

# Getting on with Integrated Impact Assessment: one set of guiding principles - many methods

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**Synopsis:** There are many practitioners who are already engaged in doing integrated impact assessments in some form. At the same time, there are many practitioners and potential clients who are still wondering how integrated impact assessments can be done. This paper draws on a contemporary review of international 'integration' practice and an historical overview of the evolution of impact assessment in general, and suggests how these two lines of practice could merge, yielding an emerging set of key questions aimed at helping teams of practitioners to develop their own practice of integrated impact assessment. The main messages from the paper are practically focused: build outwards from your current practice and current strengths; integration is not methodologically prescriptive; integration does not happen by accident, it happens by design; time and resource constraints are likely to influence the degree of sophistication that is possible; better documentation of integrative practice will support learning by others and self-improvement.

**Keywords:** sustainable development, impact assessment, practice, integration, integrative function, methodological pluralism, functional equivalence.

## 1 Introduction

This paper is motivated by a desire to encourage integrative practice by impact assessment practitioners, and to encourage improved integrative practice in future. To do so, it provides a brief historical overview of the evolution of impact assessment practice - the main thematic developments - and draws on the findings of a considerable range of literature review activity, as well as nearly twenty years professional practice by the authors. The paper attempts to lay out a conceptual framework in a simple and practical manner. The essence of contemporary impact assessment practice is described, as are the integrative functions which give practical meaning to the concept of integration. It is the merging of these two sets of concepts which, the authors suggest, should underpin the practice of integrated impact assessment.

If the old maxim - if something is worth saying, it is worth repeating - holds true, then it is probably helpful to draw attention to the main messages of the paper at this point, as sign-posts to assist readers to relate the proposition contained here to their own practical experience of impact assessment. There are five -

- firstly, integrated assessment is most likely to build on existing practice;
- secondly, integrated assessment is not methodologically prescribed; there is no single procedure or set of assessment tools and methods required;
- thirdly, time and resource constraints will always influence the degree of integrative effort;
- fourthly, integration does not happen by accident, it happens by design and determination;
- fifthly, better documentation of integrating activities and procedures is necessary for learning by others and improving future practice.

### ***The stimuli for integrated impact assessment***

Efforts to promote closer integration and better overall coherency in assessment activities have been driven by several factors; momentum has been building for some years. Important factors underlying these efforts include the need to make impact assessment practice relevant to the internationally popular and important concept of 'sustainable development', the demands of national legislation or regulation, as well as calls from practitioners themselves.

#### **The concept of 'sustainable development'**

Most conceptualisations of 'sustainable development', from the World Commission on Environment and Development in 1987 (1) to contemporary views based on systems thinking (2,3), articulate the importance of recognising several co-existent dimensions, often labelled

generically as economic, environmental, social and cultural. These dimensions are generally highlighted in a context which emphasises the need to recognise the inter-dependencies that exist between each and the others. In New Zealand, these dimensions have been associated explicitly with principles for policy and decision making stated as follows: "The government recognises that its decisions should ensure the wellbeing of current and future generations. It will take account of the social, economic, environmental and cultural consequences of its actions by (inter alia) seeking innovative solutions that are mutually reinforcing, rather than accepting that gain in one area will necessarily be achieved at the expense of another (our emphasis); and using the best information available to support decision making; ..." (4). If impact assessment across all these dimensions is to serve such policy principles, it needs to be integrated and coherent, rather than disjoint and unrelated.

### **National legislation**

The primary legal instrument mandating impact assessment activity in New Zealand is the Resource Management Act (RMA) passed in 1991 (5) and amended in 2004. The co-existent dimensions of 'sustainable management', as it is referred to in the purpose of the legislation, are stated explicitly - "managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety". Furthermore, "environment" is defined in the legislation to include "(a) Ecosystems and their constituent parts, including people and communities; and (b) All natural and physical resources; and (c) Amenity values; and (d) The social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) of this definition or which are affected by those matters." Public decision makers are constantly required to weigh up the economic, environmental and social considerations presented to them in RMA settings as the outputs of impact assessment activities.

