MSIA Reading Series 7

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1. Introduction

Social Impact Assessment (SIA) and Socio-Economic Assessments (which include either Socio-Economic Analysis (SEA), Economic Assessment (EV) on Significant Impacts and Cost Benefit Analysis (CBA)) on development projects are very important in decision - making processes to develop the country's economy while ensuring the sustainability of the country's natural assets and social attributes. SIA reporting needs to be prepared and submitted to PLANMalaysia while SEA reporting needs to be provided in the Environmental Impact Assessment Report (EIA Schedule 1) and EV on the significant impacts in EIA Schedule 2 (if requested) to the Department of Environment. SCBA is now required in the Integrated River Basin Management Report (IRBM) where the options of mitigation measures to manage the river basin need to be evaluated from the aspect of economic feasibility for the socio-economic benefit of the country.

The preparation of the above reports is indeed subjected to manuals, guidelines and theoretical foundations. The basic knowledge of the theories and methods of analysis of SIA, SEA, EV and CBA are quite specific so further descriptions and explanations can help MSIA members and interested parties understand and appreciate these specialised fields of investigation. Therefore, this ‘Sembang Pagi Sabtu’ (SPS) chat is timely for the awareness and acceptance of various stakeholders, especially the authorities that make decisions on the management of environmental and social assets and services and on development project approval, and to other professionals including consultants so that correct and accurate reporting on socio-economic assessment and economic feasibility of a development project can be provided. Decisions to approve development projects with either negative or positive impacts (called externalities by economists) can lead to a decline or increase in community welfare respectively. Development projects with positive externalities should be supported while that with negative externalities could still be supported if the negative effects can be eliminated or at least reduced by mitigation measures taken to address them. Therefore, the SPS discussion this time is timely and very important in ensuring sustainable of development projects in the country.

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This SPS discussion on the 9th October 2021 has provided detailed deliberations on a relatively specific topic - economic valuation (EV) of impacts and cost benefit analysis (CBA) and their relevance to social impact assessment (SIA) which is the professional practice of MSIA members. Understanding EV and CBA can be an additional area to the professional services that MSIA members can offer. For this session, MSIA has invited two experts to share their thoughts in this SPS session. They are Dr Awang Noor Abd. Ghani[1] and Dr Kamaruzaman Hj. Ujang[2]. The topic highlighted for this SPS discussion is "SIA and Socio-economic Assessments".

The motives of this MSIA SPS revolves around

i. Fundamentals of Theory, Analysis and Practice of EV and CBA
ii. Use of EV and CBA in Development Project Reporting and Decision Making
iii. Direction of EV and CBA adoption by Stakeholders

2. Fundamental Theory, Analysis and Practice of EV and CBA

Sustainable development implies that development decisions must integrate economic, social and environmental principles. This means that sustainable development programmes must bring benefits to the entrepreneurs, ensure fairness and inter-generational equity while at the same time do not cause adverse impacts to the human community. Governments can promote sustainable development through broad strategies including improving the quality of life; protection and sustainable management of the physical and social assets; promoting sustainable production and consumption; and enhancing human, institutional and infrastructural capacity.

The challenges to sustainable development are many and the key is to ensure the maintenance of a healthy physical and human environment. Development impacts need to be integrated into mainstream planning processes.

2.1 EV

Development is intended to generate benefits to society and for that profits are earned by the project proponent. But invariably development causes change to both physical and human environment. Occasionally these changes have externality effects, i.e. there are economic costs of the effects upon the rest of society that are not borne by the project proponent. For an economist, to correct for these market failures, it is necessary to estimate the value of the losses imposed upon society and mechanisms be introduced to capture the amount of these values to transfer back to the project proponent. Various methodologies have been introduced

to estimate these values and mechanisms or economic instruments created to internalise these externalities back to the project proponent (McNally and Mohd Shahwahid 2003).

