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A framework for clarifying the meaning of Triple Bottom-Line, Integrated, and Sustainability Assessment

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Abstract

Terms such as Integrated Assessment and Sustainability Assessment are used to label 'new' approaches to impact assessment that are designed to direct planning and decision-making towards sustainable development (SD). Established assessment techniques, such as EIA and SEA, are also widely promoted as SD 'tools'. This paper presents the findings of a literature review undertaken to identify the features that are typically promoted for improving the SD-directedness of assessments. A framework is developed which reconciles the broad range of emerging approaches and tackles the inconsistent use of terminology. The framework comprises a three-dimensional space defined by the following axes: the comprehensiveness of the SD coverage; the degree of 'integration' of the techniques and themes; and the extent to which a strategic perspective is adopted. By applying the framework, assessment approaches can be positioned relative to one another, enabling comparison on the basis of substance rather than semantics.

Keywords: Integrated Assessment; Triple Bottom-Line Assessment; Sustainability Assessment; SEA; Integration; Sustainable development

1. Introduction

Integrated Assessment, Triple Bottom-Line Assessment, Sustainability Assessment and variations of these terms, such as 3-E[1] Impact Assessment (Sadler, 1999:4) and Extended Impact Assessment (Wilkinson et al., 2004), are used in the literature promoting the use of impact assessment as a means of directing planning and decision-making towards sustainable development (SD). Dalal-Clayton and Sadler (2004:8) observe that "the alphabet soup of acronyms [and terms] currently makes for a confusing picture."

At an international workshop on 'SEA and Sustainability Appraisal'[2] it was apparent that there is little consensus regarding the meaning of Sustainability Assessment. At times the discussions were at crossed purposes, since some participants were referring to the UK's system of Sustainability Appraisal of regional plans; whereas the perspective of others was based on experience in Australia, Canada, and Southern Africa where the most prominent Sustainability Assessment experience has been at the project-level or in response to projects (Dalal-Clayton and Sadler, 2005:256–258; DETR, 2000; Gibson et al., 2005; Grace and Pope,

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[1] Environmental, economic and equity.

[2] At the International Association for Impact Assessment (IAIA) 'International Experience and Perspectives in SEA' conference, Czech University of Agriculture, Prague (28/09/2005).

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2005). In the UK the term Sustainability Appraisal is used to distinguish 'conventional' SEA with a biophysical focus from a form of strategic assessment that also covers social and economic impacts (Dalal-Clayton and Sadler, 2005:101–102). Govender et al. (2005) argue that what is called Sustainability Assessment/Appraisal in some countries is essentially the same as SEA in South Africa, where a broad definition of 'environment' is used. In a similar vein, the authors of an OECD (2006) SEA guidance document observe that frequently "SEA approaches are given different, institution-specific 'labels' such as Sustainability Appraisal, Integrated Assessment, Strategic Impact Assessment, etc."

Despite its widespread use, there is also no consensus regarding the meaning of Integrated Assessment (Morrison-Saunders and Therivel, 2005:3). 'Integrated' is sometimes merely used to refer to extending the coverage of an assessment rather than to 'combining the parts' (Lock, No date:1). However, Scrase and Sheate (2002) identify 14 meanings of integration, Eggenberger and Partidário (2000:204) identify five forms of integration, and Lee (2002:14) suggests that the term is used in at least three general senses, namely: bringing together different types or categories of impacts, e.g. biophysical and socio-economic (horizontal integration); linking together separate assessments undertaken at different levels/stages (vertical integration); and integration of assessments into decision-making.

Furthermore, in some jurisdictions planning and/or decision-support techniques are used that are not labelled assessment, but which achieve similar outcomes; hence they are assessment techniques in practice. Examples are Impact Benefit Agreements in Canada and Integrated Development Plans in South Africa (DEAT, 2002; Galbraith and Bradshaw, 2005). These para-assessment techniques may — in some respects — fall short of, or exceed the expectations typically associated with assessment of one form or another (Dalal-Clayton and Sadler, 2005:1&12).

2. Establishing the framework

This paper aims to provide a basis for comparing assessment and para-assessment techniques — used separately or in combination — on the basis of their features rather than their labelling. To achieve this, the key features that are typically associated with SD-directed[3] forms of assessment were identified via a literature survey. The survey covered assessment at the policy, plan and programme (PPP) and project levels, and included literature on 'sharpening' established forms of assessment for SD, 'integrated' assessment, and 'new'[4] techniques, e.g. Sustainability Appraisal. (It should be noted that this normative literature generally describes what the various assessment approaches are meant to be, rather than what is done in practice.) Priority was given to the post-1995 literature, on the assumption that the more recent literature captures the essence of progress over time and is most likely to have an SD focus. A difficulty when considering assessment and SD is not the scarcity of literature, but rather the vast quantity; hence a question that arose is how much of the literature to survey. The approach taken was to continue the survey until what Strauss and Corbin (1998:143) call theoretical saturation[5] was achieved.

This paper does not aim to provide a comprehensive review of the recent assessment literature, but rather seeks to 'build bridges' between the 'islands' that have emerged. The intention is not to endorse any particular approach, but rather to provide a platform for further debate. Other researchers have explored one or more of these SD-directed assessment types; however they have mostly focussed on developing their own interpretations and definitions rather than on reconciling and clarifying what others have already proposed. The resulting 'menagerie' of terminology and acronyms confuses discussions (Dalal-Clayton and Sadler, 2005:12–14).

The literature survey revealed assessment features in the three categories, namely:

- Context features, i.e. features that characterise the planning and decision-making context and describe the relationship between the assessment and its context.
- Process features, i.e. how, including when and by whom, the assessment is undertaken.
- Features within the assessment, i.e. the type and level of analysis used, and what the output of the assessment process contains.

While process and context features are unquestionably important, it was not possible to isolate features in these categories that distinguish SD-directed assessment. In general, the recommendations for enhancing the effectiveness of the process and context features of established forms of assessment are also relevant to SD-

[3] For the sake of brevity 'assessment that contributes to directing the planning and decision-making process towards achieving SD' is referred to as SD-directed assessments; although — strictly speaking — it is the planning an decision-making process that should be SD-directed through the use of, amongst others, appropriate assessment techniques.

[4] In many cases these are enhanced versions of established techniques, usually EIA or SEA; hence the only truly new aspect is their names.

[5] This is the point at which no new properties, dimensions, or relationships emerge.

directed assessments, since assessment must be effective in order to direct decision-making towards SD. There is still much to be done to improve the effectiveness of assessments and most of the recommendations of the landmark International Study of the Effectiveness of Environmental Assessment are still relevant (Sadler, 1996). The shift to SD will introduce additional obstacles, such as capacity constraints, disciplinary protectionism, and conflicts with existing institutional arrangements (Jenkins et al., 2003:63–64; Kirkpatrick and Lee, 1999:231). However, the purpose of this paper is not to contribute to the pursuit of assessment effectiveness, but to explore the distinguishing characteristics of SD-directed assessment as a basis for comparing and/or reconciling emerging forms of SD-directed assessment.

