UNIT (IV) Environmental impact assessment system- Cost benefit analysis – Contingent value technique- Travel cost method – Hedonic pricing - Carbon trading

ENVIRONMENTAL IMPACT ASSESSMENT SYSTEM

During the past decade, the Environmental Impact Assessment System (EIA) has been developed and refined, as a basic procedural system for environmental management by most industrialized nations. Now, even large number of developing countries also adopt this system. It is stated that this system is the best one in deciding whether a project is environmentally sound or not. When adopted and legislated into the law of the land, it requires that all new projects, as well as ongoing projects, whether in the public or private sector be subjected to an EIA before they are given clearance to proceed or continue.

The system and the documentation in its operation can be briefed as follows:

1. E.I.A. System: It is a formal procedural analysis by which, it can interpret, predict and communicate the possible environmental impacts, resulting from a proposed project or action. By weighing such benefits against the benefits of alternate actions, will provide guidance in reaching responsible decisions relative to the approval or otherwise of the proposal.

2. Project Proponent: Any agency, company or individual, either public or private sector, which proposes an undertaking or operation, which might significantly affect the environment.

3. Initial Environmental Examination: A preliminary study prepared and submitted to the Lead Agency by the project proponent. It serves two functions:

(a) Preliminary information to authorities that a project is under consideration and possible impact of in the environment;

(b) For projects of little or no concern to the environment, the authorities can avoid unnecessary preparation of EIS which may be very time - consuming and costly process.

4. Environmental Impact Statement: It is a comprehensive description of the proposed project with a detailed technically supported data of forecast of potential environmental hazards, resulting from it, or by alternative action. It must provide all information necessary to identify, analyze, interpret and predict the environmental impact, resulting from implementation of a proposal or of alternate action, so that responsible decisions can be made. This should be prepared by the Project proponent on the basis of the format envisaged by the Lead Agency in consultation with the apex authority. The Certificate of Compliance is normally issued only by the apex authority, but it is forwarded to the project proponent through Lead Agency concerned.

COST – BENEFIT ANALYSIS

Cost-benefit analysis can be shortly defined as "an attempt to quantify the social advantages and disadvantages of alternative courses of action in terms of a common monetary unit. The unquantified effects, often known as intangibles, should also be described".

The objective of cost-benefit analysis is to quantify the net benefit to the community of following a certain course of action. This is done by valuing in terms of a common standard the costs and benefits of a policy action. The costs and benefits are those according to society as a whole, and not the specific firms or households. Hence, they, are referred to as Social Costs and Social Benefits.

Step Involved In The Cost-Benefit Analysis

(i) The different steps involved in the cost-benefit analysis can be identified as follows:-

(ii) Alternative Methods: The first and foremost question in cost-benefit analysis is to find out whether other techniques are available to realise the same objective and if those techniques are appropriate. Cost-benefit analysis is expensive and time- consuming process and the choicę of the technique should be made with great care after detailed study. The stated objective can be achieved in many ways. The correct analysis should result in finding the cheapest method of achieving the objective. This is called Cost-effectiveness study.

(iii) Alternative Projects: One of the characteristic contributions of economists is to suggest overlooked alternatives. For example, a water-supply project may be needed because people do not pay the true cost of the water they consume. So, an alternative project would be installing metres and charging the true cost, or simply asking the people to conserve water. Only the decision-taker can decide whether the alternatives are politically feasible, but the economist can point out that the relative costs may influence the electorate's political judgement.

(ii) Listing costs and benefits: When the cost-benefit actually starts, the first activity is to list as many effects of the projects as possible. Three questions arise at this stage: They are: (a) Distributional Changes; (b) Diversionary Effects; and (c) The Choice of Cut-off points.

(a) By Distributional Changes, we mean the effect of the project in benefiting some people and harming others. If we are content to assume that rupee one from someone is worth the same as rupee one given to someone else, then we are said to be ignoring distributional effects. If, however, we do not value the transaction equally, then we have to decide how to compare different people's losses and gains or to list exactly how the project affects different groups.) Economic analysts may have their own preferences for worthy groups in society, but if the gainers and losers are made public, then it can be left to the political process to decide. Economists cannot really criticise the political process, but they can insist that all the relevant information should be known. Thus, cost-benefit analysis has at least a minimal role, searching out some of the distributional (income-transferring) effects of projects.

(b) Diversionary Effects: An example of this might be a new road which transfers trade from service-station to another, or a fly-over plan shich inflicts noise on one group of people rather than another the amount involved is equal, should we bother about it at all? The answer really depends on the previous question, viz., distributional effects.

