

# International Journal of Sustainable Development & World Ecology

ISSN: 1350-4509 (Print) 1745-2627 (Online) Journal homepage: <http://www.tandfonline.com/loi/tsdw20>

## Theorising pathways to sustainability

Karin Beland Lindahl, Susan Baker, Lucy Rist & Anna Zachrisson

**To cite this article:** Karin Beland Lindahl, Susan Baker, Lucy Rist & Anna Zachrisson (2016) Theorising pathways to sustainability, *International Journal of Sustainable Development & World Ecology*, 23:5, 399-411, DOI: [10.1080/13504509.2015.1128492](https://doi.org/10.1080/13504509.2015.1128492)

**To link to this article:** <http://dx.doi.org/10.1080/13504509.2015.1128492>



© 2015 The Author(s). Published by Taylor & Francis.



Published online: 29 Dec 2015.



Submit your article to this journal [↗](#)



Article views: 559



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 1 View citing articles [↗](#)



## Theorising pathways to sustainability

Karin Beland Lindahl<sup>a</sup>, Susan Baker<sup>b</sup>, Lucy Rist<sup>c</sup> and Anna Zachrisson<sup>d</sup>

<sup>a</sup>Unit of Political Science, Luleå University of Technology, Luleå, Sweden; <sup>b</sup>Sustainable Places Research Institute & Cardiff School of Social Sciences, Cardiff University, Cardiff, UK; <sup>c</sup>Department of Forest Ecology and Management, Swedish University of Agricultural Sciences, Umeå, Sweden; <sup>d</sup>Department of Political Science, Umeå University, Umeå, Sweden

### ABSTRACT

Using a Pathways approach, controversies over environmental and natural resource management are viewed as expressions of alternative, or competing, pathways to sustainability. This supports deeper understanding of the underlying causes of natural resource management controversies. The framework is composed of two elements: the STEPS (Social, Technological, and Environmental Pathways to Sustainability) Pathways approach and frame analysis. Many sustainable development dilemmas are played out in specific places and consequently, the Pathways approach is integrated with a place-based frame analysis. The resulting framework guides empirical investigation in place-based contexts. This theorising about sustainability science can be used to cast light on contested natural resource management issues, in this case mining in northern Sweden. By exposing the range of alternative Pathways to critical norms of sustainable development, we ascertain whether action alternatives are compatible with sustainable futures. The framework provides a way in which sustainability science can better understand the origins of natural resource management conflicts, characterise the positions of the actors involved, identify the potential for cooperation between stakeholders leading to policy resolution and judge what Pathways help or hinder the pursuit of sustainable development. In addition, it can enhance sustainability science by guiding integrative sustainability research at the project scale.

### ARTICLE HISTORY

Received 1 October 2015  
Accepted 30 November 2015

### KEYWORDS

Pathways to sustainability;  
sustainable development;  
frame analysis; place;  
sustainability science;  
natural resource  
management

## 1. Introduction

This paper is primarily theoretical in nature, presenting an analytical framework to support research into societal efforts to promote sustainable development. Controversies over environmental and natural resource management are investigated as expressions of alternative, or competing, strategies of sustainable development. Nobody is against 'sustainable development' or 'sustainability', as is evident by the range of actors and organisations that have made declaratory commitments to promote this normative goal. Yet progress is slow and there are as many understandings of the concepts as there are ideas about how to implement them. Accordingly, actors fill the concepts with meaning that is consistent with their preferred path of development, but which may differ to meanings held by others (see, e.g. Bruff & Wood 2000; Biermann 2013; Bulkeley et al. 2013). Using a pathways approach, it is possible to develop a research framework that can help to understand better the underlying causes of environmental controversies, despite the claims of different actors that they are all promoting the objective of sustainable development. While this paper focuses on the theoretical approach, we briefly demonstrate how this theorising

can be used to cast light on contested natural resource management issues, including those relating to mining developments. In a world characterised by finite resources, sustainable use and just access to natural resources presents a core challenge for the implementation of sustainable development.

As many commentators have argued, sustainable development is best seen as similar to concepts such as 'democracy', 'liberty' and 'social justice' (Lafferty 1995; O'Riordan 1985; Jacobs 1995). For concepts such as these, there is both a readily understood 'first level meaning' and general political acceptance, but beyond this level, there lies deeper contestation. The debates around such contested concepts form an essential component of the political struggle over the direction – and steering – of social and economic development, that is of change (Lafferty 1995). However, the outcome of such debates are more often than not the reflection of an asymmetrical distribution of power that sees some given voice, while others struggle to be recognised. So, in making visible the arguments and outcomes of contested policy processes, we ask: what perceptions or preferences are prioritised and which are ignored? As actors each claim that they are mindful of their social and environmental responsibilities but all present different

policy options and outcomes – how is it possible to exercise discernment? Is it the case that there are different, but equally plausible, understandings of sustainable development at play? On the other hand, are some using the concept of sustainable development as an ideological tool – a veil of ignorance – to mask and sustain the unsustainable?

