

BEYOND THE PILLARS: SUSTAINABILITY ASSESSMENT AS A FRAMEWORK FOR EFFECTIVE INTEGRATION OF SOCIAL, ECONOMIC AND ECOLOGICAL CONSIDERATIONS IN SIGNIFICANT DECISION-MAKING

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Sustainability is an essentially integrative concept. It seems reasonable, then, to design sustainability assessment as an essentially integrative process and framework for decision-making on undertakings that may have lasting effects.

The realm of sustainability has often been depicted as the intersection of social, economic and ecological interests and initiatives. Accordingly, many approaches to sustainability oriented assessments — at the project as well as strategic level — have begun by addressing the social, economic and ecological considerations separately and have then struggled with how to integrate the separate findings. The problem is exacerbated by the generally separate training of experts in the three fields, the habitual collection of data separately under the three categories and the common division of government mandates into separate social, economic and ecological bodies. The combined effect is not merely an absence of integrative expertise, data and authority but an entrenched tendency to neglect the interdependence of these factors. The three pillars or triple bottom line approach also appears to encourage an emphasis on balancing and making trade-offs, which may often be necessary but which should always be the last resort, not the assumed task, in sustainability assessment.

There are, however, important concerns underlying advocacy and application of some three pillar, limited integration approaches. Most significant are well-grounded fears that integrated, sustainability-based assessments may facilitate continued or even renewed neglect of traditionally under valued considerations, especially the protection of ecological systems and functions. This problem needs to be addressed thoughtfully in judgements about how integration is to be done.

One possible solution is to take sustainability as an essentially integrative concept and to design sustainability assessment more aggressively as an integrative process. This would

entail a package of regime and process design features, centred on ones that

- build sustainability assessment into a larger overall governance regime that is designed to respect interconnections among issues, objectives, actions and effects, though the full interrelated set of activities from broad agenda setting to results monitoring and response;
- design assessment processes with an iterative conception-to-resurrection agenda, aiming to maximise multiple, reinforcing net benefits through selection, design and adaptive implementation of the most desirable option for every significant strategic or project level undertaking;
- redefine the driving objectives and consequent evaluation and decision criteria to avoid the three conventional categories, to ensure attention to usually neglected sustainability requirements and to focus attention on the achievement of multiple, mutually reinforcing gains;
- establish explicit basic rules that discourage trade-offs to the extent possible while guiding the decision-making on those that are unavoidable;
- provide means of combining, specifying and complementing these generic criteria and trade-off rules with attention to case- and context-specific concerns, objectives, priorities and possibilities;
- provide integrative, sustainability-centred guidance, methods and tools to help meet the key practical demands of assessment work, including identifying key cross-cutting issues and linkages among factors, judging the significance of predicted effects, and weighing overall options and implications; and
- ensure that the decision-making process facilitates public scrutiny and encourages effective public participation.

Keywords: Sustainability assessment; integration; process design; decision criteria; trade-off rules.

Introduction

The core argument here is quite simple. 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.

Sustainability assessment can be integrative in many ways (Eggenberger and Partidario, 2000; Scrace and Sheate, 2002; Dovers, 2005). It can and should be designed to foster greater awareness of connections between global and local concerns, for example. It also has great potential for encouraging stronger connections between strategic and project level assessments, better links among assessment methodologies, more effective inclusion of usually disadvantaged voices, improved means of combining formal and traditional sources of data and insight, and more successful combinations of anticipation and adaptation. Perhaps, it can even be designed to foster more graceful collaboration among different jurisdictions and authorities.

Most if not all of these possibilities arise, at least tangentially, in the discussion to follow. The focus, however, is on integrated attention to the “three pillars of

sustainability” — the interrelated influences, effects and objectives that we have most often categorised, and treated more or less separately, as matters in the social, economic and biophysical realms. Ensuring careful attention to the interrelations among these realms, and seeking mutually reinforcing gains in all areas that are crucial for progress towards more viable futures, comes close to covering the defining agenda of sustainability assessment as an approach to the planning, evaluation and implementation of significant undertakings.

Even with this restricted focus and cheerful purpose, however, there are dangers and complexities to be faced. Arguably, the biggest are related to concerns that pursuit of desirable integration through sustainability assessment could dilute attention to ecological imperatives and other too often neglected concerns, thereby imperilling some of sustainability’s own objectives. The aim of the paper is to illuminate how we might best achieve integration in sustainability assessment while avoiding the risks.

Sustainability and Integration

Sustainability as an idea arose as a critique of and response to decision-making practices and results that failed consistently and sometimes catastrophically because the interconnections among key factors were not recognised.

Some pre-Brundtland versions of the concept — for example, eco-development (CIDA, 1979) — responded to the disappointments and tragedies of development assistance undertakings that had ignored local conditions, cultures and capacities. Other versions such as in the 1980 World Conservation Strategy (IUCN, UNEP and WWF, 1980) were the fruits of gradual experiential learning that there could be no species preservation without habitat preservation and no habitat preservation without local livelihood security.

“Sustainable development” as proposed by the Brundtland Commission (WCED, 1987) became popular because of and despite the tension it embodied. Critics called it an oxymoron or an illusion (e.g. Livingston, 1994; Sachs, 1999). But its genius lay in recognition that combating poverty (which is not just economic) and protecting the environment (which is not just biophysical) were necessary to each other and both were likely to fail if not addressed together.