(c) Cut-off Points: The third problem while listing costs and benefits is to decide when to stop listing. This is rather easy to decide For example, for a project in West Bengal, decision- taker may say that they are not bothered about others, i.e., Bangladesh or Nepal. Similarly, there may be effects that are judged to be too small to be worth computing such as savings in time of less than five minutes on a journey or savings in cost of less than 5 per cent of the total cost of journey, so these become the cut-off points.

(iv) Quantifying Costs and Benefits: Next comes 'quantifying' the Costs and benefits in the process. This is rather a complex and a controversial area. However, we can identify some general principles, Which we can term (a) Market Prices (b) Shadow Prices (c) Standard Values and (d) Political prices. Each value is appropriate in particular circumstances and between them they cover a great-many problem areas'. Market prices are used to value costs and benefits when they are available and it is based on market economics of supply and demand, i.e., willingness to pay and willingness to supply, though monopolies distort prices. Shadow prices can often be calculated where something is never sold. In some cases, the decision-taker already has sets of shadow prices which are used in its cost-benefit analysis studies and these are often called Standard values. Using these values ensures that the cost- benefit analysis studies will be consistent with each other and with other decisions taken using other techniques.) If none of the previous sources of values is used, then we are left with some costs and benefits without money values on them. In such cases, we can value them by using political prices.

The process of finding out political prices 'may be illustrated as follows: Suppose an old building of historical or archeological importance has to be demolished for an alternative project on the site. The owners of the old building have to compensated by the government. What would be the size of compensation? This depends on the value of the building. The valuation of the building could be according to its shadow price which could be set equal to its insured value. Objections may be Obviously, both valuations are in error; the insurance value is too low and the unique monumental value is too high. So, a political decision has to be taken to set up a political price on some standard values. This problem is obviously wider than cost-benefit analysis and depends on the government policy.

(iv) Discounting Costs and Benefits: The costs and benefits of any project are likely to occur at different points of time and thus will need to be discounted to their present value. If this is accepted there still remains the problem of choosing the discount rate. In practice, a public organisation will usually have a discount rate which is customarily used in investment studies, and will insist that this is used. However,, economists will often feel that this rate has been set for reasons irrelevant to the particular project or industry.

(v) Presentation of Result: Finally comes the problem of presentation of result. The report can be expected to lead clearly a partiçular decision or conclusion which follow from the criteria being used. Where the decision-taker has no clear criteria, or does not reveal them, the report has to be both very general and more of the analyst's own creation.

CONTINGENT VALUE TECHNIQUES

CVM requires that individuals express their preferences for some environmental resource, or change in resource status, by answering questions about hypothetical choices. The very nature of this methodology has therefore meant that CVM has been subject to criticism from both economic and psychological experimentalists, whose growing research focus has been the problem of preference elicitation. This criticism has in turn caused supporters of CVM to pay much more attention to a testing protocol in which questions of method reliability and validity are directly addressed. The respondents to a CVM questionnaire will be asked a variety of questions about how much they would be willing to pay (WTP) to ensure a welfare gain from a change in the provision of a nonmarket environmental commodity; or how much they would be willing to accept (WTA) in compensation to endure a welfare loss from a reduced level of provision. A basic question for the implementation of the CVM is therefore whether WTP or WTA is the most appropriate indicator of value in a given situation.

THE CONTINGENT VALUATION METHOD

METHOD AND ECONOMICTHEORY

Hanley (1990) identifies six distinct phases involved in the practical application of CVM which we have interpreted as follows: Stage 1: Preparation in. Set up the hypothetical market: individuals may be presented with two basic variants: How much are you willing - to - pay (WTP) for a welfare gain? How much are you willing - to accept (WTA) in compensation for a welfare loss? ii. Define the elicitation method. The major alternatives are: -Open ended; "how much are you willing to pay?". This approach produces a continuous bid variable and may therefore be analyzed using at least squares approaches (OLS) .- Take - it - or - leave it (dichotomous choice); "are you willing to pay £ X", the amount X being systematically stepped across the sample to test individuals' responses to different bid levels. This approach produces a discrete bid variable and requires logit - type analysis. - A recent variant upon the dichotomous approach is to supplement the initial question with an iterative second round (double - bound) question (see Haneman et al., 1991). For example if the respondent answers yes to the £ X bid then they are asked if they are WTP 2X (or £ 0.5X if they answered no to the initial question) -Other elicitation methods include the use of payment cards and bidding games with suggested starting points. iii. Provide information regarding: the quantity / quality change in provision of the good - who will pay for the good - who will use the good. iv. Define the payment vehicle, for example: -higher taxes - entrance fees - donation to a charitable trust Stage 2: Survey Obtaining responses to the questionnaire. Interviews can be either on - site (face to face; users only), house to house (face to face, users and non - users) or by mail / telephone (remote; users and non - users).