To answer these questions, an analytical framework has been developed that can be used to cast light on natural resource management controversies in concrete, empirical place-based contexts. This framework is composed of two elements. The first draws on the works of Leach et al. (2010a), the so-called STEPS (Social, Technological, and Environmental Pathways to Sustainability) Pathways approach. The second element is taken from frame analysis (Schön & Rein 1994; Perri 6 2005; Beland Lindahl 2008; Beland Lindahl et al. 2013). Both are combined into a research framework to support empirical research into societal efforts to implement sustainable development.

This study will begin by introducing the Pathways approach, including identifying its specific strengths and weaknesses. It will then turn to frame analysis, which offers a means to explore actors' beliefs, perceptions and appreciations alongside their policy preferences. An assumption underpinning the analysis is that many natural resource controversies and sustainable development dilemmas are played out in specific places. Affinities to, or senses of, specific regions, landscapes or locales influence actors' understanding of what sustainability and sustainable development actually entails and to which they are prepared to give allegiance. The Pathways approach will then be integrated with a place-based frame analysis, constructing an operational research framework. This framework can be used to explore alternative Pathways to sustainability in various environmental and natural resource management contexts. A short empirical example is provided to illustrate how the framework can be operationalised in a contested natural resource management setting. The focus is on what Miller (2013) defines as 'procedural sustainability', an understanding of sustainability as a process for identifying important societal values and pathways for a desirable future. However, as will be seen below, attention has to be paid to investigating the gap between statements as to commitment to sustainable futures and their normative credibility. Finally, the potential for theoretical integration and the support provided to research into societal pursuit of sustainable development will be highlighted.

## 2. Pathways to sustainability: the STEPS approach

Following others (e.g. O'Riordan 1985; Jacobs 1995; Lafferty 1995), Leach et al. (2010a, Leach and Stirling

2011) calls for (re)instating our understanding of sustainability<sup>1</sup> as an essentially political process, and their approach offers useful tools for analysing this process as a tension, or struggle, between competing Pathways to sustainability. They describe how contemporary responses to environmental and developmental challenges often result in policy conflicts and failures, manifested at the local level. Consequently, they argue for an approach that embraces the dynamic interactions between social, technological and ecological processes; which takes seriously the ways in which diverse people and groups understand and value these interactions; and acknowledges the role of economic and institutional power in shaping the resulting choices. In short, they argue, 'we need to recognize the essentially plural and political nature of our quest for pathways to sustainability' (p. 2). Pathways are here understood as:

...alternative possible trajectories for knowledge, interventions and change which prioritize different goals, values and functions. These pathways in turn envisage different strategies to deal with dynamics – to control or respond to shocks or stresses. And they envisage different ways of dealing with incomplete knowledge, highlighting and responding to the different aspects of risk, uncertainty, ambiguity and ignorance in radically different ways. (Leach et al. 2010a, p. 5)

Sustainability should consequently be recognised as a contested and plastic concept facilitating arguments about diverse Pathways to different futures.

A recurring argument in the Pathways literature (Stirling et al. 2007; Leach et al. 2007a, 2007b, 2010a) is that there is a pervasive tendency – supported by professional, institutional and political pressures – for powerful actors and institutions to 'close down' around particular framings, committing to particular pathways that emphasize maintaining stability and control' (Leach et al. 2010a, p. 5). Addressing the full implications of dynamics and incomplete knowledge, 'requires an "opening up" to methods and practices that involve flexibility, diversity, adaptation, learning, and reflexivity, and an alternative politics of sustainability that highlights and supports alternative pathways' (p. 6). However, this call to 'open up' does not deny the need also to reduce complexity sufficiently to avoid anomy and retain the ability to act (see Voss et al. 2006). Stirling (2008) discusses this necessary balancing between opening up and closing down, suggesting that wider social choices be delivered as 'plural and conditional' policy advice (p. 280). This, according to Stirling, involves systematically revealing how various courses of action appear preferable under different assumptions and 'framings' (see below), and how these dependencies relate to the real world of divergent contexts, public values, disciplinary perspectives and stakeholder interests. Far

from being impractical, or denying the need to come to closure, appraisal conducted in such an 'opening-up' mode may be seen as more transparent, accountable and compatible with established democratic institutions and decision-making procedures (Stirling 2008, p. 281).

