PROVIDING A SOLID FOUNDATION FOR SUSTAINABLE POLICY MEASURES IN EUROPE

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Summary

Sustainable Development (SD) has become an overall policy objective in Europe. This is confirmed by the recent issuing of a renewed European Sustainable Development Strategy (EU SDS in 2006) and a variety of national and regional SD strategies. Making the concept of SD operational for public policies raises important challenges in terms of relevancy, accuracy and legitimacy. Without prospective approaches, including foresight and a variety of assessment tools, sustainable policy measures have a risk to lack a solid foundation. Measuring the progress towards SD and assessing the impact of different policy options helps to manage a government or organisation by providing a better understanding of the problem and related solutions. This explorative process can also facilitate the interaction with the public and/or their stakeholders through its communication capability.

Researchers have introduced different prospective approaches to support decision-making for sustainable development. Over the past 15 years, Europe has rapidly adopted the practice of developing and using impact assessment tools. Formal activities and guidance for Impact Assessment (IA) are successfully established within the Commission of the European Communities (EC) and in most EU Member States. Practice can range from models and scenario analysis to participatory methods including expert and non-expert opinion. Although these prospective approaches are legitimate on a conceptual basis, practice reveals that developing and using the assessment tools is far from being straightforward. Clearly, the adoption of IA procedures alone does not guarantee that science delivers the best available knowledge for decision-making. A strategy for SD must take into account not only its financial costs and benefits, but also its potential environmental and health impacts and its social acceptability. Decision-making can only proceed in a sustainable way if the effects of new policy measures are explored and understood before they are introduced. Key issues such as stakeholder commitment and complexity in decision-making, reflected in the synergies and trade-offs of the different dimensions within SD, yet remain difficult to manage.

The purpose of this paper is to provide information on the scientific underpinning of decision-making, i.e. ‘How to explore and assess new policy measures before they are introduced?’ To do this, a scoping study is set up to evaluate and compare 15 different IA exercises concerning natural resources, biodiversity, energy, agriculture and trade, including formal IA within EC and more experimental and novel IA policy cases in the EU Framework Programmes for Research (FP5 & FP6 projects). The scoping study will include desk research and interviews with different users involved, including the EC policy officers. The main criteria for evaluation include the relevancy, accuracy and legitimacy of the use of IA tools. Hence, the exercise will provide insight on the impacts and implications for research and policy.
1 Introduction

The last decade has seen a growing international interest in the development and use of evidence-informed policy and practice across a wide range of public policy issues (Lee & Kirkpatrick, 2006). Policymakers at different scales are confronted with the complexity of a future that holds an array of possibilities. They need to find ways to deal with this uncertainty and to anticipate trends and expectations. This is confirmed by the recent issuing of a renewed European Sustainable Development Strategy (CEC, 2006) and a variety of national and regional Sustainable Development strategies (De Smedt, 2006; Meadowcroft, 2007). Although the term sustainable development has been widely used for the last fifteen years - not only in politics, but also in science, media, business and society - it still remains questionable whether there is a shared and common accepted understanding of its meaning.

The precise meaning of sustainable development, both in theory and in practice, is a vexed question for its broad appeal has not led to coherent interpretations (Cashmore, 2007). Looking backwards at its origin, the concept of sustainable development was the result of the growing awareness of the global links between increased environmental problems, of concerns about quality of life now and in the future, and of complex socio-economic issues related with poverty and inequality. In previous times, sustainability of human kind was taken for granted and did not appear as an explicit goal. It certainly was an implicit goal: no human society has ever consciously promoted its own 'unsustainability' (Bossel, 1999). Global developments now focus attention on sustainability as an explicit goal (Watson, 2005). However, the detailed principles required to implement these concepts are profoundly contested (O’Riordan, 2008).

Since the introduction of the sustainability notion into the realm of political and environmental thought some thirty years ago (Goldsmith et al., 1972), the concept’s meaning has evolved considerably. While the environmentalists of the seventies blamed industry, economic growth and technological development for environmental degradation, representatives of a second wave in environmentalism came to hold the idea that environmental protection is not necessarily opposed to economic development (Grin et al., 2002). The first important use of the term was in 1980 in the World Conservation Strategy (IUCN et al., 1980). This process of bringing together environmental and socio-economic questions was most famously expressed in the Brundtland Report’s definition of sustainable development as meeting ‘the needs of the present without compromising the ability of future generations to meet their needs’ (WCED, 1987). This defines needs from a human standpoint. As such, sustainable development should be understood as an anthropocentric concept (Hopwood et al., 2005).