2.1.1 Economic Value and Its Categories

People attach different values to environmental and social assets and services. An ecologist might value a certain environmental and natural resource in terms of its importance to wider ecological processes; an anthropologist may value a social service or event in terms of its importance in cultural or religious ceremony. An economist adopts a distinct value-system underpinned by an anthropocentric, utilitarian ethic. That is to say, things only have value if they give humans satisfaction – alternatively referred to as utility, welfare or happiness. Therefore, the economic value of environmental and social assets and services relates only to the contribution they make to human welfare.

A classification of values of environmental and social assets and services have been developed to account for the manner these benefits are gained and lost. Some of these benefits are derived directly while others are obtained indirectly. In other cases, the benefits are obtained without making any actual consumption because the mere presence and protection of the environmental and social assets and services may generate emotional satisfaction. There is also a time dimension to the benefits derived. In most cases these benefits are in the current period, but there are also circumstances where satisfactions are derived from protecting an asset or service now to ensure that future generations also have the opportunity to use or appreciate it. The categories include:

i. Direct Use values

These are the values that accrue from the direct human use of the environmental and social assets and services, and can be either extractive or non-extractive. Examples of the former include the use of forests by the local community for the timber material and non-timber forest products such as fruits and meat. The extracted product may be sold commercially or used for subsistence purposes. Non-extractive direct use values include the amenity, recreational or spiritual benefits individuals receive from visiting areas of outstanding natural beauty or of spiritual attributes, as well as the research and educational values people derive from studying biologically and social diverse and unique features.

ii. Indirect Use values

These are the biological and human ecological functions of the physical and social environmental assets and services that indirectly provide support and protection to people and economic activity. For example, the watershed protection functions of a standing forest can help to control erosion and sedimentation, and hence the flooding of productive land and residential areas downstream. The natural environment provides a myriad of other ecological services such as air and water purification, nutrient recycling, carbon sequestration and micro-climate stabilisation, all of which indirectly help support or protect economic activity and human welfare. The social environment can be defined as the environment developed by humans as contrasted with the natural environment. It may include communities, culture and norms, events and festivals, employment and jobs. A well-functioning social environment provides opportunities for the setting up of a stable, peaceful and productive community.

iii. Option value

Individuals may want to conserve natural and social environment so that future generations also have the chance to enjoy them. This is the option value. Individuals or companies may also want to conserve nature if they believe there is potential value in doing so. Bio-prospecting firms, for example, may conserve areas of high endemism and biodiversity in an attempt to derive new products, such as medicines, that have considerable commercial value. Similarly, folks may preserve certain religious and cultural practices within their clan with the intent that their family members and generations to come uphold these practices. This is the option value. It arises because of the uncertainty of the future.

iv. Existence value

The above three categories capture the benefits of actually using the environmental and social assets and services, either now or in future. But people also derive value from this asset and service simply by knowing that it exists. This existence value captures people's desire to see environmental assets and services conserved, even though they never intend to use them. For example, people pay money to conservation organisations to protect charismatic wildlife species and heritage areas, although they may never see or visit them.

Table 2.1 below provides some of the more popular economic valuation methods that could be used to place values to environmental and social assets and services while Table 2.2 presents an illustration of economic values computed for a range of environmental and social assets and services, classified according to the different categories of economic value.

Table 2.1: Examples Of Economic Valuation Methods and Values Derived For A Range Of Environmental Assets And Services