For analytical and practical purposes, Leach et al. (2010a) suggest it may be useful to think about an increasingly complex and dynamic world in terms of particular 'systems'. 'Systems' are not set and given, but continuously shaped by processes of social construction:

Thus, we recognize that system boundaries, dynamics, functions and outcomes are always open to multiple, particular, contextual, positioned and subjective assumptions, methods, forms of interpretation, values and goals. (p. 44)

'Framing' is here introduced as the different ways of understanding or representing a 'system', and involves subjective value judgements, and 'framings' are produced by particular actors and 'co-constituted with their particular institutional, political and life settings' (Leach et al. 2010a, p. 44). However, although 'framing' is a key component of the pathways approach, its theoretical underpinnings are not well developed. Leach et al. go back to Schön's (1984, p. 31) and Schön and Rein's (1994, p. 31) definitions of 'frames', but then shift to speak about 'framing' and how particular 'systems framings' become part of 'narratives' about a problem or issues. 'Narratives', with reference to Roe (1994), are defined as 'simple stories with beginnings defining the problem, middles elaborating its consequences and ends outlining the solutions'. Therefore, Leach et al. (2010a) use four related terms, 'frames', 'framing', 'framings' and 'narratives' interchangeably to capture the importance of actors' meaning constructions and ideas. Consequently, it is difficult to know exactly what is meant by each of these terms. This imprecise use of 'frames' and 'framing' also conflates the process of frame construction (i.e. framing as a verb) and the outcomes of this process (frames as a noun). Whether 'framings' refer to the process or the outcome is equally unclear. According to Leach et al. (2010a), the starting point for an analysis, or identification, of Pathways to sustainability is to identify the range of dominating and alternative 'narratives' in a particular context. For each narrative, the analyst is then asked to identify actors, their connections and how the 'system', goals, incomplete knowledge, risk, etc. are 'framed'. Following this procedure, we end up with a number of narratives populated by actors and characterised by specific 'framings'. However, it is difficult to see which actors promote exactly which frames (the noun), how these frames were constructed (by whom and how), how they conflict or

overlap, what frames (or narratives) give rise to which Pathways and, finally, exactly what frames (and associated actors) are promoted or marginalised in a particular policy process or governance situation. The linkage between actors, their ideas, their activities and the governance context is therefore lost. Consequently, the important question (which is raised by Leach et al.) about alternative Pathways and actors' differentiated capacities to realise them is difficult to answer using the procedure that the approach suggests. The next section shows how a more theoretically grounded frame analysis can help overcoming some of these weaknesses.

A useful contribution of the STEPS Pathways approach is its ambition to explore the relationships between different ways to understand 'system change' and the type of preferred action. According to Leach et al. (2010a), narratives about actions aiming to promote sustainability involve assumptions about the nature, or 'temporalities' of the changes these actions are intended to counter: 'are changes seen as short term shocks or long term stresses?' Furthermore, is the aim 'to control the causes or drivers of change, or to respond to them?' (p. 59) Sustainability, according to Leach et al., is about responding to *both* shocks and shifts and it requires *both* control and response actions. Combining these parameters, Leach et al. map out four dynamic properties of sustainability: 'stability', 'durability', 'resilience' and 'robustness' (p. 59). These four properties may be seen as 'individually necessary and collectively sufficient elements of sustainability'. Consequently:

'Sustainable solutions' are those that offer stability, durability, resilience, and robustness in specified qualities of human wellbeing, social equity and environmental quality. (p. 62)

Another contribution of the Pathways approach is its attention to different dimensions of incomplete knowledge. They differentiate between 'risk', 'uncertainty', 'ambivalence' and 'ignorance' (Leach et al. 2010a, p. 53). While 'risk' refers to situations where there is confidence that probabilities can be calculated across a range of known outcomes, 'uncertainty' applies to situations where there is confidence in the characterisation of outcomes but where sufficient information to assign probabilities is lacking. Under the condition of 'ambiguity', it is the characterisation of the outcomes themselves that are considered problematic; and in a situation of 'ignorance', neither probabilities nor outcomes can be fully characterised. In recognising these contrasting states of knowledge, the Pathways approach offers tools to help gain insights into actors' understandings of sustainability challenges and of how they want to deal with them.

So, according to Leach et al. (2010a), issues and problems are framed in different ways. The resulting

narratives (or frames) include different perceptions of the system; they promote different goals; they attend to varying degrees, and in different ways, to the dimensions of incomplete knowledge; and they may, or may not, address the different dynamic properties of sustainability. Which pathways become dominating and pursued, and which are not is a question of governance (Leach et al. 2010a). Governance is broadly referred to as the intersection of power, politics and institutions, including both private and public institutions, the market, political and civil processes in which they are embedded, as well as relationships that are built around the exercise of power and its related knowledge base (p. 65). This means a process is witnessed in which particular narratives (frames) giving rise to different pathways are promoted by powerful actors and institutions, as they uphold the status of their institutions and their power to intervene, manage or at least avoid blame for the situation. Some Pathways thus interlock with the nature of governance, so that they become, in effect, self-reinforcing as well as reinforcing of existing power relations (Leach et al. 2010a). In contrast, narratives (frames) of more marginal actors may remain sidelined. Here, the inter-relationship between specific actors, their ideas and actions, the governance context and policy influence is stressed; although the precise linkages are difficult to trace in the analytical procedure offered by the Pathways approach. The point made is that not all existing possible narratives (frames) necessarily entail a practically realisable Pathway. Rather, particular, dominating, narratives play a key role in justifying and constituting those Pathways that do come to be followed – and suppressing others (even if technically and socially viable). Therefore, Leach et al. (2010a) return to the need ‘open up’:

...to reveal and give voice to marginalised narratives and so enable pathways which do address poorer people's goals and take greater account of multiple dimensions of incomplete knowledge and of sustainability. (p. 96)

In summary, the STEPS Pathways approach does not offer an operationalised research methodology or method of investigation. Rather, it may be seen as a call for a new analytical approach promoting integrative research, within a range of theoretical and methodological options. As discussed above, some components are weak and under theorised (see also Demeritt et al. 2011). The approach is also based on unclear normative assumptions (Demeritt et al. 2011; Li 2011). Nevertheless, Dobson (2011) argues that the Pathways approach makes a vital contribution to the theory and practice of sustainable development by stressing the normative nature of ‘sustainability’; by addressing complex dynamics; and by arguing that

reflexive deliberation is instrumental to the entire process. This article also argues that the Pathways approach offers a number of useful concepts and analytical approaches. First, the metaphor of Pathways is in itself appealing as it has a clear temporal dimension and thus highlights transition rather than steady states. This accords with the view that sustainable development is not an end state, nor a ‘blue print’ for policy makers, but has to evolve over time, and remain responsive to different spatial and temporal contexts (Baker 2015). Second, the ambition to link social and natural ‘systems’ is appreciated, as is the attempt to apply a social constructivist approach without abandoning the privilege to prioritise some Pathways over and above others. Furthermore, the call to recognise alternative pathways to sustainability by ‘opening up’ and ‘broadening out’ is welcome. Recognition of the roles of different forms of incomplete knowledge and dynamic properties of sustainability are particularly interesting in an environmental and natural resource context. Consequently, we take these contributions further by integrating a place-based frame analysis into an operational research framework. The resulting framework can help overcome some of the weaknesses in the existing Pathways approach, and guide integrative research efforts in contested development contexts.

### 3. Deepening the understanding of frame analysis

The idea of ‘frames’ and ‘framing(s)’ are central to the Pathways approach. As argued above, the theoretical understanding of frames and frame analysis remains under-developed and at times burdened with analytical weaknesses. A theoretically informed frame analysis as outlined below may enhance analytical rigor and potential.

Frame analysis is one way to explore actors’ beliefs, perceptions and appreciations alongside their policy implications (for a full overview, see Beland Lindahl 2008; Beland Lindahl et al. 2013). Frames are defined in a variety of ways but common to most is an understanding that frames have two functions: they organise experience and they bias for action. The latter means that frames represent people’s worlds in ways that call for particular styles of decision-making or action (Perri 6 2005). This capacity makes frames particularly suitable for studies concerned with linkages between, on the one hand, perceptions and, on the other, coalition building and political activity (see Beland Lindahl 2008). Actors’ strategies and activities, here understood as products of their frames and interactions, shape policy and practices, that is they have particular outcomes. Therefore, one way to conceptualise the relationship between frames and Pathways is to see a Pathway as including the



action-oriented function of the frame and the activities to which it gives rise. A Pathway may thus be understood as a more or less enacted action strategy consistent with a particular way of seeing the world. Frames are not the same thing as perceptions, as perception represents one component of a much more complex and multi-faceted relationship between knowledge and action. A frame may be seen as more inclusive in that it not only organises all kinds of experiences, but it also bias for action (Schön & Rein 1994; Perri 6 2005).