The political content of the concept was developed above all at the UN Summits of Rio in 1992 and Johannesburg in 2002. It is now widely accepted that governments all over the world and at different levels share responsibility and should work together and in partnership with non-governmental actors towards the achievement of a sustainable society (Bomberg, 2004). Hence, societies and their environments are dynamic, technologies and cultures change, values and aspirations change, and a sustainable society must allow and sustain such changes, i.e. it must allow continuous, viable and vigorous development, which is what Bossel refers to as a ‘sustainable development’ (1999). Although the factors constraining the development process and the processes driving it are known, the path of sustainable development is still the unpredictable result of an evolutionary process. The shape and form of a sustainable society must allow change in order to be sustainable; it can neither be planned nor predicted (Bossel, 1999). Therefore, instead of being defined in objective terms, sustainable development should
be understood and defined by process-oriented logics (Holling, 2000). As a consequence, it is not possible to gain any knowledge, regardless of improvement in scientific understanding, on what should be considered as a sustainable situation. As such, making the concept of sustainable development operational for public policies raises important challenges in terms of relevancy, accuracy and legitimacy.

The purpose of this working paper is to analyse how, in Europe, policy instruments have been developed in order to provide a solid foundation for sustainable policy measures. This paper thus aims to advance the debate on Impact Assessment (IA) and the relationship with sustainable development (SD) by contributing to a richer understanding of the current practices drawing on the new empirical evidence. To do so, this paper reflects on IA as a policy instrument and explores the core problems concerning practice to support SD strategies and policies in Europe. In a broader context, policies are seen as legitimate and accepted by society if they are well motivated and based on sound evidence. This also includes that policies should be effective to reach clear goals and be respectful for social and individual rights. However, the role and value of science is changing and improved structuring of knowledge to identify opportunities and areas of vulnerability in complex strategic issues, such as SD, are needed. The next section of the paper, “How does SD fit into EU policy making?”, begins with a brief overview of the IA system to support the implementation of the renewed EU SDS in the Commission¹ (EC). The third section: “Aims and Methods” explains how a scoping study was conducted to evaluate current IA practice. The scoping study includes 15 European impact assessment initiatives - concerning natural resources, biodiversity, energy, agriculture and trade - and examines the empirical evidence on IA practice through the lens of users via document analysis and interviews. This section also outlines the review criteria and methods by which different current practices have been analysed and compared. The three criteria - relevancy, accuracy and legitimacy - are being used in section four to structure the main findings. The content of section five was driven by the key question "How to improve current practice?" and the related implications for research and policy. The sixth and final section summarises the principal findings of the study and outlines some issues requiring further research for integrating the underlying learning-by-doing dynamic to improve current practice. The paper is a working document for discussion. The paper only reflects the authors’ personal opinions and do not entail an official point of view of the EC, nor can it be binding the EC in any sense. We would appreciate that it would not be cited without authors’ permission.

2 How does SD fit into EU policy-making?

2.1 EU Sustainable Development Strategy

Managing a transition toward a more sustainable development path at a global scale is one of the great challenges today (Raskin et al., 1998; Rotmans et al., 2001). From a policy point of view, SD is a cross-cutting issue that needs a very high degree of policy coordination. This is especially true considering that the European Union’s 2001 Sustainable Development Strategy demands all European Union (EU) policies to actively support the sustainable development of other countries, particularly those in the developing world (Adelle et al., 2006).

¹ In the paper the 'Commission' and 'EC' are used to refer to the 'Commission of the European Communities'
Following the review (EC 2005a; EC 2005b) of the 2001 Sustainable Development Strategy launched by the EC in 2004, the European Council adopted a renewed Sustainable Development Strategy (renewed EU SDS) in June 2006. The overall aim of the renewed EU SDS is "to identify and develop actions to enable the EU to achieve continuous improvement of quality of life both for current and for future generations, through the creation of sustainable communities able to manage and use resources efficiently and to tap the ecological and social innovation potential of the economy, ensuring prosperity, environmental protection and social cohesion" (CEC 2006).

