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A FRAMEWORK FOR TOOL SELECTION AND USE IN INTEGRATED ASSESSMENT FOR SUSTAINABLE DEVELOPMENT

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Integrated assessment is rapidly developing in the scientific as well as policy community. Different methods, techniques and procedures (i.e., tools) are used in these assessments.

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Often, the choice for using certain tools in an assessment is not well founded. This paper presents a framework that scientifically underpins the role of, and thus choice for, tools within an integrated assessment. The framework identifies four phases in an integrated assessment, which are derived from the complementarities between various forms of integrated assessments. Tasks have to be done within each of the four phases. Seven types of tools with similar characteristics are matched to those tasks. The tool framework is a theoretical construct, developed whilst keeping in mind perceptions and suggestions from eventual users. It is a first step in the development of an overarching framework for finding appropriate tools for different tasks in an assessment, and justifying the use of those tools.

Keywords: Sustainability assessment; tools; integrated assessment; framework; EU.

Introduction

Integrated assessment is rapidly spreading as a practice at different levels of governance. Across the world, these are seen as necessary procedures to improve and inform decision making at policy, programme or project levels with empirical knowledge. However, the actual practice of integrated assessments has been subject to critiques. It appears that assessments of different types have not been able to deliver on the many hopes attached to it.[1] At the same time, sustainable development has emerged in many jurisdictions as not only a high political priority (e.g., United Nations, 2002; CEC, 2001; Council of the European Union, 2006) but a mighty intellectual challenge (e.g., Kates *et al.*, 2001; O'Riordan, 2004).

Sustainability assessment, a specific form of integrated assessment, is "a range of processes that all have as their broad aim the integration of sustainability concepts into decision-making" (Pope, 2006). Overlapping and conflicting priorities, value systems and complexities of interlinked systems and sectors make planning and analysis for more sustainable policies a difficult and complex issue. The subject was extensively covered in a special issue of this Journal (Vol. 8, No. 3, September 2006), and included discussion of theoretical principles for sustainability assessment (Gibson, 2006) and institutional and governance aspects (Pope and Grace, 2006).

In this paper we build on the framing contributions with respect to sustainability assessment by focusing on the tools, methods and procedures which are, or potentially can be, used within an assessment. A common problem identified in literature is the lack of guidance on what tools can be used. Frequently, guideline documents provide the necessary procedural steps, checklists and matrices but remarkably little actual methodological and analytical guidance (e.g., CEC, 2002b, 2005).

[1] See, for example, Wood *et al.*, 1996; ECP, 2001; Mandelkern, 2001; Stinchcombe and Gibson, 2001; CEC, 2002a; CEC, 2003; Cashmore *et al.*, 2004; CEC, 2004; ECP, 2004; Lee and Kirkpatrick, 2004; Wilkinson *et al.*, 2004; Canelas *et al.*, 2005; Christensen *et al.*, 2005; Adelle *et al.*, 2006; Ballantine and Devonald, 2006; EEAC, 2006; Lee and Kirkpatrick, 2006; National Audit Office, 2006.

The research on how to organize and deploy tools and methodologies in assessments is still in its infancy (Wrisberg *et al.*, 2002; Nilsson *et al.*, 2005; Lee, 2006).

The purpose of this paper is to present a generic framework which scientifically underpins the selection and the role of tools in all kinds of integrated assessment for sustainable development. The framework is intended to help those carrying out or commissioning an integrated assessment, explaining why certain tools are (or are not) useful in different parts of assessments. In order to ensure that the framework can actually be used in practice, it has been developed to support in particular the Impact Assessment (IA[2]) procedure that is in use by the European Commission since 2003 (CEC, 2002a).

This paper first discusses the current IA system used in the European Commission, followed by a summary account of its main weaknesses in practice, as identified in numerous reviews over the past five years. We then present the tasks which are generally to be done in an integrated assessment, and the range of tools available to support these tasks. Based on this, we present the basic elements of the "tool framework", followed by a discussion of the framework and its usefulness for understanding and underpinning tool use in integrated assessments.