### **The international community of impact assessment practitioners**

More than 600 practitioners of various categories of impact assessment attended the 20th Annual Meeting of the International Association for Impact Assessment (IAIA) in Hong Kong in June 2000. These practitioners took part in 27 parallel streams of papers and discussions aimed at reviewing methodological progress at that time, identifying methodological needs and developing vision statements for the practice of impact assessment over the following 10 years. Nineteen out of the 27 streams (6) identified the need for integration between the disparate streams of assessment activities and practice. In other words, many practitioners had experienced the limitations and frustrations of working in artificially partitioned ways, and were calling for change towards a more integrated form of professional practice.

### ***The evolution of impact assessment practice internationally***

This brief historical overview of the evolution of impact assessment practice is intended merely to indicate the main thematic developments which have occurred during the last three decades, and thereby provide a context for considering the next phase of its evolution - embracing more integrative practice.

The institutional origins of Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) are usually traced to the United States and its National Environmental Policy Act (NEPA) of 1969. It is ironic to observe almost 40 years later, that the Act "requires Federal agencies to use a systematic and interdisciplinary approach, to ensure there is an integration of the natural and social sciences within environmental design and planning in decisions that may have an impact on the environment." (7), even if such integration rarely occurred in practice. For much of the 1970s and 1980s, various streams (environmental, social, cultural, economic) of impact assessment evolved essentially in parallel; much of this was focused at the project level. Furthermore, much of this early impact assessment work was characterised by voluminous documents of a largely descriptive nature. Since then, two important changes have occurred. One was a change of focus - EIAs and SIAs began to be used to assess policies and plans rather than just individual projects. They were applied at a more strategic level, hence the evolution of the terminology Strategic Environmental Assessment (SEA). The second was a change of function - less emphasis on encyclopedic description, and more emphasis on anticipating environmental and social issues requiring mitigation. They were applied in the cause of anticipatory change management, a function that required a more iterative approach to assessment practice, to be able to accommodate learning and adjustment as it occurred during the process of assessment.

With the emerging interest in sustainability assessment since the 1990s, interest in the need for a more integrative form of assessment also grew. As often happens in the early stages of enquiry and experimentation, 'integration' soon became a popular focus of discussion in impact assessment and policy appraisal circles. The term was used in an array of different settings. Furthermore, rhetoric and discussion about the need for integration was much more in evidence than documented examples of emerging integrative practice. In 2002, Scrase and Sheate produced a paper which documented fourteen distinct meanings of 'integration in environmental assessment and governance' (8). In Western Australia, Pope et al. (9) described an emerging taxonomy of integrated assessment practice which distinguished three modes -

(i) an EIA-based assessment, where the basic one-dimensional mode of assessment is replicated in the so-called 3-pillar form of parallel assessments of environmental, social and economic changes;

(ii) an objectives-led appraisal, similar in nature to Strategic Environmental Assessment, in which the assessment is carried out within the explicit framework of established policy goals and principles, except that once again it is replicated in the so-called 3-pillar form of parallel assessments;

(iii) a principles-based assessment, with the attribute of being objectives-led, but where the objectives are derived from broader sustainability principles.

Pope et al. further differentiate these three modes in terms of their capacity for supporting the achievement of sustainability goals and principles. In their analysis, the EIA-based assessment is limited to identifying impacts in terms of their 'direction to target', that is to say, the assessment aims to minimise negative social, economic and environmental or Triple Bottom Line (TBL) outcomes in absolute terms, but not necessarily to move towards meeting positive specified sustainability targets. The objectives-led appraisal, in their view, also is limited to identifying impacts in terms of their 'direction to target', since it asks whether positive social, economic and environmental gains can be made (as well as negative outcomes minimised) but they question whether the TBL objectives really reflect sustainability goals and principles. Pope et al. describe the principles-based assessment as focusing on identifying impacts in terms of their 'distance to target', that is to say, the extent to which the assessed outcomes contribute to specified sustainability targets, which, they say, implies having decided on a clear concept of what is meant by sustainability and defining corresponding assessment criteria.

### ***Literature reviews in pursuit of integrated assessment practice***

This paper is the result of a literature review exercise; one that deliberately sought to capitalise on more substantial review work by others.