Post-Brundtland sustainability is even more thoroughly integrative. Sustainability-based deliberations are now commonly presented as the appropriate response to the increasingly well-reported legacy of narrowly motivated and fragmented initiatives that proved to be problematic, if not disastrous, because key factors — local conditions, cultures and capabilities, the needs and preferences of intended beneficiaries, implications for ecosystems and future generations, the potential for unanticipated surprise — had been overlooked or too quickly dismissed. DDT and CFCs, acidic precipitation, tractors rusting in the fields of Africa, silted reservoirs,

assistance programmes that worsened circumstances for the poorest of the poor, and countless uncelebrated but similarly regrettable local experiences have been lessons on the need for a different approach.

In most informed circles, sustainability has become firmly associated with appreciation of the complexity of entwined human and ecological systems (multiple interacting factors and dynamic self-organising processes in multiple interacting systems, at various scales, with pervasive and inevitable uncertainties, etc.). This has been accompanied by an industry of indicator development initiatives leading to a glorious diversity of packages that have nonetheless all encouraged attention to a wider range of factors and connections.

Where there have been attempts at implementation through sustainability-oriented projects, policies and other undertakings, they have virtually always required new or further collaboration — not just among specialised experts and narrowly mandated agencies, but also in broadening circles of public and private interests. Sustainability initiatives (and reaction against clearly unsustainable practices) have helped to push the transition from a standard market-and-state government model to multi-player governance. There is now increasingly widespread acceptance that while governments and markets are and will remain crucial, they are also insufficient and there is a consequent need for bigger systems linking public government, market actors, civil society organisations, and engaged citizens, often at several scales, local to global.

The product of this continuing evolution is sustainability as a multi-dimensional integrative concept. Among other aspects, sustainability links the human and bio-physical, present and future, local and global, active and precautionary, critique and alternative vision, concept and practice, and universal and context-specific. In addition, proper sustainability implementation engages together participants covering the full range of public, corporate and civil society organisations and institutions, as well as individuals with their various capacities and inclinations. And all of these are recognised as constituent factors in complex and dynamic interrelations.

There is no possibility that all this can be depicted, much less understood or managed, in any comprehensive way. Appreciation of uncertainty is necessarily also part of the sustainability concept. Still, the essence of the concept, and the key to its implementation, is clearly centred on appreciation of links and integration of the relevant considerations.

Integration and the Three Pillars

The realm of sustainability has often been depicted as the intersection, rather than the integration, of social, economic and ecological interests and initiatives. Accordingly,

many approaches to sustainability oriented assessments — at the project as well as strategic level — have begun by addressing the social, economic and ecological considerations separately and have then struggled with how to integrate the separate findings.

The three pillars (three circles or triple bottom line) approaches to sustainability have some important advantages, including for sustainability assessment application. They fit well with the established capacities of assessment and review experts trained in the three constituent fields (social, economic and ecological), with the organisation of much of the relevant information (e.g. data sets collected separately under these categories), and with the usual division of social, economic and environmental mandates among government bodies with relevant responsibilities in strategic as well as project assessments.

But if we see integration as the core characteristic of sustainability as a concept and the main challenge of sustainability assessment as a process, these strengths re-emerge as limitations. Effective integration of the major interdependent considerations in sustainability assessment is likely to be frustrated by the established capacities of experts trained separately in social, economic and ecological fields, by the habitual collection of data separately under these categories, and by the common division of government mandates into separate social, economic and ecological authorities.

This makes the three pillars approach a poor fit with intertwined sustainability problems, which by definition do not fit tidily into any one of the three pillars and which demand responses that seek multiple, mutually reinforcing contributions to a positive shift in practice.

The consequences include not just an absence of integrative expertise, data and authority, but an entrenched tendency to neglect the profound interdependence of these factors, and to see them as likely to be conflicting rather than potentially complementary. The three pillars approach is often accompanied by an assumption that sustainability is about balancing, which contradicts both the key insights concerning the interdependence of factors and the need for mutually supporting advances on all fronts. It also encourages an emphasis on making trade-offs, which may often be necessary but which should always be the last resort, not the assumed task, in sustainability assessment.

No less significantly, the three pillars fit poorly with the concerns commonly expressed by citizens who are the intended beneficiaries of strategic and project level undertakings. These concerns rarely slide tidily into the social, economic or ecological categories. Bottom-up public issue identification and priority setting processes often identify secure livelihoods, safety, health, vibrant and attractive communities, new opportunities and choice, and influence in decisions as key objectives. None of these is a purely social, economic or ecological matter.

Integration after Three Pillar Evaluations

There is some defence for the use of three (separate) pillar approaches in assessment decision-making. As suggested above, pillar-based approaches may often be more palatable politically for reasons of fit with existing expertise, institutional structures and data sets. An important additional argument centres on two admirable objectives: ensuring clear and explicit attention to traditionally undervalued ecological (and other) considerations, and enhancing political accountability in ecologically significant decisions.

There are good grounds for concern on both fronts. Ecological considerations certainly have been neglected, quietly down played, marginalised and trivialised in important decision-making processes, including those with environmental assessment requirements. To the extent that more attention is now paid and better decisions are now more frequently won, much of the credit goes to the long and strenuous efforts by many individuals and organisations to establish strong legislated regimes with a mandatory biophysical focus and decision-making transparency. These achievements are important, incomplete and fragile. Any new decision-making process that may threaten these gains deserves to be regarded with some suspicion. And certainly we have seen allegedly sustainability-centred processes that have used loose applications of the language of sustainability to cover business as usual emphasis on economic over ecological concerns.

