

**TWO DAYS TRAINING PROGRAMME ON  
“ENVIRONMENTAL DAMAGE ASSESSMENT AND  
COMPENSATION”**

**&**

**“ONLINE CONTINUOUS EMISSION/EFFLUENT  
MONITORING SYSTEM”**

**August 2 – 3, 2019**

**Jointly Organized by Central Pollution Control Board and  
Karnataka State Pollution Control Board**



**CENTRAL POLLUTION CONTROL BOARD  
Regional Directorate (South)  
Bengaluru**

Two-days training programme on “**Environmental Damage Assessment and Compensation & OCEMS**” was organized jointly by the Central Pollution Control Board, Regional Directorate (South) and Karnataka State Pollution Control Board on 2-3<sup>rd</sup> August at Tejaswi Hall, KSPCB. The programme was intended to train and upgrade the knowledge of the officials of CPCB and KSPCB. First day programme is about the various types of pollution impact on environment and applying different methods of valuation for estimating the environmental costs. Second day programme deals on installation of OCEMS and the related issues. Officials from CPCB and Regional officers, KSPCB participated in the training programme. A booklet with all the guidelines issued by the CPCB was made available to all the participants as reference material.



**First day- Inaugural Session:**

The programme was initiated with welcome address by **Mr. Prabhu Dev, Senior Environmental officer, KSPCB**. He welcomed the participants for two-day programme and appreciated the importance of training on new environmental guidelines.



**Mr. Suresh S, Regional Director, CPCB, Bengaluru** has provided the background for conducting the training programme by highlighting the spirit of implementation of guidelines issued by the NGT/CPCB in environmental compensation calculation for industry, untreated sewage disposal, solid waste, biomedical waste, hazardous waste. He expressed that as a beginning these compensation calculation is developed by CPCB, where damage assessment is not considered. In next step CPCB is on the way of developing the document on environmental damage assessment, which is likely to be published.

He delineated the background, how this Polluter Pay Principle is developed with certain orders of Hon'ble Supreme Court in the cases Vellore Citizens Welfare Forum vs Union Of India & Ors on 28 August, 1996, where

*The "Polluter Pays" principle as interpreted by this Court means that the absolute liability for harm to the environment extends not only to compensate the victims of pollution but also the cost of restoring the environmental degradation. Remediation of the damaged environment is part of the process of "Sustainable Development" and as such polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology. The precautionary principle and the polluter pays principle have been accepted as part of the law of the land. In view of the many constitutional and statutory provisions we have no hesitation in holding that the precautionary principle and the polluter pays principle are part of the environmental law of the country.*

And also explained that based on the above judgment order, in many cases this was referred and polluter pay principle was applied by Hon'ble Supreme Court.

Later part of judicial orders, Polluter Pay Principle is also discussed and published in National Environmental Policy 2006.

In the end of his speech, he emphasized that for carrying out environmental damage assessment, background ground data is required, so the data collection and compilation is to be done properly.

Moreover, he expressed that since Supreme Court in its judgments quoted that *precautionary principle and polluter pays principle have been accepted as part of the law of the land* and also various NGT orders supports the environment compensation. So SPCBs shall start imposing compensation by quoting those judgments.

**Mr. Mahesh T, Senior Environmental Officer** provided the details about the two-day training programme and topics. He introduced the resource persons and their specialization and their contribution to the public policy in the area of environmental economics and environmental law. He elaborated that the training programme is organized to enlighten the knowledge of officers on the valuation methods, legal perspective of EC and Online Continuous Emission / Effluent Monitoring systems.

***Technical Session - Valuation Methods for Environmental Damage and Compensation:***



Dr. Krishna Raj, an expert consultant and Professor specialized in the field of Environmental Economics at “Institute for Social and Economic Change (ISEC) Bengaluru” provided the background ***“Report of the CPCB In-house Committee on Methodology for Assessing Environmental Compensation***

***and Action Plan to Utilize the Fund”***. Prof. Krishna Raj began his lecture by providing a brief outline on the cases and formula for environmental compensation as prescribed by CPCB. Further, he aptly highlighted various guidelines issued by the CPCB for environmental damage and compensation.