In this paper, integrated assessment for sustainable development, or indeed sustainability assessment, is a broad notion that in principle can cover any type of assessment, as long as some "form" of integration occurs (e.g., Scrase and Sheate, 2002), some link to decision-making exists and some aspects relevant for sustainable development are being considered. Rather than entering the discussion on the precise definition of sustainability assessment, or indeed integrated assessment, we refer the reader to the aforementioned special issue, and focus on the use of tools in any kind of integrated assessment. The term "tool" in this paper has been chosen as a collective term and refers to all kinds of methods, techniques and procedures that are developed and intended to play an instrumental role in an assessment. Examples include model tools, cost-benefit analysis tools, tools for organising participation, and tools that frame an entire integrated assessment, such as the aforementioned IA procedure.

Impact Assessment in the European Commission

The European Commission's IA procedure (CEC, 2002b; 2005) was introduced in 2003. The IA procedure aimed to ensure compliance of new legislation with the subsidiarity and proportionality principles, to improve the quality of regulation, and to ensure that all major policy proposals are assessed on their potential economic,

[2]Note that in this paper we use the abbreviation IA to refer specifically to the EU Impact Assessment system rather than to "integrated assessment".

social and environmental consequences. IAs are developed by the operational Units (i.e., those responsible for developing a policy proposal), with help from the Commission's Secretariat-General, the architects of the system). Policy proposals, with the IA statement (or report) attached to it, are then sent for Inter-Service Consultation and passed through to the European Parliament and Council of Ministers. Following the Inter-institutional agreement on better law making,[3] Parliament and Council may also "have impact assessments carried out prior to the adoption of any substantive amendment". All IAs are published on the Internet, including the lists of stakeholders consulted and in some cases a collation of their submissions.[4]

The impact assessment procedure

At the time of its introduction the procedure knew two stages (CEC, 2002b). All new policy proposals from the European Commission go through the first stage, which gives an overview of the identified problem, policy options and sectors affected. On the basis of this so-called "preliminary assessment" the Commission could decide to carry out an "extended impact assessment" (the second stage). The impact assessment system was slightly revised in 2004, i.e., simplified. As of 2005, "impact assessments will be conducted on all major policy-defining documents and all legislative proposals listed in the Commission's legislative and work programme" (CEC, 2004, p. 6). As a result, the preliminary impact assessment is replaced by so-called "roadmaps", outlining the impact assessment process in terms of the assessments and consultations that will be undertaken. The extended impact assessment is now referred to simply as "impact assessment".

Critique to the IA system

Since the IA system was introduced, 160 IAs have been completed.[5] In analyses of how the early IAs were implemented (e.g., CEC, 2004; Wilkinson *et al.*, 2004; EPC, 2004; Lee and Kirkpatrick, 2004), and those from later years (e.g., EAI, 2006; EEAC, 2006; Renda, 2006), there are common threads of critique which emerge:

(1) European Commission's guidelines on IA are rarely fully applied and assume thorough understanding of the principles of sustainable development;
(2) Tools are not used much. For example, fewer than half of the extended IAs in 2003 used tools. Tool choice is seldom objectively explained;

[3]OJ C 321/01, 31.12.2003.
[4]A list of these can be found at http://ec.europa.eu/governance/impact/practice_en.htm (last accessed on 10 November 2006).
[5]Those publicly available up to 25 October 2006.

(3) The policy problem analysis is a crucial and subjective step in the assessment. The analysis often reflects the view of the Directorate General responsible for the IA. In general, there tend to be an economic focus. Environmental and especially social aspects are less well covered.

Our own investigations, i.e., 16 interviews held with staff in the European Commission (Hertin *et al.*, 2006) also reveal that demand for formal tools is generally quite low, with simple and economic-focused tools being the most popular.[6] Tool choice is mainly determined by time, data, and budgetary constraints, the qualifications of IA practitioners, and the range of tools available and easily accessible to them. Characteristics of tools which favour their choice include transparency and accuracy, the flexibility to adjust to a given situation, scientific and political acceptability of a tool (such as its development having been funded by the Commission) and previous policy officer experience of it. Pre-existing personal contact between policy officers and tool developers is another factor determining method selection.