With this in mind, some sustainability assessment advocates have argued for approaches that keep the economic, social and ecological pillars quite separate, with integration (assumed to be a trade-off decision) reserved for the approval (or rejection) decision (Jenkins *et al.*, 2003). The intent is to ensure that ecological concerns are not quietly shuffled off the agenda at some early stage, that the political character of trade-off decisions is recognised, and that decision accountability is facilitated.

The resulting process — three separate pillar assessments with integration at the political decision stage — does have strengths. If the three assessments are public and the authoritative decision-making is transparent, somewhat more late process attention to ecological factors and somewhat greater political accountability may be won. Focusing on open sustainability-oriented integration at the decision stage is particularly enticing in cases apparently centred on a single key trade-off between immediate economic interests and longer term ecological values.

The Gorgon gas field case in Western Australia is a possible example (Pope *et al.*, 2004; and the papers by Morrison-Saunders and Therivel (2006) and by Pope and Grace (2006)). In that case, controversy turned on an apparently sharp choice between the economic objectives served by approval of gas field exploitation and ecological objectives threatened by the proponent's determination that the

only viable site for its gas processing facilities was an irreplaceable island nature reserve. Sustainability objectives allegedly guided assessment work, and the government authorities hoped that environmental offsets would allow ecological as well as economic gains. When possibly adequate offsets were not found, the exercise ended conventionally by favouring the economic priority. In end this seems to have been a simple economy versus environment trade-off case, ill served by integrative assessment efforts. But even here it remains possible that a more advanced approach to sustainability assessment, with a broader and more critical early framing of the key question and a consequently richer range of development options under consideration, would have expanded the search for feasible solutions with wider benefits and less ugly trade-offs.

The Gorgon case aside, there certainly have been and will be situations in which there are few potentially viable options and all involve straightforward environment-economy conflict. In such cases, full process integration may obscure as much as it enlightens. In most cases, however, the issues are more complex, the potential options and variations of options are more numerous, and the task of sustainability-guided integration cannot properly be reduced to illumination of one key choice at one important decision point.

Assessment cases typically involve multiple, iterative decisions. Among the important choices that are normally made well before the approval/rejection decision are those that determine purposes, alternatives, scope, key issues to examine, legitimate participants, evaluation criteria, case priorities and information adequacy. Indeed, the most powerful decisions are often those that determine the purposes to be served and the alternatives to be considered. Unless sustainability considerations are addressed, together, throughout the full deliberative process beginning with the earliest decisions that frame the discussion, what comes to the approval point is likely to a business as usual proposal with damage mitigation promises, rather than a more forward looking and innovative option that has been carefully conceived, selected and designed to deliver maximum positive contributions to sustainability.

Moreover, in most assessment cases the key public issues cross pillar boundaries. Conventional institutions and professionalised experts may favour the conventional pillar categories but, as noted above, citizens asked about their key well-being concerns more typically list priorities that do not fit tidily into single pillars.

An integrative focus on approval decisions also defies the practical reality that at this point it is typically too late for serious reconsideration. In a very few highly contested cases, rejection or very heavily conditional approval may be possible. But usually, by the time the approval decision is sought, the momentum of the proposal is too great. Too much has been invested. Too many expectations have been raised. And too much political courage is required to go against the still dominant forces

and habits that favour immediate growth. In late integration, ecology may get its visible day in the decision-making sun, but it is disadvantaged there.

Even the prospects for practical accountability in relatively visible political approval decisions are limited and not often likely to bring substantial gains. It may be possible to persuade political authorities to make the economic, social and ecological evaluations public before the political decision is made. It may also be possible to establish an expectation for public rationales when decisions are announced (though the actual agency advice that normally plays the determining role will still remain a secret in most jurisdictions). But authorities habitually devoted to economic priorities, and well versed in issue management, are unlikely to abandon their usual path in these circumstances. Except for extraordinarily high profile matters that spur disruptive public controversy, the attention given to a single decision and the resulting effects on voting behaviour are likely to be negligible. A much more effective and well tested means of enhancing accountability is a combination of process transparency and publicly enforceable legal obligation, neither of which needs to be (or should be) limited to the approval decision stage.

Most fundamentally, processes using separate assessments with integration only at the point of approval neglect the central character of the sustainability concept and focus the assessment enterprise on conflict between objectives. As argued above, the genius of the sustainability concept is its insistence on interconnections and interdependencies. It consequently demands planning and decision-making that look for the links, and seek mutually reinforcing gains on all fronts. It is not about balancing or making trade-offs. It is about integrating and avoiding trade-offs to the extent possible.

The integrative understanding that underlies the sustainability concept recognises also that overall results will rarely be simple sums of anticipated direct effects. Because of the interconnections, secondary effects and multiple feedbacks, adding up the predictions separately calculated in separate pillars will not provide a reliable total of effects, or a sense of the resulting whole.

Together, these difficulties seem fatal for the separate pillar assessment and political trade-off decision approach. Unfortunately, the problems that this approach were designed to confront are still with us. In a world that is far from sustainability and determinedly marching in wrong direction, trade-offs can seldom be avoided entirely and are often very serious. Moreover, it is still an uphill struggle to ensure that all crucial factors (including often neglected ones such as long-term ecological integrity and distributional equity within and between generations) are given adequate attention in a transparent process with accountable decision makers.