It was possible to achieve theoretical saturation for the SD-directed features within assessments; hence only these features — and not process and context features — are explored further in this paper. SD-directed features within assessments converged under three main categories, namely the degree to which:

- SD 'themes' are covered ('comprehensiveness').
- The assessment techniques that are used and/or the themes that are covered are aligned/connected/compared/combined ('integratedness').
- The focus/perspective is broad and forward-looking ('strategicness').

In Fig. 1 these categories are used to form the axes of a three-dimensional space within which various forms of assessment (and para-assessment) can be located. Proponents of SD-directed assessment promote varying degrees of movement along one or more of the axes. These features reflect the overall effect of the assessment context and process (Bisset, 2003:56; Abaza et al., 2004:41).

The framework can be used to compare assessment approaches by considering the features that they encompass rather than the terminology used. This can help to facilitate debates between practitioners from various jurisdictions regarding the distinction between SEA and Sustainability Assessment, the difference between approaches to SEA (e.g. purely biophysical versus 'integrated'), gaps in planning and assessment for SD, and so on. In Fig. 1 the relative positions of techniques labelled Strategic Assessment, 'Triple Bottom-Line', and Integrated Assessment are proposed. There is inconsistency in the use of these terms in the literature. For example, Integrated Assessment is sometimes used to refer to what is labelled 'Tripe Bottom-Line' Assessment in Fig. 1, i.e. EIA or SEA that has merely "been extended to incorporate social and economic considerations as well as [biophysical] ones" (Pope et al., 2004:595).

Sustainability Assessment/Appraisal is sometimes used to refer to specialised forms of strategic assessment, which only encompass features in the most 'advanced' corner of the framework (see Fig. 1). However,

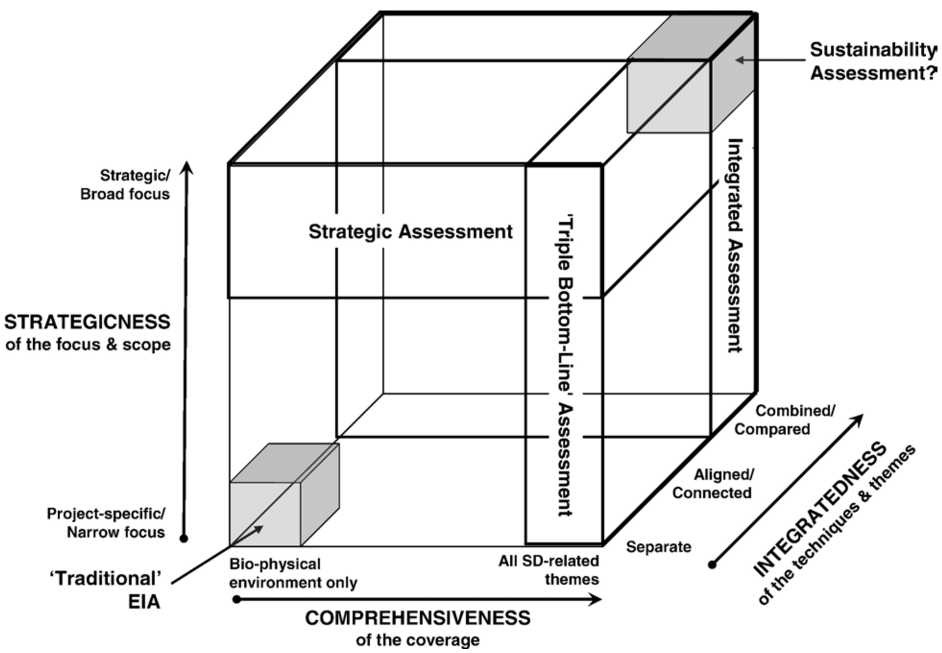

Fig. 1. Spectrum of SD-directed features within the assessment process.

the authors favour the use of the term to refer to the spectrum covered by the overall framework. This is consistent with Dalal-Clayton and Sadler (2004:8) definition, namely: "approaches that are used to integrate or inter-relate the environmental, social and economic (ESE) pillars of sustainability into decision-making on proposed initiatives at all levels, from policy to projects and particularly within or against a framework of sustainability principles, indicators or strategies". They contend that Integrated Assessment is a necessary but not sufficient condition for Sustainability Assessment, which is consistent with the distinction proposed (p12).

The strategicness axis has intentionally not been subdivided into the idealised planning levels favoured in much of the normative assessment literature. A distinction is typically made between project-level assessment and strategic assessment at the PPPs levels, with the levels connected via 'tiering' (OECD, 2006:30). However, 'tiering' has been criticised for being an unrealistic representation of reality (Dalal-Clayton and Sadler, 2005:18; Gibson et al., 2005:90; Lee and Kirkpatrick, 2000:10; Pope et al., 2004:600; Scrase and Sheate, 2002:280). Lee (2002:14) observes that there have been limited opportunities to test the hypothesis that significant benefits can be obtained from a tiered assessment system. Researchers have found that in practice there is an iterative relationship between the project and strategic planning levels; the strategic-level is as likely to informed by 'trickling-up' from the project-level, as *vice versa*; and that in many countries 'tiering' is still in its infancy and faces many obstacles (Lee and George, 2000:5; Noble, 2000:217; Sadler, 1996:155; Stinchcombe and Gibson, 2001:363). The normative 'tiering' literature has, in particular, not addressed adequately the challenge of linking projects initiated by the private sector with strategic planning (Goodland and Mercier, 1999:25; MMSD North America, 2002:22).

In situations where assessment and panning at the PPP levels is ineffective the assessments of large-scale projects, in particular, may be 'pushed' up the strategicness axis. This does not negate the normative arguments in favour of addressing strategic matters at higher planning levels, but rather represents a response to non-ideal circumstances. For example, the independent reviewers of an EIA for a mining project in Canada's Northwest Territories observed that while project-specific assessment is arguably not the appropriate forum to address cumulative impacts and land use planning, it becomes a focal point for them when higher level planning processes are absent (CIRL, 1997:52). In a similar vein Couch (2002:267) concludes that in Canada's north "EIA reviews have on occasion been the 'only show in town"; hence:

> By default, the EIAs of mega-projects have had characteristics ascribed to strategic environmental assessment, SEA) […]. They have been thrust into the breech to fill gaps for policy and/or regional planning of areas larger than many European countries, and have served as a catalyst for broader government initiatives.

In jurisdictions with well developed assessment and planning at the PPP levels the strategicness axis may well be covered by a tiered system. Hence, it should be emphasised that the framework does not represent the coverage of a single assessment technique, but rather the net effect of all the assessment and para-assessment techniques used in a particular context. In the vein, Vanclay (2004:268) defines 'assessment' as "a generic term that can mean either an integrated approach or the composite/totality of all forms of impact assessment".

In the light of the many challenges still facing assessments with less ambitious goals, it could be argued that it is premature to pursue assessment that has SD as the goal. Conversely, it could be said that the uptake of SD-directed assessment is long overdue in the light of the widespread commitment to SD principles by governments and companies. These commitments are only likely to be achieved if they are pursued explicitly; hence techniques are needed that are able to direct planning and decision-making towards SD. 'Traditional' EIA is undoubtedly an important contributor to this endeavour; although SD is not always the explicit goal.

The features encompassed by the framework's three axes are outlined in the remainder of the paper.

