ENVIRONMENTAL IMPACTS OF THE SUGAR INDUSTRY- AN ECONOMIC EVALUATION

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ABSTRACT

Environmental pollution has a great impact on men and society. It adversely affects on the human health or public health, animals and plants. Environmental pollution decreases the efficiency and performing capacities of human beings and it increases the mental depression and decreases the average age of level of men and animals.

The principal object of the Environmental Impact Assessment may be said to be an attempt to internalise environmental costs of a project so that development duly considers environmental preservation besides economic and other factors.

Environmental Impacts may be positive (beneficial) or negative (adverse). Further it may be tangible or intangible. Tangible impacts are found on health, recreation, water quality etc. these impacts are to be valued by using certain market prices using techniques such as ‘change in productivity’, loss of earnings’ etc. on the other hand intangible impacts are related to habitat change, bio-diversity loss etc. and these are to be valued through surrogate market techniques such as Hedonic prices or travel cost methods etc. Similarly, people’s willingness to pay for an environmental preservation is to be measured by using contingent valuation technique. In this paper effort has been made to analyse environmental impacts and applicable valuation techniques.

Keywords: Sugar Industry; Environmental Impact

INTRODUCTION

Increasing urbanisation and industrialisation resulted in destruction of forests and wild life in India. India has a land area 2.4% of the world but our forests are disappearing at a very fast rate, giving way to man’s need for development and to his greed. Large tracts of forests are destroyed to make way for habitation industries and big river valley projects.

The environmental pollution in large industrialised cities like Calcutta, Mumbai, Bangalore has reached dangerous levels and is growing due to careless disregard for its far reaching effects. Industrial wastes are dumped in open places and the industrial effluents are discharged in open drains and rivers. In India during 1992 the amount of loss due to environmental pollution was £1000 crores which represented more than 4.5 per cent of total internal production. One interesting feature is that the users of resources are not necessarily the ones who suffer the damage. Persons suffering the most are generally the poor and illiterate. Though large number being dispersed over a wide area they are not able to take collective action.
The Environmental Impact Assessment (EIA) is a widely recognized study to assess environmental impacts of developmental projects. Decisions on proposed environmental projects are made based on the findings of an EIA study. An extension of the environmental Impact Assessment could be a cost benefit analysis where the value of economic gains and environmental losses and vice-versa can be suitably compared to establish a sound basis for the choice of a particular project. To enable a cost benefit analysis to be performed, the environmental damage costs have to be ascertained, a task that requires a variety of specialized economic valuation techniques.

This paper outlines the applicability of some of the environmental valuation methods for a hypothetical sugar mills project.

The term ‘Environmental Impact Assessment’ and its associated acronym, EIA, initially came to be used with the enforcement of the National Environmental Policy Act on January 1, 1970, in the USA. Since then EIA vocabulary has gained world-wide acceptance and is used in a number of countries. The Environmental Impact Assessment (EIA) is now a widely accepted tool to help the decision making process for developmental projects. Environmental Impact Assessment may be described as a process designed to ensure that potential environmental impacts are satisfactorily assessed and taken into account in planning, design, authorization, and implementation of all types of developmental projects. Internalisation of environmental costs of a project is one of the objectives of the EIA. In addition to the project’s financial costs and benefits that determine the economic feasibility of the project, the environmental costs of impacts should also be known and incorporated in the overall financial analysis of the project. A composite cost benefit analysis incorporating the project as well as environmental costs and benefits would enable a judicious decision to be made based on the findings of the EIA. While project costs are easily available from prevailing material, labour and other market prices, environmental costs are often rather difficult to estimate and require specialized valuation techniques for their quantification.

Sugar industry- a hypothetical case study, is regarded as one of the 29 categories of polluting industries by the EIA notification of the government of India 1994 (MOEF, 1994). Sugar industry making operations have the potential to cause a variety of impacts on the environment. These impacts depend on the process stage, the size and type of operation, the technology employed, the nature and sensitivity of the surrounding environment and the effectiveness of the planning, pollution prevention, mitigation and control techniques adopted (UNEP-IISI Report, 1997). The various environmental impacts that could be caused by a hypothetical sugar industry together with the methods of cost evaluation applicable are outlined below:

**Air Pollution and Health Effect**

The pollution generated from various sugar mills in air is very dangerous for the health of the people in the surrounding area and the overall environment. Dust pollution is generated by almost all sugar mills. A variety of air pollutants are emitted such as SPM(suspended particulate matter), NOx(Nitrogen oxide), SO\(_2\) (sulphur dioxide). These are highly toxic. The value of the health effect from the pollutants can be estimated by the use of “loss of earnings” approach. This estimation is made from the actual loss of earnings from chronic exposure to these pollutants and the medical costs from the poor quality of the air environment.

Surrogate market value technique such as “property value” can also be used to value the air pollution, particularly to the dirty and polluted residential areas. This methods relies on the
assumption that among other factors, the local environmental quality will influence the property prices.