There is potentially a vast amount of literature on sustainability and sustainability assessment (or sustainability appraisal), much of which is rhetorical in nature - arguing the case for more integrative methods but not actually explaining what such integrative methods are. The repetitive nature of this body of literature reflects the widespread interest in the topic - across many countries, many assessment disciplines, and many fields of application.

We have already referred to the review papers by Scrase and Sheat, and by Pope et al. because we found them helpful in distilling a structure of assessment applications; contexts in which better integration might be desirable. Two other literature review exercises contributed substantially to informing our conclusions. They are the reviews coordinated by Dalal-Clayton and Sadler (10) under the auspices of the International Institute for Environment and Development (IIED) on behalf of the Norwegian government, and by Brinsmead (11) for the Australian National Academies Forum. These two substantial efforts grew out of similar interests, even though they occurred on opposite sides of the globe. Yet they occurred entirely independently.

The IIED Review was a response to "renewed calls for the further development and application of an integrated approach to the development of policies, strategies, plans and programmes ..." in light of global expressions of interest in Sustainable Development from Rio (1992) to Johannesburg (2002). In the authors words (Ch.1), "this study takes stock of the status of sustainability appraisal - broadly defined to encompass a range of equivalent terms such as sustainability impact assessment and strategic impact assessment. For our purposes, sustainability appraisal is taken to include approaches that are used to integrate or inter-relate environmental, social and economic considerations (the three 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.” This work produced an informative catalogue of tools and methods, but in many cases, little of the method is written up and replicability, even if desirable, is difficult to achieve. The authors concluded (Ch.16) “There is no single best approach. Yet there is also no shortage of promoters of particular frameworks and methodologies, and brand names abound. .... Linking impact assessment to other tools and processes is also a critical part of an integrated approach to SA (sustainability appraisal).”

In May 2002 the Australian Academy of Science hosted an internet symposium with the theme of “Transition to Sustainability”. In that conference, participants set out a blueprint for achieving the goal of the construction of “a mature sustainability science capacity” for Australia, whereby “maturity is to be characterised by suitable multi-disciplinary integration” (14). One finding of the resulting study (p.7 of reference 11) is that while there are, and have been, a large number of projects conducted nationally that could arguably be classified as integrated sustainability assessments, “the methodologies employed are not only extremely diverse in range, but invariably not explicitly articulated in easily accessible publications.” “Most of the successful integrative experience to date has been due to learning-by-doing and much of the practice is informal. While there are a number of studies that appear well-integrated in practice, neither the methods nor the methodological principles for achieving successful integration are usually documented”. Nevertheless, this work produced an in-depth review of integrative practice focused around exemplifying a set of fundamental integrative functions.

In our view, these two lines of enquiry - the tool-box of integrating tools and methods, and the articulation of fundamental integrative functions - have the potential to be complementary; the latter is useful in helping us to understand the potential relevance of the former to our own situations in impact assessment.

Further literature review carried out by the authors has been reported (12), drawing on experience from Western Australia’s Institute for Sustainability and Technology Policy, the European experience of Integrated Environmental Assessment, and the experience of the United Nations Environment Programme in a number of developing countries. This literature review effort had the specific objective of ... see p.3 of our report.

### ***The structure of this paper***

The remainder of this paper takes a pragmatic orientation. Section 2 outlines the framework of fundamental integrative functions. Section 3 sets out elements of a generic impact assessment process. Section 4 demonstrates how these two sets of ideas can merge in practice and draws out an initial set of key questions aimed at helping teams of practitioners apply the integrative functions and develop their own practice of integrated impact assessment. The paper concludes (Section 5) by making a call to practice integrated assessment and by providing some cautionary encouragements.

## **2 Integrative functions**

Choosing to focus on ‘fundamental integrative functions’ reflects what we see as a need to remove the ambiguity and lack of clarity which pervades much of the literature and discussion of integration and integrated assessment. This ambiguity and lack of clarity is, we believe, one source of the uncertainty experienced by many practitioners and clients of impact assessment regarding the practice of integrated assessment.