3. Comprehensiveness of SD coverage

The feature that is almost universally promoted in the SD-directed assessment literature is extending the coverage beyond the purely biophysical. Extending the coverage to include non-biophysical themes may be motivated by: the realisation that the biophysical environment will only be successfully managed by adopting a holistic view, i.e. it cannot be managed independently of social and economic matters (Barrow, 1997:2); the desire to have non-biophysical areas of concern considered in decision-making (Bisset, 1996: Sec4.24); and/or increasing awareness that the coverage of assessments should correspond to the (biophysical, social and/or economic) criteria that should/may be considered in decision-making (Lee, 2002:16).

The adoption of SD as a development goal may also be a 'driver'. It is argued that SD-directed assessments should adopt a holistic perspective by comprehensively/simultaneously/equally considering the relevant/full range of SD 'themes', since decision-makers and other stakeholders wish to be informed of the full spectrum of impacts associated with proposed initiatives (Eggenberger and Partidário, 2000:202; Lee, 2002:16; Wilkinson et al., 2004:5). One of the few areas of widespread agreement in on-going debates concerning the definition and meaning of the SD is that it encompasses — at a minimum — biophysical, social and economic dimensions[6], which are sometimes referred to as the 'three pillars' of SD or the 'triple bottom-lines'. There are many proposals for enhancements, such as the 'five capitals framework' (natural, human, social, manufactured and financial) proposed by Parkin et al. (2000), or the suggestion that governance should be added as the fourth dimension (MMSD, 2002:23). Stated colloquially, these are essentially attempts at 'explaining the composition of the cake by cutting it into thinner slices'.

The inclusion or reinforcement of areas of concern that are considered to be or actually are omitted, given insufficient attention or treated as 'poor neighbours' in assessments is also promoted. These include: complete themes or disciplines, such as 'social' (Lee and Kirkpatrick, 2000:4; Sadler, 1996:30; Sadler et al., 2000:20); and/or specific topics or 'neglected' issues, such as: gender, health, biodiversity, climate, etc. (Bisset, 1996:Annex.1; Eggenberger and Partidário, 2000:204; Kirkpatrick and Lee, 1999:228; Lee and Kirkpatrick, 2000:4; Lock, No date:1; Sadler et al., 2000:20).

Extended coverage is being accommodated and signified by: 'stretching' EIA or SEA by broadening the definition of 'environment' and, hence, the thematic coverage, or 'piggy-backing' new themes onto them (Bisset, 1996:Sec4.24; Fowler, 1996; Vanclay, 2004:277); conducting other theme-specific assessments, e.g. Social Impact Assessment (SIA), Health Impact Assessment (HIA) and/or Economic Impact Assessment, in parallel with (biophysical) EIA or SEA (Vanclay, 2004:273–277); combining techniques and terms, such as Environmental Social and Environmental Impact Assessment (S&EIA) (Abaza et al., 2004:115–116; Finney et al., 2004)[7]; and/or developing 'new' techniques and terms, such as Sustainability Appraisal.

Accommodating the extended scope by 'stretching' or 'piggy-backing' onto EIA is considered by some to be the most pragmatic route, since EIA is the most successfully established assessment technique, and in many countries is backed by legislation and institutional frameworks (Abaza et al., 2004:115; Slootweg et al., 2001:20). However, there are still many countries where 'environment' is defined narrowly — both in legislation and in practice — and non-biophysical impacts are either not assessed or are only considered in a limited way (Bisset, 1996:Sec4.25; Burdge, 2003:225; Eggenberger and Partidário, 2000:201&204). The trend in SEA has mirrored EIA; hence in many jurisdictions the coverage of SEA is still predominantly biophysical, but in others it has evolved to include or has always included socio-economic impacts (Dalal-Clayton and Sadler, 2005).

There is the suggestion that priority should be given to the themes that decision-makers would be inclined to neglect in order to restore the 'balance', rather than allowing assessment to cover every conceivable topic. Hence, not all commentators agree that SD will be best served by extending the coverage of impact assessment. Their primary concerns are that there will be a loss of focus and, in particular, that biophysical concerns will be insufficiently emphasised, since they might be diluted or overshadowed by socio-economic considerations (Smith and Sheate, 2001a:268). George warns that the "extension from environmental appraisal to Sustainability Appraisal removes this emphasis on the [biophysical] environment, and leaves a degree of uncertainty as to what purpose the appraisal is intended to serve" (2001:99). He recommends prioritising the factors that distinguish SD from traditional development (1999:177). Scrase and Sheate (2002:283) also complain that due time and resource constraints there will be a loss of depth in the consideration of the biophysical environment if social and economic objectives are considered simultaneously.

A 'slice' on the left-hand side of the framework can accommodate purely biophysical impact assessment techniques, and the framework should not be taken to imply that expanding the coverage of EIA or SEA would be desirable in every context. For example, in situations that have "capitalism in order to serve the interest of wealth creation, and social democracy to curb its excesses and limit inequality", much of the right-hand side would be occupied by other planning and decision-making

[6] Also referred to as spheres, attributes, assets, capitals, issues, considerations, implications, concerns, components, factors, goals or principles (Abaza, 2003:3–4; Bond et al., 2001:1011; George, 2001:96; George and Kirkpatrick, 2003:3; Guijt et al., 2001:17; Hardi and Zdan, 1997:13; Lee, 2002:16; MMSD North America, 2002:21; Nicholson, 2002:27; Sadler, 1996:Sec7.2.1; Sadler, 1999:4; Sadler et al., 2000:5 & 8; Scrase and Sheate, 2002:282; Shell, 2002:4 & 11; Smith and Sheate, 2001b:736; Stinchcombe and Gibson, 2001:345).

[7] In some jurisdictions the definition of 'environment' includes the socio-economic dimensions; hence EIA has the same meaning as S&EIA as used where 'environment' is narrowly defined.

processes that act as para-assessment techniques for socio-economic matters (Scrase and Sheate, 2002:288). In such circumstances it would be appropriate for assessment practitioners to focus on 'filling' the biophysical 'slice'. However, in under-developed regions socio-economic matters may also be neglected, especially at the local level, and it may be appropriate for the coverage of EIA and/or SEA to be expanded to cover non-biophysical impacts.

4. Integratedness of techniques and themes

Interwoven with calls for the thematic coverage of assessment to be extended are arguments for integration within the assessment process, sometimes called 'horizontal integration' (Lee, 2002:14). Within assessments there can be integration of the assessment techniques, e.g. EIA+SIA, and/or the integration of the themes covered by the assessment process, e.g. biophysical and social (Eggenberger and Partidário, 2000:201; Kirkpatrick and Lee, 1999; Scrase and Sheate, 2002). Fig. 2 illustrates the interconnection between technique and theme integration for which Vanclay (2004:277) asserts the motivations are "logistics" and "because everything is inherently interconnected", respectively.

4.1. Technique integration

Both thematic (e.g. SIA and HIA) and analytical assessment techniques have proliferated. Examples of analytical techniques are Life-Cycle Assessment (LCA), Multi-Criteria Analysis (MCA), Cost–Benefit Analysis (CBA), and Risk Assessment (RA). Via an Internet search Vanclay (2004:273–275) identified well over 100 types of impact assessment; although many are not intended as major forms of assessment. In a development cooperation context, the OECD (2006:149–151) has identified twelve assessment approaches that are considered to be complementary to SEA. They conclude that there is "is a need for SEA to recognise, link with and, where feasible, reinforce other policy appraisal approaches used to shape development policies and programmes" (p35).

