ENVIRONMENT VALUE: CONCEPT AND MEASUREMENT

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ABSTRACT

This paper deals with environmental value and its measurement. Environmental value (E-value) is considered as the real wealth of nation. E-value can be calculated on the basis of the use value. This paper defines e- value and concepts related with e-value. It also includes various methods of measuring e-value. There exists monetary and non-monetary measurement of e-value. Non-monetary measurement fails to define e-value. In the economic sense we must monetize e-value.

KEYWORDS: *Environmental Value (EV), Environmental Value Accounts (EVA)*

INTRODUCTION

National income accounting was created for the purpose of producing a more scientific measure of the performance of the economy (Holcombe 2004). It is the monetary value of all final goods and services produced in an accounting year. But modern national income fails as a true measure of calculating the wealth of nation. National income excludes the value of environment. Environment has important concern today. Now a day's environments become deplete. Man's activity leads to the depletion, in order to reduce the deterioration of environment, putting price on environment is essential. This paper tried to calculate the value of environment and discuss about various techniques of environmental valuation.

ENVIRONMENTAL VALUE

The paper discussed about environmental value. The environmental value is the value acquired by environment from its non –polluted or pollution Free State (Satheesh Babu). According to G.S Rai and Macer "Environment value is common value across the culture that can promote foundation for building and promoting a more sustainable economic growth preserving biodiversity and preventing environment from deteriorating further". According to Bishop and Wood Word (1995) Environment value is the value of goods damaged by environmental deterioration either by dislocation of eco-system or by harmful effect on species or both. Economic valuation offers a way to compare the diverse benefits and costs associated with eco-systems, by attempting to measure them and expressing them in a common denominator—typically a monetary unit (Pagiola,2004). Environmental valuation is the process of putting monetary values on environmental goods and services (Dixon, 2008)

MEASUREMENT OF ENVIRONMENTAL VALUE

Environmental value measured in monetary terms through individual's willingness to pay (WTP) or willingness to accept (WTA) (Bishop et al 2004) and through Total Economic Value (TEV). TEV is used a convenient organizing frame work for thinking about different sources of value (Atkinson, 2007). TEV divided in to two i.e., use value and non- use value.

USE VALUE

Use value is the value that individuals derive from using the environmental resources. Use values can be further classified into three broad categories: Direct use values, indirect use values, and option values. Direct use values come from the consumptive use of the environmental resource itself with regard to water

resources; these include drinking water, irrigation. For most private (normal) goods, value is almost entirely derived from their direct use. Many environmental resources however perform an array of functions that benefit individuals indirectly that is known as indirect use value. Indirect use values of water resources include benefit

s such as flood control, nutrient retention, and storm protection. Option value recognizes that individuals who do not presently use a resource may still value the option of using it in the future.

NON- USE VALUE

These are valuing that individuals may derive from environmental resources without ever personally using or intending to use them. These can be further classified into three categories, namely existence value, bequest value, and altruistic value. Existence value refers to the value individuals may place upon the conservation of an environmental resource, which will never be directly used by themselves or by future generations. Individuals may value the fact that future generations will have the opportunity to enjoy an environmental resource, in which case they might express a bequest value. And finally, altruistic value states that even if the individuals themselves may not use or intend to use the environmental resource themselves, they may still be concerned that the environmental good in question should still be available to others in the current generation (Birol et al., 2006).

DIFFERENT METHODS OF ENVIRONMENTAL VALUATION

Revealed Preference and stated preferences are two important methods of Environment Value (Atkinson, 2010).

REVEALED PREFERENCE

Revealed Preference means that we infer preferences for environmental goods from observed behaviour in actual market transaction (Kolstad ,2000 pp.313). Revealed preference (Indirect valuation methods) is a market for environmental goods is implicitly traded. Information derived from observed behaviour in the surrogate markets is used to estimate willingness to pay (WTP), which represents individual's valuation of, or the benefits derived from, the environmental resource. Production function, Replacement cost, Travel cost, Hedonic pricing are the important methodology used in Revealed preference (Pagiola et al, 2004).

HEDONIC PRICE METHODS

The Primary empirical approach to measuring environmental value is known as hedonic price methods. The basic idea is best conveyed through examples: measure the price of houses for a variety of different air pollution levels and attempt to see how the price changes when the air pollution changes, keeping everything else constant (Kolstad,2000 pp 313).

TRAVEL COST

Travel cost method is the oldest method of valuing environmental goods. The travel cost method (TCM) is used to estimate use values associated with ecosystems or sites (such as forests, wetlands, parks, and beaches) that are used for recreation to which people travel for hunting, fishing, hiking, or watching wildlife (Bishop et al 2006). We are referring to an environmental good that takes effort to enjoy, such as national park, we can infer something about how the consumer values the park. When that effort consists of traveling to the park, what we are dealing with is the travel cost approach to valuing environmental goods. This method is most frequently applied to valuation of natural environments that people visit to appreciate. Travel cost method can be used to value the beach in its clean state and polluted state; the difference can be attributed to damage from the pollution (Kolstad, 2000 pp344). Important limitation of Travel cost method is time consuming

STATED PREFERENCE METHODS

Stated preference method is also known as direct valuation method. Stated preference methods of valuation involve finding an individual's willingness to pay for a good by posing a set of questions regarding preferences directly to the individual (Kolstad, 2000 pp 356). Most widely accepted stated preference technique is Contingent valuation method.

