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Report Part Title: CONCEPTS AND FRAMEWORK

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CONCEPTS AND FRAMEWORK

What is sustainability knowledge?

In its most generic sense, sustainability knowledge can be defined as *knowledge that facilitates the development of policies with sustainable outcomes.* Such knowledge includes different constituent elements. In this report, we include two forms of sustainability knowledge. First, it entails knowledge about the *substance* of policy problems and solutions, in other words a better understanding of environmental effects, a more comprehensive and holistic problem understanding, and better economic or technical solutions to problems. Second, and in line with the emerging field of 'sustainability science' (Kates *et al.* 2001; Clark 2007), it also entails knowledge about the *process* with which more sustainability-oriented policies needs to or can be made. Such process-oriented knowledge includes, for example, methods for effective stakeholder participation (*cf* Forrester 1999 and Kasemir *et al.* 2003) and joint learning (*cf* Forrester *et al.* 2008) while maintaining scientific[1] excellence. This integration of stakeholders and their diverse knowledge has been considered necessary in environmental and sustainable development research for over a decade (e.g. *cf* Shackley & Wynne 1995 and Bailey *et al.* 1996) and particularly the integration of such knowledge into policy (*cf* Gallopín 1999). However, measuring the impact of such knowledge has proven to be difficult, although it is widely considered to be a necessary prerequisite for sustainability (e.g. *cf* Folke *et al.* 2005 and Pahl-Wostl *et al.* 2008).

What is policy impact?

Policy impact can be defined as *an observed change in the public policy process (and/ or content) as a result of the knowledge that is supplied (or co-generated).* Debates about the impact and role of knowledge in the policy process first coalesced in policy analytic work in the 1970s, in particular that of Weiss (1979) and Wildavsky (1979). More recently, this literature and the questions it poses have re-emerged in the European setting in relation to the use of impact assessment and other decision support systems as part of enhancing European and member state government functions – so called 'better regulation' and 'evidence-based policy-making' (for a more extensive discussion see Nilsson *et al.* 2008: especially page 336). There are several different types of policy changes that may occur as a result of knowledge use. Here, the work of Weiss (1979) provides a useful starting point. Weiss identified seven different ways in which the use of research could be examined. These included the 'problem solving model' which is the direct application of knowledge to inform a decision; a 'tactical model' where evidence is used to delay action and support non-decision making; an 'interactive model' where the use of evidence is chaotic and non-linear; a 'political model' where evidence is used to support pre-determined positions; and an 'enlightenment model' where evidence affects policy slowly and indirectly via longer term processes of social

learning. SEI as an organization may in view of its mission to bridge science and policy be primarily interested in having instrumental and learning-based impacts, but efforts must be mindful of other, more political, types of knowledge use. These can include using knowledge for the purpose of post-hoc legitimating of action and positions or as ammunition in 'turf wars' between parts of government, and may lead to regulatory capture situation for the knowledge provider (Shulock 1999).

A sequence of learning elements can provide a means for categorizing the depth of impact in terms of learning. In this study, the following degrees of depth are used:

- knowledge **acquired**: an assimilation of experience, as well as new ideas and concepts from other actors;

- knowledge **interpreted**: gaining new understandings of cause-effect relations of policy problems and how to resolve them, as well as incorporating understanding into the organization's own goals, strategies, and activities;

- knowledge **institutionalized**: incorporation into procedures, rules, policies, and other tangible outputs for implementation (Nilsson 2006, adapted from Huber 1991).

Policy impact and the policy cycle

Understanding any impact upon policy making requires understanding how policy decisions are made. According to traditional approaches within policy analysis and public administration (*cf* Hogwood & Gunn 1984), a simplified policy cycle can be broadly described in terms of four stages: the first stage is strategic policy *formulation* or the decision on what broad course of action to take. Sustainability knowledge may feed into this stage with supporting information on the problem definition underlying the course of action and criteria for why this course is the correct one to take. The next stage is the *translation* of this strategic policy into policy measures or packages of measures that will enable meeting the strategic aim. These measures are often referred to as the policy 'output'. Sustainability knowledge can and should feed into this stage by identifying and evaluating likely successful measures. However, at this policy stage many decision premises, interest group positions, and other mechanisms are 'competing' with sustainability knowledge. Such premises may include public opinion but also cost-benefit and other economic analyses. Policy measures then need to be implemented: *implementation* of the policy measures needs a further raft of decisions and communication. The final stage is that of *evaluation* of the policy and its 'outcomes'. This latter stage has two facets: the policy output evaluation (i.e. was the policy successful: did people accept the measure, was it politically successful?) and the policy outcome evaluation (i.e. did it have the desired consequence?). In reality, things are rarely that simple. Despite its continued use in some policy circles, the sequenced policy cycle model has been convincingly overthrown in empirical and