Before presenting the five integrative functions, first articulated by Brinsmead, it is worth reflecting on the essential meaning of the word ‘integrate’. Wiktionary (13) defines the verb ‘integrate’ as meaning ‘To form into one whole; to make entire; to complete; to renew; to restore; to perfect.’ In his review work, Brinsmead (p.15 of reference 11) adopts the definition of ‘integration’ in the context of assessment activity to mean ‘The combination of parts into a whole in an appropriate way such that the resultant combination is satisfactorily fit for purpose (and possibly adaptable to a specified suite of purposes.’ We believe that Brinsmead’s definition captures the essence of the verb. It also carries the implication that ambiguity can be reduced or removed if explicit reference is made to the ‘parts’ which are being combined; this we attempt to do explicitly in the descriptions that follow.

We now turn to the question of what integrative functions are necessary for the practice of integrated impact assessment. An in-depth analysis of this question is found in reference 11 at pp.166-172. However, on reflection, many other authors imply a similar taxonomy. The fact that so many authors treat

the integrative functions in an implicit manner serves to reinforce the finding that knowledge about the practice of integration resides mainly in the realm of the tacit knowledge of practitioners applying their skills and experience at the workplace.

Brinsmead's framework for integration appears to have come out of a combination of deductive and inductive thinking: using his initial analytical framework to help direct and illuminate the case study experience (the deductive approach) while also using the case study experience to test and refine that framework (the inductive approach). In our literature review, this is one feature which distinguishes the Brinsmead material from others, and makes it potentially richer in insights. To do so, Brinsmead interviewed some of the research participants and practitioners, rather than relying simply on reading documentary outputs.

So what does Brinsmead suggest are the essential integrative functions in integrated impact assessment? In his own words "The framework is a classification of integrative functions. Methods used in integrated sustainability assessment integrate within one of four integration domains: empirical description, evaluation, strategy development and policy context. The case-study analysis reveals the significance of a fifth important integration, mutual integration *among* the four integration functions." This five-part taxonomy is presented in the following table. Corresponding to each integrative function is Brinsmead's statement of the functional role each plays in the integrated assessment process.

### Integrative functions and their associated roles in integrated impact assessment

Integration domain	Integrative function	'Parts' being combined	Functional role
empirical description	descriptive integration [D]	multi-disciplinary sources of knowledge, experience, observations and partial descriptions of the system of interest	anticipative prediction
evaluation	evaluative integration [V]	predicted impacts and explicit criteria or specified outcomes; evaluative criteria across non-commensurate domains of analysis	strategy appraisal
strategy development	strategic integration [S]	alternative policy prescriptions/project designs; analytical values subject to adjustment or trade-off	selection of specific interactions
policy context	contextual integration [C]	perspectives and interests of stakeholders (formal and informal); the 'system of interest' and its 'institutional environment'	ensure socio-political legitimacy, coordination with related policy processes and institutional support
assessment process	mutual (functional) integration [M]	the four integrative functions described above; processes for achieving these	ensure the other four functions are carried out in a mutually compatible and consistent manner.

#### **Descriptive integration:**

Brinsmead elaborates on this descriptor as follows (p.21): "*Descriptive, system understanding, modelling, positive or predictive integration* (D) has to do with the integration of complementary or alternative descriptions of cause and effect that relate to the system of interest, sometimes representing system states that are not directly observable." This includes physical, biological and socio-economic perspectives on the system of interest, and reflects the fact that practitioners in these various disciplines view the same system, but through different lenses. To this definition we might add that descriptive integration focuses on developing a "common framework" - meaning a set of interrelated concepts, categories and principles that is assembled and discussed amongst members of the assessment team for the purposes of illuminating those features deemed collectively to be of significant interest. Built up from the knowledge, experience, observations and partial descriptions of various participants, such a common framework is by its nature, multi-dimensional and draws on multi-disciplinary sources of knowledge. Furthermore the possible artefacts of descriptive integration may take a variety of forms: formal mathematical or computer simulation models; narrative descriptions represented in qualitative verbal form; qualitative visual symbolic representations. Indeed, it is likely that much of the "modelling" is mental modelling and takes place informally in the minds of individual practitioners and participants. At the heart of descriptive integration, therefore, is the collective accumulation and structured assembly of knowledge to assist in understanding processes of dynamic change within the system of interest as well

as the dynamics of change which results from any deliberate human intervention in the system (via policy or project) so that plausible predictions can be made.