Various attempts have been made to organise the plethora of frame theories into different kinds of 'schools' or 'traditions'. One approach represented, for example by Goffman (1974), Schön and Rein (1994) and Van Gorp (2007), emphasises the institutional or cultural origin of frames. Perri 6 (2005) links with this tradition in developing a sociological approach to frames and framing based on Durkheim's sociology of knowledge. Perri 6 defines a frame as '... the overarching or organizing concept that represents the application to a specific context, of the general cognitive commitments of a given solidarity ...' (p. 104), acted out in social and institutional contexts. Perri 6 draws on Durkheim's ideas about how society moulds its individuals through 'discipline' and 'group attachment' (Durkheim 1897/1951, 1925/1961, 1912/1995), in other words how 'thought styles' may be explained with reference to institutional forms of social organisation. These institutional forms are described as 'solidarities', and can be understood as a group of social positions which are connected by social relations and perform a social role (see Perri 6 2002). This approach is particularly relevant for understanding conflicts related to the environment and natural resource exploitation as it emphasises the importance of social processes and organisation in the formation of frames. It invites us to take account of variables that we assume are important to locally enacted conflicts, for example group identity, social loyalties, place attachment and opportunities to maintain collectively valued life styles, while acknowledging the institutional context. Perri 6's theory provides a rich social and institutional account of how frames – and the Pathways that they bias for – may be derived. The theory also suggests that the plurality of frames that actors may hold and adopt is limited. The adoption of an arbitrary or an unlimited amount of frames by an individual is not socially viable. Conceptualising a Pathway as the action-oriented function of the frame, as elaborated above, may thus help reveal why some actors promote particular Pathways rather than others, why some readily shift frames and Pathways while others are less likely to change (see also Beland Lindahl 2008; Beland Lindahl et al. 2013).

### 3.1. Understanding place-related frames

As outlined above, social organisation is an important factor in shaping actors' frames. However, natural resource management involves activities with a strong material dimension. Therefore, it is reasonable to believe that people perceive resource management activities and sustainable development differently, not only because they are organised socially in various ways but also because they are involved in different kinds of place-based activities (Ingold 2000; Beland Lindahl 2008). So, how can we address the importance of peoples' relationships to those places in which they are engaged and embedded?

Place is a concept with roots in the discipline of human geography, but is used in several disciplines including sociology, psychology and anthropology (Tuan 1974; Relph 1976; Massey 1995, 1997; Massey & Jess 1995; Rose 1995; Ingold 2000). It is often associated with a particular location but Massey (1997) argues for an open and dynamic understanding of places. She stresses the importance of social relations, of seeing 'meeting places' shaped by spaced social relations, understandings and activities weaving together at a particular 'locus'. Similarly, Shields (1991) takes a sociological approach to spatial analysis and uses social theory to explain the construction of spatial perceptions as well as their enactment in the material world. Both Shields (1991) and Massey (1995) argue that the identities of places are socially constructed and should be understood as products of people's perceptions and representations.

One way to explore actors' place-related perceptions and action strategies is to understand them as a particular aspect of their frames. Building on Perri 6's (2005) basic understanding of a frame, Shields' (1991) theory of social spatialisation adds the spatial component. According to Shields, places with specific characteristics become construed as being appropriate for specific activities and related economic and social developments. Shields (1991) introduces the term 'social spatialisation' to explain how the spatial is socially constructed and how this results in place perceptions, such as place images and place myths. Social spatialisation, as an overarching order of space, may thus be combined with Perri 6's conceptualisation of frames as products of social solidarities (see Beland Lindahl 2008; Beland Lindahl et al. 2013; for a comprehensive review). In this view, place perceptions become understood as the particular parts of the frame that relates to spatial dimensions, for example images of landscapes, locales and their natural resources. The resulting tool enables an analysis of actors 'place-related frames' and how they inform Pathways to sustainability and sustainable development.

The raw material that comprises the analytical framework of this paper has now been introduced. From the Pathways approach, it is possible to retain the metaphor of Pathways, a set of guiding questions, the ideas about different forms of incomplete knowledge and dynamic properties of sustainability, and the general call to 'open up' and 'broaden out' analysis and appraisal. From frame and place theories, a theoretically informed means of exploring actors' place-related frames has been derived. Many sustainability challenges warrant research approaches that embrace the interaction between social, technological and ecological processes, as highlighted by the Pathways approach. It is argued that one way to achieve this integration, especially in natural resource management contexts, is to study how these processes connect in 'place'. In the next section, this analytical framework will be synthesised and we demonstrate how it can be operationalised into a series of concrete steps within an empirical research process. As we introduce the framework, we also show how it has been used to support research design and data collection in a study of a mining-related conflict in a traditionally resource-dependent community in Northern Sweden.

#### 4. An analytical framework to explore competing pathways to sustainability

Leach et al. (2010a) summarise the Pathways approach in a number of questions they believe can be applied to most cases or issues. First, a range of dominant and alternative 'narratives' should be identified. Of each narrative, a number of questions are to be asked:

- (1) Who are the actors and how are they connected?
- (2) How is the system framed, and what goals and values are prioritised for system change?
- (3) How is incomplete knowledge addressed – whether in terms of risk, uncertainty, ambiguity or ignorance?
- (4) What dynamic properties of sustainability are prioritised – whether stability, durability, resilience or robustness?
- (5) What appraisal approaches close down (in the case of dominant narratives) or might help broaden out and open up (in the case of revealing alternatives)?
- (6) What is the role of policy and mobilisation process in such closing down or opening up?
- (7) What do the narratives and their associated pathways imply for social justice and the priorities of poorer and marginalised people? (p. 157)

