**CHAPTER 6 - SOCIAL COST BENEFIT ANALYSIS (SCBA)‏**

What is SCBA?

SCBA called economic analysis, is a methodology developed for evaluating investment projects from the point of view of the society (economy) as a whole. It is based on the assessment of the utility of a project for the society as distinct from the financial and economic utility for the promoter group. While in the latter the focus is limited to financial benefits and costs directly accruing to the enterprise, in social cost benefit analysis the benefits and costs accruing to the society as a whole are considered. It is a technique for making enterprise decisions, from society’s stand point.

**Objectives of SCBA**

The main focus of SCBA is to determine:

1. Economic benefits of the project in terms of shadow prices.
2. The impact of the project on the level of savings and investments in the society.

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

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

**6.1 Rationale for SCBA**

In SCBA the focus is on social costs and benefits of a project. These often tend to differ from the monetary costs and benefits of the project.

The principal reasons for discrepancy are:

* Market imperfections
* Externalities
* Taxes and subsidies
* Concern for savings
* Concern for redistribution
* Merit wants

**1. Market imperfection**

Market prices, which form the basis for computing the monetary costs and benefits from the point of view of the project sponsor, reflect social values only under conditions of perfect competition, which are rarely, if ever, realised by developing countries. When imperfection exist, market prices do not reflect social values.

The common market imperfections found in developing countries are:

1. **Rationing:** Rationing of a commodity means control over its price and distribution. The price paid by a consumer under rationing is often significantly less than the price that would prevail in a competitive market.
2. **Prescription of minimum wage rates :** When minimum wage rates are prescribed, the wage paid to labour are usually more than what the wage would be in a competitive labour market free from such wage legislations.
3. **Foreign exchange regulation :** The official rate of foreign exchange in most of the developing countries, which exercise close regulation over foreign exchange, is typically less than the rate that would prevail in the absence of foreign exchange regulation. This is why foreign exchange usually commands premium in unofficial transactions.

**2. Externalities**

A project may have beneficial external effects. For example, it may create certain infrastructural facilities like roads which benefits the neighbouring areas. Such benefits are considered in SCBA, though they are ignored in assessing the monetary benefits to the project sponsors because they do not receive any monetary compensation from those who enjoy this external benefit created by the project. Likewise, a project may have a harmful external effect like environmental pollution.

In SCBA, the cost of such environmental pollution is relevant, though the project sponsors may not incur any monetary costs. It may be emphasised that externalities are relevant in SCBA because in such analysis all costs and benefits, irrespective to whom they accrue and whether they are paid for or not, are relevant.

**3. Taxes and Subsidies**

From the private point of view, taxes are definite costs and subsidies are definite monetary gains. From the social point of view, however, taxes and subsidies are generally regarded as transfer payments and hence considered irrelevant.

**4. Concern for savings**

Unconcerned about how its benefits are divided between consumption and savings, a private firm does not put differential valuation on savings and consumption. From a social point of view, however, the division of benefits between consumption and savings (which leads to investment) is relevant, particularly in the capital-scarce developing countries. A birr of benefits saved is deemed more valuable than a birr of benefits consumed. The concern of the society for savings and investment is duly reflected in SCBA wherein a higher valuation is placed on saving and a lower valuation is put on consumption.

**5. Concern for redistribution**

A private firm does not bother how its benefits are distributed across various groups in the society. The society, however, is concerned about the distribution of benefits across different groups. A birr of benefit going to an economically poor section is considered more valuable than a birr of benefit going to an affluent section.

**6. Merit wants**

Goals and preferences not expressed in the market place, but believed by policy makers to be in the larger interest, may be referred to as merit wants. For example, the government may prefer to promote an adult education programme or a balanced nutrition programme for school-going children even though these are not sought by consumers in the market place. While merit wants are not relevant from the private point of view, they are important from the social point of view.

**6.2. UNIDO approaches for SCBA**

The UNIDO method of project appraisal involves five stages:

1. Calculation of the financial profitability of the project measured at market prices.

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

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

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 whose social values differ from their economic values.

**6.3. Net benefit in terms of economic (efficiency or shadow) prices**

**Financial profitability** is indicated by the Net Present Value (NPV) of the project, which is measured by taking into Account inputs (costs) and outputs (benefits) at market price.

The commercial profitability analysis (calculated in stage 1) would be sufficient only if the Project is operated in Perfect market. Because, only in a perfect market, market prices can reflect the social value. If the market is imperfect (most of the cases in reality), net benefit of the Project is determined by assigning shadow Prices to inputs and outputs. Therefore, developing the **shadow prices** is very much vital.