***Evaluative integration:***

Whereas descriptive integration focuses on understanding processes and cause-and-effect relationships, evaluative integration seeks to assess the likely outcomes against a range of specified criteria. Brinsmead elaborates on this descriptor as follows (p.20) “*Evaluative or normative integration (V)* refers to the integration of alternative or complementary appraisal evaluations (soft constraints), obligations and legal or ethical hard constraints that apply.” The purpose of evaluation in impact assessment is essentially normative - does the policy/project meet specified criteria of acceptability; and how can the benefits of a project be enhanced and the dis-benefits minimised or avoided? Thus evaluative integration focuses on reconciling proposals with legal and ethical constraints as well as reconciling otherwise disparate evaluative criteria - disparate in the sense that they derive from different, possibly overlapping and non-commensurate dimensions or domains of analysis (environmental, social and economic). Evaluative integration is not an exercise in reductionism. Frequently, a central issue concerns how decisions are taken in response to assessments which present results relevant to multiple criteria. This may be complicated by the fact that different evaluative criteria may apply to subsystems at different scales; for example welfare is defined at the scale of the individual, but ecosystem health is defined at a larger scale. It may also be complicated by the need to address uncertainty in predictions, requiring the explicit articulation of attitudes to risk and the selection of risk assessment technique. As a result of his in-depth review of a range of case studies, Brinsmead concluded that “it remains true that much of integrated evaluation takes place informally via expert judgements and negotiated social processes.”

***Strategic integration:***

Brinsmead elaborates on this descriptor as follows (p.23) “Given the integrated descriptions of cause and effect, and integrated evaluation methods *strategic, policy, design, management or prescriptive integration (S)* is the sub-problem of determining an appropriate decision strategy, taking into account risk and uncertainty.” In the context of impact assessment processes, this aspect of integrative function is, in effect, most closely allied to evaluative integration. In practical terms, strategic integration refers to the processes of exploring and evaluating alternative policy prescriptions/project designs, synthesising the knowledge about each alternative, and incorporating improvements and mitigation measures, with a view to generating an optimal proposal. At the heart of strategic integration are the related issues of trade-offs and optimisation across non-commensurate domains of analysis.

***Contextual integration:***

Brinsmead elaborates on this descriptor as follows (p.23) “To the above three integrative functions internal to the integrated science/policy process should also be added a fourth, external integration. *Contextual integration (C)* refers to the integration of the integrated sustainability assessment process itself within its socio-political context, its institutional context, and its integration with policy implementation - including integration with other policy actions concurrently taking place.” This element of integrative function in impact assessment reflects the fact that no proposal (policy or project) is conceived or implemented in isolation; almost invariably there will be other actors and other interventions active at the same time; and no two situations (in time and place) will be identical for designing and implementing any proposal. At the heart of contextual integration is the consideration of stakeholders and their participation in the assessment. The concept of stakeholders (in relation to any proposal) incorporates those with formal and informal interests in the proposal. Formal interests might be thought of as interests mandated by legislation or regulatory requirements: government agencies whose responsibilities overlap with the proposal in some way, while informal interests might be exemplified by non-government organisations which advocate about issues that may arise. An inclusive concept of stakeholders incorporates statutory and institutional interests, communities of interest, and individuals and groups who stand to be affected directly or indirectly to a significant extent. A particular challenge for impact assessors is to try to identify those for whom the potential consequences might be less obvious or certain, or - at some stage during the iterative process - to be on the look out for those groups for whom consequences (beneficial or not) might otherwise not be anticipated.