4

theoretical policy science over the last few decades, especially the idea that there is a starting point and a finishing point (*cf* Hudson & Lowe 2004; page 223*ff*). Alternative perspectives include, for instance, theory constructions such as the garbage can model of decision making or the advocacy coalition framework (Cohen *et al.* 1972, Sabatier 1988, Sabatier & Jenkins-Smith 1993, and Schlager & Blomquist 1996).

One alternative perspective might be called a 'multi-level' approach which draws upon the stages of the policy cycle but not necessarily as a clearly linearly connected sequence. According to this approach, policy processes occur within and across geographical and functional layers of governance. Strategic policy may be formulated at a relatively high level of governance (regional or international). This strategic policy is then translated into policy measures, usually at the national or state level, and then implemented at the local level. It is useful when identifying and assessing where pivotal decisions are made, to think of each stage in the policy cycle as actually having its own cycle of decision making with strategic elements (albeit, at lower levels and constrained within certain limits) as well as choice over actual policy measures. Thus it is necessary, when looking at a 'big' issue such as ecological and sustainable development issues to track power and influence of different actors at different stages in the policy cycle(s) and to use insights from a range of models and theoretical approaches. Each of the levels of decision making in this multi-level model – regional strategic, national measures and local implementation schemes – has embedded within it decision windows in which important decisions are taken: these windows are where the sustainability knowledge must be targeted in order to have the desired effect. This perspective appears particularly useful as a backdrop for assessing impact within a research organization that operate from the global policy level all the way through national processes to local on-the-ground implementation issues.

How does one achieve policy impact?

A small literature on this topic helps us to identify *a priori* expectations concerning what qualities of the science-policy interface are required (Cash *et al.* 2003). The first is the quality and *validity* of the scientific and technical knowledge. However, being recognized for scientific excellence, will not deliver a policy impact on its own. The second critical quality is having good stakeholder engagement processes, ensuring *legitimacy* of the knowledge produced. Indeed, such criteria are inherent in the emerging concept of sustainability science (see above). However, neither are straightforward or simple to achieve. SEI's experience working with stakeholder processes, as well as in other arenas, highlight how the policy impact of sustainability knowledge can be influenced by several factors including who has power and influence within engagement processes and the relationship between engagement and the participation of actors (see also Forrester *et al.* 2008). The challenge becomes how, under these influencing factors, it can be ensured that scientific excellence and the democratic basis both get prioritized. A third issue is the question of *relevance*, that is to couple the knowledge to processes where it is to be making a positive contribution. For example,

political context can shift the significance of science in decision making (Pielke 2007: page 40*ff*). Cases where there is 'a commitment to a specific course of action' through shared values and limited uncertainty 'can be resolved primarily through the systematic pursuit of knowledge' (what Pielke calls 'tornado politics') and, conversely, there are cases Pielke calls 'abortion politics' where 'there are conflicting commitments based on differing values' where science cannot contribute very effectively (*ibid*: page 41, 42*ff*).

Whatever the contexts, effective *communication* is critical. Sustainability knowledge needs to be communicated well via stakeholder engagement in an iterative process (i.e. knowledge-producing organisations need to listen to stakeholders as well as talk to them) and learning needs to occur as a result of that communication: 'what we need then is a new understanding of sustainable … resource management as a societal search and learning process' (Pahl-Wostl *et al.* 2008). In any analysis of learning and/ or communication it is important to understand the actors involved. These are primarily the sender and the receiver, which, in this paper, are categorized as *supply-side actors* and *demand-side actors*. Also important is the medium, and of course the packaging or framing of the message and the context within which it is delivered.

Analytical framework, methods, and case study questions

We selected six cases of science-policy interaction across SEI where it was generally acknowledged (by supply-side and demand-side) that the introduction of new knowledge had had an impact. These case studies were chosen to offer a variety, in terms of the research programmes, geographical regions and governance levels (local, national, international) of SEI's work. There are advantages and disadvantages to using a case study design. Crabbe and Leroy (2008) note that case study research offers a number of advantages, for example as it yields added value in situations where it is unclear where a policy ends and policy context begins and where there is a situation of 'many variables, small *n*' (*cf* Ragin 1987, Yin 1994). The main disadvantage relates to the potential lack of robustness and generalisability of the results. This should be considered especially in this study where positive cases were intentionally selected, that is where a policy impact perceived as positive was manifest (in contrast to no or negative impact). However, generalisation is not the main purpose of this study, but rather to explore types of and conditions for effective impact and using illustrative cases for that purpose.