Preservation of Forest

A potentially significant ecological impact on the forest cover due to the emission from the sugar mills could cause damage to valuable trees and animals. One of the methods of economic valuation to address impacts on ecology is to apply the “dose response” approach. The extent of ecological degradation due to a certain quantum of environmental pollution has been established scientifically for a large class of pollutants and ecological resources. These relationships can be used (dose response) to quantify the extent of harm possible. Besides this the “contingent valuation” method is another tool for monetising value of forest land. The local people willing to pay to preserve the forest ecosystem can be found by a survey.

Water Pollution

In the case of water pollution, Bio Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Suspended Solids (SS) are regulated and the firm cannot freely dispose of them.

There are three inputs: capital, labor, and materials and three outputs: good output, Sugar and bad outputs, BOD, COD, and SS. In India, the water pollution standards (MINAS) for BOD, COD, and SS are respectively given as 30mg/l, 250mg/l, and 100mg/l. if any sugar mills exceeds this limit then tax method can be applied.

Surface as well as ground water resources may be polluted from the discharge of suspended solids, NOx etc. it may cause a serious health hazard. Sugar Industry wastes are dumped in open places and the sugar mills effluents are discharged in open drains and rivers. This induces the sugar mills authorities to treat the effluents before discharging to nearby streams or to prevent the contamination of groundwater by the use of effluent treatment plant (ETP). In this case “preventive expenditure” can be used as a environmental cost. Groundwater resources are often contaminated by un-treated industrial effluents and adequate finance for their clean-up is not available, specially in developing countries like India.

Effect on Fisheries due to Water Pollution

Fisheries are more at risk due to the discharge of sugar mills effluents which may arise the temperature of the water in addition to adding toxic pollutants to the stream. Serious pollution causes reduction in fish yield and disruption of fish spawning leading to loss of income to fishermen. It also spoils the quality of fish because in polluted water , fish is contaminated and not good for health. The valuation can be estimated by the “change in productivity” method. Possible improvement of the river water quality from from the boa table to a level of fishing could be estimated using the “contingent valuation” method.

Recreational and Heritage Values

Impacts on the recreation, heritage and local amenity in and around the forest land surrounding the unsightly, dirty and noisy sugar mills can be monetised. The travel cost method (TCM) can be applied to estimate the recreational value. This technique primarily involves collecting data on the number of visitors arriving at recreational sites and expenditure incurred in reaching the place through on-site questionnaire survey.
Location and Technology Options

Sugar mills usually take a lot of land as the industry by its heavy nature needs several utilities and ancillary units. The change in land use brought about by the setting up a sugar mills can be studied by means of an “opportunity cost” approach where the opportunity cost of not choosing a sugar mills but other development pattern can be computed. Similarly choice of technology options for meeting the same production pattern can be analyzed by the opportunity cost technique. With this technique it is possible to quantify the extra costs involved in choosing an environmentally better, but more expensive solution and thus arrive at an optimum trade-off between capital expenditure and environmental protection.

An assessment matrix of environmental components and valuation techniques has been presented in table 1

<table>
<thead>
<tr>
<th>Environmental Components</th>
<th>Impacts</th>
<th>COP</th>
<th>LE</th>
<th>PE</th>
<th>RC</th>
<th>TCM</th>
<th>LVC</th>
<th>CVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and safety</td>
<td>Environment related diseases due to air and water pollution</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecology</td>
<td>Loss of habitat &amp; species due to air pollution, water pollution, forest clearing etc.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental resources</td>
<td>Renewable fish resource, surface and ground water resource raw materials like sugar cane etc.</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational / Heritage and amenity</td>
<td>Degraded air quality due to gaseous emission/ dust and their impact</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Human values</td>
<td>Rehabilitation, employment pattern, cultural changes</td>
<td></td>
<td></td>
<td>X</td>
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</tbody>
</table>


CONCLUSION

Environmental pollution has a great impact on men and society. It adversely affects on the human health or public health, animals and plants. Environmental pollution decreases the efficiency and performing capacities of human beings and it increases the mental depression and decreases the average age of level of men and animals. The principal object of the Environmental Impact Assessment may be said to be an attempt to internalise environmental costs of a project so that development duly considers environmental preservation besides economic and other factors. Environmental Impacts may be positive (beneficial) or negative (adverse). Further it may be tangible or intangible. Tangible impacts are found on health, recreation, water quality etc. these impacts are to be valued by using certain market prices using techniques such as ‘change in productivity’, loss of earnings’ etc. on the other hand
intangible impacts are related to habitat change, bio-diversity loss etc. and these are to be valued through surrogate market techniques such as Hedonic prices or travel cost methods etc. Similarly, people’s willingness to pay for an environmental preservation is to be measured by using contingent valuation technique. All these techniques require some form of database or a detailed survey to arrive at an estimate of the impact.

REFERENCES