CONTINGENT VALUATION METHOD

Contingent valuation became very popular for valuing environmental goods. In contingent valuation, respondents to a questionnaire are asked directly for their WTP (Pearce et al. 2002)

CHOICE MODELLING

Choice modelling refers to a variety of procedures for inferring WTP from sets of rankings or ratings of alternative options presented to respondents (Pearce et al., 2002).

CALCULATING NATIONAL INCOME INVOLVING ENVIRONMENTAL VALUE

There are rare studies related with the incorporation of environmental value in national income analysis some of them are:

1) Environmental accounting for sustainable growth and development with special reference to a system of integrated environmental economic accounting (SEEA): The Indonesian Experience by Kusmadi Saleh,2002 discussed about the calculation of environmental value. The methodology used in this study is SEEA. The equation used for calculating environmental value is derived as follows:

$$NDP = C+I+(X-M)$$

NDP = Net domestic product = Consumption, I= Investment, X = Export, M= import

If net capital accumulation in economic assets (Ap.ec+Anp.ec) replaces I, then equation becomes

$$EDP = C + (Ap.cc+Anp.ec) - Anp.env + X-M$$ is an important methodology given by (Kusmadi Saleh,2002)

EDP = Environmentally Adjusted Net Domestic Product
Ap.cc = Produced assets
Anp.ec = non-produced economic assets
Anp.en = other natural assets

In order to maintain the identity, the negative element for the economic counter part of changes in natural assets other than economic assets (Anp.env) is added. Then equation can be rearranged in to

$$EDP+Anp.env = C+(Ap.cc+Anp.ec) +(X-M)$$

2) Greening the national Accounts – Approach and policy use by Peter Bartelmus, 1999 discussed about the inclusion of natural assets in national income calculation. He used System of national Accounts (SNA) methodology. Environmentally adjusted indicator is used. The equation used in this paper is

- ➢ supply-use identity:

$$O + M = (IC + EC) + C + (CF – EC) + X$$ equation for supply side given by Peter Bartelmus, 1999

Indicating that the supply of goods and services produced (O) and imported (M) equals their use in intermediate (IC) and final consumption (C), capital formation (CF) and export (X). Note that environmental costs (EC) are added to intermediate consumption (IC) as additional cost and deducted from environmentally adjusted capital formation, thus maintaining the supply-use identity;

- ➢ value-added (environmentally adjusted) identity for industry i:

$$EVA_i = O_i - IC_i - CC_i - EC_i = VA_i - EC_i$$ methodology by Peter Bartelmus, 1999

Describing value added generated by an industry i (EVA_i) as the difference of output (O_i) and cost, including intermediate consumption (IC_i), fixed capital consumption (CC_i), and environmental depletion and degradation (EC_i);

$$EDP = 3EVA_i - 3EC_h = NDP - EC = C + CF + X - M - CC - EC$$

defining Environmentally-adjusted net Domestic Product (EDP) as the sum of environmentally adjusted value added of industries, with a further deduction of environmental costs generated by households (EC_h). Alternatively, EDP can also be calculated as the sum of final uses of consumption (C), environmentally adjusted net capital formation ($ECF = CF – CC - EC$) and the balance of exports (X) and imports (M). Environmentally-adjusted net Capital Formation (ECF) is an indicator that can be used for demonstrating the non-sustainability of economic performance.

3) Green GDP is another important index of economic growth. The equation for Green GDP is

$$Green\ GDP = GDP - CNR - ED - EPE$$

Where,
GDP - gross domestic product,

CNR – natural resource consumption

ED – degradation of environment

EPE - environmental protection expenditures.

4) Genuine progress indicator is alternative to GDP. It measures well-being (Venetoulis, 2004). The calculation of GPI presented in the simplified form is the following:

$$GPI = A+B-C-D+I$$
A is income weighted private consumption.
B represents non-market services value
C is private defensive cost of natural deterioration
D is natural deterioration cost

I include improvement in both capital stock and balance of international trade

The above methodology of calculation of certain draw backs. One of the most important limitation is it does not calculate environmental value, they only try to deduct the depletion. The existing methodology excludes the real wealth of nation. My study is different from the above study. In this study incorporate the value of environment through Environment Value accounts (EVA).

ENVIRONMENT VALUE ACCOUNTS (EVA)

Environment value accounts are the methodology for calculating the value of environment. Environmental value accounts are defined as the monetary valuation of all things in nature. Environment account is based on environmental index. Equation used for environment value accounts

$$EVA_i = GDP + EV_i - ED_i$$

EVA_i = Environmental value accounts
EV_i = Environmental value
ED_i = Depletion of environment

CONCLUSION

Modern world faces the problem of depletion of environment. In order to reduce the depletion of environment, environmental value is essential. Environmental value is used as a monetary value of environmental goods for reducing depletion. Through the calculation of environmental value, we can reduce the problem of depletion.

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