Few studies consistently apply the Pathways approach as outlined above. While some address most of the listed questions (e.g. Leach 2008; Leach et al. 2010b), others pick bits and pieces in combination with other theories, for example resilience (Thapa et al. 2010), conflict transformation theory (Rodriguez et al. 2013) or livelihood studies (Muller-Mahn et al. 2010). Ely et al. (2013, 2014) focus on 'innovation pathways' and the idea of 'opening up' and 'broadening out', and Randhawa and Marshall (2014) explore how the institutional context prioritises particular pathways to sustainability in an Indian water management context. However, it is hard to find research that address all components (narratives, actors, their ideas/perceptions, Pathways and the governance/institutional context) in ways that are systematic enough to reveal the mechanisms of domination and suppression of alternative Pathways. This article has pointed to some conceptual weaknesses that may contribute to the observed limitations, for example weak linkages between actors, frames and action strategies. Below, a developed procedure for exploring Pathways to sustainability in environmental and natural resource management contexts is suggested. It draws on the STEPS approach, but takes it further by adding a theoretically grounded frame analysis and a place-based perspective. In addition, we demonstrate how the framework has been used to guide a transdisciplinary exploration of a contested mining development in Storuman municipality in Northern Sweden (see Table 1 for a summary of the case)

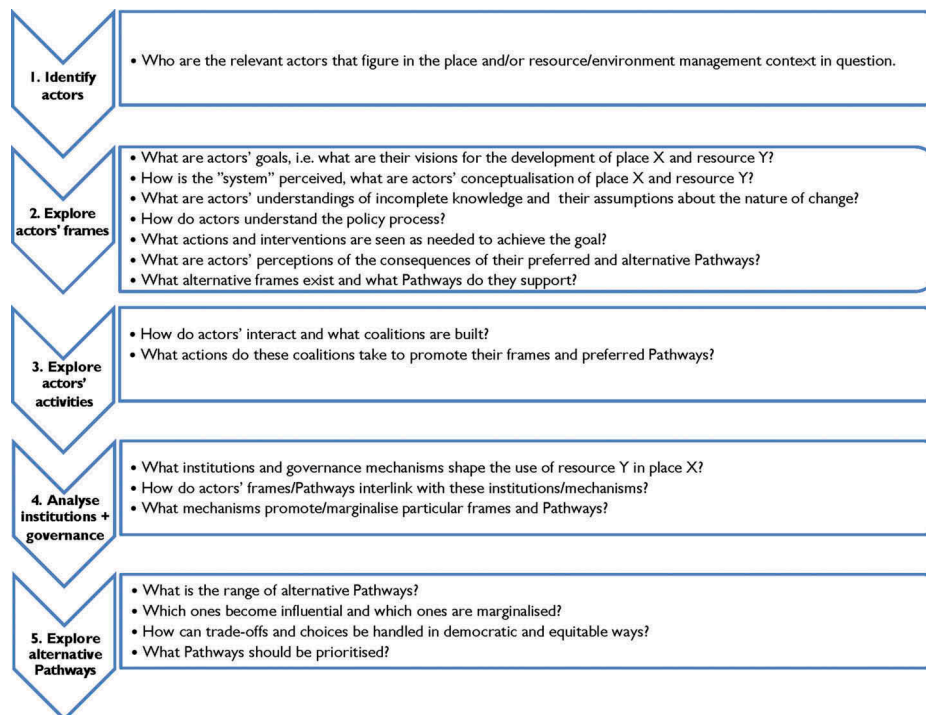
Following the procedure outlined in Figure 1, a *first step* is to identify the *actors*. Organisations, or people, that have taken action, expressed an interest in the issue, or figure in media or other actors' stories about the issue and place in question, are identified. Research on the Storuman case focused on local actors, with 23 organisations, businesses and networks representing a broad range of interests in the municipality taking place in the research during the period January 2013 to May 2015.

In the *second step* (Figure 1), actors' place-based *frames* are explored. Undertaking a frame analysis under our framework means analysing actors' 'frames', not 'framings' or 'narratives'. Frames may change, actors may move between them, they can bias for more than one Pathway, but only one term is used to capture the importance of ideas and meaning construction and that is 'the frame'. Frames, in our understanding, are never free-floating but always held, sponsored and, possibly enacted, by one or several actors. Accordingly, frame analysis is used to explore actors' perceptions of the sustainability challenges associated with a particular environmental issue or resource management activity, and how these understandings bias for various Pathways.