In order to understand the process of how policy impact occurred, a series of standardized, semi-structured interviews were carried out in each case with a number of key actors from both the supply side and the demand side. Around six actors per case were interviewed with a balanced representation of supply and demand side. In each interview it was emphasised that SEI wanted to learn from this process and improve its service to the demand side and this could only occur if demand-side actors

were honest and truthful about successes (and about failures). Where successes were claimed, actors were encouraged to provide supporting evidence.

There are questions about the policy impact and potential learning – what could be termed 'dependent variables' – that can be asked of the cases. These include identifying where, that is at what stage of the policy process and through what actors, the impact occurred and what 'kind' of impact can be observed. For each case, the following questions were posed:

- can we detect changed decisions (an instrumental or problem-solving impact);

- can we detect new knowledge being used to delay or deflect attention (a tactical impact);

- can we detect increased interaction and engagement between actors (an interactive impact);

- can we detect an actor positioning, underpinning or undermining new knowledge based upon pre-conceived notions (a political impact); or,

- can we detect new awareness leading to learning and new ways of seeing things and new ways of doing things (an enlightenment impact).

Further, we explored how deep any resultant policy impact was by analyzing whether the new knowledge was simply *acquired* (as you would expect to see in instrumental, tactical or political above); whether it was *interpreted* (any of the above) or whether it was *institutionalized*.

There are also several possible 'independent variables' linked to the principal aspects mentioned above, or factors that may contribute positively or negatively to the observed pattern of impact. *Validity*, *legitimacy*, *relevance* and *communication* are key qualities of impact potential, but what concrete factors on the demand side as well as the supply side contribute to these qualities?
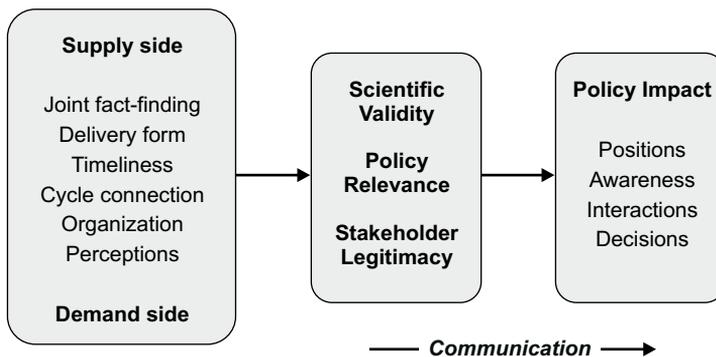

Figure 1: Schematic overview of the analytical framework

These independent variables may be related to actor capacities, interests, incentives and roles, which may differ between supply-side senders and demand-side receivers. To address these factors, demand-side actors were asked to specify their request, purpose, need, format and timeline for information and evaluate how supply-side met these expectations.

Both demand- and supply-side actors were asked to provide their perceptions and recollections on the *communication* and message presented. Several types of questions were asked to address this topic, including:

- whether the message was timely;

- the (dis)connect between the policy and research cycles;

- perceptions of the precision, quality and/or format of the knowledge and whether they (or the decision makers they were advising) perceived the new knowledge as useful evidence;

- whether it was delivered in a useful manner;

- what were the organizational arrangements for the knowledge transfer; and,

- whether there were collaboration arrangements in the provision of knowledge.

Supplementing these questions were a series of questions concerning contextual issues such as media attention, political interest, risks and perceptions of risk, uncertainties, visibility of the issue and public opinion.

The case studies are to a large extent based on interviews. The interviews were semi-structured and followed an interview guide.[2]

The cases span a range of time-scales. Some actors interviewed are still actively involved in the processes evaluated, while others reflect on completed processes. In some recent and ongoing cases the process is fresh in people's minds and we can assess the aims of the actors, the process, and the policy output. In the most recent cases the policy output not yet in place (although in most cases we know what form it will likely take). While many analyses of sustainability policy making focus on the process and policy output, by considering cases with a longer timescale, we are able, in the longer timeframe case studies, to examine the actual outcome and consider how (or not) the process and output met the goals established. This variety strengthens the analysis by allowing us to learn from past success and failure, and improve upon ongoing and future processes.