Technique	**Category of Values to Estimate**	**Use of Estimated Values**
Residual approach of valuing economic rent	Direct use values of environmental and social assets and services such as the stock of natural resources and knowledge.	As a basis of reservation prices during appraisal of user fees to be charged to bidders for extraction licenses.
Change in Productivity Approach	Indirect use value of environmental and social services eg. of the ecological and hydrological functions of protected watershed areas.	As a method to value external costs of development projects affecting environmental and social assets.
Travel Cost Method	Valuing the direct use values of environmental and social assets and services such as recreational, touristic, spiritual and heritage areas and sites.	As a method to assess the willingness to pay of visitors and a basis to determine appropriate entrance fees to a park.
Contingent Valuation	Valuing the use and non-use values of environmental and social assets and services eg. beautiful/attractive areas, spiritual sites providing tranquility and peace of mind, clean environment and social settings.	To assess the willingness to pay (WTP) for the protection and maintenance of environmental and social assets and services.
Choice Modeling	Valuing the use and non-use values of the attributes of the environmental and social assets and services eg. their physical and attractiveness aspects, emotional and spiritual aspects.	To assess the WTP for the specific attributes of the environmental and social assets and services being protected.
Cost-Based Valuation Approach	Valuing the economic cost of the health hazards from development projects and natural hazards such as flood and haze.	To assess the economic loss due to detrimental impacts of these hazards.
Benefit Transfer	Valuing the economic values of environmental and social assets and services by borrowing values from similar other sites to the study site.	To assess the economic value of an environmental and social asset and service and impacts upon it, when it is not possible to use other methods

Table 2.2: Examples Of Economic Values Derived For A Range Of Environmental Assets And Services

Environmental and Social Assets and Services	**Categories of Economic Value**	**Location**	**Economic Value**	**Source**
Virgin natural forest stand as a source of timber	Direct use value	Weng Forest Reserve, Kedah, Malaysia	Stock value US$9,600-US$10,900/ha Harvestable stock value $9,000/ha to $10,300/ha	Mohd Shahwahid and Awang Noor (1998)
Eco-tourism attraction of elephants	Non-extractive direct use value	Kuala Gandah Elephant Conservation Centre (KGECC), Lanchang, Pahang.	RM 4.29 per visit for local tourists and RM 57.27 for foreign tourists with an overall average of RM30.78 per visit.	Mohd Shahwahid et al. (2007)
Cost of erosion and sedimentation from forest clearance	Direct and indirect use value	Sungei Ikan catchment, Cameron Highlands, Malaysia	$3,398/ha/yr on-site cost $3,164/ha/yr off-site cost	Mohd Shahwahid (1999)
Value of the cost of the trans-boundary haze from the Indonesian forest fires	Direct and indirect use value	Upon population of Malaysia	$8.2 million from adjusted cost of illness $154.3 million from productivity loss $124.9 million from tourist arrival decline $0.2 million loss from flight cancellations $16.0 million from fish landing decline $9.8 million from cost of fire fighting $0.8 million from cloud seeding operations $0.3 million from expenditure on masks	Mohd Shahwahid and Jamal (1998)

Value of losses from flood hazards	Direct and indirect use value	Upon flood prone districts of Johore	RM1.392 bn from damaged cost absorbed by the Government RM433.8 mn in welfare aid by the Government RM8.2 mn on travel & food allowance on government & volunteer workforce RM9.13 mn cost of illness estimates incurred by flood victims RM133.8 mn of productivity losses incurred by flood victims RM2,170 mn of business losses Total economic losses: RM4.147 bn	MN Consult 2008
Value of losses from coastal reclamation project	Direct and Indirect Use value	Permanent loss in mudflats and mangroves and losses to fishermen	RM2.34mn value losses of mudflats RM142.66mn value loss of mangrove RM9.34mn loss of fishing ground resulting in in additional fuel cost RM0.73mn loss from damages to fishing nets Total loss valued at RM155.06	Mohd Shahwahid 2017
Value of forest recreational services at Mount Silam, Lahad Datu, Sabah	Direct use value	Visitors willingness to pay to enjoy mountain top view of forest recreational forest overlooking the ocean.	RM7 and RM11 per entry	Daim et 2021.