In summary, sophisticated assessment tools are neither commonly nor systematically used in IAs and the decision to use a particular tool is not based on a scientifically underpinned matching of tool to task. The premise of this paper is that a framework for selection and use of tools could help those about to carry out (a task in) an integrated assessment, and could contribute to improving the practice of integrated assessment and its value to decision making by explaining why certain tools have been used.

Developing the Tool Framework

The tool framework presented in this paper gives an overview of different tool types and how these are used in integrated assessments. It has been created by deriving classifications or groups of tools from a set of approximately 50 tools, and identifying what role these tool groups could have in four so-called "generic phases of an integrated assessment" developed from the policy analysis literature. The following sections discuss these tool groups and generic phases, and present the tool framework.

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[6] Interviews included the following policy areas: Agriculture and Rural Development (DG AGRI, 2); Environment (DG ENV, 4); Justice, Freedom and Security (DG JLS, 4); External Relations (DG RELEX, 1); Research (DG RTD, 1); Taxation and Customs Union (DG TAXUD, 1); Development (DG DEV, 1); Employment, Social Affairs and Equal Opportunities (DG EMPL, 1); Internal Market and Services (DG MARKT, 1).

Tool groups

A broad set of assessment tools has been categorised into seven groups. These seven groups are the result of grouping tools with common characteristics as well as common roles in an integrated assessment. The distinguished groups are (1) assessment frameworks; (2) participatory tools; (3) scenario analysis tools; (4) multi-criteria analysis tools; (5) cost–benefit and cost-effectiveness analysis tools; (6) accounting tools, physical analysis tools and indicator sets, and (7) model tools. We acknowledge that the set of tools used to derive the tool groups from is not comprehensive and that the tool categories could have been designed differently. We also acknowledge that assigning a particular tool to one of the seven groups is unambiguous: some tools can be assigned to more than one group, in particular those tools that combine the characteristics of more than one tool group, such as interactive backcasting (Kerkhof *et al.*, 2002). Other tools include fragments of different tools categories. A tool such as Environmental Impact Assessment (EIA), for instance, often includes a form of multi-criteria analysis by prescribing that the assessed impacts are to be evaluated against a set of pre-defined criteria. Tools have been assigned to the tool categories on the basis of what each tools does in essence.

The **assessment frameworks** include the EU's IA system (CEC, 2004), Environmental Impact Assessment (Petts, 2000), Strategic Environmental Assessment (Therivel, 2004) and Integrated Sustainability Assessment (Weaver and Rotmans, 2006). These can be considered "procedural tools" in the sense that they do not carry out a particular kind of analysis, but are procedures designed to connect to a decision-making process, and within which a range of different analytical tools can be applied (Finnveden *et al.*, 2003). In fact, without other tools they are merely shells. This is why assessment frameworks have a different position in the tool framework, as will be discussed later.

The **participatory tools** comprise tools that can be deployed in decision-making processes with the aim of involving or consulting stakeholders in policy development processes (Asselt and Rijkens-Klomp, 2002). They can be defined as "methods to structure group processes in which non-experts play an active role in order to articulate their knowledge, values and preferences" (Asselt and Rijkens-Klomp, 2002, p. 168). There is an overwhelming variety of participatory methods and techniques, which stem from a broad range of scientific disciplines. They include IT-based tools such as electronic focus groups (Schneider *et al.*, 2002) as well as conventional participatory tools such as conventional focus groups (Morgan, 1988), consensus conference (Jørgensen, 1995) and repertory grid techniques (Jankowicz, 2004; Fransella *et al.*, 2004).

Scenario analysis tools include tools for defining scenarios, developing scenarios and interpreting the results. In essence, scenarios are constructed especially to assist in the understanding of possible future developments of complex systems (Schwartz, 1996; Börjeson *et al.*, 2006; Heijden, 2005). Scenario analysis tools include, for example, Delphi and cross-impact analysis (Helmer, 1977), scenario workshops (Andersen and Jaeger, 1999), and many more (Glen and Gordon, 2005).

