International Research Journal of Management and Commerce
ISSN: (2348-9766)
Impact Factor- 5.564, Volume 5, Issue 4, April 2018
Website- www.aarf.asia, **Email** : editor@aarf.asia , editoraarf@gmail.com

VALUATION OF ENVIRONMENTAL GOODS AND SERVICE: A STATE OF ASSESSMENT THROUGH APPLICATION OF GREEN ACCOUNTING AND INDICATORS

Sunitha.S
Assistant professor
New Horizon College,
Kasturinagar, Bangalore

ABSTRACT

Environmental goods and services are the biogeochemical processes, attributes or the products thereof that relate to the self-maintenance of an ecosystem, provision of wildlife habitat, cycling of carbon, nitrogen, phosphorus, sulphur, water or the trapping of nutrients, etc. and make the basis of sustenance as well as prosperity to the human society. Only some environmental goods and services have markets, and therefore, prices of only a few of them are available as data. These prices too, are only the indicators of the minimal payments at which the consumers and the producers have agreed to enter into transactions. At these prices, there may be substantial consumer and/or producer surpluses that may go unaccounted.

The worth of environmental goods and services include these unaccounted surpluses, but their prices do not generally reflect their worth. However, a greater part of environmental goods and services have no markets and, therefore, no prices at which they are available to the consumers. Valuation of such goods and services is much more relevant. Economic valuation of nature is not new. In fact, it has been a companion of capital accumulation for centuries. Yet, despite the long

history of valuing select portions of nature economically, there seems to be a new quality to current approaches.

***Green accounting** does this by supporting the notion that with the right kind of accounting and market-based instruments for environmental protection, economic exploitation will automatically better price in the value of nature. Such economic visibility would hence lead corporations to recognize the value of environment goods and services. As a result, natural resources would be protected and this will leads "Green economy". This paper would focus on why is economic valuation of ecosystem is needed. How do we place values on these costs and/or benefits to the environment? Several attempts to value the impact of changes on a sensitive environment have been the subject of public debate. This paper also outlines valuation methods and their application aspects by corporate.*

Key words: Environmental Goods, Environmental Protection, Economic Exploitation, Green Accounting, Green Economy, Valuation Methods

INTRODUCTION

Decision-making with respect to the management of environmental or ecosystem goods and services is complex, commonly involving multiple objectives which could be competing and conflicting. While talking about production, consumption and pricing many producers and few consumers argued that the former to be active and the latter to be thrifty. Today the notion of value and price are quite mixed for most of the people and they are the same, for many others .While talking about man-made resources i.e. is capital, starting from Adam Smith to the present day thinkers, a clear distinction has been made between price and value. But when it comes to environmental and natural resources, this is a matter requiring a much more serious attention.

In many of the developed and developing economies, major development projects which are deemed to have a potentially adverse impact on the environment requires to have an environmental impact assessment in order to assess the costs of the project. As a result, appropriate evaluation tools or techniques to assist decision-making will be limited to those that

have the capacity to incorporate information from a number of disciplines and that can identify an outcome that offers a compromise solution through green accounting.

THE VALUATION OF RESOURCES

Land and site are the factors strongly influence whether a given environmental feature will provide a particular function and whether that function will generate a service or product and what will be the economic value that service or product. This is important because the measurable outcome of conservation practices involve change in environmental features. From an economic perspective, the optimal allocation of a resource relies on the criterion of economic efficiency. Where there is a competitive market functioning, the price mechanism will ensure an economically efficient allocation of resources.

Another important issue in environmental economics is resource accounting. It is sometimes difficult to understand 'Natural and Environmental resources' as natural capital. It is a stock in exactly the same sense that man-made capital is addressed. It has the characteristics of repeated use, depreciation and possibility of replacement, and can enjoy rent for its use or abuse. It's accounting however, both as a stock and flows (i.e., use or non-use benefits from it) are not yet within the framework of Green accounting.

There are three generally accepted approaches of valuation and accounting for environmental and natural resources of ecosystem. Each approach includes several methods. They are:

- **Market Prices** – Revealed Willingness to Pay

The values of some ecosystem goods or services can be measured using market prices. Some ecosystem products, such as fish or wood, are traded in markets. Thus, their values can be estimated by estimating consumer and producer surplus, as with any other market goods. Other ecosystem services, such as clean water, are used as inputs in production, and their value may be measured by their contribution to the profits made from the final goods.