2.2 CBA

Cost benefit analysis (CBA) is an evaluation tool used to evaluate projects from a community perspective. The analysis refers to an evaluation method that analyzes the costs and benefits of a development project, programme or policy that may have to be borne by the community. The main concern is to identify the negative impact of the project, programme or policy on the daily routine of the community. This negative impact is termed economic and sometimes social cost. Ignoring these economic or social costs can lead to the emergence of public protests, which, in turn, can lead to delays and cost overruns as a result of protests and lawsuits. In incorporating social impacts in the feasibility analysis, the concerns relate to the questions Who benefits? Or Whose Perspective?

There are various CBA methods being implemented. Among them include the Financial Cost Benefit Analysis, and Economic and Social Cost Benefit Analysis.. The difference between the first financial CBA and economic and social CBA lies in the perspective of the analysis. The financial CBA analyses the feasibility of a project from the perspective of the project proponent only – how much he or she gains and loses only. Whereas the economic and social CBA analyses the feasibility of a project from the perspective of society or the nation overall not only to the project proponent. Hence, the need to incorporate the economic and social benefits, as well as economic and social costs of the positive and cost benefit analysis. Among the economic and social CBA methods include that of the UNIDO Method and Little Mirrlees (LM) Method. The UNIDO method is a systematic way of determining the economic or social feasibility of a project. This process continues from the planning stage to completion. Project evaluation is conducted in five phases:

1. Evaluate market performance at market value
2. Determine net interest from a financial perspective.
3. Take into account the implications of development on savings and investments.
4. Take into account the impact of the program on the distribution of wealth.
5. Modify program results with social values.

The LM method is one of the techniques in social cost-benefit analysis. The important principle of this method is to use shadow prices to indicate the true value of a resource to society. The LM strategy categorizes community resources- inputs and outputs- relevant to the project as labor commodities and non-trade interests. To determine the true value of a resource, LM Numeraire offers three options; shadow wage rates, shadow prices of traded assets, and shadow prices of non -traded assets. Little and Mirrlees propose a detailed methodology for calculating non-tradable shadow prices using a detailed input-output table. By doing so, the researcher can track the chain of all untraded and traded inputs in an effort

to realize the project. If no input/output table is available, a conversion factor based on the market price ratio of assets can be used to estimate the shadow price of an untraded resource.

Outside of UNIDO and LM, the use of economic and social CBA has become common to assess the economic or social cost benefits of a project. To do so, the assessment incorporate 6 main categories.

1. Demographic process
2. Economic processes
3. Geographical process
4. Institutional and legal processes
5. The process of emancipation and empowerment
6. Sociocultural processes

Assessment using economic and social CBA has the objective of comparing social benefits with social costs. The conclusion is based on the results of

i. Positive Net Present Values (NPV)
ii. Benefit Cost Ratio (BCR) equal and in excess of one ($\geq$1). ratio.

The project should be considered feasible/viable if the NPV $\geq$ 0 and BCR $\geq$ 1.

3. Use of EV and Economic and Social CBA

Estimates of the economic values of environmental assets and services can be used to influence decisions in a number of ways – for example to assess the impacts of environmental and social problems of a development project upon the environmental, social and economic welfare, to influence policy and project formulation, and to determine which type of economic instrument to introduce to internalise the environmental and social impacts of development projects.

In reaching a decision – for example, which project to choose or policy to adopt – the advantages and disadvantages of the different choices need to be weighed up. Various decision-making frameworks exist to facilitate this process. The failure to incorporate economic values of the impacts upon environmental and social assets and services can lead to choices that cause a wasteful and inequitable use of a country's natural resources. The manner on how these economic values are incorporated in the decision-making techniques need to be elaboration.

Among the decision-making frameworks widely used are Economic or Social CBA and

Environmental Impact Assessment (EIA) and Total Economic Value (TEV). The SCBA is a decision-making tool that judges the economic viability of projects, policies or actions by comparing their costs and benefits. Benefits are defined as anything that increases human satisfaction (or wellbeing) and costs are anything that reduces wellbeing. Since the costs and benefits of actions are often expressed in monetary terms, comparison is undertaken in monetary units. CBA is defined according to the objective of economic efficiency and therefore the favoured option is the one where net benefits are maximised.