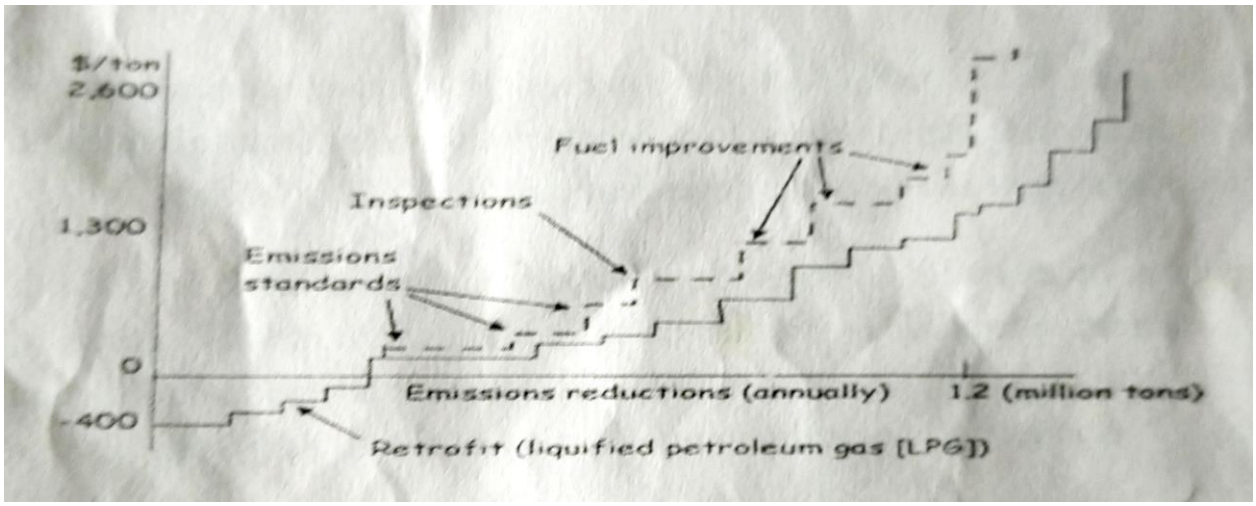
Stage 3: Calculation Calculate the mean WTP (or WTA) from responses. This commonly involves the omission of protest votes3, and / or the use of trimmed means. In a dichotomous choice format experiment the mean is obtained by calculating the expected value of the dependent variable (WTP or WTA) Stage 4: Estimation A bid curve can be estimated to investigate the determinants of WTP bids. For a continuous question format OLS estimation techniques are often employed. Typically, in WTP scenarios, the bid curve will relate bids (WTPi) to visits (Qij), income (Yi), social factors such as education (Si), and other explanatory variables (Xi). A parameter of the environmental quality of the site (Ej) may also be included. WTPi = f (Qij Yi, Si, Xi, Ej) There is no theoretical correct form of this function. However, if a log - log function is chosen then the coefficients are elasticities. In such a case the bid curve allows us to estimate changes in mean WTPi arising from changes in Ej. Indeed if the other relationships are sufficiently stable then we can use this curve to evaluate changes to other strongly related environmental goods, eg. impacts of water quality change upon wetland quality.

TRAVEL COST METHOD

The hedonic prizing method is mainly used to estimate economic values for economic benefits or costs associated with environmental quality (eg.; Air pollution, water pollution, or noise) and environmental amenities (eg, aesthetic views or proximity to recreational sites) . The travel cost method looks at how far people are willing to travel to enjoy an environmental nonmarket good such as a beach, lake, river, or wilderness area. Travel is costly in terms of time, fuel, and other expenses. We expect people who live closer to a pristine lake to visit it more often, on average, than people who live far away, just as we expect people to buy more pizza when the price is low than when the price is high. So, if we can estimate a demand curve for pizza using its price, then we can also estimate a demand curve for a pristine lake using the travel costs as a proxy for its price (where distance from the site means

differences in travel cost). That is exactly what economists have been doing since the 1960s. To explain how the travel cost method works, a simple illustration probably works best. In the upper portion of figure 14.2, we designate three rings or zones for people who live at different distances from the lake (five, ten, and fifteen miles). We conduct In addition to estimating benefits from environmental improvements, economic analysis can often help policymakers estimate the costs. In the case of reducing air pollution, for example, policymakers face great uncertainty about the costs of air quality improvements and how those costs may differ for a wide range of possible actions under consideration. After they combine technical and economic data, it is possible for economists to estimate the marginal cost and changes in emissions for individual actions such as imposing emissions standards, retrofitting high - use vehicles such as busses and taxis, inspections for enforcement, fuel improvements, or fuel taxes.