Practitioners from various disciplines have endeavoured to separate out and elevate the theme(s) of importance to their discipline, resulting in thematically-focussed forms of assessment. This has, in particular, led to the establishment of SIA predominantly by social scientists, which has evolved to gain stature similar to that of the natural scientist-dominated EIA field (Vanclay, 2004:270). SIA may be undertaken on its own, as a component of EIA, in parallel with EIA, or as part of an 'integrated' S&EIA, and there is ongoing debate regarding whether greater integration or separation is most desirable (Lee and Kirkpatrick, 1997:7–8; Sadler et al., 2000:3; Vanclay, 1999:310).

HIA has followed a similar path to and, perhaps, surpassed SIA by becoming well established and gaining endorsement from international agencies, such as the

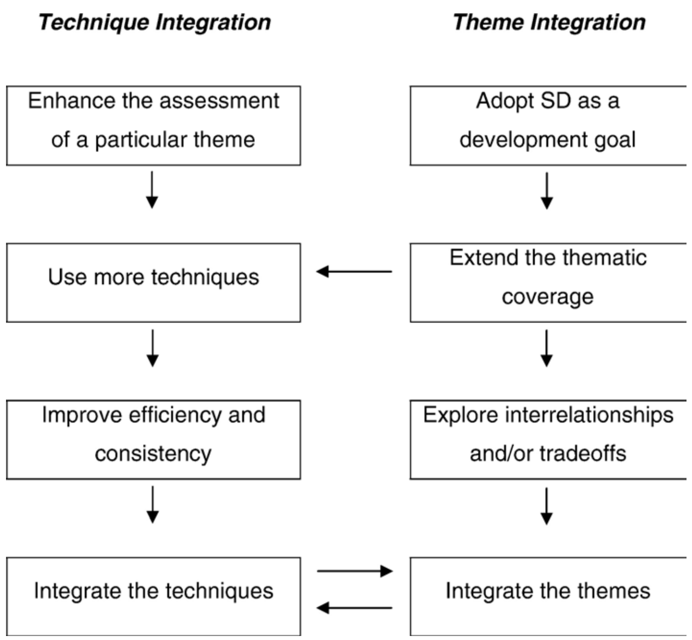

Fig. 2. Interconnection between technique and theme integration.

World Health Organisation (Vanclay, 2004:275). Separate strands are also splintering off the more established forms of impact assessment to cater for specific interests, e.g. Gender Impact Assessment and Ecological Impact Assessment (Barrow, 1997:23; OECD, 2006:149). Scrase and Sheate (2002:285) believe that this proliferation has, in part, been fuelled by disciplinary protectionism, where practitioners from various disciplines focus on developing or elevating forms of assessment that cover their field of interest. To this can be added 'institutional protectionism', i.e. where intuitions develop techniques that are similar to established techniques, but strive to establish 'brand distinction' by giving them new labels and emphasising the (often subtle) differences (OECD, 2006:32–39).

Additional analytical assessment techniques, such as LCA, MCA, CBA, and RA are also being used (or promoted) within a particular theme, most often 'environmental', or across themes in order to benefit from their analytically capabilities or other attributes (Lee and Kirkpatrick, 2000:3). Some techniques evolved under the EIA 'umbrella' while others, such as CBA and RA, have their own disciplinary, practical and historical origins (Scrase and Sheate, 2002:285). There have been a considerable number of comparisons between one assessment technique and another, with comparisons involving EIA most prevalent. In addition to pairwise comparisons, researchers have considered the relationship between larger numbers of techniques (Eales and Twigger-Ross, 2003; Muschett, 2000; Pearce and Hett, 1999:Sec. 3.10; Petts, 1999; van der Vorst et al., 1999; Vanclay and Bronstein, 1995).

Technique integration essentially attempts to reverse the 'disintegration' that has resulted from the proliferation of assessment techniques. As shown in Fig. 2, a key driver is improving procedural efficiency and/or methodological consistency[8]. The focus may be on techniques within a theme or techniques covering a number of themes, depending on the position on the comprehensiveness axis. Scrase and Sheate (2002:275) conclude that "calls for more integration do not in fact amount to calls for comprehensiveness". For example, EIA, LCA and RA can be used for purely biophysical assessment and it may be desirable to integrate these techniques. There is a substantial body of literature covering the integration of EIA and one or more of the other biophysically-focussed techniques.

Integration may also be pursued between thematic techniques for procedural and/or methodological reasons. For example, Barrow (1997:228) concludes that in the light of the commonality of goals and approach between EIA and SIA, and the frequent lack of sharp distinction between them, there is "an increasingly stated — though not universal — desire for the two to be integrated". The compliers of a UNEP (2003:271) manual point out that the World Bank and other international agencies recommend that, where appropriate, HIA should be integrated with the EIA process since both use similar information, approaches and methods. Similarly, a Health Canada (2003:25–26) HIA guidance document concludes that SIA and HIA are similar and complementarily, since they have overlapping data requirements and both use participatory approaches; hence integrating the two could prove advantageous.

Proposals for achieving technique integration range from using frameworks to link established techniques to combining techniques. The use of some form of linking framework to bring together established assessment techniques is a popular response to the integration challenge (Brookes et al., 2001:115; Petts, 1999:53; Slootweg et al., 2001:27; van der Vorst et al., 1999). According to Scrase and Sheate (2002:285) linking is the preferred option, since it would avoid techniques "being stretched to inappropriate uses and [... would] allow them to develop without provoking turf wars".

'Stretching' EIA or SEA by expanding the thematic coverage and/or adding analytical features can achieve procedural integration. The MMSD (2002:248) authors observe that since its origins social and economic factors have tended to "creep into" EIA and that this is now being deliberately promoted with the integration of techniques such SIA and CBA into the EIA process. Sánchez and Hacking (2002:29) promote the use of EMS features within EIA, and Abaza et al. (2004:146) describe the motivations behind including RA in EIA. It is questionable whether 'stretching' EIA or SEA can achieve significant methodological integration, since the process may remain locked into a predominantly technocratic paradigm and non-biophysical themes may be treated as 'second-class'. Dissatisfaction with this arrangement is why the SIA discipline, in particular, has sought greater independence.

Combining SIA with EIA (or SEA) is another popular approach to extending assessment coverage. Superficially integrating these two techniques is fairly straightforward; however there are a number of deep-seated

[8] Descriptions vary, but in this paper 'procedural integration' refers to the organisational arrangements that synchronise the timing, avoid gaps and overlaps, and ensure optimal sharing of information and resources, i.e. good project management; while methodological integration refers to the alignment of approaches and paradigms/insights, which influences the assumptions made, choice of valuation criteria, setting of boundaries, etc. (Eggenberger and Partidário, 2000:204; Kirkpatrick and Lee, 1999:227).

differences that cannot be overcome by merely combining the process 'flow diagrams'. These differences are due to the differing worldviews that typically inform the natural and social sciences, and differences in the behaviour of social and biophysical systems (Barrow, 1997:228; Bisset, 1996:Annex.1).