An EIA is a systematic process whereby information about the environmental effects of a government policy or development project are collected and evaluated, with the conclusions being used as a tool to aid the decision-making process. TEV is not a formal decision-making tool, however it can be used to illustrate the aggregated values of specific environmental and social assets and services. It is an estimate of the total, rather than the incremental value to society. TEV is often use to encourage Governments to set aside conservation and protected areas from being converted to development projects.

a. Economic and Social CBA

CBA differs from a financial analysis in that it is taken from the perspective of society as a whole.[i] A financial analysis is undertaken from the perspective of the individual investor, who uses market prices to estimate returns on the investment. It does not take into account market or policy failures that may distort prices. In an economic analysis, market imperfections and policy distortions are corrected by translating market prices, if they exist, into shadow prices.

The resources that go into a project or policy have alternative uses. If they are not used in one place, they can be used productively elsewhere in the economy. The opportunity costs are the foregone benefits of putting the resources to one use, rather than the next best alternative. Given that CBA is assessing the best use of resources from the perspective of society, it must measure all costs in terms of opportunity costs.

A key aspect of CBA is the definition of the baseline reflecting the conditions that would occur without the project. This allows the changes brought about by the alternative scenarios to be compared with what would have happened if they were not introduced. If, for example, a proposed project of converting a forested area to agriculture had serious environmental impacts, but some of those problems were already occurring, the environmental cost would be the *additional* damage, not the total damage.

Costs and benefits occur over different time periods. There is no basic rule for setting the time horizon for the appraisal, but it is important to include all the relevant costs and benefits. This may not always be possible: changes in soil hydrology or climate, for example, may not be apparent for many decades. Since the project must be appraised over its entire life, costs and benefits occurring in the future need to be converted into present value terms. Unsurprisingly, those costs and benefits are valued less in the future because of the time factor: people prefer to reap benefits sooner than later.

The discount rate is the interest rate used to reduce future costs and benefits to their present day equivalent. In most situations, analysts are given a specific discount rate used by public authorities for all public investment decisions. Discounting allows the stream of costs and benefits to be compared over the project life, and to arrive at a single figure – the net present value (NPV). This is the sum of the discounted annual total benefits minus the sum of the discounted total annual costs.

The project is economically viable so long as economic benefits exceed the economic costs. The alternative is economically superior to the status quo – the no-project option – if the incremental net present value (INPV) is positive. By comparing the INPV of different alternatives, the most economically efficient option – that with the largest incremental net present value – can be chosen. The internal rate of return is the discount rate at which the stream of costs and benefits are equal to zero. If it is higher than the cost of capital, or a predetermined rate of interest, the project is accepted.

Despite the popularity of CBA as a decision-making tool, analysts must also recognise its limitations, particularly when applying it to decisions pertaining to the environment.

3.1 Some limitations of CBA

With CBA, all losses and gains are defined according to the objective of economic efficiency. This technique therefore neglects other important objectives such as equity and sustainability. In practice, CBA takes no account of who wins and who looses. [ii] A decision may be perceived to be socially desirable since it brings the highest economic rate of return. However, projects benefiting the wealthy at the expense of the poor may be socially undesirable. Distributional impacts can be included in the analysis, either directly through weighting by decision-makers, or through the use of alternative participatory decision-making techniques such as multi-criteria analysis.

The fact that CBA only strives to maximise efficiency does not necessarily ensure sustainable development.[iii] CBA also has a myopic outlook: discounting disregards the desires of future generations and compromises intergenerational equity. The level at which the discount rate should be set is a highly contentious issue. High discount rates are often viewed as damaging to the environment because they hasten the exploitation of renewable natural resources and give less weight to the interests of future generations. However, they can also encourage less overall investment, particularly in large capital-intensive projects with potentially damaging environmental impacts.