There are, consequently, two key lessons here: it is sensible and in the end necessary to integrate the full suite of sustainability considerations through the entire process of deliberation, decision and implementation. At the same time, however,

the integration must be seriously devoted to mutually-supporting gains in all categories and the process must be designed and reliably applied in ways that are open and accountable enough to provide confidence that the core principles of integrated sustainability assessment will be respected. Otherwise there is indeed a serious risk of decision makers making claims about sustainability and integration but actually just using a new cover for the longstanding biases favouring narrow and short-term interests.

A Package of Assessment Components for Integration

The challenge, then, is to design a sustainability assessment approach that is true to the integrative genius of the concept, but that also ensures attention (maybe even special, corrective attention) to the usually neglected factors, and is minimally vulnerable to damaging implementation. The working premise here is that no single assessment design feature is likely to be sufficient for this, but that a package of linked features might succeed.

There are many ways of fostering early and consistent attention to cross-pillar issues and linkages in sustainability assessment. Perhaps most common are frameworks that adjust or extend the three pillar categories to include cross-pillar concerns and connections. This may be done in the establishment of generic categories for evaluation or in the early stages of deliberations on particular cases. Versions of this strategy include Devuyst's (1999) addition of non- or cross-pillar considerations to a generic list of standard criteria and use of case- or region-specific visions or scenarios to help define and extend the assessment framework for particular assessments; Hong Kong's (2002) adoption of issue-based assessment categories that depart more and less significantly from the usual pillar categories; and the Forest Stewardship Council's (2004a,b) use of cross-cutting key principles and criteria combined with use of three pillar area expert/interest groups (chambers). By themselves, however, such approaches do not ensure attention to the often neglected voices and issues, unless the categories of concern and the criteria to be met are designed explicitly to require it.

Some assessment approaches address the neglect problem by putting one set of under-appreciated concerns at the forefront and arranging all other considerations around this core. This is done in ecosystem-centred assessment tools. The World Conservation Union's "egg of sustainability" approach, for example, depicts people as the yolk within the ecosystem egg (Guijt *et al.*, 2001). Similarly, the Millennium Ecosystem Assessment project (2005) begins with the systems that provide key ecosystem services and their links to other, largely cross-pillar determinants and constituents of human well-being. Such approaches, including the two examples here, are meant mostly for evaluations of conditions and trends, rather than for

direct application in the assessment of strategic or project undertakings. But such frameworks could be used for more than information gathering and interpretation. The difficulty is that ecological concerns are not the only crucial factors that deserve more attention than they usually get. Social justice and equity effects, for example, are often at least equally vulnerable to neglect. For comprehensive sustainability assessment purposes, the need is for means of ensuring adequate attention to all factors that matter.

In the circumstances, no one mechanism or process characteristic is likely to provide a satisfactory response. As a rough proposal, however, the following package of key assessment design components centred on seven broad components might provide the makings of a viable solution.

- *Build sustainability assessment into a larger overall governance regime that is designed to respect interconnections among issues, objectives, actions and effects, though the full interrelated set of activities from broad agenda setting to results monitoring and response.*

Particular sustainability-based assessments will be more reliably integrative, in a way that ensures attention to otherwise often neglected considerations, if they are part of and subject to an overall decision-making regime and associated processes designed to ensure application of the integrative approach. The broad regime should properly include broad agenda and objective setting (e.g. national sustainability objectives), strategic and project level planning and evaluation, performance requirements and incentives, monitoring and response mechanisms, suitable institutional arrangements, etc. All of these would be linked together as well as specifically designed to facilitate and support integrated attention to concerns affecting prospects for sustainability.

An initial, though still incomplete, example is provided by the State of Western Australia, which has been moving into sustainability assessment guided by a State Sustainability Strategy (Government of Western Australia, 2003). The Strategy has, for example, been adopted as the basic foundation for a sustainability-based assessment of the proposed South West Yarragadee Water Supply Development (Strategen, 2006). The Yarragadee assessment does not cover water supply and demand alternatives. But it does explicitly adopt sustainability-based evaluation and process principles (based on the Strategy) and trade-off rules (the ones in Box 2, below). Moreover, it is open to public comment through a Sustainability Panel established to provide “transparent and independent advice on the proposal and ... integrated evaluation of social, economic and environmental factors” (Strategen, 2006, vol. 1, p. 2–4). While this assessment is an ad hoc process rather than a regular application of an established larger regime, it does represent a step towards the kind of larger package needed as a reliable context for integrative sustainability assessment (Pope and Grace, 2006).

- *Design assessment processes with an iterative conception-to-resurrection agenda, aiming to maximise multiple reinforcing net benefits through selection, design and adaptive implementation of the most desirable option for every significant strategic or project level undertaking.*

Within the larger regime, the sustainability assessment process itself would need be designed with explicit sustainability purposes and criteria (see below regarding criteria and trade-off rules). The requirements would specify application of an integrative approach through all steps of deliberation and action on an undertaking, from conception to resurrection, so that the whole process would serve the objective of maximising multiple reinforcing benefits and avoiding compromises on matters required for progress towards sustainability.

All of the usual expectations for effective assessment law and process apply. In addition to the sustainability purposes and criteria, crucial components would include, for example, clear delineation of and authority for:

- the categories of undertakings to which assessment requirements apply;
- hierarchies, tiers and streams of assessment, with guidance on how they may be linked;
- the scope of mandatory considerations, including comparative evaluation of alternatives in light of the full suite of sustainability criteria/considerations;
- process transparency and means of facilitating public and other stakeholder participation;
- assignment of responsibilities and accountability for approvals;
- follow-up monitoring and response;
- enforcement powers, including public rights of appeal and legal challenge;
- administrative arrangements and institutional responsibilities;
- linkages beyond assessment to components of the larger regime;
- means of pursuing efficiencies in process application (focusing of deliberations, consolidation with other review and approval requirements, etc.).