2.2 Improving policy coherence

In order to fulfil this ambitious obligation, the Commission has committed itself to consider the impacts that all new policies have within and outside the EU as part of a new integrated impact assessment regime (Adell et al., 2006). This builds on the Göteborg European Council meeting in 2001 and was also outlined in the Communication on Impact Assessment (EC, 2002). This communication commits the Commission to undertake an IA “to improve the quality and coherence of the policy development process” and to “contribute to an effective and efficient regulatory environment and further, to a more coherent implementation of the European strategy for Sustainable Development”. Furthermore, in 2003 the Impact Assessment (IA) system was introduced in the Commission, replacing and integrating all sectoral assessments of direct and indirect impacts of proposed measures into one global instrument. These new IA procedures became fully operational in 2004/2005 (Lee & Kirkpatrick, 2006). The integrated impact assessment has to be carried out if: “...the proposal is expected to result in substantial economic, environmental, and/or social impacts, significant impacts on major interested parties and/or if the proposal represents a major policy reform in one or more sectors”. For reasons of simplification, IA was chosen as the overall concept (Rudy & Hilty, 2008). Yet, the integrated character is clearly foreseen as an essential element of the IA system. To summarise, the IA procedure is meant to inform and improve policy coherence, but not determine the final decision. IA is conceived as an assessment of distinct alternatives to achieve a specified policy objective, thereby providing the basis for a decision in which the policy is chosen with the ‘best’ net benefit.

2.3 Implementing the IA system

The IA system in the Commission is implemented as a decentralised approach whereby each Directorate-General is responsible for preparing its own impact assessments supported by an inter-service steering group of Commission services. The lead service is also responsible for timely and adequate consultation of stakeholders. The results and conclusions of the impacts evaluated in all IA are to be integrated into policy-making, thereby guiding the final policy choice by anticipating the possible effects of the proposed policy. In 2005, the Commission Impact Assessment Guidelines were introduced providing further support with the implementation. These guidelines are designed to provide a framework for the systematic examination and comparative analysis of emerging policy options in a wide range of proposals, including their interactions within the three pillars of SD. The IA Guidelines can be seen as a set of logical steps, which structure the preparation of policy proposals. Six steps are foreseen in the process

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2Impact Assessment Guidelines published in June 2005, with March 2006 and 2008 planned update:
http://ec.europa.eu/governance/impact/docs/key_docs/sec_2005_0791_en.pdf and annexes to the guidelines:
providing answers to basic analytical questions: 1) to identify the problem; 2) to define the objectives; 3) to develop main policy options; 4) to analyse their impacts; 5) to compare the options; and 6) to outline policy monitoring and evaluation. Furthermore, it sets out minimum standards of consultation with relevant stakeholders.

In 2006, an independent IA Board was launched at the highest level\(^3\) to provide independent quality support and control for impact assessments prepared by Commission services. As mentioned, the Commission’s impact assessment system aims at ensuring evidence-based policy making inside the Commission through an integrated and balanced assessment of problems and alternative courses of action. The IA Board complements and reinforces this approach, notably by providing an independent and focused perspective on the quality of the analysis carried out by the Commission services in the elaboration of IA exercises. This also includes using the possibility to opt out from decision making whenever there was the risk of a (perceived) conflict of interest. The IA Board has also endeavoured to make the results of its work as transparent as possible. Its recommendations are accessible to all Commission staff and are formally integrated into the Commission’s internal decision-making, from inter-departmental consultation to the final adoption by the College. The IA Board’s opinions are made available to the other institutions and the general public, once the corresponding Commission initiative is adopted. The IA Board also presented itself and its activities at a public stakeholder conference in June 2007.

