

SUSTAINABILITY ASSESSMENT: A TOOL FOR PLANNING FOR SUSTAINABILITY AS A DESIRED OUTCOME FOR A PROPOSED DEVELOPMENT

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ABSTRACT

We present a theoretical framework for planning for sustainability for any proposed development project. The objective of this framework is to foster and preserve the social ecological system in which the proposed development project is to occur so that the system remains dynamic, adaptive, resilient and durable through time. The overall approach to the framework is the understanding of the function and relationships within the social ecological system in which the proposed development is to occur. The system is analysed through stakeholder engagement and expert analysis. Sustainability is assessed through the development of sustainability principles and criteria with sustainability indicators to measure the progression. The framework has developed through a long history of impact assessment and strategic environmental assessment in the environmental sector.

INTRODUCTION

The theoretical framework described is based in large measure on the objectives-led SEA protocol used in South Africa (DEAT, 2000), as well as the recent research on and analyses of sustainability assessment, conducted by *inter alia*, Pope *et al.* (2004, 2006) and Gibson (2006). The theoretical sustainability assessment framework constitutes a process that facilitates *planning for sustainability* and is not directed towards decision making on plans, programmes, strategies and projects. Rather, it is intended to assist users, in planning and implementing development projects that are expressly designed with sustainability as their goal. So, sustainability is the focus of all activity in the investigation of a proposed development plan, programme, strategy and project. This is different from the conventional approach to environmental assessment, which is used to provide information for decision making, based on the level of potential environmental impacts that are considered acceptable, or which through mitigation can be managed.

THEORETICAL BACKGROUND TO SUSTAINABILITY ASSESSMENT

Environmental Assessment vs Sustainability Assessment

Environmental Impact Assessment (EIA) has been firmly entrenched in use, in a large number of countries across the globe, for the analysis of potential effects of developments on the environment. The technique and process of EIA have an established history of application spanning the past 40 years, having first been legislated in the USA in the National Environmental Policy Act of 1969. Although the use of EIA has to some extent effectively brought environmental concerns into project level development planning, its success in promoting sustainability or sustainable development as an outcome of planning, has been limited. The reasons for this limited success, is that EIA focuses primarily on identifying and evaluating the potential ecological, social and economic effects of proposed projects separately and in isolation from each other, and only

thereafter are attempts made to integrate the implications of these effects, so that a more comprehensive picture of the impact of the proposed development can hopefully be obtained. In addition, EIA traditionally does not address the potential effects that may manifest over time, and is usually used to evaluate a development proposal at a “snap shot” in time – meaning that the nature, extent and dimensions of the project must be constant for the analysis to take place, and so changes in the project over time constitute a “new project”, which must then be subjected to a new EIA. Finally, project level EIA is commonly focused only on the investigation of potential effects on the proposed project site and seldom broader.

The consequences of these limitations include, for example, that:

- The *relationships* between social, ecological and economic components of the environment are not considered in the identification nor analysis of potential effects – leading to significant omissions from the list of potential effects to be analysed;
- It is not possible to consider *different project scenarios and time lags* (the long term view) in a single analysis, through which the development proposal could be improved;
- *Cumulative effects* of different projects developed in a specific area are not accounted for and this places significant constraints on accurate impact prediction and evaluation. Cumulative effects also apply in the case where for example, several of the same type of projects are developed simultaneously, as opposed to just one or two in a region. Unconsidered cumulative effects, result in the so called “death by a thousand cuts”.

Such limitations place obvious constraints on planning for sustainability.

The ongoing development and application of Strategic Environmental Assessment (SEA), is in part an attempt to address these limitations, but also to “move environmental assessment upstream” in the development planning process. As the name of the tool implies, SEA is intended to facilitate the consideration of environmental effects from a strategic perspective, so that broader considerations than only those apparently applicable to individual projects, are taken into account in planning. The strategic perspective in large measure, changes both the nature and number of potential effects that may result from a particular development proposal, since many of the potential effects can be avoided by informed policy and development plan / programme formulation. SEA has been widely used for more than two decades to improve the incorporation of environmental issues into development policy, plans and programmes, as recorded in for example Dalal-Clayton and Sadler (2005).