In one study of this kind for Mexico City (Eskeland and Devarajan 1996), such estimates made it possible to construct a marginal cost or supply curve for emissions reductions. This was done by estimating the emissions reductions and marginal cost for a range of actions and then ordering them from lowest to highest cost. The results of that analysis produced a marginal cost or supply curve that looks something like the one below.



HEDONIC PRICING

Hedonic pricing is a model, which identifies price factors, according to the premise that price is determined both by internal characteristics of the good being sold and external factors affecting it. A hedonic pricing model is often used to estimate quantitative values for ecosystem or environmental services that directly impact market prices for homes. This method of valuation can require a strong degree of statistical expertise and model specification, following a period of data collection. The most common example of the hedonic pricing method is in the housing market, wherein the price of a building or piece of land is determined by the characteristics of the property itself (eg its size, appearance, features like solar panels or state - of - the - art faucet fixtures, and condition), as well as characteristics of its surrounding environment (eg if the neighborhood has a high crime rate and / or is accessible to schools and a downtown area, the level of water and air pollution, or the value of other

homes close by). The hedonic pricing model is used to estimate the extent to which each factor affects the price of the home. When running the model, if non - environmental factors are controlled for (held steady), any remaining discrepancies in price will represent differences in the good's external surroundings. With regards to valuing properties, a hedonic pricing model is relatively straightforward as relies on actual market prices and comprehensive, available data sets.

Advantages and Limitations of Hedonic Pricing

The hedonic pricing model has many advantages, including the ability to estimate values, based on concrete choices, particularly when applied to property markets with readily available, accurate data. At the same time, the method is flexible enough to be adapted to relationships among other market goods and external factors. Hedonic pricing also has significant drawbacks, including its ability to only capture consumers' willingness to pay for what they perceive are environmental differences and their resulting consequences. For example, if potential buyers are not aware of a contaminated water supply or impending early morning construction next door, the price of the property in question will not change accordingly. Hedonic pricing also does not always incorporate external factors or regulations, such as taxes and interest rates, which could also have a significant impact on prices.

CARBON TRADING

Carbon trading is an approach used to control carbon dioxide (CO_2) pollution by providing economic incentives for achieving emissions reductions. It is sometimes called cap and trade or carbon emissions trading Carbon trading is administered by a central authority such as a government or international organization which sets a limit or cap on the amount of CO_2 that can be emitted. Companies or other groups are issued permits that require them to hold allowances (or credits) in order to emit an equivalent amount of CO_2. The total amount of allowances and credits cannot exceed the cap, limiting total emissions to that level.

Companies that need to increase their allowance must buy credits from those who pollute less. The transfer of allowances is referred to as a trade. The buyer therefore pays to pollute, while the seller is financially rewarded for reducing CO_2 emissions. In theory, those that can easily reduce emissions most cheaply will do so. Carbon emissions trading has been steadily increasing in recent years. According to the World Bank's Carbon Finance Unit, 374 million metric tonnes of carbon dioxide equivalent (tCO_2e) were exchanged through projects in 2005, a 240% increase relative to 2004 (110 $mtCO_2e$). In 2008, the carbon market was valued at $ 47 billion, while in 2009 the World Bank estimated its value at $ 126 billion. On June 9, 2005, twenty - three multinational corporations from the G8 Climate Change Roundtable released a statement vocating market - based solutions to climate change. The group, including Ford, Toyota, British Airways, BP and Unilever, called on governments to establish "clear, transparent, and consistent price signals" through "creation of a long - term policy framework" that would include all major producers of greenhouse gases . By December 2007 this group had grown to encompass 150 global businesses.

Carbon Trade Watch has documented how the European Union Emissions Trading Scheme, the world's largest carbon market, has consistently failed to "cap" emissions, while the UN's Clean Development Mechanism (CDM) routinely favors environmentally ineffective and socially unjust projects. They have also criticized voluntary offsets for placing disproportionate emphasis on individual lifestyles and carbon footprints, rather than addressing the larger, systematic changes and collective political action required to successfully address pollution and climate change. According to Carbon Trade Watch's Kevin Smith, "Effective action on climate change involves demanding, adopting and supporting policies that reduce emissions at the source as opposed to offsetting or trading. Carbon trading isn't an effective response; emissions have to be reduced across the board without elaborate get - out clauses for the biggest polluters. "