tourism and non-use values	This method asks people directly how much they would be willing to pay for specific environmental services. It is often the only way to estimate the non-use values. It is also referred to as a "stated preference method".	There are various sources of possible bias in the interview techniques. There is also controversy over whether people would actually pay the amounts stated in the interviews. It is the most controversial of the non-market valuation methods but is one of the only ways to assign monetary values to non-use values of ecosystems that do not involve market purchases.

(Adapted: Barbier et al., 1996)

Most studies of economic valuation history are replete with efforts to establish the meaning of value; what is it and how is it measured. While the classical theorists required a standard physical commodity unit for measuring exchange value, neoclassical theorists did not need such a commodity. As value was supposed to be determined by utility on the margin, and consumers were supposed to give out money optimally across uses, the marginal utility of money was the same for an individual in all its uses. Money thus became the standard unit of measure. The utility-based values of goods and services are reflected in people's willingness to pay (WTP) to achieve them. Estimates of economic value are designed to reflect the difference that something makes to satisfaction of human preferences (Farber, Costanza, Wilson, 2002). If preferences change over time and under the influence of education, advertising, changing cultural assumptions and variations in abundance and lack, we require a different standard for what is 'optimal'. Moreover, we have to discover how preferences change, how they relate to this new standard, and how they can, or should, are changed to satisfy the new standard (Norton et al., 1998). The base of all economic valuation studies thus is payment for ecosystem service. The common point between all economic valuation studies is trying to force ecosystem services into the market model. Economic valuation studies need to continue to develop better methods to measure, map, model, and value ecosystem services at multiple scales. We have to go on the process of development of measurements. It is the variation between different economic valuation studies. The difference in economic valuation methods has relation to value types.

5. Conclusion

The applications of enhanced valuation methods guide to interesting observations. The valuation methods tell us although many individuals benefit from development plans that lead to natural resources degradation or the loss in ecological services, the costs borne by society of these development plans are often higher. It is a kind of cost-benefit analysis.

The economic valuation process is one of the used methods for reconciling conflicts of interests. Most

of time, externalities are not included in the land use studies. A full economic evaluation approach is essential to determine the monetary value of environmental properties. It is used to calculate the net social benefit of a freeway construction.

Examining the difference between the availability of inputs and outputs with and without the project is the basic method of identifying project costs and benefits (CBA). It is, also normally the same as "after/before comparison". The comparison of with/without is an attempt to measure the cost/benefit arising from the project. The "after/before" comparison, fails to account for changes in the environmental quality directly because it has not market price. In the recent years, the economic valuation (EV) techniques replace with CBA more and more. Some of EV techniques like CVM is more powerful than CBA because estimates nonmarket values. We anticipate CVM and some other EV techniques will place in environmental impact assessment procedure in near future.

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