**Shadow pricing: Basic issues**

Shadow prices reflect the real value of a resource (input or output) to society as opposed to their financial or market value. Shadow Prices are also referred as **economic prices, accounting prices, economic / accounting efficiency prices** etc Use of shadow prices is considered essential particularly due to market imperfections, non-market economy, fiscal policy of the state etc.

For instance, if the production cost of 1 ton of a fertilizer is birr.2000, though it is supplied to the farmers at a subsidized price of birr. 1500 only, the point of consideration is whether the cost of fertilizer should be taken as birr.2000, the actual cost of production or birr.1500, its market price.

* Before we deal with shadow pricing of specific resources, certain basic concepts and issues must be discussed:
  + choice of numeraire,
  + concept of tradability,
  + sources of shadow prices,
  + treatment of taxes, and
  + consumer willingness to pay.

**1.Choice of Numeraire :** One of the important aspects of shadow pricing is the determination of the numeraire. It is a unit of account in which the values of inputs and outputs are to be expressed.

To define the numeraire, the following questions have to be answered:

1. What unit of currency, domestic or foreign , should be used to express benefits and costs?
2. Should costs and benefits be measured in current values or constant values?
3. With reference to which point-present or future- should costs and benefits be evaluated?
4. What use-consumption or investment-will be made of the income from the project?
5. Should the income of the project be measured in terms of consumption or investment?
6. Which reference to which group should the income of the project be measured?
7. In general, Numeraire is determined at:
   1. Domestic currency rather than border price.
   2. Present value rather than future value.
   3. Constant price rather than current price
   4. Consumption use rather than investment use.
8. The specification of the UNIDO numeraire in terms of the above questions is “ net present consumption in the hands of people at the base level of consumption in the private sector in terms of constant price in domestic accounting birr.”

**2.Concept of Tradability** : A key issue in shadow pricing is whether a good is tradable or not.

For a good that is tradable, the international price is a measure of its opportunity cost to the country. For a tradable good, it is possible to substitute import for domestic production and vice versa; similarly it is possible to substitute export for domestic consumption and vice versa. Hence the international price, also referred to as the **border price,** also represents the ‘real’ value of the good in terms of economic efficiency.

**3. Sources of Shadow Pricing** : The UNIDO approach suggests three sources of shadow pricing, depending on the impact of the project on national economy.

**4.Treatment of Taxes :** When shadow prices are calculated, taxes usually pose difficulties.

The general guidelines in the UNIDO approach w.r.t taxes are as follows:

* If the project augments domestic production, taxes should be excluded.
* If the project consumes existing fixed supply of non-traded inputs, tax should be included.
* For fully traded goods, taxes should be ignored

**5.Consumer Willingness to Pay (CWP) :** If the impact of the project is on the consumption in the economy, the basis of shadow pricing is CWP.What a consumer wants to spend for a product or service and what he actually does pay. The difference between CWP and actual payment is called **consumer surplus .**

**Shadow Pricing of Specific Resources**

**1.Tradable inputs and outputs**:- A good is fully traded

1. when an increase in its consumption, results in a corresponding increase in import or decrease in export
2. when an increase in its production results in a corresponding increase in export or decrease in import.

For fully traded goods, the shadow price is border price, translated in domestic currency at market exchange rate. The above definition of a fully traded good implies that domestic changes in demand or supply affect just the level of imports or exports.

For non-traded goods the border price does not reflect its economic value. The value on non-traded good should be measured in terms of what domestic consumers are willing to pay,

* + If the out put of the project adds to its domestic surplus or if the requirement of the project causes reductions of its consumption by others.
  + The value of a non-traded good should be measured in terms of its marginal cost of production :
  + if the requirement of the project induces additional production or if the output of the project causes reduction of production by other units.

**2. Non-tradable Inputs and outputs:-** A good is non tradable when the following conditions are satisfied

1. its import price (CIF price) is greater than its domestic cost of production and
2. its export price ( FOB price) is less than its domestic cost of production.

* The valuation of non-tradables is done as per the principle of shadow pricing discussed earlier.

On the output side,

* if the impact of the project is to increase the consumption of the product in the economy, the measure of value is the marginal consumers’ willingness to pay;
* If the impact of the project is to substitute other production of the same non-tradable in the economy, the measure of value is the saving in cost of production.

On the input side,

* If the impact of the project is to reduce the availability of the input to other users, their willingness to pay for that input represents social value;
* If the project’s input requirement is met by additional production of it, the production cost of it is the measure of social value.