**Table 1.** Background summary of the Storuman case.

The case of a possible mining operation in Rönnbäck, Storuman municipality	
Company	Nickel Mountain AB (subsidiary of IGE Resources AB)
Planned operation	Open pit nickel mining
Location of planned mine	Rönnbäck in the mountain valley Björkvattdalen, close to the Ume River headwaters and the ski resort Tärnaby/Hemavan in Northern Sweden
Permit process	The company has been granted a permit of exploitation concession from the Mining Inspectorate and was at the time of investigation working on acquiring a final permission from the Environmental Court <sup>a</sup>
Public debate	Highly contested mining operation. Storuman municipality is facing severe socio-economic challenges and mining proponents are citing benefits of employment and infrastructure development. Others are concerned over environmental and social impacts; in particular the indigenous Sami population who perceive threat to traditional livelihoods including reindeer husbandry
Research approach and methods used	In a series of five structured, professionally facilitated and documented meetings (alternately homogenous focus groups and large heterogeneous deliberative fora), local actors' perceptions of the proposed mine, preferred pathways to sustainability and the prospects of using 'consultation' to handle mining related conflicts were explored. Supplementary documents were analysed

<sup>a</sup>In June 2015, Nickel Mountain decided to put the project on hold due to low nickel prices, rising costs and poor prospects for profitability. However, the permit of exploitation concession is still valid.

**Figure 1.** Framework for exploring alternative Pathways to sustainability.

As outlined above, frames have two functions: they organise experience and they bias for action. Four questions explore the first categorising and organising function of the frame. They focus on actors' *goals*, their conceptualisations of the 'system' or *place*, their understandings of *incomplete knowledge* and assumptions about the *nature of change*, and their perceptions of the *policy processes*. Actors' understandings of 'goals' in terms of their vision for a particular place and its sustainable development are consequently explored. It is investigated how place is conceptualised by inquiring, for example how actors understand a specific resource and its role in the making of the affected place. More specifically, the properties of place (sites, resources/capital, people, locations, institutions, etc.) that are used and valued by the actors, and how these, or other dimensions, are related and

could be enhanced, or impeded are explored. This part of the analysis is sensitive to actors' different understandings of interactions, scale and temporality. In order to investigate actors' understandings of incomplete knowledge, the STEPS approach's understanding of 'risks', 'uncertainties', 'ambiguities' and 'ignorance' is used. This article also draws upon the STEPS framework to investigate how actors envision the nature, and degree of change that they expect to encounter and find acceptable. When exploring actors' perceptions of the policy process, their understandings of the formal policy process, their perceptions of other actors as well as their assessments of their own, and others', opportunities to influence the process are investigated. In the Storuman case, a mix of qualitative, social science research methods, including participatory mapping, focus group discussions



and supplementary document analysis, were used to explore actors' frames.

So far, the first, categorising and organising, function of the frame has been explored. This article will now focus on the second function of the frame: how it biases for different kinds of action and Pathways to sustainability. Accordingly, it is explored which *actions* and *interventions* are considered needed by actors to achieve their 'goals'. At this stage of the frame analysis, it becomes clear how actors' ways of understanding the world, resource, place and the policy context bias for different Pathways to sustainability. Consistent with the Pathways approach, we identify the range of Pathways and explore in what ways they serve to 'open up'/'broaden out' or 'close down'/'narrow in' the space for future alternatives and choice. Finally actors' perceptions of the *ecological, social and economic consequences* of different Pathways are explored. It is then possible to identify mutually reinforcing as well as competing frames and Pathways, and the *trade-offs and choices* that have to be made to reconcile, or choose between, conflicting Pathways. At this stage of the process, the actors in the Storuman case were presented with the researchers' compilation of different Pathways, including itemisation of the main similarities and differences between the various groups involved. They were then asked to provide feedback on the researchers' interpretations, initiating an iterative process of research feedback.

An empirical analysis of actors' frames, as outlined above, provides valuable information about how different actors understand a particular environmental challenge or resource management activity in the context of a particular place and its sustainable development. It also reveals how the actors assess the policy options and how these different understandings give rise to alternative Pathways. However, it does not say anything about which frames become influential or what Pathways are articulated and enacted.

Central to addressing the issue of influence is an exploration of actors' interactions, for example how actors build coalitions with likeminded others and take actions that forward their frames and Pathways (see Beland Lindahl 2008; Beland Lindahl et al. 2013). In the *third step* (Figure 1), it is explored how *actors interact* and what *actions* they take as a first move towards assessing why some frames and Pathways become dominating while others remain marginalised. In the Storuman case, actors' interactions and action strategies were observed throughout the research process, including through direct observation, focus group discussions and documentary analysis.

In *step four* (Figure 1), we analyse the *institutional and governance framework* embedding the resource management activity in question. The STEPS Pathways

approach pays attention to how mobilisation processes, policy and governance mechanisms may promote particular Pathways and marginalise others. However, by systematically analysing actors' frames, the actions they give rise to, and how these particular frames and actions interlink with existing institutions, the mechanisms by which some frames and Pathways become influential can be more thoroughly revealed. Consequently, the formal process of obtaining a permit for the proposed mining operation in Rönnebäck, Storuman municipality was analysed, with the objective of ascertaining which frames and Pathways had been promoted and which marginalised.