Although it could be argued that SEA has made a substantive contribution to the incorporation of environmental concerns into development planning, the manner in which it is applied and the purpose that is defined for individual SEAs, also do not necessarily constitute planning for sustainability. There are notable exceptions in the basket of ways of applying SEA, in particular what is called *Objectives-led SEA*.

A further development of objectives-led SEA is that of Objectives-led Integrated Assessment. Integrated assessment here refers to the integration of social, ecological and economic concerns in the assessment. In both cases, the assessment is “led” (focused on as an outcome) by a common *vision* of stakeholders in the planning process.

If the intention of development planning in the 21st Century is to ensure sustainability, and thereby make sustainable development possible, a new tool is required. Such a tool is sustainability assessment, and the use of Objectives-led SEA is an important first step in the direction of both sustainability assessment and planning for sustainability.

SUSTAINABILITY ASSESSMENT

As described in the section above, the essential difference between traditional EIA and many forms of SEA on the one hand, and objectives-led SEA and especially Sustainability Assessment on the other, is that the purpose of sustainability assessment is expressly to prepare and design a

development policy, plan, programme or project with sustainability as the desired outcome, rather than merely to prevent or mitigate potential environmental impacts i.e. to “minimise unsustainability” (Pope *et al.*, 2004). The approach is therefore inherently positive as well as prospective (future orientated). Pope *et al.* (2004) propose that the concept should be understood as “assessment for sustainability”, meaning that its intended use is to promote sustainability, if the outcome of using the tool is to be effective in achieving its purpose. Notwithstanding the challenges inherent in defining the concept of sustainability, an approach which looks more broadly and in greater depth, at the potential contributions to or effects of a development proposal on sustainability, is clearly preferable to approaches that merely attempt to identify actions to avoid.

The most important step in sustainability assessment, as defined by Pope *et al.* (2004), is to define a sustainability vision which is equivalent to a desired condition defined by all stakeholders, upon which planning of a development proposal should be focused. Assessing whether a proposed development will be sustainable or not, requires that sustainability principles and criteria be defined, which can be used to determine whether the sustainability goals have been met. These criteria will always be context specific (Pope *et al.*, 2004), taking into account local social, economic and environmental conditions and the relationships between these components, as well as the unique group of stakeholders. Setting the vision and determining criteria for the achievement of sustainability at the start of a sustainability assessment process, provides a robustness to the analytical process required for decision making, later in the process.

It is vital to the understanding of sustainability assessment, that sustainability is not interpreted as merely meeting individual and separate targets for ecological, economic and social components of the environment, by modifying a development proposal to avoid adverse effects and maximise benefits for each of the components separately. Perhaps even more important, is to consider the relationships between social, ecological and economic factors. Gibson (2006) strongly advocates that sustainability assessment must be focused on these interrelationships and their character, resilience to change and adaptability, and the sustainability goals should embody such an orientation. He asserts that: “Because sustainability is an essentially integrative concept, it is reasonable to design sustainability assessment as an essentially integrative process that can act as a framework for better decision-making on all undertakings – policies, plans and programmes as well as physical undertakings – that may have lasting effects”, (Gibson, 2006).

It should now be evident that the relationships between the “pillars” are vitally important considerations in sustainability, and that these relationships need to be characterised and explored at the earliest stages of a sustainability assessment process i.e. integration of the social, ecological and economic must happen at the beginning of the sustainability assessment process, to inform the accurate formulation of appropriate sustainability criteria.

As explained above, this is in direct contrast to the approach of EIA and some forms of SEA, where integration only occurs much later in the process.

Many other linkages can be explored in the context of a sustainability assessment (Gibson, 2006), including that between strategic and project level activities and, therefore, the tools that are used for assessment at each of these levels; the links between geographic scales and issues (from local to global); and integration of different knowledge systems, including traditional or indigenous knowledge systems.