CBA is unable to include all the economic benefits of biodiversity because of mankind's limited understanding of complex ecological systems and the difficulty in estimating those we *do* understand. Nor does it account for irreversible events such as the loss of species, the cumulative impact of which can cause changes in ecosystem characteristics with potentially catastrophic affects. The fact that these important values of biodiversity are often neglected by the decision-making process leads to an over-investment in myopic projects or policies to the detriment of the environment (McNally and Mohd Shahwahid 2003).

Given the considerable uncertainty surrounding our impacts on the environment now and in the future, the non-market and public nature of environmental assets and the existence of irreversibilities, safe minimum standards (SMS) must be integrated into the economic analysis. This follows the basic rule that the natural capital stock should not be reduced below the safe minimum standards estimated for each component of the overall stock, unless the social opportunity costs are unacceptably large. Adopting this rule will ensure a minimum reserve of "critical natural capital" such as a particular species or habitat. There will be some difficulty in deciding what exactly should be protected so decisions must be informed by the best possible science, and where there are uncertainties and potential irreversibilities, a precautionary approach must be adopted.

CBA is also subject to the practice of institutional capture. The complexity of carrying out a CBA makes it less open to scrutiny and allows for institutional bias as different government departments try to protect their own interests rather than serve the public good. Independent experts may be needed to scrutinise the results.

CBA is an important tool insofar as it provides a useful yardstick for comparing alternative actions. If the economic benefits of biodiversity can be estimated and incorporated into the analysis, this can potentially highlight the economic viability of protecting, rather than converting, land.

3.2 Services Potentially Affected by a Proposed Project and Valuation methods

Below is provided an illustration of valuation methods available to assess potential impacts.

No.	Environmental Components	Environmental services Affected	Location and Stakeholders Affected	Suggestion on Evaluation Assessment
1	Socio-economy - loss of fishing ground and hindrance of access to the sea	There will be a reduction in the size of fishing ground because part of the sea will be reclaimed. The reclamation will force the fishermen to find alternative fishing ground/s, potentially increasing their operational cost. The reclaimed land mass will also hinder direct movements of coastal fishing vessels. Thus some fishermen will incur additional cost when going to and coming back from the fishing ground	The directly affected stakeholders are the coastal fishermen operating from jetties identified in the study area	Change in productivity Approach will be adopted. Fishermen who routinely fish in the affected area will have to find other locations. The additional cost of fishing involves the increase in cost of travelling to and from the alternative fishing ground. They may have to travel further away because conflict may arise as they are encroaching into traditional fishing grounds of existing fishermen.
2	Net repairing and replacement	During the dredging activities, fishing nets were likely to be hooked to the dredging vessels causing damage to the nets	Fishing crews plying close to the dredging areas were likely to have their fishing nets damaged and need for replacement	Replacement cost approach will be used. Cost of repairs and replacement can be used to value potential losses
3	Recreational services	Impact on certain areas that reduces the value of recreational services.	Potential areas that may be impacted included beach recreational activities and some angling area Thus, visitors who benefit from the recreational services are perceived to have directly impact.	Visitor decision to come-by maybe affected by reclamation project. Their purpose of visit and angling will be marginally affected. Valuation is undertaken using the travel cost method.
4	Loss of assets and business opportunities			Historical costs versus present value of net future benefits / incomes

4. Conclusion

This reading series has highlighted how Economic Valuation (EV) on Significant Impacts and Cost Benefit Analysis (CBA)) are capable to support assessments of social impacts of development projects and help make more accountable decisions in the pursuit of a more sustainable economy. The preparation of both EV and CBA requires special sets of tools and good grasps of economic principles. The proceedings of this 'Sembang Pagi Sabtu' (SPS) chat have clarified the methods normally adopted in both EV and CBA.

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Disclaimer

The opinions expressed in this MSIA Reading Series are those of the panelists. They do not purport to reflect the opinions or views of MSIA and the editors.

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