3 Aims & Methods

As stated earlier, the purpose of this paper is to analyse how in Europe policy instruments have been developed in order to provide a solid foundation for sustainable policy measures. The analysis involved the set-up of a scoping study during Spring 2008 to evaluate and compare different current 15 practices, including formal IA exercises within the Commission and more experimental and novel research policy cases in the EU Framework Programmes for Research (FP5 & FP6 projects). The selected IA exercises and research policy cases are analysed on the basis of a set of criteria developed specifically for this scoping study. The criteria for evaluating the use of IA tools incorporates: (i) the relevancy, i.e. ‘How closely connected or appropriate IA of the EC and novel IA policy cases are to the renewed EU SDS.’; (ii) the accuracy, i.e. ‘The quality or state of being exact or precise and correct in all detail, of being capable of, or successful in reaching the intended target.’; and (iii) the legitimacy, i.e. ‘The extent to which the IA conforms to a given standard (= EU SDS and EC IA Guidelines). The scoping study focuses on document analysis and interviews. Two different user communities are distinguished: (a) a first group is composed out of policy-makers, i.e. the desk officers within the EC responsible for IA exercises of EU policies; and (b) a second group is composed out of researchers who are supposed to provide scientific knowledge supporting IA via theories and methodologies and/or supporting IA practice via IA methods. The comparative case-study design allows for an in-depth study of the science-policy interface and a systematic examination of similarities and differences between the 15 cases. The data in the scoping study consists of primary documents such as scientific reports, IA reports and public policy documents and 10 additional interviews with researchers and policy-makers.

\(^3\) The Impact Assessment Board, chaired by the Deputy Secretary-General responsible for Better Regulation, was set up by President Barroso on 14 November 2006. Members of the IA Board, coming from departments with the most direct expertise in the three dimensions (i.e. economic, social and environmental), are appointed ad personam by the President.
### Table 1. Overview of the set of criteria and related questions developed to analyse the use of IA tools to support sustainable policy measures (after EPA, 2000)

<table>
<thead>
<tr>
<th>Criteria + Description</th>
<th>Questions</th>
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<tr>
<td><strong>RELEVANCY</strong>&lt;br&gt;How closely connected or appropriate are IA of the EC and novel IA policy cases to the renewed EU SDS.</td>
<td>Key challenges of EU SDS&lt;br&gt;SCOPE&lt;br&gt;[7 key challenges]</td>
</tr>
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<td></td>
<td>SD pillars&lt;br&gt;[Assessment of the Social, Economic and Environmental Dimensions] TRADE-OFFS</td>
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<tr>
<td><strong>ACCURACY</strong>&lt;br&gt;The quality or state of being exact or precise and correct in all detail, of being capable of, or successful in reaching the intended target.</td>
<td>Technical Requirements&lt;br&gt;Data&lt;br&gt;EVIDENCE&lt;br&gt;[EC and EU agencies are a prime source of sound scientific advice.]</td>
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<td></td>
<td>Models&lt;br&gt;TOOLS</td>
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<td>Institutes</td>
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<tr>
<td><strong>LEGITIMACY</strong>&lt;br&gt;The extent to which the IA conforms to a given standard (= EU SDS and EC IA Guidelines).</td>
<td>Methodology&lt;br&gt;PARADIGM&lt;br&gt;GOAL&lt;br&gt;PROCESS/ TIMING</td>
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<td></td>
<td>Participation of stakeholders and civil society in the assessment</td>
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<td>Consultation in the outcomes STAKEHOLDERS</td>
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4 Results

The scoping study on the use of IA tools revealed a broad variety of successfully established initiatives linking to several SD challenges but also recognises the limits of current knowledge and practice. As a concept IA, is effectively accepted among researchers and policy-makers as a tool to support sustainable policy measures. Although the general application is still recent, more and more expertise is being achieved within the EC and among research projects. In 2007 for example, more then 170 IA exercises have been conducted within the EC. The next section reflects the findings of the scoping study including the empirical evidence from the interviews and the analysed documents. The set of criteria and related series of questions ensured a consistent approach to data collection, showed to be analytically sound and supported a comprehensive dialogue during the interviews. In this section, the three criteria are also used to present the findings and to provide guidance to the reader. However, issues often do (in)directly relate to more than one criteria and some overlap exists. The main findings reflect on the use of the tools in general. Hence, the criteria should be considered as a framework to support comparison, not as a strict classification.