In addition to the above, the use of interdisciplinary teams is recommended for enhancing methodological integration (Abaza and Baranzini, 2002:1; Bisset, 1996; CIESN, 1995; Eggenberger and Partidário, 2000:204; Lee and Kirkpatrick, 2000:11; Lock, No date; MMSD North America, 2002:24; Rotmans, 1999:3–4&13). However, it is recognised that this task will be far from straightforward because of the entrenched differences between disciplines, possibly compounded by a lack of mutual understanding and respect among practitioners (Health Canada, 2003:25–26; Petts, 1999:55; Scrase and Sheate, 2002:285&288).

4.2. Theme integration

It is possible to extend the thematic coverage by using theme or discipline-specific techniques in parallel without much interaction between them, i.e. "interconnected phenomena are presented as discrete" (Scrase and Sheate, 2002:275). George (2001:99) also points out that "to draw together economic, social and [biophysical] objectives into a single list does not integrate them". There are commentators who advocate separate biophysical, social and economic assessments, which are only brought at the end of the process, immediately prior to consent decision-making at the political level (Morrison-Saunders and Therivel, 2005:4). However, the recognition that biophysical, social and economic systems are interconnected leads commentators to conclude that the pursuit of SD requires the linkages and interdependencies to be considered by: exploring interrelationships between the themes; and presenting impacts across the themes in a comparable manner so as to reveal the existence of tradeoffs or 'win–win' outcomes (Abaza, 2003:6; Bisset, 1996:Annex.1; Draaijers et al., 2003:Sec. 4; George, 2001:96; Gibson, 2001:21; MMSD North America, 2002:23; Rattle and Kwiatowski, 2003:92; Rotmans, 1999:9; Stinchcombe and Gibson, 2001:345).

The OECD (1996:34–35) authors illustrate the theme integration continuum using the well-known 'three circle' SD model. At one end the circles are separate and at the opposite end they overlap. They conclude that the 'un-integrated' approach is justified when the initiative is primarily designed to deliver social and economic outcomes and an assessment focussed on biophysical concerns is needed to "mainstream and upstream" biophysical concerns into the decision-making. In contrast, the 'integrated' approach is "particularly relevant in developing countries where environmental takes on a meaning beyond the biophysical aspects to those more closely linked to quality of life and growth".

Theme integration can be a driver for technique integration, but they are not the same (Devuyst et al., 2001:148–149). As shown by Fig. 2, technique integration can be pursued for logistical reasons without theme integration being an objective. Within a theme, such as 'biophysical', integration of the sub-themes (e.g. water, air, etc.) is usually attempted at least to some extent. However, integration between major themes (e.g. biophysical and social) is more challenging.

The importance of biophysical ↔ socio-economic, economic ↔ social, and health ↔ social/biophysical interrelationships have been identified in the literature (Abaza et al., 2004:144; Rattle and Kwiatowski, 2003; Smulders, 2000:603; Vanclay, 2004:277). The use of cause–effect methods, matrices, and interdisciplinary teams are promoted as ways of exploring these interrelationships (Glasson et al., 1999:112&121; Hacking, 2001; Sánchez and Hacking, 2002:34; Kirkpatrick and Lee, 2002:31; Slootweg et al., 2001; UNEP, 2003:258–261).

Integrated Assessment (IA) models are "computer simulation frameworks that try to describe quantitatively as much as possible of the cause–effect relationships of a specific issue, and of the interlinkages and interactions among different issues" (Rotmans, 1999:13). These models have mostly been used at the national-to-global scale to explore topics such as resource depletion, acidification and climate change (Burdge and Vanclay, 1995:89).

Abaza et al. (2004:138) warn that it is little better than having a completely separate study when an SIA is conducted almost in isolation and then incorporated in the EIA report as a 'stand alone' chapter. To avoid this shortcoming they promote the use of interdisciplinary teams, including social scientists, under the direction of a study leader that understands the links between social and biophysical impacts and, therefore, is able to ensure integration throughout the assessment process. They observe that the strength and diversity of the biophysical ↔ social linkages are potentially stronger in developing countries, since "people and their social groups (such as villages and tribes) are a component part of their environment".

The SD ideal is to simultaneously achieve improvements in human and ecosystem wellbeing — sometimes called 'win–win' solutions — and to avoid tradeoffs (Guijt et al., 2001:18; MMSD North America, 2002:7;

Nicholson, 2002:29). However, Gibson (2001:35&43) concludes that while tradeoffs are undesirable in theory, they are often unavoidable in practice and many tradeoffs will inevitably be proposed. Sadler et al. (2000:34) posit that: "Clarifying such trade-offs lies at the core of decision-making for sustainable development."

As a first step, there may be efforts towards presenting decision-makers with the complete picture. As with a jigsaw puzzle, the complete picture cannot be deduced by examining each piece in isolation, and only emerges when all the pieces are fitted together (Macleod Institute, 2002:1; Rotmans, 1999:2). Burdge and Vanclay (1995:55–56) complain that S&EIAs frequently do not "provide a comprehensive picture of likely project impacts [… since] most SIA statements are stapled to an EIA, and the total recommendations are the sum of the parts [… and no] attempt is made to interpret the collective findings".

According to Glasson et al. (1999:22) trade-offs often constitute a dilemma for decision-makers, and they identify "assessing the tradeoffs between economic apples, social oranges and [bio]physical bananas" as an assessment challenge. A complicating factor in evaluating tradeoffs is establishing whether social impacts are positive or negative, since they are not consistent across the community, cannot be precisely defined, are subject to value judgements, and people may change their minds over time (Burdge and Vanclay, 1995; Vanclay, 2004:280).

There are three main approaches to comparing impacts, namely: using 'scoring' tools; using integrating techniques, i.e. Multi-Criteria Analysis (MCA) and/or Cost–Benefit Analysis (CBA); and/or relying on 'political' decision-making.

A wide variety of rating and weighting tools have been developed to analyse the significance of impacts (Glasson et al., 1999:148–151). They typically use a number of criteria, such as 'magnitude' and 'duration', with hierarchies of scores and some way of combining the scores into an overall significance score. Weighting may be applied to identify the relative importance of the various impacts, and the results are often presented in tables and/or matrices. Glasson et al. (1999:149) recommend that, whenever possible, scoring and weighting should reveal the tradeoffs in impacts. This will only be the case if biophysical and socio-economic, and positive and negative impacts are rated as, for example, recommended by the International Finance Corporation (IFC, 2003c:8). While there have been methodological advances, determining the significance of the impacts continues to be challenging and when tradeoffs are involved the outcome can be controversial (Brookes et al., 2001:117; Gibson, 2001; Pearce and Hett, 1999: Sec4.3).

MCA is an umbrella term used to describe a collection of approaches that can be used to help individuals or groups explore important decisions by explicitly taking account of multiple criteria (Belton and Stewart, 2002:2). MCA may range in sophistication from complex modelling to basic 'scoring', as described above (Eales and Twigger-Ross, 2003:11). MCA seeks to overcome some of the deficiencies of CBA by, in particular, allowing for a "plurist view of society composed of diverse 'stakeholders' with diverse goals and with differing values" (Glasson et al., 1999:148). However, Belton and Stewart (2002:2–3) warn that MCA is unable to provide the 'right answer' or to dispel subjectivity from decision-making, but rather seeks to make transparent the decision-making process and judgements on which decisions are based. Stewart (2001:7) explains that the intention is "not to reduce all criteria under consideration to a single index, but rather to determine what represents an acceptable trade-off between the different criteria in the context of stated stakeholder preferences".