***Mutual integration:***

Brinsmead elaborates on this descriptor as follows (p.24) “*Mutual integration (M)* is a final, fifth integration concerning how well integrated the above four functions are with each other.” The main point to focus on here is that the other four functions are carried out in a mutually compatible and consistent manner. For

example, the integrated description of the system should reflect those elements of the system which stakeholders agree are important to acknowledge and understand; similarly, the evaluative criteria should reflect the general normative criteria pertinent to public policy outcomes and customised to locally-relevant conditions, and the integrated description should enable 'modelling' to predict possible consequences in terms of the criteria selected for integrated evaluation. Even though most integrative functions are characterised by informal processes and (currently) by tacit knowledge, a commitment to integrated impact assessment suggests an obligation to manage the overall process for consistency. The fact that Brinsmead concluded from his review of current practice that this occurs very rarely indicates the need for mutual integration to be a specific focus of attention in its own right. In practical terms, mutual integration is most likely to be achieved if an iterative methodology is employed. A methodology that is deliberately structured in an iterative manner facilitates the repeated testing and review of links between context setting, system description, evaluation and strategic option choosing activities.

With reference to the comments at the beginning of this section regarding ambiguity in the discussion of integration, we have compared the five fundamental integrative functions just described with the fourteen distinct meanings of integration identified previously by Scrase and Sheat in reference 8. A mapping of these appears at p.15 of reference 12, which supports, we believe, the usefulness of Brinsmead's taxonomy.

### **3 The essence of contemporary impact assessment from a practitioner perspective**

The following description of a generic impact assessment process is intended to provide a practical template that should be familiar to a broad range of impact assessment practitioners. Without being prescriptive of individual approaches, it sets out the main process steps. The description below could apply to applications of environmental impact assessment, economic impact assessment, social impact assessment, or indeed to any of the more specific assessment sub-disciplines such as bio-diversity assessment, cultural impact assessment, trade impact assessment, health impact assessment, and so on. The terminology may differ from discipline to discipline, but we suggest that the essence is common to all forms of impact assessment.

We describe the generic process as 'contemporary' because the steps included reflect the emphasis on anticipating issues requiring mitigation, rather than being merely descriptive, and because the process can be applied with equal validity at the policy and plan level or at the project level. These are the directions in which contemporary impact assessment practice has moved, as described earlier in our paper.

Our purpose in describing such a generic impact assessment process is to present a practical template, in relation to which the set of integrative functions described in Section 2 may be considered. With these caveats in mind, we set out the following series of basic process steps:

1. Understand and describe the system of interest and its constituent parts - construct a 'model' of the system, and articulate the interactions between the constituent parts;
2. Acknowledge the expressed policy goals/objectives relevant to that system's development (direction of development, character of development), including the range of 'policy' goals of various stakeholders (i.e. drawing on both government policy as well as 'policy' pursued by other stakeholder groups, including voluntary NGOs, etc.);
3. Identify the indicators and parameters of change that are relevant to evaluating changes of state in the system against the set of desired outcomes (translate policy objectives into describable or quantifiable outcomes);
4. Describe the intended intervention (project proposal, policy initiative, preliminary instrument design);
5. Use the system knowledge to 'model' or predict expected changes likely to result from the proposed intervention;
6. Evaluate the full range of outcomes - against the policy objectives/outcomes expected; also compare these outcomes with the outcomes of the 'do nothing' option;

7. Explore ways to mitigate negative outcomes and enhance positive outcomes;
8. Modify the preliminary intervention in light of step 7 - repeat steps 4, 5 and 6.

It is important to remember that while the steps above are described as a linear list, in reality they may and arguably should occur as a series of iterations, as 'experts' and 'stakeholders' build up the knowledge required to carry out each step. Such an iterative process was presented graphically in Appendix 6 of Reference 12.

#### **4 Where integrative function and impact assessment merge**

In this section we do two things in order to answer the question "How is integration accommodated in the impact assessment process?" Firstly, we point to what appears to us to be a straightforward mapping of integrative functions onto assessment steps. Secondly, we suggest some leading questions for impact assessment teams to address in developing integrative method for their particular application.

