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Social Cost-Benefit Analysis – A Case Study of Tata Steel Coal Washery, Jamadoba.

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Abstract: *Social cost benefit analysis is an appraisal tool to evaluate a project from the view point of the society as a whole. It refers to the analysis of the costs and/or the benefits that a society may have to bear and/or get from the proposed project. It is a systematic and cohesive economic tool(method) to survey all the impacts caused by an urban development project. It is a study of feasibility of a project in terms of its total economic Cost and total economic Benefits, not just the financial effect (investment cost like tax and fees, et but all th social effects like pollution, safety indirect (labour) market, legal aspects, etc. The paper analyses the application of Social Cost Benefit Analysis on Expansion of Jamadoba Coal washery based on Mines plant and tries to highlight the social costs and benefits associated with each project. In fact, Coal continues to play a major role in the economic development of a country, especially in metallurgical industries and conventional power generation plants. Coal is the dominant energy source in India, accounting for more than half of the country's requirements.70% of India's coal production is used for power generation, with the remainder being used by heavy industry and public use. In a bid to break the public sector monopoly over coal, the government is seeking to introduce legislative changes allowing for private mining, whilst liberalizing norms for the allocation of captive blocks permitting trading of coal. The government is contemplating the allocation of captive blocks for setting up was here in the private sector. Captive block holders would also be permitted to sell their coal on the open market. The current legislative requirements permit private-sector investment only for the limited purpose of setting up coal washeries and captive mining for specified end-uses, including setting up power plants, fertilizer and steel units.*

Keywords: Economic Development, Legislative, Financial Effects, Feasibility.

1. INTRODUCTION

Social Cost Benefit Analysis (SCBA) is a feasibility study of a project from the viewpoint of a society to evaluate whether aproposed project will add benefit or cost to the society. That is, it is an approach that is concerned to judge the economic and social viability of a project especially public expenditure project or donor-led programs. SCBA model is based on the theory of welfare economics, according to which the welfare of a society depends on the aggregate individual utility levels of all members of that society. SCBA had, at first, used for evaluating public investments in the decade of 1960s and 1970s. In those decades, this model had got a good emphasis; because public investments in many countries, especially in developing countries, were immensely increased. Nowadays, SCBA is also becoming important for private project or investment as more often there is a possibility for this kind of projects to bring adverse impact to the society.

In the context of planned economies, SCBA aids in evaluating individual projects within the planning framework which spells out national economic objectives and broad allocation of resources to various sectors. In other words, SCBA is concerned with tactical decision making within the framework of broad strategic choices defined by planning at the macro level. The perspectives and parameters provided by the macro level plans serve as the basis of SCBA which is a tool for analyzing and appraising individual projects. As an aid to planning, decision-making, evaluation and control, the social cost benefit analysis provides a scientific and quantitative base for the appraisal of projects with a view to determine whether the total social benefits of a project justify the total social costs.

The need for a scientific social cost benefit analysis arises because of the fact that the criteria used for measuring commercial or trading profitability that normally guide capital budgeting in the private sector investing projects may not be appropriate for public or social (macro) projects investment decisions. Private investors are most interested in minimizing private costs and hence they take into consideration only those elements or costs which directly affect their private earnings i.e. the private expenses and private benefits. Both private earnings and private costs are valued at the prevailing market prices for al accounting purpose. But the existence of externalities

i.e. the social costs and social benefits introduces bias in the market price based investment decisions.

Fig.1 Optimum relationship in SCBA

To make a scientific and systematic social cost benefit analysis of projects, it is necessary to weigh each project's advantages (benefits) and disadvantages (costs) to the society or nationals a whole. Thereafter, various projects under consideration are ranked on the basis of social cost benefit ratio and the final decision about the selection of a project is taken based on the score in ranking. In other words, a social costs benefit analysis is a vital tool for comparing economic alternatives.

In a summarized form, social cost benefit analysis refers to the cases where the projects had a broad impact on the society and usually carried out through government. In such project, the society is involved directly or indirectly. Thus, for any such project it is necessary to do Social Cost Benefit Analysis keeping the benefits of the society in our mind. The main thing we have to analyze is the Benefit-Cost ratio. For approval of any such project, the benefit-cost ratio must be greater or equal to 1.

$$\text{Benefit} \geq \text{Cost}$$

But, in the case of social cost benefit analysis it is difficult to quantify the benefits and costs of the project. So, there are some models and various researches are under working to minimize the variations between the actual costs/benefits and expected costs/benefits.