If all the positive and negative impacts across the various themes can be 'measured' on the same scale then they can be aggregated to determine whether the advantages outweigh the disadvantages, which is the approach used in CBA (Eales and Twigger-Ross, 2003:10; Petts, 1999:37). CBA generates what seems to be an objective single value expressing net benefits of a proposed development (Barrow, 1997:20). The application of CBA remains contentious due to the practical difficulties with monetising impacts, objections to the use of money as the primary measure of value, and dissatisfaction with discounting the future (Lee and Kirkpatrick, 1997:8–11). There has been progress with developing methods, e.g. the 'willingness to pay', to value externalities that are not ordinarily monetised by the marketplace (Health Canada, 2003:53–54). In developing countries, in particular, the unavailability of data can further exacerbate the uncertainties inherent in such estimates (van Zyl et al., 2005:27). Pearce and Hett (1999:Sec. 3.9.3) explain how based on some arguments CBA is a prerequisite for sustainability since it can ensure that actions are not taken where costs exceed benefits, while on others CBA is thought to encourage non-sustainability because of the way gains and losses are treated. CBA has been applied most successfully to publicly funded infrastructure projects to make relative comparisons between alternatives (Boardman et al., 2001; Pearce, 1998).

It is generally agreed that it is not the role of assessment to make, or judge the acceptability of tradeoffs.

For example, Jenkins et al. (2003:59) argue that trade-offs should be made at the political level, and not throughout the assessment process; however they do not elaborate the basis on which politicians should make tradeoffs. Other researchers have warned that decision-makers may resist initiatives that erode their decision-making role or restrict their discretionary powers (Draaijers et al., 2003:Sec4.; Gibson, 2001:7; Lee and Kirkpatrick, 1997:13). Some of the objections to trade-offs being considered can be allayed by emphasising the distinction between identifying the existence of tradeoffs versus the process of deciding whether they are acceptable (IEEP/DEFRA, 2002:8). Pearce and Hett (1999:Sec3.1) observe that: "Those who see government as an institution acting on behalf of people will tend to opt for more politically-oriented approaches whereby politicians decide what counts, with experts backing up and informing those assessments." From an SIA perspective Burdge and Vanclay (1995:51–52) argue that:

SIA cannot judge. It can merely report how different segments of a community are likely to respond to development projects or policies and advise on appropriate mitigation mechanisms [...]. Decisions are about whether a project should proceed, or what compensation a developer should pay, are ultimately and inherently political. [...] SIA provides information for informed decisions making [...]. It is unlikely, however, that SIA can change the inherently political process of decision-making and planning.

5. Strategicness of the focus

The spectrum represented by the comprehensiveness and integratedness axes can, in principle, be applied to an assessment with relatively unambitious goals and a narrow focus. Descriptions of SD-directed assessment invariably promote the adoption of more ambitious goals and a broader focus in arguments for assessments to be more strategic.

Perhaps due to its overuse in the impact assessment literature, the term 'strategic' has lost much of its meaning and is widely used merely as a label for assessment at the PPP levels. In this paper 'strategic' is used in a more conventional sense to refer to the features that characterise the degree of "emphasis on strategy" within assessment at any level (Noble, 2000:206). Planning at the project-level can be informed by a strategic perspective either by 'pushing' project assessments up the strategicness axis, or by cascading the results of assessments and/or planning at higher levels. It might be less challenging and/or more appropriate to incorporate strategic features at higher planning levels; however project-level assessment may — to varying degrees — adopt a strategic perspective, especially in the absence of well-developed planning at higher levels. Strategicness should be determined by the features of the assessment rather than the level at which the assessment is initiated. As noted by Couch (2002:267), assessments of large-scale projects can have features normally attributed to SEA, and assessments at the PPP-level may be undeserving of the 'strategic' label (Noble, 2000).

The key features that determine the strategicness of assessments are: the explicit goal; the 'benchmark' used; the spatial and temporal coverage; and the extent to which alternatives, cumulative impacts, and uncertainty are considered.

5.1. The assessment goal

A common theme in descriptions of SD-directed assessment is that the assessment goal should be shifted from avoiding negative impacts, to also proactively enhancing positive impacts, and then to do this in a manner that contributes to SD (Abaza, 2003:2; Gibson, 2001:25; MMSD North America, 2002:7; Sadler et al., 2000:46; Shell, 2002:iv). An assessment is most likely to be SD-directed if this is explicitly its goal or purpose. The shift has been described, as follows (MVEIRB, 2002:25):

In the past, the goal of some [assessments] for large and controversial developments was ensuring conditions were not made worse because of a development. In more recent times [...] the goal is increasingly focused on the principles of sustainable development, ensuring that developments provide maximum positive benefits for affected people and address equitable distribution of costs and benefits.

If it is argued that an SD is essentially about avoiding negative impacts and enhancing positive impacts, then the final 'SD shift' appears redundant or self-evident. There are two reasons why this is not necessarily the case. Firstly, 'doing better' will not necessarily achieve SD, since it may still not be 'good enough' (George, 2001:96). SD will only be achieved if negative impacts are sufficiently avoided and positive impacts are sufficiently enhanced. This can only be determined if assessments consider the larger SD 'picture'. Secondly, completely avoiding negative impacts or achieving the same 'package' of positive impacts for everyone is unlikely to be feasible. Hence, the mix (tradeoffs) and distribution of positive and negative impacts (equity) needs to be considered.

5.2. The assessment 'benchmark'

Within impact assessment criteria are the 'benchmarks', 'rules of the game' or 'levels of accepted practice' established to evaluate the significance of impacts and, hence, to guide decision-making (Gibson, 2001:7; Shell, 2002:23; UNEP, 2003:275). The most widely used criteria are jurisdiction-specific or internationally recognised standards; and/or the 'no project' baseline, i.e. the conditions that are likely to prevail without the initiative (Eales and Twigger-Ross, 2003:12; Pope et al., 2004:604; UNEP, 2003:275).

Standards could, in principle, be set at the 'sustainable' level, but they are more likely to be damage limiting. In developing countries, in particular, standards are sometimes set on the basis of international practice, and do not account for context-specific factors. While comparison with the 'no project' baseline is undoubtedly an important analytical device, it insufficient to ensure progress towards SD. (Even if conditions will improve in comparison to the baseline, the trend might still be unsatisfactory.) Hence, it is argued that the 'benchmarks' for SD-directed assessment should also include aspirational SD objectives (Pope et al., 2004). There is growing consensus that the use of SD objectives is necessary, but not a sufficient, requirement for Sustainability Assessment (Abaza et al., 2004:122; Dalal-Clayton and Sadler, 2004:12).

Hacking and Guthrie (2006) have explored the use of SD objectives in impact assessment. From a review of the literature and the analysis of case studies they identify five possible sources of SD objectives, namely: stakeholder opinion, derivation from the baseline, 'backcasting' from a desired future, derivation from SD principles, and 'tiering'. They found an encouraging degree of experimentation in the use of SD objectives, but little convergence in the approaches used.

