

CHAPTER – VI

COST - BENEFIT ANALYSIS

The present chapter deals with Cost-Benefit analysis of Teacher Education in Manipur during 2003-04 to 2009-10. Before making an in-depth study, it will be necessary to know what Cost-Benefit means. Economists have spent a deal of time thinking about how people choose. In doing so, they have developed a set of ideas and analytical tools that help people to sift through information and make better decisions. This process is known as “Cost-Benefit Analysis”. While the label may appear intimidating, Cost-Benefit Analysis is at its core, quite simple.

Cost-benefit analysis is a formal way of adding up the advantages and disadvantages of doing one thing as opposed to doing something else.

In fact, the Cost-Benefit Analysis is the most popular method of project evaluation under which the CBA of different projects are analysed and then to select the one involving financial lesser cost and yielding better benefit. The role of Cost-Benefit Analysis is explained by Prof.

Marglin as “The perspective and five year plans determine the broad strategy of growth by allocating resources among sectors. But the strategy of growth embodied in the plans leaves many tactical questions unsolved, and it is these tactical decisions that are the province of Cost-Benefit Analysis”. It provides superior criteria for project evaluation in planned economy. It helps the planning authority in making correct investment decisions to achieve optimum resource allocation by maximizing the difference between the present value of benefit and cost of a project. Thus, Cost Benefit Analysis “purports to describe and quantify the social advantages and disadvantages of a policy in terms of a common monetary unit”.

The origin of Cost-Benefit Analysis can be traced back to welfare economics of 19th century. The first practical embodiment of the maximization of net benefit occurred in 1930s in the realm of water resources. According to Flood Control Act of 1916, “the principle of comparing benefits to whomsoever may accrue with the estimated costs”. This reveals unmistakably the social nature of the public investment decision.

In the present analysis, we are not essentially using this technique to compare the relative Cost-Benefit of different projects and to choose

the best one which accrues maximum benefits. Rather we consider Teacher Education as an indispensable part of social development/upliftment program and every school teacher ought to be trained to impart better education. So we simply try to evaluate whether the benefits accrue to the trained teacher in particular and society in general are greater than that of total costs (monetary and non-monetary) incurred in getting such sort of training.

Now we will examine conceptually how the Cost-Benefit Analysis is to be evaluated. The evaluation of cost benefit analysis can be made on the following grounds.

6.1 Evaluation on the basis of Benefit

Benefits refer to the addition to the flow of national output resulting from investment in particular project. Those projects are said to be profitable whose contribution to national output is greater than those with a smaller contribution. Benefits may be real or nominal and direct or indirect.

(i) Real Benefits:

In cost benefit analysis, we are concerned with real benefits rather than nominal benefits flowing from a project. A river valley

project may increase irrigational facilities to the cultivators but if at the same time, the state levies heavy betterment tax on them, the benefit is nominal. But if the same project besides increasing irrigational facilities, raises productivity of land per acre and leads to a number of other external economies whereby real income of the farmer rises, then, it is said to lead to real benefits.

(ii) **Direct and Indirect Benefits:**

Direct benefits are those which can be obtained immediately and directly from the project and indirect benefits are those which are more or less identical to direct benefits. The direct benefits flowing from multipurpose project are flood control, irrigation, navigation, development of fisheries etc. But there may be also certain side effects of the project which may be categorized as indirect benefits.

(iii) **Tangible and Intangible Benefits:**

Benefits flowing from a project may be tangible or intangible. Tangible benefits are those which can be computed and measured in terms of money while intangible benefits cannot be measured in monetary terms.

6.2 Evaluation on the Basis of Costs

The calculation of cost of a project is very difficult because various types of costs are considered in its construction. Costs mean the value of resources used in the construction of a project.

i) **Real and Nominal Costs**

Cost may be real or nominal as they involve real sacrifice on the part of people or otherwise not. If money is borrowed from the people, it is a case of nominal cost. But if the people are required to construct the project themselves, they will be incurring real sacrifice and then it will be a case of real cost.

ii) **Primary and Secondary Costs**

Primary or direct costs are those which are directly incurred on the construction of a project but the secondary costs include the cost providing benefits to the people working on projects such as cost of constructing houses, schools, hospitals etc. at the site of project.

iii) **Associated Costs**

They are the value of goods and services needed beyond these included in the cost of a project to make

immediate products or services of the project available for use or sale.

iv) Project Costs

These are the value of resources used in constructing, maintaining and operating the project. This includes cost of labour, capital, equipment, intermediate goods, natural resources and foreign exchange etc.

These are all the theoretical aspects of cost-benefit analysis in the context of pure economic analysis. In our analysis it will be very difficult to follow the complete procedure of analysis particularly that of comparison with other sectors.