Some ecosystem or environmental services, like aesthetic views or many recreational experiences, may not be directly bought and sold in markets. The prices people are willing to pay in markets for related goods can be used to estimate their values. For example, people often pay a higher price for a home with a view of the ocean, or will take the time to travel to a special

place with scenic beauty. These kinds of expenditures can be used to place a lower bound on the value of the view or the recreational experience. The methods include:

- ✓ Market price method
- ✓ Productivity method
- ✓ Hedonic pricing method
- ✓ Travel cost method

- **Circumstantial evidence**- Imputed willingness to pay

The value of some ecosystem services can be measured by estimating what people are willing to pay, or the cost of actions they are willing to take, to avoid the adverse effects that would occur if these services were lost, or to replace the lost services. For example, wetlands often provide protection from floodwaters. The amount that people pay to avoid flood damage in areas similar to those protected by the wetlands can be used to estimate willingness to pay for the flood protection services of the wetland. These methods include:

- ✓ Damage Cost Avoided
- ✓ Replacement Cost
- ✓ Substitute Cost methods

- **Surveys** – Expressed Willingness to Pay

Many ecosystem services are not traded in markets, and are not closely related to any marketed goods. Thus, people cannot "reveal" what they are willing to pay for them through their market purchases or actions. In these cases, surveys can be used to ask people directly what they are willing to pay, based on a hypothetical scenario. Alternatively, people can be asked to make tradeoffs among different alternatives, from which their willingness to pay can be estimated. These methods include:

- ✓ Contingent Valuation Method
- ✓ Contingent Choice Method

Approaches to evaluation

- ➢ ***Cost-Benefit Analysis***

CBA is the standard tool used by economists to establish the economic efficiency of investment. It provides a theoretically sound and consistent approach to evaluate investment decisions using the sole criterion of economic efficiency. In essence, CBA requires all of the costs and benefits associated with a proposed project or policy to be identified and valued in monetary terms. A cash flow of the estimated monetary value of all costs and benefits resulting from a project over the expected life of the project is constructed. Frequently, when information is not available to the project analyst to enable monetary values to be estimated for costs or benefits, qualitative statements are provided to describe the nature and magnitude of such items. Because the decision rule for undertaking a project is conventionally stated as accept the project if the net present value (NPV) is > 0 at a particular discount rate or accept if the benefit cost ratio is > 1 or alternatively accept the project if the internal rate of return (IRR) is > than a specified rate of return, there is a strong tendency to overlook negative or positive impacts on a project if they cannot, or have not, been valued in monetary terms. In relation to this, there is an increasing body of literature about the limitations of CBA, including perceived problems with evaluating projects where there are environmental impacts requiring a monetary value to be estimated. In response to this problem, expenditure is substantial on research projects which have the objective of developing techniques to value environmental resources and on testing the validity of such techniques.

- ***Multiple Criteria Analysis***

MCA is promoted in the literature as a tool to complement CBA rather than as a substitute for CBA. It is argued to be particularly appropriate for decision-making for natural resource management where it is important to consider environmental, social as well as economic factors. MCA is promoted as a process approach to project evaluation that facilitates a transparent iterative and interactive approach to evaluation, incorporating information from a number of disciplines. In essence, this approach requires project options to be evaluated against a number of criteria, including economic, environmental and social criteria. Although there is no requirement that the estimated performance of project options is measured against the criteria in monetary terms, where this information is available, it is likely to increase the validity of the results. Specifically, measuring project outcomes in qualitative terms or by using quantitative measures that are not immediately related to a value system could introduce a high degree of subjectivity

into project evaluation and reduce the credibility of the findings. In this regard, where research resources are available, estimating a monetary value for environmental impacts could remove some of the subjectivity surrounding the evaluation and improve the validity of the results.

Types of Indicators

- **Perspective**

  Performance measures related to past environmental investments, like profit and loss statements related to economic investments can be helpful in developing these indicators. This approach describes for developing conservation benefit indicators that can be used to assess and compare the expected payoff from investing in conservation practices at different sites However, the purpose of conservation benefit indicators as they are developed is to manage and improve performance, not to measure it. In other words is not how well last year's environmental investments perform, but to focus on what it should concentrate this year's and next year's to make the performance better in conservation of natural resource or environmental benefits.

- **Purpose**

  Conservation benefit indicators should link the anticipated environmental benefits from current or future spending decisions with specific conservation practices undertaken at specific locations. They cannot be used to measure benefits derived from past spending decisions. The focus of conservation benefit indices are factors that can exist at a site that will limit or complement the beneficial outcomes of a conservation practice, or reflect risks that these outcomes may not result or will be disrupted in the future.