For this reason, Tata Steel Limited 6&7 Pit Colliery in Jharia Division, Dhanbad receive economic support from the government for the Expansion of Jamadoba Coal washery in 6 & 7 Pit Colliery : from 1 MTPA to 2 MTPA. In this paper we are analyzing and finding the outcomes of Social Cost Benefit Analysis of the Tata's Coal washery expansion project.

2. METHODOLOGY

The UNIDO Approach for Social Cost Benefit Analysis as prescribed by United Nation Industrial Development Organization (UNIDO) is one of the most common method used for this kind of analysis.

The United Nation Industrial Development Organization (UNIDO) and the Centre for Organization of Economic Co-operation and Development (COECD) have come with useful publications dealing with the problem of measuring social costs and social benefits. It may be noted, in this context, that the actual cost or revenues from the goods and/or services to the organization do not necessarily reflect the monetary measurement of the cost ant or benefit to the society. This is because these figures are grossly distorted on account of restriction and controls imposed by the government. Hence a different yardstick has to be used for evaluating a particular in terms of cost and sacrifice on the part of the society. Such payments are easily valued at opportunity cost or shadow prices to judge their real impact in terms of cost to society for the purpose of social cost benefit evaluation.

UNIDO Approach is a five stage methodology:

1. Calculation of financial profitability measured at market prices.

2. Obtaining the net benefit of the project measured in terms of economic prices.

3. Adjustment for the impact of the project on savings and investment.

4. Adjustment for the impact of the project on income distribution.

5. Adjustment for the impact of the project on merit goods and demerit goods.

The UNIDO is applied in a simplify way to a project of expansion of Coal washery.

3. CASE STUDY

Tata Steel Limited, 6 & & Pit Colliery in Jharia Division, Dhanbad, Jharkhand.

3.1 Project:-

Expansion of Jamadoba Coal washery in 6 & 7 Pit Colliery : from 1 MTPA to 2 MTPA of M/s Tata Steel Ltd., Jharia, Dhanbad, Jharkhand, India.

Fig.2 Jamadoba Coal washery

3.2 Introduction:-

6 & 7 Pit Colliery is an underground existing coal mining project in Jamadoba, Jharia Mining Area of Tata Steel Limited.

Jharia coal field is the only coking coal field of the country wherein mining started way back in 1896. There are total 18 seams which are coupled with number of geological distribution in the coal field and were operated by different companies.

From 1910 to 1918, Tata Steel leased six of the metallurgical coal bearing properties in the Jharia coal fields, situated in the Damodar River Valley, with estimated reserves of 287 million tonnes. Spread across 5500 acres, these six collieries are grouped in two locations, Sijua and Jamadoba. In 1918, Tata Steel acquired Malkera and Sijua as well as Jamadoba, Digwadih and 6&7 Pits Collieries of the Jamadoba Group.

The Indian operations of Tata Steel, draws its greatest strength and its competitive position as one of the lowest cost producers of steel in the world from the quality and yield of its raw material units. The mines have successfully given it raw material security and have partially insulated it from the volatility of the global markets. The Company has, therefore, continuously modernised and expanded its raw material facilities right from the 1950s, when Tata Steel launched its two million tonne expansion programme.

3.3 Social Cost Benefit Analysis:-

Social Cost Benefit Analysis is a model based on the theory of welfare economics, according to which the welfare of a society depends on the aggregate individual utility levels of all members of that society.

In the context of Mines area we need to consider the environmental baseline studies. From these data that have been carried out in and around the project for assessing the present environmental status, study the likely impacts of mining operations and formulate a co-comprehensive SCBA.

The objective of social cost-benefit analysis is, in its widest sense, to secure and achieve thevalue of money in economic life by simply evaluating the costs and benefits of alternative economic choices and selecting an alternative which offers the largest net benefit. Therefore, it can be said that the main focus of Social Cost Benefit Analysis is to determine:

i. Economic benefits of the project in terms of a price (shadow price) that reflect social value;

ii. The impact of the project on the level of savings and investments in the society;

iii. The benefit of the project in the society;

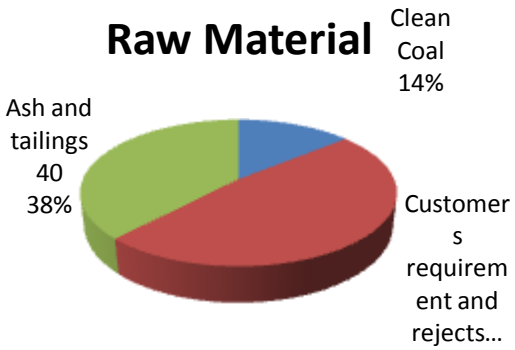
iv. The Cost of the project in the society.