**Example 1**

Assuming that for a project, one-half of the required input is collected from additional domestic production which has a domestic cost of birr. 200,000 and the rest one half is collected from diversion from other consumers who are willing to pay birr. 300,000. Therefore the shadow price of the inputs will Be: Cost of production + consumer willingness to pay = birr (200,000+300,000) = birr. 500,000

**Example 2**

Assuming that a newly established power station having a total capacity of 100 million units electricity, charges tariff at birr. 1 for per unit electricity consumption. The consumers of that particular area are willing to pay birr. 1.20 for per unit. Therefore, the shadow price is (birr. 1.20 x100 million) = birr. 120 million, instead of birr. 100 million.

**3.Externalities :** An externality, also referred to as an external effect (either beneficial or harmful), is a special class of good which has the following characteristics:

* It is not deliberately created by the project sponsor but is an incidental outcome of legitimate economic activity
* It is beyond the control of the persons, who are benefited or affected by it, for better or for worse
* It is not traded in the market place

**4.Labour inputs**

The principles of shadow pricing for goods may be applied to labor as well, though labor is considered to be service.

When a project hires labor, it could have 3 possible impacts on the rest of the economy:

1. **It may take labor away from other employments :** When a project takes labor away from other employments, then the shadow price of labor is equal to what other users of labor are willing to pay for this labor. In a relatively free market this will be equal to the marginal product of such labor.

**ii. It may induce the production of new workers and;** The social cost associated with inducing ‘additional’ production of workers consists of the following:

1. The marginal product of the workers in the previous employment. If the worker is previously unemployed, this would naturally be zero;

ii. The value assigned by the worker on the leisure that he may have to forego as a result of employment in the project-the value of the leisure is reflected in his reservation wage;

The reservation wage of a person depends on the following:

1. The income he already enjoys through transfer payments
2. His idea of what job is acceptable to him, and
3. His preference for work and leisure.
4. The additional consumption of food when a worker is fully employed as opposed to when he is idle or only partly employed;
5. The cost of transport and rehabilitation when a worker is moved from one location to another;
6. The increased consumption by the worker and its negative impact on savings and investment in the society when the worker is paid market wage rate by the projects; and

h. The cost of training a worker to improve his skills.

1. **It may involve import of workers :** The social cost associated with the import of foreign workers is the wage they command.In this case, however, a premium should be added on account of the foreign exchange remitted abroad by these workers from their savings.

**5. Shadow pricing of Capital Inputs**

When a capital Investment is made in a project two things happen :

1. Financial resources are converted into physical assets.
2. Financial resources are withdrawn from national pool of savings and hence alternative projects are foregone.

**6.4. Savings Impact and its value**

Most of the developing countries face scarcity of capital. Hence the governments of these countries are concerned about the impact of a project on savings and its value thereof.

**Stage three** of the UNIDO method, concerned with this, seeks to answer the following questions: Given the income distribution impact of the project what would be its effect on savings? What is the value of such savings to the society?

**Evaluation of the Net Impact on Savings :**

Net savings Impact of the project = ΣΔYi MPSi

Here,

**Δ Yi** = change in income of group i as a result of the project

**MPSi**= Marginal Propensity to save of a group i

**Example**: Assuming that as a result of a project ,the income gained or lost by 4 group is

* + Workers (W) = Birr. 25,000
  + Consumer(C) = Birr. -70,000
  + Project (P) = Birr. 100,000
  + External (E)=Birr .50,000

The Marginal Propensity to Save of these four groups is:

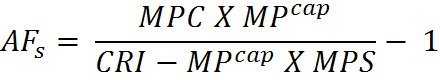
* + MPSw=0.04,
  + MPSc=0.25,
  + MPSp=0.4 and
  + MPSe = 0.3

Therefore, the net impact of the project on savings is:

{25000 x0.04+(-70,000) x 0.25 + 100,000 x 0.4 + 50,000x0.3} = Birr. 29,500

**Adjustment Factor for Savings (AFs)**

AFs measure the percentage by which the social value of investment of one Birr exceeds social value of consumption of one Birr.



Here,

MPC = Marginal Propensity to Consume

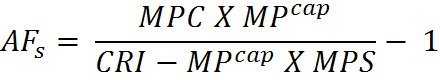
MPS = Marginal Propensity to Saving

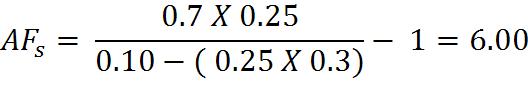
MPcap = Marginal Productivity of Capital

CRI = Consumption Rate of Interest (Social Discount Rate)

Assuming that MPC, MPS, MPcap and CRI of an economy is given: MPC = 70%, MPS = 30%, MPcap=25% and CRI=10% .