4.1 Relevancy

Most desk officers recognise the potential relevance of IA to support sustainable policy measures. For some desk officers IA is explicitly seen as one of the most important instruments for the implementation of the EU SDS. However, they also realise that current IA practice has its limits. These observations can partly be explained due to its broad application despite its relative short existence. In its short life span, the IA system is applied for a variety of different policy measures, which makes it difficult to compare and to learn from experience. The observation that IA practice has not yet reached its full potential is also linked with the inherent complexity of a crosscutting issue, like SD. As such, SD needs strong co-ordination on all domains and this is even more challenging in a multi-level governance system such as the EC. Researchers also recognise the potential added value of IA exercises but they find it difficult to evaluate the contributions of current IA exercises for SD in the complex process of decision-making. It is also important to remember that outcomes and decisions are not necessarily one and the same (Cashmore, 2007). Often researchers find the scope of the current IA exercise too narrow to support real change for the unsustainable developments, such as climate change and biodiversity loss.

A variety of analytical tools are being used in current IA practice to evaluate the social, economic and environmental dimensions of SD in a balanced way. The use of SD indicators, for example, is effectively established in Europe (see also De Smedt, 2006). A set of indicators can provide a sound analytical reference to the well known three pillars and/or to the renewed EU SDS challenges. Indicators can also serve as means to communicate the IA outcomes. Science has provided effectively accepted concepts and data for a broad range of economic and environmental indicators. However, most of the social indicators are still lacking sound concepts or monitoring initiatives to provide qualitative data. A shortlist of SD criteria/indicators is also integrated in the EC IA guidelines. Although the use of this indicator list often entails practical problems due to missing data, less appropriate indicators for the policy proposal, etc., the indicators can be seen as a checklist to ascertain if the full scope of the assessment is met. Overall, the use of SD indicators provides policy-makers with some guidance that all relevant and available information is integrated in the assessment. Yet, there is only limited experience with the use of indicators that provide information on the interaction and trade-offs between
different socio-economic and environmental developments. Material flows, for example, are a common link between natural systems on the one hand, and human societies on the other (Rotmans, 2006). In addition, no established and easy-to-use numeric models are available for desk officers to analyse the impacts in a balanced way.

4.2 Accuracy

No evidence is found of a methodologically sound way to be precise and correct in all detail and great variation in the presentation of evidence can be found in the IA exercises and research projects. Both, desk officers and researchers, mention time and resource constraints, which have an impact on the accuracy of the assessment. It should also be noted that research projects and policy initiatives such as IA exercises have a limited life-span and have specific starting and completing dates, making it difficult to link them to each other. They also recognise that practice is - even more than the mentioned constraints such as data availability and time to perform the analysis - dependent on the people conducting the assessment. Hence, both user communities recognise the importance of the process.

The EC IA guidelines foresee 6 key analytical steps, supporting a coherent presentation in the formal IA exercises. This is in contrast with most of the research projects that only report on some of the 6 key analytical steps. The guidelines also recommend the use of quantitative information. The scoping study indeed revealed that most of the knowledge generated, analysed and presented has a strong quantitative origin including official statistics and numeric models. Most of the models used are developed by standing research organisations and were peer reviewed and applied in policy for many years. In general, most researchers and policy-makers perceive the quantitative knowledge as accurate. However, most quantitative knowledge (i) is often fragmented due to sector specific models; (ii) is strongly based on assumptions of the past and (iii) ignores the high-levels of uncertainties of a complex and cross-cutting issue such as SD. In addition, some researchers are more interested in developing (new) concepts and tools and are less focused on the policy relevance. So even promising or successful tools from a policy perspective are not always being maintained or further applied by the developers for new policy challenges. These ‘orphan tools’ clearly indicate a potential limit to research funding. This is more or less recognised by the policy-makers, but science does not provide established and easy-to-use tools and models to deal with these inter-linkages and uncertainties. Furthermore, due to the sometimes limited interactions with policy-makers, science does not recognise the loss of opportunity of not further maintaining or applying existing tools. However, some practice in formal IA exercises and research projects reveals promising experiments with agent-based modelling, scenario and participatory approaches to support a more integrated and explorative approach supporting a more vibrant science-policy interface.