i. Economic benefits of the project in terms of a price (shadow price) that reflect social value:-

It has been operational for last 60 years. Jamadoba coal washery receives coal from captive mines of Tata Steel & BCCL mines to beneficiate it in order to produce clean coal required for Tata Steel plant from Jharia division.The proposal is for expansion in coal washery from 1 MTPA to 2 MTPA within the area of 7 ha with 100 % expansion. It is a fully mechanized washery.

The company is in the process of expansion of production capacity of its mines to meet the coal demand at Jamshedpur. The demand for clean coal after expansion of the integrated steel plant at Jamshedpur (from 6.8 MTPA to 10 MTPA) has been estimated to be 7.30 MTPA.

The raw coal (30-32%) is fed to the washery to produce clean coal with 15-18% ash as per customer requirement and rejects with 48 -50% ash and tailings with 38-42% ash.



The process is based on cyclone separation for coarser particles and teetered bed separator and froth flotation for fine particles. In fact:

- The clean coal is sent to Jamshedpur works.
- The rejects are consumed in power plant.

- The tailings are disposed of to end user (viz. institutionalized customers including power plant, cement and brick kiln manufacturers).

There is no involvement of forest land, in fact there are no National Parks, wildlife sanctuary, biosphere reserves found in the 10 km buffer zone.

Details of land usage are as under:

- Damodar River flows at a distance of 2.5 KM from the washery. The total estimated water requirement is 1240 m3/d. Range of ground water level is 78 – 7.98 m below ground level. The source of water is underground mine water. Washery is provided with effluent recycling system so as to take care of effluent generated due to cleaning and any overflow from the plant. The existing tailings management through ponds and subsequent recycling shall be phased out in stages till the mechanical tailing dewatering system is stabilized.

- The ambient air quality seasonal data has been documented for December 2011 to February 2012. Some of the data recorded (PM10 values) are above limits but overall the results are within prescribed limits.

Compliance:

This washery is an old washery and has been operating since 1952 and therefore the compliance of earlier EC from MoEF Regional Office is not available.

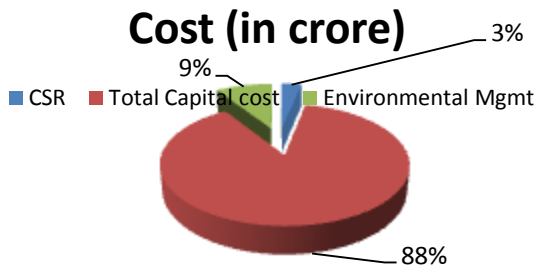
Cost:

CSR: 5 crores

Total Capital Cost: 135 crores

Environmental Management: 14 crores

TOTAL:154 crores



Net Present Value:-

Expansion of 0.2 million in 5 stages

Profit 1 ton production: 15000 Rs.

1 stage profit: 60 crores Rs

Breakeven in 3 stage

Rate of return: 8.26%

NPV= 83,91

YEAR	0	1	2	3	4	5
CASH FLOW	(154)	60	60	60	60	60
DISCCOUNT CASH FLOW	(154)	55,42	51,19	47,28	43,68	40,34
CUMMULATIVE DISCOUNT	(154)	(98,58)	(47,39)	(0,11)	43,57	83,91

Present Status: In loss since last 3 years so buy coal from BCCL.

ii. The impact of the project on the level of savings and investments in the society;

The thrust areas for CSR activities in Jharia Division are income generation programme, health & hygiene, empowerment (Including SHG Development, Employability Training etc.), water supply network for surrounding villages & Infrastructure Related Jobs.

The CSR expenditure budget is about Rs. 5 crores. This expenditure will include the expenditure required to comply with the above assurances.

- Coal transportation: The underground belt conveyors for coal transportation from captive underground mines to the washery site are already in practice. Transportation of coal to steel plant at Jamshedpur will be through Rail wagons.