Some of these are only indirect contributors to well-integrated attention to sustainability considerations. Each one, however, is a necessary part of the overall package required to ensure that the integrative approach is reliably specified and that the associated obligations are respected. This is perhaps clearest in public rights of participation and legal action. Because sustainability assessment is meant to change how decisions are made, and to push a transition from conventional, unsustainable practice, we can safely assume that its demands will be avoided, resisted and minimised by a sizable portion of the proponents and authorities subject to it. Effectively integrated sustainability assessment with careful attention to usually neglected concerns and serious efforts to find best options for lasting gains may therefore depend heavily on legislated assurance of process

transparency and public rights to pursue legal action in the event of evident non-compliance with the process rules, framework criteria and/or trade-off provisions (for a discussion of legal regimes for transparency and public action to enforce obligations, see for example, Swaigen and Estrin, 1993).

- *Redefine the driving objectives and consequent evaluation and decision criteria to avoid the three conventional categories, to ensure attention to usually neglected sustainability requirements, and to focus attention on the achievement of multiple, mutually reinforcing gains.*

The assessment evaluation and decision framework must be built on generic assessment criteria that not only cover all core sustainability requirements, but also force thinking across the boundaries between the three usual pillar categories, and draw explicit attention to the concerns most commonly ignored or marginalised in conventional decision-making. The overall objective in framing these criteria is to focus attention on recognising interrelationships and maximising multiple reinforcing net benefits for sustainability, while minimising compromises, through selection, design and adaptive implementation of the most desirable option. A possible basic set of such criteria is presented in Box 1. These criteria would have to be supplemented by and integrated with more particular considerations appropriate to specific cases and contexts (see below), but would provide a consistent common base for integrated deliberations.

Box 1. Integrative generic criteria for sustainability assessments.

Socio-ecological system integrity

Build human-ecological relations to establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological well-being depends.

Livelihood sufficiency and opportunity

Ensure that everyone and every community has enough for a decent life and that everyone has opportunities to seek improvements in ways that do not compromise future generations' possibilities for sufficiency and opportunity.

Intragenerational equity

Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.

Intergenerational equity

Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.

Box 1. (Continued)

Resource maintenance and efficiency

Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long-term integrity of socio-ecological systems by reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit.

Socio-ecological civility and democratic governance

Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision-making bodies to apply sustainability requirements through more open and better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision-making practices.

Precaution and adaptation

Respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability, plan to learn, design for surprise, and manage for adaptation.

Immediate and long-term integration

Apply all principles of sustainability at once, seeking mutually supportive benefits and multiple gains.

— from Gibson *et al.* (2005), Chapter 5

- *Establish explicit basic rules that discourage trade-offs to the extent possible while guiding the decision-making on those that are unavoidable.*

The basic criteria would be supplemented by broadly applicable trade-off rules designed to encourage those planning and approving significant undertakings to avoid and minimise any compromises that might damage overall prospects for sustainability. Such rules, illustrated by the set in Box 2, would require explicit attention to and rationales for proposed trade-offs, and limit the range and possible justifications of acceptable trade-offs. Some trade-offs would be unavoidable, but successful application of the rules should prevent neglect of any major category of sustainability concern and discourage unnecessary sacrifices.

Box 2. Basic sustainability assessment trade-off rules.

Maximum net gains

Any acceptable trade-off or set of trade-offs must deliver net progress towards meeting the requirements for sustainability; it must seek mutually reinforcing, cumulative and lasting contributions and must favour achievement of the most positive feasible overall result, while avoiding significant adverse effects.

Box 2. (Continued)

Burden of argument on trade-off proponent

Trade-off compromises that involve acceptance of adverse effects in sustainability-related areas are undesirable unless proven (or reasonably established) otherwise; the burden of justification falls on the proponent of the trade-off.

Avoidance of significant adverse effects

No trade-off that involves a significant adverse effect on any sustainability requirement area (for example, any effect that might undermine the integrity of a viable socio-ecological system) can be justified unless the alternative is acceptance of an even more significant adverse effect.

- Generally, then, no compromise or trade-off is acceptable if it entails further decline or risk of decline in a major area of existing concern (for example, as set out in official international, national or other sustainability strategies or accords or as identified in open public processes at the local level), or if it endangers prospects for resolving problems properly identified as global, national and/or local priorities.
- Similarly, no trade-off is acceptable if it deepens problems in any requirement area (integrity, equity, etc.) where further decline in the existing situation may imperil the long-term viability of the whole, even if compensations of other kinds, or in other places are offered (for example, if inequities are already deep, there may be no ecological rehabilitation or efficiency compensation for introduction of significantly greater inequities).
- No enhancement can be permitted as an acceptable trade-off against incomplete mitigation of significant adverse effects if stronger mitigation efforts are feasible.

Protection of the future

No displacement of a significant adverse effect from the present to the future can be justified unless the alternative is displacement of an even more significant negative effect from the present to the future.

Explicit justification

All trade-offs must be accompanied by an explicit justification based on openly identified, context specific priorities as well as the sustainability decision criteria and the general trade-off rules.

- Justifications will be assisted by the presence of clarifying guides (sustainability policies, priority statements, plans based on analyses of existing stresses and desirable futures, guides to the evaluation of “significance”, etc.) that have been developed in processes as open and participative as those expected for sustainability assessments.