Therefore, adjustment factor for savings is :





* Adjusted Value of the impact of the project on savings: Adjusted value of Savings = (Net impact on savings X AFs) = birr. 29,500x6 = birr. 177,000
* This birr. 177,000 is now added to the NPV of the project calculated in stage 2(birr. 50,800) .
* Therefore, the adjusted NPV at this stage will be Birr (50,800+177,000) = birr 227,800

**Income distribution impact**

Many government regard redistribution of income in favour of economically weaker sections or economically backward regions as a socially desirability objectives. Due to practical difficulties in pursuing the objective of redistribution entirely through the tax, subsidy, and transfer measures of the government, investment projects are also considered as investments for income redistribution and their contribution toward this goals is considered in their evaluation. This call for suitably weighing the net gain or loss by each group, measured earlier, to reflect the relative value of income for different groups and summing them.

* This stage provides a value on the effects of a project on income distribution between rich and poor and among regions.
* Distribution Adjustment Factor (Weight) is calculated, and
* the impacts of the project on income distribution have been valued by multiplying the adjustment factor with the particular income of a group.
* This value will then be added to the net present value re-calculated in stage three to produce the social net present value of the project.

**Determination of Weights**

If there are only two groups in a society, poor and rich, the determination of weight (which essentially reflect political judgment) is just an iterative process between the analysts (at the bottom) and the planners (at the top). This is called "bottom-up" approach. When more than two groups are involved, weights are calculated by the elasticity of marginal utility of income. The marginal utility of income is the weight attached to an income, where

Where,

wi = weight of income at ci level

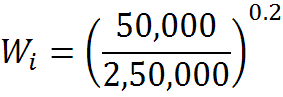
ci = level of income of group i

b = base level of income that has a weight of 1.00

n = elasticity of the marginal utility of income

Assuming that the worker group gains an income of birr 250,000 from a project, the base level of income is birr. 50,000 which has a weight of 1.00 and elasticity of marginal utility of income is 0.20.

Therefore, weight is:



So, value of the impact of the project on income distribution to this group is:

(birr. 250,000 × 0.72) = birr. 180,000.

Now, this value will be added to the net present value adjusted in stage three. Therefore, Adjusted NPV in this stage will be

Birr (227,800+ 180,000) = birr. 407,800

Adjustment for Merit and Demerit Goods

If there is no difference between the economic value of inputs and outputs and the social value of those, the UNIDO approach for project evaluation ends at stage four.

In practical, there are some goods (merit goods), social value of which exceed the economic value (e.g. oil, creation of employment etc.) and also there are some goods (demerits goods), social value of which is less than their economic value (e.g., cigarette, alcohol, high-grade cosmetics etc.)‏

Adjustment to the net present value of stage 4 is required if there is any difference between the social and economic value.

The steps of adjustment procedure are:

1. Estimating the present economic value

2. Calculating the adjustment factor as the difference between the ration of social value to economic value and unity.

3. Multiplying the economic value by the adjustment factor to obtain the adjusted value

4. Adding or subtracting the adjusted value to or from the net present value of the project as calculated in stage four.

An alcohol factory is under construction. The present economic value of the project is birr. 407,800 (Adjusted NPV up to stage 4). The output of the project has no social value than its cost of production. Cost of production is the 60 percent of the economic price.

Therefore, adjustment factor is:

So, the adjusted value = (birr. 407,800× - 0.40)‏

= - 163,120 birr

Therefore, the net present value of the project in terms of socially acceptable consumption is :

(407,800-163120) = birr. **244,680**

Example 2: consider a project for which the following information is available:

1. The present economic value of the output of the project is 250,0000.
2. The output of the project has a social value which exceeds its economic value by 20 per cent.

Exercise

Given this information:

* Calculate the adjustment factor
* Calculate adjusted value
* Determine the net present value of the project in terms of socially acceptable consumption.

Solution

* The adjustment factor = (120/100)-1 = 0.2
* The adjusted value = 0.2 \* 250,000 = 50,000
* The net present value of the project in terms of socially acceptable consumption =

**250,000 + 50,000 = 300,000**

Where the socially valuable output of the project does not appear as an output in the economic analysis-as is the case where the project generates employment-the procedure is somewhat different. In such a case the output is treated like externalities and its valuation in social terms is the adjustment.