Conventionally, tools such as EIA and SEA cannot easily address these linkages. Gibson (2006) uses terminology like “intertwined” and “interdependent” to describe issues dealt with in sustainability assessment. These are not terms that are commonly used in EIA and SEA processes. These processes also do not enable the identification of issues that arise at the interface between the social, ecological and economic. These issues are thus usually omitted by default, from the investigation. The reason is that these systems are designed to study the pillars, and all issues falling within the ambit of each, separately, and then to attempt to integrate knowledge obtained on

each group at a late stage in the process – once the evaluation within the pillars is completed. Practitioners and specialists work with and within the pillars, and the environmental assessment and development planning systems are designed around these specialisations.

Taking a sustainability assessment approach, is therefore both intellectually and practically challenging, but to ensure that planning for sustainability can become a reality, this must be the future path for development planners. Furthermore, lessons can be learned from engagement with stakeholders and especially local affected communities, who integrate the social, economic, and ecological and the relationships between them in their daily lives, every day.

Gibson (2006) compares the conventional assessment approaches with integrative sustainability assessment, to clearly illustrate the fundamental difference between the two:

- i. Investigation of issues pertaining to the three pillars; investigation focused on providing information for decision making; integration at latter stages following evaluation requiring tradeoffs, because of a perceived contest between objectives (Gibson, 2006:266) of the assessment.
- ii. Investigation primarily of the interconnections and interdependencies (Gibson, 2006:266) between issues in each of the pillars; focus on “mutually reinforcing gains on all fronts” and *avoiding* tradeoffs; continuous and iterative integration throughout, from the beginning of the process; investigation and process focused on planning for sustainability rather than for decision making.

Integrative approaches to sustainability assessment (planning for sustainability) such as those described by Pope *et al.* (2004) and Gibson (2006), are unfamiliar to the majority of assessment practitioners and development planners, and possibly even more so, to specialists comfortable and used to working within each of the pillars.

FUNDAMENTAL ASPECTS OF THE PLANNING FOR SUSTAINABILITY ASSESSMENT FRAMEWORK

Stakeholder participation

An essential characteristic of the process of planning for sustainability, is that it is fundamentally and broadly participative from the beginning throughout the entire process, meaning that it should draw on the inputs of as many interested and affected parties and stakeholders as possible. The complexity of dealing with the concept and issues of sustainability, means that the process of planning for sustainability in development plans, programmes and projects must involve the full range of stakeholders to ensure that all the social-ecological issues and the relationships between them are both identified and investigated. Without such a comprehensive involvement, there is a high risk of excluding important considerations and of failure to effectively plan for sustainability. The planning process is iterative and should engage the broadest range of participants in a deliberative process (a process of deliberation, discussion, debate) throughout all stages. Gibson (2006) refers to this as a process that “creates spaces for deliberation in which a range of views may be expressed or heard; qualitative data, values and perceptions are considered alongside technical data; and identification of modifications or alternatives to a proposal that would deliver more sustainable outcomes is encouraged”.

A further characteristic of the process of planning for sustainability, is that all participants learn within, and from, the process of planning and engagement with other stakeholders, and progressive exposure to information throughout the entire process. This learning is cumulative and iterative throughout the process, and includes everyone involved, including the technical specialists who are either engaged in facilitating the planning process, or involved in specific technical investigations that feed into the assessments. Exposure to new and different perspectives, information and insights in the process of planning for sustainability, “induces a reframing and learning process in the participants” (Nilsson, 2006).

The key challenge facing the sustainability assessment practitioner is to orchestrate consensus building with all stakeholders, on the sustainability vision and principles for the particular proposed development and the social ecological system within which it is situated. The sustainability assessment practitioner must determine the “ground rules” for stakeholder engagement towards consensus on these issues, to avoid an impasse on defining the vision and to enable progress towards planning for sustainability.