Open process

Proposed compromises and trade-offs must be addressed and justified through processes that include open and effective involvement of all stakeholders.

Box 2. (Continued)

- Relevant stakeholders include those representing sustainability-relevant positions (for example, community elders speaking for future generations) as well as those directly affected.
- While application of specialised expertise and technical tools can be very helpful, the decisions to be made are essentially and unavoidably value-laden and a public role is crucial.

— from Gibson *et al.* (2005), Chapter 6

- *Provide means of combining, specifying and complementing these generic criteria and trade-off rules with attention to case- and context-specific concerns, objectives, priorities and possibilities.*

The generic criteria and trade-off rules ensure attention to broad sustainability considerations and provide a common integrative framework for assessment work, but they are inherently insensitive to the particular conditions and priorities of different cases and places. Attention to these particulars — existing ecosystem stresses, cultural sensitivities, vulnerable communities, untapped opportunities, etc. — is crucial if lasting gains are to be delivered.

Merging the generic assessment criteria and trade-off rules with case- and context-specific concerns and priorities can be done in several ways. The key is to retain the design qualities that favour integrated attention to all interrelated issues, especially the often neglected ones, and that discourage the conventional compromises while ensuring that the case/context particulars, including the people who are to be affected, play a duly powerful role.

Three basic options are outlined in Box 3. Perhaps none is suitable for all applications. Certainly there is a need for testing in practical cases to see which works best for various different assessment types and topics.

Box 3. Basic framework options for merging generic assessment criteria and trade-off rules with case- and context-specific considerations.

Option 1 Integration of case/context specific considerations and concerns under assessment criteria categories

Basic structure of a framework for assessment deliberations, evaluations and decisions

- Standard framework categories would be defined by the assessment decision criteria and the generic trade-off rules set out in Boxes 1 and 2.
- Case- and context-specific considerations would be used to clarify and elaborate on the particular matters of importance in the broad framework categories defined by the generic decision criteria.

Box 3. (Continued)

Advantages

- Because they reflect the universally applicable general requirements for progress towards sustainability, these criteria and rules should be suitable for adoption in every particular assessment case.
- Common use of such a framework would enhance consistency and ease implementation by administrative authorities, major proponents and other process professionals.
- The framework would be available for application at the outset of deliberations, encouraging attention to the full suite of sustainability considerations in the crucial early stages where purposes and options are identified.

Difficulties

- Some of the major case- and context-specific issues may not fit tidily within the criteria-based framework categories (common concerns such as health and security, for example, tend to be relevant to several categories).
- Imposition of a generic framework may obscure case/context concerns and discourage effective participation by potentially affected citizens and other important stakeholders.

Option 2 Integration of assessment criteria under case/context issue categories

Basic structure of framework for assessment deliberations, evaluations and decisions

- Framework categories would be defined by the major sets of issues and concerns raised in the case and context.
- The generic assessment decision criteria and trade-off rules would be incorporated, as needed to fill out the case/context issue categories, to cover the full set of sustainability requirements.

Advantages

- The framework would be built on concern categories easily recognised by potential participants.
- The visible attention to case-context would reduce fears of an externally imposed agenda.
- Case/context-based framework might facilitate identification of needs and responses relatively easily incorporated in the case decision-making.

Difficulties

- Framework development would have to wait for identification of case and context issues, and would therefore not be available at the outset of deliberations.
- Some generic criteria and associated more specific concerns may not fit tidily within the case/context issue framework categories.
- Case issues might well evolve over the course of an assessment, as participants consider options and implications.
- Case by case framework design would limit the potential for consistency of approach and ease of implementation by administrative authorities, major proponents and other process professionals.

Box 3. (Continued)

Option 3 Hybrid models

Basic structure of framework for assessment deliberations, evaluations and decisions

- The frameworks would be built using a combination of generic criteria and rule categories and case/context issue categories.
- Elaborations under each category would take both generic and case/context specific considerations into account.

Advantages

- The combination would provide a visible reminder of the need to respect both generic requirements and case/context realities and priorities.
- Starting with the generic categories and gradually adding case/context categories and elaborations would permit expansion and evolution of thinking throughout the process but would also ensure a comprehensive basic framework is available for immediate use at the outset of deliberations.

Difficulties

- Considerable case-by-case variation would still limit consistency and administrative convenience.
- The total number of categories of considerations could become unwieldy, adding to process complexity and participant confusion.

One example of an integrative merging of the generic and specific considerations is provided in the current review of a proposed multi-billion dollar natural gas pipeline project in the Mackenzie Valley of Canada's Northwest Territories. The Joint Review Panel, operating under legislated federal, territorial and aboriginal authority, has formally expressed its intention "to approach sustainability as an important framework to evaluate the evidence and argument on the issues and questions that are before it" (JRP, 2005). Accordingly, it commissioned a report that outlines an evaluation framework integrating generic sustainability criteria and key case- and context-specific considerations (Gibson, 2006). For this application, where there have been decades of related public debate and where familiar language is crucial for fruitful public review, the issue and criteria categories are chiefly drawn from decades of local and regional discussions about potential pipelines and associated development concerns. At the same time, however, all of the sustainability requirements that have been recognised in international research and experience are addressed.