Multi-criteria analysis (MCA) tools support comparison of different policy options on the basis of a set of criteria. Within this group at least three subgroups of MCA tools can be distinguished: (1) compensatory MCA tools, which are tools that allow compensation between different criteria used in the MCA such as the multi-attribute value theory (Fishburn, 1967; Keeney and Raiffa, 1976); (2) non-compensatory MCA tools, which are tools that do not allow compensation between different criteria used in the MCA, e.g., the dominance method (Jankowski, 1995); and (3) the partial compensatory MCA-tools, which are tools that allow compensation on only a limited number of criteria used in the MCA, e.g., PROMETHEE (Brans and Vincke, 1985).

Cost-benefit analysis (CBA) monetises expected positive and negative impacts of a policy. The monetised results can be used to justify acceptance or rejection of a policy proposal by simply comparing costs with benefits (Pearce *et al.*, 2006). The group **CBA tools** include tools such as contingent valuation (Mitchell and Carson, 1989) and hedonic pricing (Dixon *et al.*, 1996), that are used to monetise certain impacts for which no market value exists include. The **cost-effectiveness analysis** (CEA) tool is also included in this tool group, because, like CBA, it is rooted in economics and plays a role in analysing policy options. However, unlike CBA, CEA cannot determine whether the benefits of different policies outweigh the costs (Pearce *et al.*, 2006). CEA focuses on the cost-side of policy options, with the aim to find the most cost-effective option.

Accounting tools, physical analysis tools and indicator sets have in common that they are used for elucidating the physical side in an assessment, rather than the economic, or monetised, side (Adriaanse *et al.*, 1997). Three subgroups are distinguished in this group. The first is accounting tools, e.g., measure of economic welfare (Nordhaus and Tobin, 1972), which are tools that add the physical dimension to common economic accounts. The second subgroup is the physical analysis tools, which can be used to calculate certain physical quantities, like the ecological footprint (Wackernagel and Rees, 1996). The third subgroup is called indicator sets. This group includes different indicator sets that can be (or are) taken together to assess something specific within a broader assessment. Indicator sets can, for instance, be designed to measure poverty, hunger or economic competitiveness.

Model tools as a tool group in this paper include models, i.e., simplified representations of complex real-world phenomena, with a focus on "applied" models, i.e., models that try to simulate real-world processes based on or calibrated to empirical information and with some relevance to actual policy decisions. The models considered here are models from natural and economic sciences and do not include e.g., psychological models. Three categories of models are distinguished: (1) socio-economic models (e.g., general economy models); (2) bio-physical models (e.g., climate models); and (3) integrated models (e.g., land-use models).

Phases in an integrated assessment

The usefulness of tools is related to the phase of the decision-making process in which tools are used. The mainstream thinking here is that analytical support should contribute to all stages of policymaking (Norse and Tschirley, 2004). Early on in the decision-making process, when the core task is to frame a problem (i.e., to understand it, to agree on its boundaries etc.), different tools are used as compared with the phase later on in the process where concrete policy proposals are assessed on their impacts.

There is no single and commonly accepted approach to integrated assessment that provides a useful basis to distinguish different phases of an integrated assessment. Instead, many different descriptions of the steps or phases of integrated assessment can be found in the literature (e.g., Finnveden *et al.*, 2003; Norse and Tschirley, 2000; Sheate *et al.*, 2003; Dalkmann *et al.*, 2004; Devuyst, 1999; Lee and Kirkpatrick, 2001; Weaver and Rotmans, 2006). These descriptions reflect the existence of the many different assessment approaches. However, there are strong complementarities and overlaps between the different assessment frameworks. Since they share the same origin in policy analysis (Dunn, 2003; Hogwood and Gunn, 1984) and systems analysis (Miser and Quade 1985; Quade, 1983), it is possible to map different assessment frameworks (for example IA, ISA, EIA, SEA) onto a more basic, or generic, framework (see Table 1).