Sustainability vision

The most important step in sustainability assessment is to define a sustainability vision (Pope et al., 2004). The vision is equivalent to a desired end state or sustainability scenario for the social ecological system in question, as defined by all interested and affected parties during the participation process. If a common vision for the proposed development cannot be created amongst the stakeholders and there is no consensus on the vision, then this is where the sustainability assessment process stops. The proposed development may thus not be appropriate for the specific area or regional / national context, and the desired state of sustainability will not be achieved.

Mapping of the receiving environment

As with the better known forms of environmental assessment (EIA and SEA), it is necessary to obtain information and knowledge of the environment in which the proposed development project is to be implemented. To obtain a comprehensive understanding of the baseline receiving environment and issues that will play a role in, or affect the viability of the bioenergy development plan or project, information must be sought on at least the following:

- Current state of the environment (social, ecological, economic, and the status of the links between them)
- Legal and institutional background of the local area, region, country
- Drivers of environmental change (e.g. specific economic development policies)
- Trends in environmental changes (e.g. year on year deterioration of water quality in a catchment)
- Future development scenarios (e.g. catchment development plans that include several other land use changes and other developments, to enable the consideration of cumulative effects or conflicts and contest for ecosystem services)
- Identifying opportunities and constraints, offered by the unique character of the receiving environment, and all of the conditions listed above.

This information and understanding could be sought from a range of sources, including key stakeholders, government agencies, business, parastatal organisations such as research bodies, academia, conservation bodies, people living in the area, NGOs and development organisations. As is the case for the other steps in the sustainability assessment process, this information gathering activity, and the consideration of challenges, including identifying opportunities and constraints, must occur in a process of deliberation with all stakeholders.

The outcome of this task should be a comprehensive description of the receiving social ecological system or context in which the development is to be implemented, and all internal and external influences on it. The information will provide baseline values and trends against which to assess the sustainability performance of the development.

Opportunities, Constraints and Trade-offs

The purpose of the sustainability assessment analysis is to identify characteristics of the social ecological system or context that provide opportunities for achieving a sustainability vision for the proposed development, and characteristics that would constrain achieving the sustainability vision. The analysis should be conducted in a process of deliberation with all stakeholders. Where possible

the opportunities and constraints should be captured and illustrated visually and in combination to assist in determining the potential for the implementation of the proposed development i.e. whether the vision is realistic and achievable.

It is inevitable that for social and economic gain (as is the required outcome for any development) there will be a trade-off with biophysical or ecological elements. However, when planning for sustainability and in sustainability assessments the one essential rule is that trade-off decisions must not compromise the fundamental objective of net sustainability. As the sustainability framework is participatory based all trade-offs and compromises identified must be openly discussed and explicitly justified and the most desirable option chosen. In this regard, the following generalise rules must be applied (Gibson, 2006):

- No trade-off or compromises will be permitted unless approved by all relevant stakeholders; or
- Only undertakings that are likely to provide neutral or positive overall effects for each core sustainability requirement can be acceptable; or
- No significant adverse effects in any core category can be justified by compensations of other kinds, or in other places.

Sustainability Principles, Criteria and Indicators

Assessing whether a proposed biofuel development will be sustainable or not, requires that sustainability principles, criteria and indicator be defined. A sustainability principle is a broad based statement for achieving the sustainability goal. Sustainability criteria are management objectives that are set in order to achieve the broad principles. Sustainability criteria essentially indicate how the sustainability principles can be achieved. To add depth and integrity to the assessment, the criteria should be developed at a global, national and local level. All the sustainability criteria that have been set must be satisfied to ensure that the sustainability principles and thereby the sustainability goal will be achieved in the implementation of the proposed development. Sustainability indicators provide a measure of the criteria. Practical, meaningful and measurable indicators should be identified for each of the criteria, so that it is possible to measure whether individual sustainability criteria have been met or not. Indicators may be qualitative or quantitative in response to the specific criterion.

The principles, criteria and indicators are of necessity context specific, taking into account local social, economic and ecological conditions and the relationships between them, as well as the unique group of stakeholders. Setting a sustainability vision and determining principles and criteria for the achievement of sustainability at the start of a sustainability assessment process, provides robustness to the analytical process required for decision making later in the process.