##### ***Mapping integrative functions onto assessment steps***

In the simplest of terms, we can take the five integrative functions described in Section 2 and the 8 assessment steps described in Section 3 and link them as follows:

	<b>Generic assessment step</b>	<b>Related integrative functions</b>
	develop an assessment plan that incorporates all aspects of integration to the extent appropriate and feasible	mutual integration
1	understand and describe the system of interest and its constituent parts - construct a 'model' of the system;	descriptive integration
2	acknowledge the expressed policy goals/objectives relevant to that systems development;	contextual integration
3	identify the indicators and parameters of change that are relevant to evaluating changes of state in the system against the set of desired outcomes;	descriptive and contextual integration
4	describe the intended intervention (project proposal, policy initiative, preliminary instrument design);	descriptive integration
5	use the system knowledge to 'model' or predict expected changes likely to result from the proposed intervention;	descriptive integration
6	evaluate the full range of outcomes - against the policy objectives/outcomes expected; comparison with the outcomes of the 'do nothing' option;	evaluative integration
7	explore ways to mitigate negative outcomes and enhance positive outcomes;	strategic integration
8	modify the intended intervention as required and repeat steps 5-7	strategic integration

The fifth integrative function - mutual integration - focuses explicitly on planning to incorporate the other aspects of integration in a mutually-consistent and coherent manner. Consistency and coherency relate to matters of data, tools and techniques, and people involved.

##### ***Leading questions for developing a practical approach to integrated impact assessment***

Understanding the intention behind each integrative function provides practitioners with the basis to ask questions in order to guide their development of an integrated assessment process. Space does not permit us to incorporate in this paper more than a few examples of such leading questions. Emerging lists of questions are contained in pp.29-33 of reference 12, but even these are only indicative. They are intended to stimulate team discussion about integrative practice in the expectation that the team will take responsibility for developing and documenting its own integrative method.

### **For Mutual integration**

- In the assessment team, who is responsible for integration in the assessment activities?
- What range of skills, knowledge and experience is required for the team to carry out integrated impact assessment? Is this range represented in the assessment team?
- What empirical data are available to inform the various dimensions of an integrated impact assessment? Is there a bibliographic record of all such data sources? Are the data easily accessible for all team members? Do the data require interpretation for some team members?

### **For Descriptive integration**

- How do team members build up a common framework of understanding?
- In your team's common framework, how do you understand the relationship between the things that particularly interest you (your analytical perspective) and the things that particularly interest other team members?
- What language and concepts do you use to describe the essential aspects of the system - the extent of the whole system? the components of the system?  
Do any of your concepts equate with/overlap/relate to concepts used by other team members? Which ones, and what is the relationship? What language and concepts do you use to describe the essential aspects of the system - the extent of the whole system? the components of the system?  
Do any of your concepts equate with/overlap/relate to concepts used by other team members? Which ones, and what is the relationship?
- Does each/any team member's discipline have a particular analytical framework which they consider fundamental to constructing their description of the system of interest?
- What are the most important cause-and-effect relationships occurring in the system of interest, when viewed from ecological, social and economic perspectives?

### **For Contextual integration**

- What are the statutory requirements for the assessment process and assessment outputs?
- What are the relevant policy goals and objectives in environmental, social and economic policy at the appropriate level of jurisdiction (national/federal, regional, local)?
- Have the social, environmental and policy agencies developed policy to the point of describing observable outcomes or targets, against which potential outcomes (impacts) can be assessed?
- What are the communities of interest for the proposal being assessed? How are these communities expressed in terms of geographical coverage, social organisation and governance structures?
- How will you select stakeholder representatives? Who selects?

### **For Evaluative integration**

- How do expected outcomes compare with desired outcomes across the range of assessment criteria?
- How is information on environmental, social and economic impacts presented to decision makers in a coherent way?
- Do economic gains come at the expense of social and environmental costs? Or is there some other combination of gains and losses?
- Would the use of a multi-criteria analysis tool be helpful?
- Do team processes deliberately seek to engage all team members in the evaluation process?

### **For Strategic integration**

- How are environmental, social and economic considerations applied to the search for an optimal set of outcomes?
- Are there particular (explicit) optimisation techniques that could be used to refine the proposal?