From the analysis of the various types of assessments, four phases can be identified that exist, in one form or the other, in all of them. These have been labelled "generic phases of integrated assessment":

- Phase I — the process of analysing the problem
- Phase II — the process of diverging to a wide variety of possible solution to address the problem and roughly estimating the effects and impacts of proposed solutions
- Phase III — the process of converging to a smaller set of more concrete policy options and assessing these for there expected effects and impacts, select the best option and implement it
- Phase IV — the process of monitoring the implemented policy and reflecting on the decision-making process.

Table 1. Generic terms of an integrated assessment linked with other descriptions of integrated assessment.

		Frameworks for integrated assessment		
Generic terminology	Commission style Impact Assessment	ISA	EIA	SEA
I – Problem analysis	Problem identification	Scoping	Problem identification (screening, scoping)	Assessment of (environmental) situation (screening, scoping)
II – Finding options	Objectives definition	Envisioning	Objectives identification	Objectives identification and development of policy options
III – Analysis	Development of main policy options	Experimenting	Impact assessment	Impact assessment
	Analysis of impacts		Review	Review
	Comparison of options		Mitigation, decision making	Decision making
				Implementation
IV – Follow-up	Evaluation/ discontinuation	Learning	Follow up	Monitoring and evaluating

The four generic phases become the basis upon which to understand the role of tools. Clearly, the context, time frame and scope of the tasks and the entire assessment can be different, and not every type of assessment framework includes all four generic steps in the same terminology as given here. Some assessment frameworks go through the entire assessment process numerous times, cyclically and iteratively (e.g., ISA). Others (e.g., EIA) start from the moment a policy proposal has been developed, as it is not the core of EIA to develop alternative proposals, and focus on the identification of all possible (environmental) impacts.

It is acknowledged that the different types of integrated assessment cannot be equalised, and that we did not cover all types of assessment that exist. In addition, the boundaries between the different phases of an integrated assessment are blurred, and integrated assessments need not necessarily follow the four phases sequentially.

Iterations could take place and certain parts of different phases could be done in parallel, or skipped. These are criticisms which have been levelled at a similarly idealistic representation of the stages model of the policy cycle (e.g., Sabatier, 1999). However, using the four generic phases is a useful means of classification to break down the problem of understanding the role of tools in integrated assessments; it is not intended as a faithful description of the operation of assessment systems in practice.

The tool framework: matching tools to tasks

We now describe the four generic phases in greater detail. We show what each phase aims at, which tasks are to be done and how the tool groups we have distinguished can support these tasks.

Phase I — Problem analysis. The aim of this phase is to understand the problem and to frame it, whilst accounting for different views on it. Useful tools in the problem analysis phase are those that can steer the process of mobilising knowledge and articulating values, by means of stakeholder participation (experts, policy makers, lay people). In this phase, knowledge is being developed, made available and discussed, to reduce uncertainty and to elicit views and if possible build consensus on the problem to be addressed (Hisschemöller and Hoppe, 1996). Uncertainty cannot always be reduced and consensus cannot always be reached; the problem analysis process should at least result in acknowledging and understanding the uncertainty and the dissent. Through participation, stakeholders become the (co-)definers of the problems to be addressed. This will assure the relevance of the assessment and could avoid so-called Type-III errors, i.e., assessing the wrong problem by incorrectly assuming that there is no difference between the problem as defined by the analyst, and the actual problem as defined by the stakeholders (Dunn, 1997).