- *Provide integrative, sustainability-centred guidance, methods and tools to help meet the key practical demands of assessment work, including identifying key cross-cutting issues and linkages among factors, judging the significance of predicted effects, and weighing overall options and implications.*

The practical work of carrying out well-integrated, sustainability-centred assessment is likely to depend as much on the availability of good guidance and suitable methods and tools as on the framework of conceptual understanding and legislated obligations. Because sustainability assessment is still quite new, supporting guidelines, methods and tools specifically designed to meet the needs for integrated attention to sustainability concerns are not yet well developed. There is, however, existing guidance on some key matters, for example, how best to judge the sustainability-related significance of predicted effects where the relevant influences are expected to be interconnected (Gibson *et al.*, 2005, Chapter 9; Lawrence, 2005).

There is also a wonderful array of methods and tools that were developed for related purposes such as sustainability-oriented regional planning. Many are quite well suited to giving reasonably integrated attention to a range of generic and specific considerations, at various scales, and go beyond the relatively easy task of individual effect prediction to the much harder job of depicting systemic interrelations and overall implications. Some of the particularly attractive ones involve scenario building exercises, often with backcasting from apparently desirable futures, that help reveal case/context priorities, facilitate depiction of overall objectives and implications, and encourage thoughtful identification and comparison of alternative pathways (e.g. Ravetz, 2000; Robinson, 2003). Participative community mapping exercises (Lydon, 2000; Porter *et al.*, 2002; CMN, 2005) and cumulative effects projections (Cizek *et al.*, 2002) can play similar and complementary roles. But few if any are suitable for all applications and certainly there is room for more experimentation and for guidance on what and how to use in particular circumstances.

- *Ensure that the decision-making process facilitates public scrutiny and encourages effective public participation.*

Arguably, the main barriers to effective integration are the entrenched divisions of mandate and training that characterise modern institutional structure and professional practice. These qualities are to some extent unavoidable and even beneficial. But they mean that assessment cannot safely be left to the authorities and the experts.

Concerned citizens, communities and civil society organisations can also have narrow agendas. But as noted above, these agendas (for viable livelihoods, physical and environmental security, convenience of movement, etc.) often cross the usual lines of authority and expertise. The combination of diverse public contributions can cover most if not all of the key sustainability imperatives and, if historically neglected voices are encouraged, public contributions can push attention to issues that the traditional decision-making players have tended to overlook

or discount. Moreover, public participants are likely to bring to the assessment process a level of tenacious commitment rarely matched by supervisory authorities or expert consultants. Where assessment processes facilitate public openness and effective engagement — especially from the earliest stages of deliberation, where basic purposes and options can receive careful critical examination — the practical pressures for more comprehensive and better integrated attention to sustainability issues are likely to be higher.

So far, there are no comprehensive examples of such a package in place and in operation anywhere in the world. Each of the components outlined above involves important complexities and there are, inevitably, plenty of additional details to consider. But if well-integrated sustainability assessment is not easily at hand, it is at least within reach. While there is a great deal of further exploration and experimentation to be done in all areas, we now have an adequate base for application. In principle, at least, this package is well equipped to foster effective integration of sustainability considerations throughout deliberations on assessed undertakings. As noted above, it does have the disadvantage of a poor fit with established mandates, expertise, data sets and inevitable resistance from entrenched authorities and other defenders of habitual practice. But in the long run this is a less deadly sin than poor fit with an interconnected reality.

Summary of Implications for Sustainability-Based Assessment

The core argument here is that integration — particularly of social, economic and ecological considerations — is the essence of the concept of sustainability and must be a central consideration in the design and implementation of sustainability-based assessment. This applies at the strategic as well as project level and through all stages of deliberation and decision. While many different approaches to, and tools for, integration are available, no one method or process component is likely to be sufficient. Instead, a package of components is likely to be needed to ensure that an integration is fully incorporated in the assessment process and that it does not permit continued or renewed neglect of traditionally under-valued considerations, including protection of ecological systems and functions, reduction of inequities and respect for uncertainty.

The best practical solution may be the package of regime and process design features discussed above. Consistent with the concept of sustainability, the package is aggressively integrative. It demands comprehensive attention to overall effects, is concerned about the long-term as well as the short, applies linked fundamental and case/context specific criteria, seeks best options rather than “acceptable” undertakings, engages experts and citizens, and for particular cases covers all deliberative

stages from the initial conception (recognition of a need or opportunity for some new or renewed initiative) to the final resurrection (renewal, replacement or retirement with recycling of the remaining pieces). It treats integration as an iterative practice throughout the process, not a task to be accomplished at a single key decision point.

None of this is now common. Each integrative aspect is likely to be at best unfamiliar to and uncomfortable for many existing authorities and other participants. Moreover, even with firm commitment and unusual resources, such comprehensiveness cannot be achieved more than roughly and tentatively. This means that integrative sustainability assessment is necessarily a best effort, continual learning process, and one that will have to be introduced gradually where the opportunities emerge. It also means that there will be barriers to adoption. Like the pursuit of sustainability, generally, sustainability assessment requires a major transition in thinking and practice, which is never achieved without patience and persistence.

At the same time, however, it is important to see the core sustainability assessment design features as a package of interdependent components, each of which is crucial. While transition to integrated sustainability assessment may have to be gradual, ill-considered piecemeal moves — especially ones that claim to introduce a sustainability agenda but fail to ensure effectively integrated attention to traditionally neglected concerns — will darken the path to a better future.