He discussed about the 'Valuation Methods for Environmental Damage and Compensation' by introducing the trainees with the basic understanding of Environmental Economics and different valuation techniques made available in the discipline. Environment and economic activities are closely interlinked and inter-dependent which will have long lasting impact on the society. Environmental economics as a recent and special branch of economics provides guidelines on appropriate way of regulating economic activities to strike a balance among environmental, economic and social goals. Major issue of environmental economics has always been with the issue of pollution. Since it was necessary to assess the damage of pollution before levying the compensation, a clear understanding of the environmental damage aspect from economics perspective was needed. Professor provided an elaborated explanation on environmental concepts like externality, public good and so on, which would guide while valuating the damage. In the principle of welfare, 'compensation criterion' establishes that action needs to be justified with efficiency where winners from a policy will compensate the losers. Since pollution is negative externality, a polluter should pay i.e., based on the polluter pay principle.

It was further elaborated that how important and need of the hour to assess the damage from the pollution to levy the compensation. For the assessment of damage, there is various valuation techniques established in environmental economics which can be worked out for each specific case under study. One of the tradition methods of valuation of resource/project is **Cost-Benefit Analysis (CBA)** which will value the benefits from reduced pollution to different sources, but this method will overlook the health impacts from pollution or expenses involved in health improvement. With this drawback of CBA, environmental economists have evolved more efficient methods to value the damage which will consider both human and non-human damages.

Since there are use and non-use values for resources which will be accounted in Total Economic Value of resource, it is essential to consider both valued in valuation. Keeping in this mind, environmental economics literature provides number of valuation techniques, which are broadly classified into methods based on dose-response functions and methods based on observed behavior.

Under the **dose-response approach**, most widely used valuation technique is **productivity approach**. The rationale behind this approach is considering environment as an input to the production process and any degradation of this input will directly reduce the production resulting

in loss. This technique will value the loss in terms of crop yield loss or income loss to the farmers. With this simple valuation methodology, this technique has been widely used in valuation of soil erosion, air pollution, acid rain, pollution of fishers and salinity of cropland etc.

Another popular technique is *human capital approach* which will value the loss of productivity of workers due to pollution. Consider a case of air pollution and its impact on health. Increased use of vehicles will degrade the air quality which will increase the respiratory related illness among workers reducing their productivity at workplaces.

Under the *behavior approach*, common methods are *averting/mitigating approach*. This is also considered as revealed preference approach where the valuation will consider the expenditure or behavioral change due to pollution. For example, an outbreak of waterborne disease in Pennsylvania in 1983 made people to purchase bottled water to avoid the disease. The cost of bottled water can be considered as the damage cost of pollution. The steps to be followed in the analysis are the following: Identification of the environmental hazard and the affected population; Observation of the responses of individuals and Measurement of the cost of taking actions.

Another popular method under behavior approach is *Travel Cost Method (TCM)*. In this method, cost of visiting a recreational site and willingness of an individual who visit to the site will be surveyed to assess the preference of the individual towards the site. Data is usually collected through surveys in which an individual states the amount of time and money he spent traveling to a park, tourist center, fishing spot, and so on. For example, assume that the quality of the water is one of the main attributes of a marine reserve. A change in the park's qualities would result in a change in the observed number of visits to the park. If data regarding the new visitation rate is available, it is possible to calculate the new parameters and obtain a new demand curve for park visits.

Another important valuation technique is *Hedonic Price Method*. The rationale behind this method is an individual will purchase a good or service for its characteristics. For example, when buying a car, we are not interested in the car per se but in its features such as comfort, speed, power, color, shape, and so on. When renting or buying an apartment we will usually consider its size, number of rooms, neighborhood, distance from commercial centers, and distance from

public schools. Consider two apartments that are identical in all respects (such as neighborhood, location, age, etc.), but one is larger than the other. The larger apartment will cost more than the smaller one because it is bigger. If we could hold all other characteristics constant, we could measure the price increase corresponding to increases in size only. In other words we could measure the implicit price of size. The same can be done for environmental aspects, such as the quality of the air around the apartment, or the level of noise. Hedonic pricing is based on the idea that an individual's decision to buy goods or services is based on this bundle of characteristics. This method assumes that environmental quality is an attribute of the real estate and its price reflects people's preferences for environmental quality. Hedonic price method can be used for valuing the changes in air and water quality, building public area, planning location of an environmentally hazardous facility or impact of neighborhood improvement schemes in poorer parts of cities.