4.3 Legitimacy

Practice does not reveal an agreed understanding of SD and the detailed principles required to implement SD are profoundly contested. Most practice, however, does include some reference to the renewed EU SDS and/or some of the seven challenges, providing some form of legitimacy. Especially the EC IA guidelines and the IA Board support the legitimacy of an IA exercise and the related decision-making process. The fact that the IA Board was launched at the highest level to provide independent quality support and control also underpins the legitimacy of IA within the EC.
Actual practice within research projects is less connected with the formal IA system. As mentioned by the interviewed researches, there is no successfully established and accepted theory of sustainable science to support legitimacy of current research practices. Most researchers see sustainability science as a trans-disciplinary endeavour to better understand the complex dynamic interactions between environmental, social and economic issues. Some researchers strongly believe that science should go beyond progress in a better understanding of the complex dynamic interactions. Science should also engage itself in the process of ‘putting knowledge into action’, i.e., for a sustainable transition, goals and policy measures must be assessed. This has posed important challenges to the scientific community to provide not only sound theories but also efficient and reliable tools.

Some researchers also believe that in order to improve actual practice, a greater emphasis needs to be placed on the social science methodology, which can help bridging the gap between policy and science by means of creating shared platforms of ideas and actions. The use of complex models is an example that supports this observation. Many researchers and modellers are in favour of developing very complex models, including more and more variables and equations. This is in accordance with most of the current research tradition to choose for continuous specialisation, thereby entailing the risk of losing a general overview of the whole dynamic system. In contrast, the connection between policy and science and the related knowledge flow is facilitated by using simple, holistic models that are easily understood by the policy-makers and the stakeholders. Practice reveals that legitimacy of an assessment often depends on the common understanding and thereby acceptance of the model behind the assessment by a broad group of stakeholders.

5 Discussion

The sustainability challenge is to manage our ever-changing planet in a sustainable manner despite facing rapid demographic changes, economic growth, technological innovations, socio-political conditions and changing behavioural patterns (Watson, 2005). Achieving more sustainability depends on establishing an interpretation (or interpretations) of sustainable development in a given context. This process should reflect on what to avoid as well as what to seek to attain, including the relevant relationships, interdependencies and uncertainties (Tàbara et al., 2008) and encouraging enough solidarity among stakeholders to accept a joint responsibility (Norton, 2005). Therefore, SD – as a policy domain- poses particular challenges on the agenda of policy-makers due to its conceptual vagueness and inherent complexity (O’Riordon, 2008), and the uncertainty related to policy choices and their outcome in a multi-level governance such as the EC (Hooghe & Marks, 2003). Furthermore, as a research domain, SD is a complex and multi-dimensional phenomenon with a breadth and depth that cannot be fully covered by the current theoretical underpinnings from science (Rotmans, 2006). Hence, science should provide better understanding and evidence for policy, and policy-makers should increase the transparency of the difficult policy decisions lying ahead (Cashmore, 2004, Ruddy & Hilly, 2008). The practical problem to be addressed here is whether it is possible to design and implement a system - operating effectively in complex and pluralistic situations - to support a deliberative decision process (Norton, 2005). To accomplish this challenge, researchers have introduced different prospective approaches to support decision-making for SD (Kates et al., 2001, Ness et al., 2007).

Over the past years, Europe has rapidly adopted the practice of developing and using IA tools (Rotmans, 2006; Lee & Kirkpatrick, 2006; Jacob et al., 2008). Policy-makers have to rely on
information that allows them to judge on a regular basis whether or not the current evolution is to be considered as a contribution to stay or to engage on a sustainable path. As such, sustainable policies require constant feedback, providing information to policy-makers that enables them to establish a connection between past evolutions and future expectations, while integrating the underlying learning-by-doing dynamic (Bauler & Hecq, 2000). The empirical evidence of this scoping study confirms a broad variety of successfully established IA related initiatives in Europe. The interviewed policy-makers and researchers find the IA approaches legitimate on a conceptual basis. Formal activities and guidance for IA, for example, are successfully established within the EC. Practice can range from models and scenario analysis to participatory methods including expert and non-expert opinion. The inherent complexity of SD for policy and science was also recognised within the scoping study. This complexity hinders the application of IA as current practice both in research as in policy (Lee, 2006). Both communities however acknowledge that the full potential of IA tools to support sustainable policy measures in practice is not yet met. Researchers often find the scope of the current IA exercise too narrow – often including only a limited consideration of alternatives - to support real change in order to anticipate unsustainable developments. Indeed, most of the analysed research projects have a broader scope focusing more on the framing of the policy question. Still, the contribution of a formal IA exercise should be evaluated in its full context as being part of a broader policy process (Jacob & Hertin, 2007). The framing of the policy question for example has often been established before the IA exercise was initiated. In addition, research projects often struggle to bridge the gap between science and the formal policy process.