Some formal techniques are required to keep our thinking clear, systematic and rational. These techniques constitute a model for doing cost-benefit analysis and they include a variety of methods:

- i) identifying alternatives;
- ii) defining alternatives in a way that allows fair comparison;
- iii) adjusting for occurrence of costs and benefits at different times;
- iv) calculating monetary values for things that are not usually expressed in monetary units;

- v) coping with uncertainty in the data and
- vi) summing up a complex pattern of costs and benefits to guide decision making

6.3 Framework of the Cost-benefit Analysis

When the measurement of costs and benefits are complete, they might not speak for themselves until they are put in a framework. Cost-benefit analysis provides that framework. It can be used whenever a decision is needed and is not limited to any particular academic discipline, such as economics or sociology, or to any particular field of public or private endeavour. It is a hybrid of several techniques from the management, financial and social science fields.

As far as possible, Cost-benefit analysis puts both costs and benefits into standard units so that they can be compared directly. In some cases, it is difficult to put the benefits into rupees, so we use cost-effectiveness analysis, which is a cost-minimization technique.

6.4 Steps in Cost-benefit Analysis

There is no 'cook book' for cost-benefit analysis. Each analysis is different and demands careful and innovative thought. It is helpful, however, to have a standard sequence of steps to follow.

A set of standard steps is listed below:

- i) Examine needs, consider constraints, and formulate objectives and targets. State the point of view from which costs and benefits will be assessed.
- ii) Define options in a way that enables the analyst to compare them fairly. If one option is being assessed against a base case, ensure that the base case is optimized.
- iii) Analyze incremental effects and gather data about costs and benefits. Set out the costs and benefits over time in a spreadsheet.
- iv) Express the cost and benefit data in a valid standard unit of measurement (for example, convert nominal Rupees to constant Rupees and use accurate, undistorted prices)
- v) Run the deterministic model (using single-value costs and benefits as though the values were certain). See what the deterministic estimate of net present value (NPV) is.
- vi) Conduct a sensitivity analysis to determine which variables appear to have the most influence on the NPV. Consider whether better information about the values of these variables could be obtained to limit the uncertainty, or whether action can limit the uncertainty (negotiating a

labour rate, for example). Would the cost of this improvement be low enough to make its acquisition worthwhile? If so, act.

- vii) Analyze risk by using what is known about the ranges and probabilities of the costs and benefits values and by simulating expected outcomes of the investment. What is the expected net present value (ENPV)? Apply the standard decision rules.
- viii) Identify the option, which gives the desirable distribution of income (by income class, gender or region – whatever categorization is appropriate).
- ix) Considering all of the quantitative analysis, as well as the qualitative analysis of factors that cannot be expressed in Rupees, make a reasoned recommendation.

This sequence is the preferred way to structure the cost-benefit analysis report.

Despite the difficulties of making a very good model or program of cost-benefit analysis, we can lay down five element of Cost-Benefit Analysis which can be stated as follows:

- i) add up the monetary benefits
- ii) subtract the cost

- iii) see if the resulting bottom line, expressed in rupee terms, is positive or negative
- iv) compare the estimated bottom line to the returns available from the other options
- v) test the riskiness of conclusions.

These steps may sound simple in theory but in practice, of course, complications arise. Still a good Cost-benefit analysis will address all the five steps.

In our analysis of Cost-Benefit of Teacher Education in the state, it will be hardly possible to follow all the five steps due to constraints of data and also some of the costs and benefits cannot be expressed all in money terms. We will try to compute all the costs and benefits which can be expressed/measured monetarily at our best level. Further it may not be necessary to compare the Cost-Benefit of Teacher Education with other Cost-Benefit in other options. Since education has become almost compulsory for all irrespective of the volume of benefits, the Government of India has implemented many schemes such as Sarva Shiksha Aviyam (SSA), Rashtriya Madhyamic Shiksha Aviyam (RMSA) etc. to impart education at primary and secondary levels to all citizens of the country irrespective of the loss or gain, taking these expenditures as investment.

Therefore the question of option of investing in education sector does not arise.

For the sake of simplicity, in order to arrive at the conclusion whether the Teacher Education has benefited the individual trained teacher as well as the society, we have attempted to analyze separately

- i) the benefits accrued by the individual trained teacher in terms of monetary benefits which is represented by the difference in the salaries of trained teachers and that of untrained teachers.
- ii) to find out the total benefits and attempts will be made to include other non-monetary benefits which are enjoyed by the society at large.

So far concerning the cost, we have attempted to calculate the unit cost without pay component as well as with pay component. Since the figures are not comparable directly, for the sake of reconciliation, we use to find out average unit cost by taking into account all the institutions as well as the different unit colleges.

A property value of those fixed factors for which money value cannot be calculated is approximately worked out and added to the

money costs incurred by the individual trainees that may be treated as the total costs (both direct and indirect).

The difference between the two, that is, the benefits on one side and the cost on the other will show all net benefits accrued or lost.