THE THEORETICAL SUSTAINABILITY ASSESSMENT FRAMEWORK

The sustainability assessment framework comprises of four tasks. The tasks are as follows:
I. Planning for sustainability for proposed development (Preparation for Sustainability Assessment)
II. Sustainability Assessment for proposed development.
III. Re-design or modification of proposed development to improve sustainability performance
IV. Project appraisal (if required, e.g. EIA mandated by legislation)

Figure 1 diagrammatical represents the planning for sustainability theoretical framework. In the case of a new project where no development planning has yet been undertaken then only Task I should be completed (followed by Task IV for any project). This task will ensure that the project is planned at the vey onset with sustainability as its main goal. The outcome will be a set of principle, criteria and indicator that can be used through the project's life span to ensure that sustainability is

applied. For any project for which there currently are development plans (i.e. there are current infrastructure) in place then Tasks I to III must be completed as a minimum, in sequence, for the process of planning for sustainability to be effective. Task I form the foundation for assessments or further work in subsequent tasks (II – IV) and must always precede any assessment forming part of those. Any assessment conducted without this foundation, will not deliver a project with sustainability as its focus, but merely a project in which the prevention, tradeoff and mitigation of potential environmental (social, economic and ecological) impacts might have been identified and addressed.

CONCLUSION

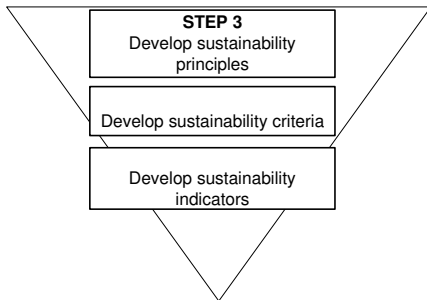
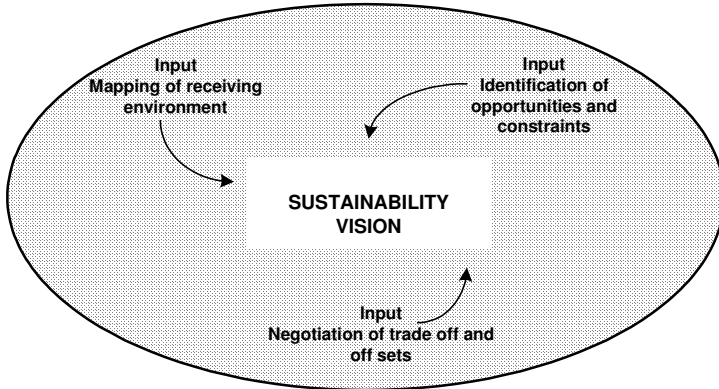
The undertaking of a sustainability assessment would be initiated mainly by some form of legislation promoting sustainable development principles, environmental management best practice and natural resource protection. The CSIR is currently testing this framework in the arena of planning for biofuel projects. Due to the potential negative elements of biofuel production such as loss of biodiversity, changing land use patterns, social economic impacts and green house gas emissions, sustainable biofuel production is becoming a key concern and is being considered as a requirement for market access. Setting standards and establishing certification systems is currently being promoted, however, a process that promotes a vigorous planning for sustainability for the life span of the biofuel project could help strength trade agreements. Sustainability assessment is an emerging science. The current principles have developed through a long history of impact assessment and strategic environmental assessment in the environmental sector. The framework presented will improve and mature over time as its application is tested on actually planned projects. It is likely that over time new and innovative methods and tools will be developed to assist the process.

TASK I : Preparation for Sustainability Assessment

STEP 1
Define the purpose of the project

STEP 2
Formulation of a vision

Environmental boundary of the PPP



TASK II: Sustainability Assessment

Evaluate the project

TASK III: Improve design for sustainability performance

Improve/update the design of the project

TASK IV: Project Appraisal

Environmental Impact Assessment or other project specific assessments

Figure 1. Planning for Sustainability Framework

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