Most widely adopted valuation technique in the environmental economics literature is *Contingent Valuation Method (CVM)*. Since, environmental goods are public goods where market fails (not traded in market) to determine the price, it becomes essential to derive the value of such goods. This method uses survey techniques to establish the value of goods and services that are not exchanged in markets and therefore have no prices associated with them. The CVM involves asking a randomly chosen sample of people what they are *willing to pay (WTP)* for a clearly defined change in the provision of a good or service, or to prevent a change. It can also be used to elicit what people are *willing-to accept (WTA)* to forgo a change or tolerate a change. The most commonly applied approach in the CVM is to interview people and ask them what they are WTP towards the preservation of that asset. Analysts can then calculate the average WTP of respondents and multiply this by the total number of people who enjoy the environmental site or asset in question to obtain an estimate of the total value which people have for the asset. An interesting advantage of the CVM approach is that it can be used to elicit values of resources that people will never personally utilize or visit. For CVM study, the first step is to set up a hypothetical market for environmental service in question. This hypothetical market should be explained to the respondents clearly so that they will understand the need and situation of environmental valuation. Next step is to provide the bids. This can be direct interviews and eliciting the information of their payment choices and then averaging these bits to derive

WTP/WTA. Due to its implicit evaluation of the preferences from the individual, CVM has been widely used in the environmental valuation literature.

In the era of economic policies of globalization, the valuation of environmental damages is imperative to achieve sustainable development. With the three main capitals available to humans (man-made capital, human capital and natural capital) it is natural capital which is though essential but under risk due to underpricing or no-pricing. Most of developed countries like Germany, Denmark, Sweden and some developing countries like Nepal and Bhutan have already considered these issues and adjusted their GDP (Gross Domestic Product) with value of natural resource called Green GDP. In this line, it is important to establish a comprehensive valuation methodology to account for damage cost and levy environmental compensation to realize sustainable development, to adopt Green GDP in accounting, and to ensure welfare of the society. He opined that these valuation techniques are highly useful for the environmental regulation and also for environmental policy.



*Prof. Ramesh from National Law School of India University* delivered a lecture on Environmental Compensation: A Legal Perspective. Professor has explained about the constitution of India 1949, 51 (A) (g) and Section 15, Section 9(3) in The Environment (Protection) Act, 1986. He expressed that any Judgments from Supreme Court of India is part of

the law of the land. He quoted Supreme Court judgment in the case Vellore Citizens Welfare Forum vs Union of India & Ors on 28 August, 1996 in which polluter pays principle have been accepted as part of the law of the land. Based on these judgments and Hon'ble tribunal orders boards shall levy environmental compensation to the polluters.

*Mrs. Vijayalakshmi S, Research Scholar, ISEC* presented studies on damage assessment methodologies used by World Bank and other countries like Lebanon, USA and UK were

explained in this session. Case studies were presented for each pollution type like, water pollution assessment in Pennsylvania, soil erosion in Morocco, air pollution in UK and USA.

The participants were actively involved in discussion, seeking clarification, and also offered suggestion to conduct more training programme on different case of environmental damage and assessing the environmental compensation specific to the case or case by case.

**Second day programme: Capacity building requirement for successful Implementation of real time monitoring**

The training programme organized to enable knowledge on proper implementation and verification of real time monitoring systems, since it has been more than five years, the major industries (17 categories of highly polluting industries, Red categories industries, and GPIs) has installed the OCEM system.

Training focused on to improve the data quality towards proper implementation of OCEMS, by identify the problems of the installations, calibration of the equipment, performance tests, stratification study, data standardization and tamper proof data transfer for analysis and compliance check.

**Suggestions:**

Based on the above training program on valuation of environmental damage assessment, it is understood that the costing (value) of each parameters is very important. This cost assessment is varying from person to person perspective. Therefore CPCB shall initiate necessary steps to get the data on costing parameters (base line values) which is already made by other government departments. This will help in framing a National level baseline values ease to apply cost count on damage assessment.

“Green National Accounts in India a Framework” A Report by an Expert Group Convened by the National Statistical Organization Ministry of Statistics and Programme Implementation, Government of India published on March 2013. This document describes about the state of an economy and form the raw material for both assessing performance and prescribing policy, which are essential for economic evaluation. This may also be referred for preparation of document.