6.5 Average Total Unit Cost

As already discussed in the previous chapters, the average total unit cost incurred by a student while undergoing Teacher Education Course (B.Ed. course), the duration of which is normally one year, is calculated by adding

- i) Average private direct cost
- ii) Average private indirect cost
- iii) Average social direct cost
- iv) Average social indirect cost

i) **Average Private Direct Cost:**

Average private direct cost comprises of the cost incurred by the student directly in terms of tuition fees, examination fees, a lump sum amount of Rs.5000/- for purchasing books, journals, stationeries, reading materials etc. per annum. Despite differences

in unit cost for different institutions, in order to maintain uniformity for easy comparison, the average value which is worked out to be Rs.23,084/- (per student) is used.

iii) Average Private Indirect Cost:

Average Private Indirect Cost here represents the earnings forgone by students during their study. It is of utmost difficulty to compute Private Indirect Cost. However, for the sake simplicity, a proxy figure/value by taking into account the initial salary earned at the present rate during a year is used. The initial monthly salary of an untrained teacher is Rs. 13,800/- per month. Assuming the course of study being one year, it is being multiplied by 12, and average indirect cost is worked out to be Rs.13800x12 i.e. Rs.1,65,600/-.

iii) Average Social Direct Cost (SDC):

Average Social Direct Cost equals the sum of current educational expenditures and capitals used upon education and property taxes that would have been levied, if the institutions

Table -6.1*Table showing Social Direct Cost for the five colleges*

	Name of the Institution	Imputed rent per annum	Unit social direct cost
1	DMCTE	Rs.30,000 x12 = Rs.3,60,000	Rs.3,60,000 ÷ 230 = Rs.1565
2	KDMCE	Rs.20,000 x12 = Rs.2,40,000	Rs.2,40,000 ÷ 100 = Rs.2400
3	RKSDCE	Rs.30,000 x12 = Rs.3,60,000	* Rs.2228
4	TITTET	Rs.18000 x12 = Rs.2,16,000	Rs.2,16,000 ÷ 100 = Rs.2160
5	TTTC	Rs.18000 x12 = Rs.2,16,000	Rs.2,16,000 ÷ 100 = Rs.2160
Average Unit Social Direct Cost			Rs.2102

Sources: college records

[* In RKSDCE, the number of students is 150 in the first 5 years and 200 in the last two years during the course of the 7 year study.

$$\text{Rs.3,60,000} \div 150 = \text{Rs.2400} \times 5 = \text{Rs.12,000}$$

$$\text{Rs.3,60,000} \div 200 = \text{Rs.1800} \times 2 = \underline{\text{Rs. 3,600}}$$

$$\text{Total} = \text{Rs.15,600}$$

$$\therefore \text{Average} = \text{Rs.15,600} \div 7 = \text{Rs.2,228}]$$

were not tax exempted. In fact, while calculating the expenditures on capital used upon education particularly the expenditures for

construction of buildings like classrooms, administrative blocks, library buildings, laboratories and other basic infrastructural facilities, the marginal rate of return on investment technique can be used as the most appropriate technique.

Due to non-availability of adequate, uniform and comparable data for different educational institutions, we use a proxy figure for such capital overheads simply by estimating the imputed rents of hiring such buildings or equipments or minimum rate of return if investment is done in other easily calculable heads.

Taking into account the infrastructural conditions of each educational institution, we calculate the imputed rent per student for each institute and an average value is worked out as shown in the above table.

iv) **Average Social Indirect Cost:**

Average Social Indirect Cost in other countries is calculated in terms of property taxes forgone. Since property taxes are not applicable in the case of Indian institutions, we are compelled to assume social indirect cost as zero.

Taking all the four components of cost as discussed above, the unit cost per student is now worked out to be Rs.1,90,992/-.

6.6 Calculation of Benefits

As already discussed in the previous chapter, the benefits of Teacher Education may either be monetary or non-monetary. For the sake of simplicity, we use to measure the monetary benefits accrued to a trained teacher during his/her life time. The method of calculation as well as the amount accrued has already been discussed elaborately in Chapter V. Accordingly we have worked out the net monetary benefit enjoyed by a trained teacher over an untrained teacher. Though the amount worked out is not hundred per cent accurate, the figure worked out is made on the existing pay structure and may be considered as fairly reasonable. It has been approximately estimated to be Rs.11,05,831/- whereas the cost incurred by taking into account all the elements is roughly estimated to be Rs.1,90,992/-. In short, though the difference is not reliable, it will not be exaggerated to conclude that the benefit of teacher education is obviously higher than that of cost.

Beside the monetary benefits, some non-monetary benefits may also be accrued by the society in terms of the sustenance of quality education which can be rendered through Teacher Education. The quality of teaching methods used by a trained teacher will be quite different from that of the untrained one. A trained teacher being exposed himself/herself to the different techniques of good teaching services, may

make the students understand the matter thoroughly and easily convinced.

For instance, Teacher Education provides training facilities to the pre-service teacher/student teacher and makes teachers more functional in their jobs by incorporating guidance and counselling. And it also helps to achieve high quality and value education by training prospective men and women. It also aims to inculcate the teacher-students a sense of human, moral, social and ethical values. It aims to introduce a need based professional and vocational academic programmes.

Such sort of trainings/facilities are not available to an untrained teacher and hence the services rendered by a trained teacher will be more practical and beneficial to the society.

From the above analysis, the test of riskiness of conclusion drawn can also be abandoned. In other words, the benefits we get from teacher education are much higher than the cost.