Phase II — Finding options. The aim of this phase is to identify all possible options so as to act on the problem as defined in Phase I. In this phase the scenario analysis tools form the centre of the assessment. Scenarios are used to elucidate visions on sustainable futures and pathways, including policy interventions, towards such futures. Whereas the previous phase focussed on mobilisation and development of knowledge and problem perceptions, in order to reduce/understand uncertainty and to understand to what extent consensus exists about the problem, this phase can make explicit which uncertainties remain, and make concrete what dissent exists over values (the different scenarios could represent different values and objectives). Note that this phase could also be done without any tools being used; options could, for example, be developed politically. Only the more strategic integrated assessment approaches use (participatory) scenario development for the development of options. During this participatory, scenario-building exercise, it is preferable to make explicit the evaluation criteria and information needs required in the next phase of the assessment, and to analyse and compare proposed policy interventions. Agreement, or “agreeing to disagree”, on the parameters that are relevant in the remainder of the integrated assessment is helpful, as it facilitates the discussion about the best option to implement. New models might need to be developed or existing ones to be re-defined, to calculate the parameters that have been agreed. The choice of models (and indicators) must be done involving the relevant stakeholders. This is necessary, as described before, to avoid Type III errors, but also to reduce the risk of non-acceptance of the results.

Phase III — Analysis. The third phase is about characterising as far as possible the details of the plausible scenarios and policy interventions developed in Phase II, with the final aim of selecting options for implementation. Here, the emphasis lies on the analytical tools, such as models, indicator sets, cost–benefit analysis tools and physical analysis tools. Models might help to further specify the scenarios, resulting in data series. Such series in turn could feed into other analytical tools. Detailed quantitative assessments are carried out for sub-systems within which, possibly by accepting boundary conditions, a relatively high degree of consensus and certainty exists (Hisschemöller and Hoppe, 1996). All analytical assessment results can form part of a multi-criteria analysis to support comparison of different policy options on the basis of agreed evaluation criteria. Stakeholder involvement during this phase could be relevant when, for example, comparing outcomes of various assessment tools in a multi-criteria analysis, in particular when dissent exists with respect to the problem and the relevant parameters to assess, and when there are large uncertainties. When a high level of consensus exists and when there is a high level of certainty with respect to the problem, this phase further rationalises the eventual policy choice. In that case, participatory tools have a limited specific role: the analysis becomes mostly a technical exercise.

Phase IV — Follow up. The last phase of an integrated assessment has two purposes: (1) to reflect on the entire integrated assessment process, to learn from it and to improve future assessment processes; and (2) to monitor and evaluate the result of the integrated assessment (e.g., implemented policy measures) to learn why the intended changes to the system did (or did not) occur. For “learning from the process” there is a role for the participatory tools in bringing together the stakeholders involved in the integrated assessment, thereby extending the quality assurance process. For monitoring and evaluating the result of the policy intervention there is a role for cost–benefit and cost-effectiveness analysis, accounting tools, physical analysis tools, indicator sets and model tools, as part of ex-post assessments.

The tasks and the potential role of tools are summarised in Table 2. The grey-shaded cells of that table refer to the tool groups that are “in the lead” during that

Table 2. The Tool Framework: The potential role of tools in assessments.

	Phase I Problem analysis	Phase II Finding options	Phase III Analysis	Phase IV Follow-up
Participatory tools	Problem framing (mobilising and integrating knowledge and values)	Supporting scenario building	Providing the context for and improve robustness of MCA, CBA and CEA	Evaluating the assessment process
Scenario tools	Providing the future perspectives to problem framing	Visioning futures, finding options and setting objectives	Providing references for the application of analytical tools	—
Multi-criteria analysis tools (MCA)	—	Definition of criteria	Comparing different alternatives	—
Cost–benefit analysis (CBA) and cost-effectiveness analysis (CEA) tools Accounting tools, physical analysis tools and indicator sets Model tools	Providing the analytical basis for problem-framing	Supporting objective setting	Full analytical characterisation of options to enable comparison	Ex-post assessment

Note: The table shows six tool groups in the left-hand column, followed by a column for each of the four generic phases of an assessment. A cell describes a task that is to be done in a particular phase. This task can be supported by the tool group of the same row as the cell. The shaded cells in the table represent task/tool combinations that are "in the lead" in a particular phase. The labels of the top row (problem analysis, finding options, etc.) can be replaced by corresponding terminology found in different types of assessments, like Impact Assessment or Strategic Environmental Assessment.

particular phase of the assessment, as explained in the description of each phase. If other tools are mentioned in addition to the tools in "lead" this is to show that they can potentially play a role in this phase but that this is mostly to support the lead tool. Table 2 indicates which phases of analysis different tools may potentially contribute to. The precise role of tools, and combination of tools used, varies from case to case, and is in reality tailored to the needs of the user and his or her budgetary and time constraints, amongst others.