- **Two types of economic indicators are**:

- **Performance indicators**: Are after-the-fact measure of the outcome of previous decisions; they are useful primarily for scorekeeping and to justify past decisions.

- **Management indicators**: Are leading indicators of performance they are useful primarily for making decisions and for allocating spending to achieve the greatest level of performance.

Conservation benefits indicators must meet three criteria.

- ✓ They must be based on sound economic principles so they will be generally accepted reviewers.
- ✓ They must be practical enough to be applied in the field by agency staff with limited economic training and tight time and budget constraints.
- ✓ They must be capable of making meaningful distinctions between the expected benefit resulting from different types of environmental projects and from similar projects undertaken at different sites.

For purposes of evaluating environmental benefits each farm site should be considered as a portfolio of environmental assets. The value of these assets, like the value of all assets, is derived from the value of the stream of services they are expected to provide over time. As environmental assets, site value depends on:

1. Level of functional capacity
2. Rate of functional capacity utilization
3. Level of service provided per unit function
4. Expected Value per unit of service
5. Risk of service flow disruptions

Five Categories of Ecosystem Value Indicators

1	**Functional Capacity**	Indicators of site conditions that determine an ecosystems ability to provide various functions
2	**Capacity Utilization**	Indicators of landscape conditions that determine how much of the functional capacity of the site is likely to be used.
3	**Service Capacity**	Indicators of landscape conditions that limit or enhance the level of services expected per unit of function.
4	**Service Value**	Indicators of local, regional, and national supply and demand conditions, individual and community preferences, and the substitutability of the service, which reflect the expected value per unit service.
5	**Service Risk**	Indicators of the likelihood of future disruptions in service flows that affect the value of expected ecosystem services. These are related to the exposure and vulnerability of the site or other critical landscape features to such threats as floods, droughts, fire, disease, infestations, water diversion, pollution, and industrial development.

Steps in Developing Relative Value Indicators:

Indicators based on the linkages listed above will be useful for comparing changes in various types of benefits. However, comparing the overall benefits from investing in different projects or sites may require assigning preferences to different types of benefits. An indicator can be defined generally as a measure of anything that provide clues about matters of greater importance. The matters of greater importance in few case are the benefits expected from a conservation practice undertaken at a specific site. In practice this means that anything that reflects conditions that limit or enhance the likelihood of progressing from one stage to another in the following chart is a good candidate for becoming the focus of an indicator.

Stage	Indicator Type	Focus of Attention
1	**Financial incentives**	Eligibility criteria, project ranking criteria, level of funding, allocation of funds, etc.
2	**Conservation practices**	Conservation tillage, wetland restoration, riparian buffers, noxious weed control, manure management, reduced fertilizer/pesticide use, irrigation practices, etc.
3	**Biophysical effects**	Reduced sediment, nutrient, contaminant runoff, reduced use of water, energy, manpower; change in mix of seasonal/permanent ground cover, etc.
4	**The state of environment**	Improved habitat for fish, birds, fur-bearing animals; increased water/air/soil quality; reduced sedimentation
5	**Improved environmental functions**	**Hydrological** - Floodwater control, groundwater recharge functions **Biological** - Biodiversity, species abundance, ecosystem resilience **Physical** - Chemical and carbon cycling, etc.
6	**Improved environmental services**	**Commercial** - Better commercial fishing, reduced dredging, etc **Recreational** - Better rec. fishing, hunting, bird watching, etc. **Other** - Reduced ecological and public health risks, aesthetics, etc.
7	**Socio-economic benefits**	Increased quality of life as measured by: Revealed, expressed, or imputed "Willingness to Pay" for improving environmental services and for reducing Environmental & public health risks estimates of the numbers of people who benefit, etc. Illustrations of how people benefit, costs avoided, etc.

Environmental investments at a particular site often generate active and passive values that accrue on or near the site as well as many miles away. In fact, the offsite passive use values

associated with many environmental investments often far exceed their onsite active use values. Because of the difficulties in measuring offsite and nonuse values in terms of value ,these values must be accessed and compared using indicators.