## **5 A call to practice integrated assessment - and some cautionary messages**

Integrated impact assessment is almost a reality, if not quite so. There are examples where several elements of integrative function are already addressed. The principal thrust of future efforts should be directed towards more conscious application of integrative principles and practice. We urge practitioners to think about the integrative functions involved and ask the questions of themselves and their collaborators that will assist them to develop their own integrative practice. With this in mind, we make a number of concluding observations, based on our review and on our experience.

Firstly, integrated assessment is most likely to evolve out of existing practice and method. Practitioners start from their own disciplinary strengths, but seek deliberately to make explicit linkages with other dimensions of assessment, to work towards overall coherency.

Secondly, integrated assessment is not methodologically prescribed; there is no single procedure or set of assessment tools and methods required. Keeping in mind the five basic integrative functions, practitioners are free to adopt specific procedures, tools and methods which they judge to be appropriate. There may be several combinations capable of being fit for purpose.

Thirdly, time and resource constraints will always be relevant considerations in selecting which procedures, tools and methods to employ, and thereby influence the degree of integrative effort. A five-year integrated research project will be different from a six-week integrated evaluation exercise.

Fourthly, integration does not happen by accident, it happens by design and determination. Further elaboration on ways to manage and facilitate integrative processes would be a topic itself worthy of a whole conference paper. Suffice to say that good integrative practice requires attention to personnel selection, disciplinary and inter-disciplinary capabilities, process management and leadership.

Fifthly, better documentation of the integrating activities and procedures is necessary for learning by others and improving future practice, bearing in mind that integrating activities often involve a mix of formal and informal processes.

## References

- 1 World Commission on Environment and Development, "Our Common Future", Oxford University Press, 1987, p.1.
- 2 Goodland, R, "Sustainability: Human, Social, Economic and Environmental", Encyclopedia of Global Environmental Change, John Wiley & Sons Ltd, 2002.
- 3 Sinner, J, et al., "Key concepts in Sustainable Development: Part 1: Economics and ecology" in Public Sector, Vol.28, (3) 2005, Institute of Public Administration New Zealand, p.2.
- 4 Dept of Prime Minister and Cabinet, "Sustainable development for New Zealand: Programme of Action", Government Printer, January 2003, p.10
- 5 New Zealand Government, Resource Management Act (1991), Government Printer, p.21.
- 6 International Association for Impact Assessment, Vision Statements and Road Maps from Session Chairs, unpublished documentation produced during the Annual Meeting, 19-23 June 2000, Hong Kong.
- 7 Taylor, C.N., et al., "Social Assessment: Theory, Process and Techniques" Third Edition, Social Ecology Press, Wisconsin, USA, 2004, pp.1-2.
- 8 Scrase, J.I. and Sheate, W.R., "Integration and Integrated Approaches to Assessment: What Do They Mean for the Environment?" in Journal of Environmental Policy and Planning, Vol.4, 2002, Wiley Interscience, pp.275-294.
- 9 Pope, J. et al., "Conceptualising sustainability assessment" in Environmental Impact Assessment Review, Vol.24,2004, Elsevier, pp.595-616.
- 10 Dalal-Clayton, B, and Sadler, B, "Sustainability Appraisal: A Review of International Experience and Practice, first draft of work in progress (January 2005), funded by the Royal Norwegian Ministry of Foreign Affairs. <http://www.iiied.org/spa/sa.html>
- 11 Brinsmead, T, "Integrated Sustainability Assessment: Identifying Methodological Options. Report prepared for Joint Academies Committee on Sustainability. <http://www.naf-forum.org.au/papers/Methodology-Brinsmead.pdf>, 2005
- 12 Baines, J.T, and Morgan, B, "Review of Integrated Impact Assessment Practice" prepared by Taylor Baines & Associates ([www.tba.co.nz](http://www.tba.co.nz)) for the Ecologic Foundation ([www.ecologic.org.nz](http://www.ecologic.org.nz)) with funding from the New Zealand Foundation for Research, Science and Technology, 2006. <http://en.wiktionary.org/wiki/integrate>, accessed on 24 July 2006
- 13 National Academies Forum, "Integrated Sustainability Assessment: Identifying the range of options for Australia - Internet Forum", April 2005 to June 2005. <http://www.naf-forum.org.au/>

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