References

- CIDA, Canadian International Development Agency (1979). *Ecodevelopment and Third World Urban Regions: a prospective for international development cooperation policy*. CIDA, Policy Branch, Ottawa.
- Cizek, P, J McCullum and A Booth (2002). *Fort Liard Cumulative Impacts Mapping Project: technical report*. Canadian Arctic Resources Committee and Canadian Parks and Wilderness Society, Yellowknife.
- CMN (2005). Community Mapping Network [<http://www.shim.bc.ca/>].
- Devuyst, D (1999). Sustainability assessment: the application of a methodological framework. *Journal of Environmental Assessment Policy and Management*, 1(4), 459–487.
- Dovers, S (2005). Clarifying the imperative of integration research for sustainable environmental management. *Journal of Research Practice*, 1(2), Article M1. [<http://jrp.icaap.org/content/v1.2/dovers.html>].
- Eggenberger, M and M Partidario (2000). Integration: development of a framework to assist the integration of environmental, social and economic issues in spatial planning. *Impact Assessment and Project Appraisal*, 18(3), 201–207.
- FSC, Forest Stewardship Council (2004a). FSC principles and criteria for forest stewardship [http://www.fsc.org/fsc/how_fsc_works/policy_standards/princ_criteria].
- FSC, Forest Stewardship Council (2004b). About FSC [<http://www.fsc.org/fsc/about>].

- Gibson, RB, S Hassan, S Holtz, J Tansey and G Whitelaw (2005). *Sustainability Assessment: Criteria and Processes*. London: Earthscan.
- Gibson, RB (2006). *Sustainability-based criteria and associated frameworks for evaluations and decisions: theory, practice and implications for the Mackenzie Gas Project Review*, a report prepared for the Joint Review Panel for the Mackenzie Gas Project. Inuvik [http://www.ngps.nt.ca/registryDetail_e.asp?CategoryID=271].
- Government of Western Australia (2003). *Hope for the future: The Western Australian State Sustainability Strategy*. Department of the Premier and Cabinet, Perth, Western Australia.
- Guijt, I, A Moiseev and R Prescott-Allen (2001). *IUCN Resource Kit for Sustainability Assessment*. IUCN Monitoring and Evaluation Initiative, Geneva.
- Hong Kong Sustainable Development Unit (2002). Sustainability assessment [<http://www.susdev.gov.hk/text/en/su/sus.htm>].
- IUCN, UNEP, WWF (International Union for the Conservation of Nature and Natural Resources, United Nations Environment Programme, World Wildlife Fund) (1980). *The World Conservation Strategy: Living resource conservation for sustainable development*, IUCN, Gland, Switzerland.
- Jenkins, B, D Annandale and A Morrison-Saunders (2003). The evolution of a sustainability assessment strategy for Western Australia. *Environmental and Planning Law Journal*, 20(1), 56–65.
- JRP, Joint Review Panel for the Mackenzie Gas Project (2005), Joint Review Panel determination on sufficiency, Inuvik, 18 July.
- Lawrence, D (2005). Significance Criteria and Determination in Sustainability-Based Environmental Impact Assessment, a report prepared for the Joint Review Panel for the Mackenzie Gas Project. Inuvik [http://www.ngps.nt.ca/registryDetail_e.asp?CategoryID=265].
- Livingston, JA (1994). *Rogue primate: an exploration of human domestication*. Toronto: Key Porter.
- Lydon, M (2000). Finding our way home: community mapping helps residents define their worries and realize their dreams. *Alternatives Journal*, 26(4), 26–29.
- MEA, Millennium Ecosystem Assessment (2005). *Living Beyond Our Means: natural assets and human well-being, Statement from the Board*, World Resources Institute, March [<http://www.millenniumassessment.org/en/products.aspx>].
- Morrison-Saunders, A and R Therivel (2006). Sustainability integration and assessment, *Journal of Environmental Assessment, Policy and Management*, 8(3), 281–298.
- Pope, J, D Annandale and A Morrison-Saunders (2004). Conceptualising sustainability assessment. *Environmental Impact Assessment Review*, 24, 595–616.
- Pope, J and W Grace (2006). Sustainability assessment in context: Issues of process, policy and governance. *Journal of Environmental Assessment, Policy and Management*, 8(3), 373–398.
- Porter, GL, R Moon and C Trent (2002). *Planning Sustainable Communities: a compilation of community mapping case studies for the Lower Mainland and Sunshine Coast of British Columbia*, Community Mapping Network [<http://www.shim.bc.ca/>].

- Ravetz, J (2000). Integrated assessment for sustainability appraisal in cities and regions'. *Environmental Impact Assessment Review*, 20, 31–64.
- Robinson, J (2003). Future subjunctive: Backcasting as social learning. *Futures*, 35, 839–856.
- Sachs, W (1999). Sustainable development: On the political anatomy of an oxymoron. In *Planet Dialectics: Explorations in Environment and Development*, pp. 71–89, Halifax: Fernwood.
- Scrase, JI and WR Sheate (2002). Integration and integrated approaches to assessment: what do they mean for the environment? *Journal of Environmental Policy and Planning*, 4(4), 275–294.
- Swaigen, J and D Estrin (1993). *Environment on Trial: A Citizen's Guide to Ontario Environmental Law and Policy*. Toronto: Emond-Montgomery.
- Strategen (2006). *South West Yarragadee Water Supply Development Sustainability Evaluation/Environmental Review and Management Programme (ERMP)*, Water Corporation, Western Australia [http://www.watercorporation.com.au/water/water_sources_sw_yarragadee.cfm].
- WCED, World Commission on Environment and Development, GH Brundtland, chair (1987). *Our Common Future*. Oxford, New York: Oxford University Press.

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