Difficulties with Environmental Valuation

Non-Market Goods	Most environmental goods, such as clean air and water, and healthy fish and wildlife populations, are not traded in markets. Their economic value - how much people would be willing to pay for these in value is not revealed in market prices. The only option for assigning values to them is to rely on non-market valuation methods.
Non-Rival Goods	One person's consumption of most goods reduces the amount available for everyone else. Environmental goods are different. Clean water and air, beautiful views, and to some extent outdoor recreation, can be enjoyed by everyone in the same way as television and internet. The economic value of non-rival or public goods is the sum of all people's willingness to pay.
Non-exclusive Goods	People cannot be excluded from enjoying most environmental goods and the cost of trying to exclude them is prohibitive. Other than increases in onsite hunting and fishing opportunities, which may be a source of economic benefit to farmers, the environmental benefits of most conservation practices are non-exclusive. The free riders problem makes it impractical for farmers to recoup the cost of on-farm conservation investments from those who benefit from off-farm environmental improvements.
Inseparable Goods	Conservation practices at a given site contribute in many roundabout ways to environmental goods and result in environmental and economic benefits that accrue over great distances in time and space. It may be impossible to separate the economic benefits that result from one conservation practice undertaken at one site from another undertaken at another site. Worse, it may be impossible to separate the aggregate benefits of those practices from those of other environmental investments.

Conclusion

All of the techniques for valuing a change in the environmental resource have positive as well as negative elements. One factor that is common to all the techniques, whether directed towards estimating an effect on production or estimating a demand function is that they require time as well as research. In addition, the values estimated for the environment are largely estimated outside of the market. By undertaking surveys using surrogate markets or directly asking the community their willingness to pay (WTP) is a second best solution to a value determined through a freely operating market. The demand function are resulting from the choice modelling study which would be relatively easily modified for a number of policy sites for pollution management ,waterway management etc. This approach would not only address a number of

problems encountered in the valuation technique itself, but would improve the credibility and reliability of the study for benefit transfer BT. It is therefore necessary to consider the opportunities that are available for the use of environmental value transfer, more commonly referred to as benefit transfer (BT).

References

- ✓ *Alfsen, K.H. and B. Torstein (1990),'Norwegian experience in natural resource accounting', Development, Journal of SID3(4):119-30.*
- ✓ *Anderson, D. (1987) The Economics of Afforestation : A Case Study in Africa, John Hopkins University Press, London.*
- ✓ *Blamey, R. K., James, R.F., Smith, R., and Niemeyer, S., 2000. "Citizens' Juries and Environmental Value Assessment", Citizens*
- ✓ *Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O.Neill, R., Paruelo, J., Raskin, R., Sutton, P., and van den Belt, M, 1997. "The Value of the World's Ecosystem Services and Natural Capital", Nature, 387: 253-260.*
- ✓ *Cummings, R.G., Brookshire, D.S., and Shulze, W.D., eds. 1986. Valuing Environmental Goods: An Assessment of the Contingent Valuation Method, Rowan and Allanheld, Totowa, New Jersey.*
- ✓ *Desvousges, W.H., Naughton, M.C., and Parsons, G.R. 1992. "Benefit Transfer: Conceptual Problems in Estimating Water Quality Benefits Using Existing Studies", Water Resources Research, 28 [3]: 675-683.*
- ✓ *Environment Canada, nd. Environmental Valuation Resource Inventory (EVRI), http://www.evri.ec.gc.ca/evri/*
- ✓ *Hanley, N., and Spash, C.L., 1993. Cost-Benefit and the Environment, Edward Elgar, Cheltenham. Kahn, J., and Kemp, W., 1985. "Economic Losses Associated with the Degradation of an Ecosystem", Journal of Environmental Economics and Management, 12: 246-263.*

- ✓ *Kirchhoff, S., Colby, B., and LaFrance, J., 1997. "Evaluating the Performance of Benefit Transfer: An Empirical Inquiry", Journal of Environmental Economics and Management, 33: 75-93.*
- ✓ *Mitchell, R.C., and Carson, R.T., 1989. Using Surveys to Value Public Goods: The contingent valuation method, Resources for the Future, Washington DC.*
- ✓ *Morrison, M.D., Blamey, R.K., Bennett, J.W., and Louviere, J.J., 1996. "A Comparison of Stated Preference Techniques for Estimating Environmental Values", Choice Modelling Research Reports, Research Report No. 1., School of Economics and Management, University College, The University of New South Wales.*
- ✓ *Morrison, M., and Bennett, J., 2000. "Choice Modelling, Non-use values and Benefit* Transfer", *Economic Analysis and Policy, 30(1): 13-32.*