This is also observed as the potential gap between the contributions of researchers and the types of assessment tools that policy-makers seem most able/willing to use (Lee, 2006). The tools used in any such process-based application must be simple, based as far as possible on rigorous analysis, while recognising explicitly where value judgements are included (Turnpenny, 2008). Moreover, whilst being simplifications of reality, many scientific models remain so complex that they are seen rather as black boxes instead of transparent analytical tools. Hence, some of what modellers see to be the great strengths of modelling tools are felt by non-modellers to be serious weaknesses (Lee, 2006 and Lotze-Campen, 2008). Consequently, research outcomes do not fully reach the policy-makers. Of course, the complexity of SD does not entail easy application of research findings. It should also be noted that research projects have a limited life-span (Leeuwis, 2004). Still, the scoping study also reveals that most of the research outcomes are not specific enough to support direct use in the decision process. Knowledge delivered must be recognised as not only factually, but also politically relevant. These findings support that, although IA can provide researchers and policy-makers with a relevant and legitimate common tool, in practice both communities only show a limited collaboration. Yet, the scoping study reveals some evidence of effective close collaboration between researchers and policy-makers. The study also confirms - and this is in contrast with most scientific literature (such as Weaver & Jordan, 2008) - that these promising experiments are not only limited to research projects, but can also be found in formal IA experiences within the EC. This supports the importance of an intensive collaboration where researchers and policy-makers interact on equal basis to support a more integrated and explorative approach. As Cash and colleagues (et al. 2003) also describes, an assessment process is often more effective if the knowledge being produced and communicated at the interface between science and policy is perceived by both sides to be credible e.g., meets scientific standards, legitimate, e.g., produced by a fair process that reflects the interests of the stakeholders - and salient e.g., answers questions seen to be relevant by potential users.
6 Conclusions

Decision-making can only proceed in a sustainable way if the effects of new policy measures are explored and understood before they are introduced. Due to the nature and importance of SD, science and policy have both an important responsibility in this matter. Most practice of sustainability, for example, is based on a set of environmental, social and economic theories. However the connection in the other direction, i.e. between practice and theory has traditionally been ignored (Gunderson et al., 2007). Hence, an overemphasis on science has a potential risk to make it impossible to identify what is important and social acceptable to sustain (Norton, 2005). Sustainable assessment - as a general concept and applied as IA practice - provides a means where both communities of practice (researchers and policy-makers) can and should collaborate in a process for structuring dialogue and analysis about how to make progress towards SD (Rotmans et al., 2008). To become more effective IA practice should go beyond the traditional supply approach of science. For example, the upcoming generation of IA models will be more demand-driven, in the sense that the policy-makers need to be involved at an early stage of the model development (Rotmans, 2006). This is needed because the dialogue linking researchers and policy-makers will not happen by itself (Liberatore, 2001). Also Guldbrandsen (2008) mentions that science has a greater chance of guiding (policy) action in inclusive, deliberative decision processes. If sustainable assessment practice will evolve in such a way, IA can be considered to be operating as a ‘frontline’ tool in making sustainable development operational, but in a markedly different manner to conventional expectations (Cashmore, 2007).

Further research and policy initiatives should therefore include a joint collaboration between researchers and policy-makers to develop a shared understanding of what constitutes a satisfactory - i.e. relevant, accurate and legitimate – IA resulting in concerted action (Lee 2006). This will provide cross-fertilisation and learning opportunities among researchers and policy-makers, providing a solid foundation for sustainable policy measures.

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