5.3. Wider spatial and temporal scales

Widening the spatial and temporal coverage is the most tangible way of broadening the focus of assessments and is strongly promoted in the SD-directed assessment literature, for example:

> Assessment of progress towards sustainable development should adopt a time horizon long enough to capture both human and ecosystem time scales thus responding to the needs of future generations as well as those current short-term decision-making requirements [and] define the space of study large enough to include not only local but also long distance impacts on people and ecosystems. (Hardi and Zdan, 1997:2)

> Sustainability Assessment is usually wider in scope, both with regard to space and time, than many projects. (Guijt et al., 2001:5)

Some suggestions for determining the appropriate spatial scale for a project-level SD-directed assessment are (George, 1999:188; MMSD North America, 2002:9; World Bank, 1999:Annex.A):

- The 'reach' of site-specific impacts as they ripple out into society and the ecosystem.
- People affected by the development, which may be the local community, a country's population, or the world's population, depending on whether impacts are local, national or global.
- The area affected by planned infrastructure and unplanned developments induced by the project (e.g. informal settlements).
- The area of influence as determined by, for example, the watershed, airshed, migratory routes, and/or areas used for livelihood, religious or cultural activities.

Spatial levels are most easily defined in terms of administrative units, but levels defined by ecologically, hydrologically, or other considerations may also be relevant (Guijt et al., 2001:46–48). Stinchcombe and Gibson (2001:358) conclude that: "The higher the focal level and, hence, the greater the spatial scale the more difficult impact prediction can become." Burdge and Vanclay (1995:53) reach the same conclusion.

The SD-directed assessment literature encourages assessments to adopt both a short and a long term focus, covering construction, operation and, where relevant, decommissioning and post-closure (United Nations, 2002:36). Considering the post-closure phase significantly increases the time horizon of assessments (MMSD North America, 2002:16). Gibson (2000) observes that:

> In theory, Sustainability Assessment should focus on the longer term where ecological, social and economic imperatives tend to coincide. In practice, however, short term imperatives are driven by powerful economic and political interests and are difficult to resist. This suggests that transition to Sustainability Assessment will be helpful only if the sustainability criterion is clearly specified and imposed in ways that stress the long term and prevent ecological sacrifices for short term gain.

Table 1
Varying applications of CEA

Project-based (bottom–up)	Narrowly as part of conventional S&EIA. (This is most common.)	
	Broadly as a planning tool, possibly as a stand-alone process.	As part of land use planning, where 'rules' are established for projects within the area.
Regional-based (top–down)	As part of the SEA of PPPs.	

(DEAT, 2004b:7–8; Stiff, 2001:3&70–71).

5.4. Considering alternatives

The need to consider alternatives is another widely promoted feature of SD-directed assessments. Considering alternatives can occur at two levels, namely: alternatives in relation to a particular project versus alternative projects or initiatives that are substantively different (DEAT, 2004a:5; Noble, 2000:207; Walmsley, 2004). The former is usually promoted within EIA and the latter within SEA.

One of the main 'selling points' for SEA is that it can be used to proactively identify the best alternatives rather than merely 'fine tuning' a particular alternative[9]. However, for assessment at the PPP levels to successfully guide projects they must be undertaken in anticipation of them. It is generally accepted that it is beyond the scope of a project-level S&EIAs to consider alternative projects, other than the 'no project option' (DEAT, 2004a:5&7; MMSD North America, 2002:23; OECD, 2006:31). While it may be too late for fundamental changes, many improvements can still be achieved at the project-level, especially at an early stage, through: site selection, choice of technology, design etc.; hence considering alternatives is also a feature that is strongly promoted for improving the SD-directedness of project-level assessments (IFC, 2003b; Shell, 2002:29).

5.5. Cumulative impacts/effects

Cumulative effects are "changes to the environment that are caused by an action in combination with other past, present and future human actions" (Hegmann et al., 1999:3). The assessment of cumulative impacts/effects is both a consequence of including SD consideration in assessments, and a tool for achieving this (DEAT, 2004b:1&5; DETR, 2000:Sec6.9; Piper, 2002:18&20). Cumulative Effects Assessment (CEA) can be applied at two levels (see Table 1).

CEA has been widely promoted as means to enhance project-level S&EIA and features in most 'good practice' guidelines (Bisset, 1996:Sec6.4&6.5; IFC, 2003a:Annex. C; Shell, 2002:28). However, since CEA requires consideration of a wide range of activities within wider spatial and longer time scales, many commentators have recognised that it is most effective when undertaken at a strategic-level (Bisset, 1996:Sec6.7; Dalal-Clayton and Sadler, 2005:20–21; MMSD North America, 2002:9; Sadler, 1996:161; Stinchcombe and Gibson, 2001:353–354).

The authors of a South African guideline observe that there appears to be a consensus that CEA should be integrated into existing EIA and SEA processes (DEAT, 2004b:1). Following her review of recent literature Stiff (2001:85) concludes that: "CEA should be undertaken both at the project-specific level and on a regional planning basis, in order to develop a complete picture of the environmental effects of human activities. Linkages need to be established between these processes." In the literature there is considerable overlap between the features described under the CEA, SEA and Sustainability Assessment 'labels'.

Brownlie and Wynberg (2001:27) complain that there seems to be lack of clarity about how to assess and allocate responsibility to developers for cumulative impacts. The MMSD North America (2002:24) researchers warn that the requirement to undertake CEA "pushes a company into subject material well beyond its area of expertise, direct control and responsibility" (Table 1).

5.6. Accommodating uncertainty

In many respects greater uncertainty is the 'price that must be paid' for improving the SD-directedness of assessments, since increased uncertainty is associated with wider thematic coverage (Bisset, 1996:Annex.1; Gibson, 2001:21); longer timescales (Dalal-Clayton and Sadler, 2004:217; Goodland and Mercier, 1999:6); considering indirect impacts (Sadler et al., 2000:19), and greater use of participatory and interdisciplinary techniques (Rotmans, 1999:6). Hence, it is argued that uncertainty is an inevitable/inherent feature of SD-directed assessment (George and Kirkpatrick, 2003:27; Sadler et al., 2000:19).

[9] (Bisset, 1996:Sec8.7; Noble, 2000:210; Sadler et al., 2000:3; Smith and Sheate, 2001b:746; Stinchcombe and Gibson, 2001:346,352&359).

Table 2
Approaches to addressing uncertainty

Sensitivity analysis	Establishing 'best' and 'worst' case predictions, and attaching confidence limits to impact predictions (UNEP, 2003:269).
Adaptive management	Moving away from pursuing the 'best' or 'most correct' option to seeking options that are flexible (George and Kirkpatrick, 2003:27; Gibson, 2001:21; Goodland and Mercier, 1999:6).
Scenario analysis	Scenarios are helpful for thinking about the 'unknowable' future and, hence, can be useful for broadening perspectives and challenging conventional thinking (Dalal-Clayton and Sadler, 2004:216–223; Rotmans, 1999:16–17). Alcamo (2001) promotes the use of scenarios in EIA, and Wollenberg et al. (2000) have developed a guide for the use of scenarios as an adaptive management tool.
Precautionary approach	Principle 15 of the Rio Declaration is extensively promoted as the appropriate response to uncertainty in the SD context *. Robèrt et al. (2002:202) posit that a "rational application of the precautionary principle requires a strategic approach".