- Afforestation: green belt development takes place every year on the open surface within leasehold areas

- Public hearing**:** The public hearing was held on 20.09.2012 atJamboda district in Dhanbad. The issues raised were increase in pollution level due to expansion, impact of washery effluents to the Damodarnadi and DungriJore, Maximum Nos. of Trees plantation, Medical facilities for villagers. Emergency facilities at night time, Supply of Water & Power, etc.

iii. The benefit of the project in the society:-

Besides CSR activities, some more benefits are to be provided through the project. Some of these benefits are listed below:

- In compensation of the land Tata will be providing jobs and to build a school in that area
- Water of washery is going to be purified and supplied to nearby colony: Tata Steel is providing huge quantity of drinking water through water pipeline as well as water tankers to the villagers. The proponent has planned to connect all the villages in the leasehold area with water pipeline connection. A pilot plant to convert mine water into drinking/ domestic water to supply the same to the population of Dhanbad and surrounding areas has been launched at Moonidih Coal Mining area by National Mission Project by CSIR in order to increase ground water recharge.

Fig.3 Circled part shows benefits given to society by Tata Steel Co. Ltd.

- About 10-12% of ash will be utilized for making bricks, tiles and it will be used in pavements, embankments and as road-filling material. Rest 88-90 % of ash has been earmarked for filling abandoned open cast mines.
- Improve the infrastructures: Road and rail will be extended till the villages; flyash generated from the captive power plant of the washery be utilised for house construction, roads and such uses.
- Almost 140 permanent jobs.
- About 100 temporary positions.

iv. The Cost of the project in the society:-

The project also incurred some costs in the society. Some of these costs of the project in the society are as below:

- Environmental impact short term:
- Pollution of the air: Increase in air pollution by increased emissions of carbon dioxide, sulfur dioxide, nitrogen oxides, particulate matter (PM), and heavy metals leading to smog, acidrain, toxins in the environment,
- Water loss or degradation of groundwater. Since coal seams are often serve as underground aquifers, removal of coal beds may result in drastic changes in hydrology after mining has been completed.
- Traffic jam increase in according to improve the capacity of the washery.
- Loss in agriculture activities.
- Environmental impact (long term).
- Despoils a place that after the activity is arid.
- The water is totally polluted and have affect to a long term (to clean the water need more than 100 years).
- Disease for the polluted water and air: numerous respiratory, cardiovascular and cerebrovascular effects. One of the most relevant disease is asthma: in the last 15 years the people affect are increased until 19% of the Dhanbad district area.

3.4 Analysis:-

On doing Social Cost Benefit Analysis, we analyzed some points which are in favor of society and against too. These points are as follows:

- Dhanbad is the most benefit of the Tata Mine because such activities create jobs, so the people are coming from remote places to work in the mines. The conditions of the workers is very bad, they earn around 300 Rs. per day.
- The energy obtained by the coal is cheap only for the factories, while for the populations is still expensive and it is more profitable hydro-electrical power.
- The development is very far so all is temporary and no quality so the people live in a very bad conditions.
- The land of farmers had been engaged in the project which will result in degradation of agriculture works.
- Air, water, soil everything are being polluted if some anti-pollutants will not be used. These pollutions will directly affect the livelihood of near places.
- Tata provide some facilities to the local people which will be beneficiary for the society. The hospitals, stadium, school are the examples of the beneficiaries provided by Tata Steel Ltd.

4. CONCLUSION

The objective of social cost-benefit analysis is, in its widest sense, to secure and achieve the value of money in economic

life by simply evaluating the costs and benefits of alternative economic choices and selecting an alternative which offers the largest net benefit. Therefore, it can be said that the main focus of Social Cost Benefit Analysis is to determine:

1. Economic benefits of the project in terms of a price (shadow price) that reflectsocial value;

2. The impact of the project on the level of savings and investments in the society;

3. The impact of the project on the distribution of income in the society;

4. The contribution of the project towards the fulfilment of certain merit wants (self-sufficiency, employment etc).

In the case study we analyzed some different points which is in favor of society as well as some points are against to society too. Some of the results concluded according to our discussions are:-

- The people of Dhanbad are benefited as they are employed in such project and also many people will come from remote places which also indirectly beneficiated to local people too.
- The coal is cheap for the factories for their use but for local people, it is still expensive for their commercial use.
- People near the project are suffering with different pollution related diseases.
- The lands of farmers had been engaged in project which will affect the agriculture system.
- Also, the local people beneficiated through different CSR activities of Tata Steel Ltd.

There is need to find the best alternatives to quantify the costs or benefits of any project. The alternatives which will reduce the variations between expected outcomes and found outcomes. Brainstorming may also be used to identify the group of people likely to be affected both negatively and positively. Risk analysis may be also used to identify variables which are relevant to sensitivity tasks.

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