The tool group "assessment frameworks" has a special place in the tool framework. This group is not shown in the left column, as are the other groups. Instead, the assessment frameworks can be used to replace the generic terminology of Phases I to IV, by using the mapping as presented in Table 1. In the case of, for example, Integrated Sustainability Assessment, Phases I to IV become, respectively, scoping, visioning, experimenting and learning. The assumption underlying of this approach is that tools essentially will have the same role in assessments irrespective of the type of assessment.

Using the Tool Framework and Related Insights

The tool framework as described in the previous section can be used to find useful types of tools for carrying out certain tasks within an assessment, using generic "stages" of assessment as groupings. A more specific discussion on which specific tools to use within the tool groups (e.g., particular models) falls beyond the scope of this paper.

Besides using the tool framework for finding potentially suitable tool groups for supporting particular tasks in a particular phase, the framework provides useful insights. First, it shows that integrated assessments have a certain sequence, over the course of which the character of the assessment changes from being open, creative and broad of scope to more technical and focussed. This gradual change explains why different qualities are required from the tools throughout the assessment process. There is no "one size fits all" with respect to tools, nor can one tool do the job. Secondly, the framework explains why certain tools are common in IAs and others are not. As previous IA evaluations have revealed, most tools used in IAs are more technical, rather than broader problem-definition, tools. This is logical when considering that, in terms of the framework, the core of an IA as carried out by the European Commission lies in the third phase of an integrated assessment.

The recent revision of the IA guidelines (CEC, 2005) puts more emphasis on the MCA tools, which seems sensible considering the value of MCA in the third phase of an assessment. The framework however also shows that the earlier phases of an assessment are crucial for framing the assessment and for eliciting views and building consensus on knowledge and values within the problem, and ideas about possible solutions to alleviate the problem. When an IA does not include the phase of problem framing and finding options, which is often the case as these are done in the political context (e.g., in the Council of Ministers of the EU), the process risks becoming stuck, or heavily criticised by stakeholders, in the phase of analysing impacts (Phase III). Obviously, the challenge is to truly integrate assessments into decision-making processes and to have decision-makers make use of assessment tools and frameworks (Lee, 2006). A discussion on the prospects for this is also beyond the scope of this paper.

The gap between the theory of integrated assessments and the reality of policy making (Lee, 2006) is worth exploring in further detail. Trans-disciplinary, deliberative integrated assessment frameworks and tools are promoted by the scientific community to address complex problems (e.g., Weaver and Rotmans, 2006). They are, however, rarely used in the ways intended by their developers and funders. The framework presented in this paper could contribute to closing this gap by pointing out to decision makers that the different types of assessment frameworks essentially consist of similar phases and can draw on similar tools. Still, further research would be needed to make a link between the more open and science-driven processes (assessments that explicitly include Phase I and Phase II) and the more closed and policy-driven processes seen in practice (i.e., processes focussed on Phase III).

Conclusions

The framework presented in this paper is neither comprehensive nor complete. It has been developed from theoretical interpretations and perceptions and suggestions from policy officers, but it remains a proposal that needs to be tested in, and applied to, real policy cases. Lessons drawn from such empirical testing will improve the framework. Nonetheless, this paper provides a first step in the development of an overarching framework for finding potentially appropriate tools for different tasks, and justifying the use of those tools. It also illuminates some instrumental reasons for non-use of tools in current IA practice, and suggests ways of addressing them. While clearly not a panacea, bridging the gap between sophisticated tool knowledge and pragmatic policy making can be partly done by communicating more clearly what these sophisticated methods can contribute to an assessment, and offering a simplified overview of how tools can be used.

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