* (Bisset, 1996:Sec8.4; George, 1999:184; Gibson, 2001:20–21; MMSD North America, 2002; Sadler, 1996:Sec7.2.7; Stinchcombe and Gibson, 2001:350).

'Risks' and 'uncertainties' are sometimes used interchangeably; however Abaza et al. (2004:145) distinguish between them, as follows:

> Risks are involved when probabilities can be assigned to the likelihood of an event occurring […]. Uncertainty is concerned with a situation in which very little is known about future events, or impacts) and therefore no probabilities can be calculated and assigned to outcomes. There are, also, events which are unknown and cannot be anticipated in advance.

The authors of an EIA guidance document observe that uncertainty is "a pervasive issue at all stages of the EIA process but is especially important for impact prediction" (UNEP, 2003:269). They distinguish between 'scientific', 'data', and 'policy' as sources of uncertainty. These are respectively due to: limited understanding of an ecosystem, community and/or change processes; restrictions introduced by incomplete or non-comparable information, or by insufficient measurement techniques; and unclear or disputed objectives, standards or guidelines.

George and Kirkpatrick (2003:24) highlight a dilemma that accommodating uncertainty may introduce, namely that the "assessment would not be robust if it failed to acknowledge uncertainties in its findings, yet at the same time, a lack of certainty may itself be interpreted as a lack of robustness". In this vein Glasson et al. (1999:138) observe that:

> Environmental impact statements often appear more certain in their predictions than they should. This may reflect a concern not to undermine credibility and/or an unwillingness to attempt to allow for uncertainty. All predictions have an element of uncertainty, but it is only in recent years that such uncertainty has begun to be acknowledged in the EIA process.

Accommodating rather than eliminating uncertainty poses many challenges (Stinchcombe and Gibson, 2001:350). Approaches to addressing uncertainty are summarised in Table 2.

On a pragmatic note the MMSD North America (2002:24) researchers observe that: "In practice, decisions must be made; the world isn't going to stop. In principle then, the way forward should be guided by tenets such as adaptive management and the precautionary principle." However, Brownlie and Wynberg (2001:27) complain that in South Africa:

> There is no clear guidance on application of the precautionary principle by decision-makers: When are levels of uncertainty and potential consequences such that a proposed action should not proceed? When are proposed mitigatory measures — including monitoring and corrective action — sufficient to allow the proposed action to proceed in spite of uncertainty?

6. Conclusions

By applying the three-dimensional framework assessment approaches can be positioned relative to one another. This should be done by referring to the features that are described rather than the terminology that is used. The discipline of 'unpacking' the features according to the axes enables comparison on the basis of substance rather than semantics, which is helpful in a field where the use of terminology is inconsistent and, sometimes, confusing. Besides facilitating common understanding across jurisdictions, the framework can be of practical use in any particular jurisdiction by revealing gaps and, hence, the enhancements needed to achieve SD-directed assessment.

On the surface, the framework may appear somewhat trivial in that it does not introduce any new or complex ideas. However, in the authors' experience the lack of clarity concerning these fundamental features frequently hampers constructive debate between commentators from various jurisdictions, 'schools of thought', and/or disciplinary backgrounds. The framework also avoids a number of frequently erroneous assumptions, namely: that a well-developed, 'tiered' planning hierarchy exists; and that SD-directed assessments will be achieved via a single, 'silver bullet' form of assessment, rather than via an eclectic mix of assessment and para-assessment techniques. By not prescribing what the mix should be, the framework can be applied to any context. In some contexts the 'box' might be filled by a large number of 'blocks' of different shapes and sizes; whereas in others there might only be a few orderly arranged 'blocks' (or 'layers'). The challenge everywhere is to ensure that the 'box' is full. This does not mean that it should be filled by EIA, SEA, or any other single impact assessment technique. The clarity of discussions surrounding any form of assessment would be greatly enhanced by firstly clarifying its position within the 'box'.

While the framework endeavours to capture the wide spectrum of features promoted in the SD-directed assessment literature, it does not represent consensus regarding the degree to which it is practical or desirable for EIA or SEA to 'expand' along the axes. In any particular context it will be necessary to determine: the themes that they should cover; the extent to which they should compare impacts rather than merely presenting a 'database' of impacts for informing 'political' decision-making; and the practicality of cascading results from higher to lower planning levels.

Analysing progress along the comprehensiveness axis is hampered by the difficulties in establishing the themes that are of relevance to SD in any particular context. In many jurisdictions there has been a shift away from purely biophysical assessment towards coverage of issues of concern to a wider range of stakeholders. However, there is the danger that SD-directed assessment may become a 'catch all' for every conceivable topic. Progress with establishing SD objectives should serve to clarify the relevant themes, since objectives need to be set in relation to something. Progress along the integratedness axis can be achieved through the use of 'integrated' S&EIA, the exploration of interrelationships between themes, and presentation of the 'complete picture' of positive and negative, biophysical and socio-economic impacts. Further progress is impeded by almost intractable difficulties with presenting impacts in a truly comparable manner.

When considering the framework in relation to project-level assessment a difficult question that arises is the extent to which shifting along the strategicness axis can (or should) be achieved. The corollary of this is to question the extent to which project-level assessments can be SD-directed. It is unfeasible to 'push' project-level assessment to the extent that it becomes fully strategic. Private sector project proponents will, in particular, be reluctant to consider alternatives that lie outside their areas of business interest. In addition, developments by the private sector are not intended primarily to satisfy societal needs; although it is reasonable for societies to expect that they contribute to such needs. Therefore, at some point along the strategicness axis the boundary is crossed between project and PPP-level assessment and planning, and some form of 'tiering' is necessary for the axis to be continuous. This introduces many practical difficulties. By avoiding the idealised distinction between assessment at the PPP and project levels, the framework can be applied to contexts ranging from well-developed system of 'tiering', to the virtual absence of assessment at higher planning levels.

While it has proven convenient to 'pigeonhole' the features into the three main categories, the axes are interdependent. For example: expanding the coverage is accompanied by integration of techniques and themes; assessing cumulative impacts requires the perspective of a wider spatial scale; and adopting wider spatial and time scales increases uncertainties.

The authors were only able to identify distinguishing SD-directed features within the assessment process. As experience in the use of SD-directed forms of assessment is gained, distinguishing process and context features are likely to emerge. Questions that have been raised regarding whether assessments have influenced substantive decisions can certainly be raised against enhanced forms of assessment, which may challenge even further politically-sensitive decision-making. This paper is rooted in the optimistic 'school-of-thought', which asserts that assessment does (ultimately) influence decision-making, even though the influence is not always readily apparent at the time.

A wide variety of approaches for progressing along each of the axis have been outlined briefly. They range from 'stretching' EIA or SEA to developing completely new techniques. However, there is little convergence of opinion and many of the proposed approaches do not yet have a sufficient track record as a basis for judging their effectiveness. A great deal of work may still be required to develop assessment techniques that deliver practical results capable of supporting the lavish policy-level commitments to SD.

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