In the final *step five* (Figure 1), this paper reflects on actors' differentiated capacities to forward their preferred *Pathways* and the implication for sustainable development. There are two issues in focus here: first, how the identified *trade-offs and choices* can be handled in a democratic and equitable manner; second, if, and why, some of the identified Pathways should be *prioritised*. For this second purpose, we suggest that a return to the original, and authoritative Brundtland understanding of sustainable development, wherein sustainable development is characterised by key normative principles (WCED 1987; Meadowcroft 2007; Baker 2012). Actions are deemed in keeping with sustainable development principles as far as they promote inter- and intra-generational equity, common but differentiated responsibilities, participation and gender equality, and are assessed to be within the planet's ecological means. In line with Meadowcroft (2013), we argue that if sustainable development is to mean anything, it must involve a consequent engagement with environmental limits. These principles can serve as benchmarks in assessing the merit or otherwise of claims as to the sustainability of particular Pathways. The application of such evaluation criteria enables us to overcome the risk of the Pathways approach that potentially allows any pathway to be construed as sustainable.

Table 2 summarises the results of steps 1 to 3 in the Storuman case. Four groups of frames were identified, each promoting a distinct Pathway to sustainability, including opinions on mine development and preference for action. However, frames in groups 1 and 2 share many similarities and overlap in many respects. They were commonly found among the reindeer herding Sami Communities (group 1), organisations representing non-reindeer herding Sami (group 2) and the NGO, 'No Mine in Rönnebäck' (group 2). Group 3 frames were identified among representatives of different village community associations (such as resident associations) while frames in group 4 were common in the business community and municipality leadership. A major division was found between group 4, that is frames that are supportive of mining, and groups 1, 2, and 3, which were either

**Table 2.** Groups of similar frames promoting distinct pathways to sustainability. Each group of frames is sponsored by particular actors and bias for specific action.

Frames	1. Reindeer husbandry consistent with nature	2. Local development and reindeer herding consistent with nature	3. Quality of life and local benefits	4. Natural resource exploitation for jobs and growth
Vision of place?	Sustainable local communities Quality of life more important than growth Small-scale development		Quality of life Jobs – but not at any cost	Growth for sound economy, service and jobs Large-scale development
Core of perceptions of place?	Landscape with multitude of values Humans as part of nature Extensive reindeer herding under threat		Local processing and benefits Social relations	Natural resource use Infrastructure Population growth and inward migration Human needs in focus
Effects of a mine?	Almost exclusively negative Damage to environment and surroundings, disturbance, threat to other businesses. Many risks		Benefits in relation to costs and risks	Almost exclusively positive Jobs, business, incomes Few risks
Mining politics and the permit process?	Closed: dominated by the state and mining industry Low trust in the process		Closed... Low trust...	Relatively open and fair Trust in the process
Pathway to sustainability?	Local development without a mine Robust and viable reindeer husbandry		Local processing and benefits Mining <i>iff</i> benefits weigh up costs and damages	Natural resource exploitation and mining development for jobs, growth and survival
Action	Formal interventions and legal action against mining development	Mobilisation and campaigning against mining development	No action so far Lack of information and networks	Networking and/or lobbying in support of mining development

against mining or were very cautious in their approach, remaining undecided at the time of the research. However, our approach enabled a deeper analysis of how these differences reflect diverse perceptions and visions of place, in other words we found that they stemmed from affiliations to alternative, or even competing to pathways to sustainability. We revealed that underlying the disparate positions on mining developments were fundamentally different beliefs in relation to, for example the importance of economic and population growth in the locale, the relationship between human and nature, willingness to take risks, the centrality of land rights and rights of indigenous communities. In turn, these were linked to adoption of different spatial and temporal scales, including focus on the short term rather than future generations' benefits, and impacts in the immediate surroundings of the pit rather than effects on entire landscapes and watersheds.

The research revealed that several of the identified Pathways were mutually exclusive, rather than complementary, for instance group 1 and 2 frames portray a mine as a major threat to the possibilities to maintain and develop reindeer husbandry, a traditional way of life and community development. Group 1 frames, on the other hand, include perceptions of a mine as a precondition for local development.

Moreover, the institutional analysis (step 4) revealed the limited participatory opportunities afforded to certain local groups, and that the capacity of such groups to influence public policy outcome was unequally distributed. Whereas both mining proponents (group 4) and mining opposition groups (group 1 and 2) were visible in the public debate, actors with a more indeterminate position (group 3) lacked the necessary resources to voice their opinions. Only the Sami reindeer herding communities (group 1), certain directly affected land owners (group 2) and the local government authorities within the municipality (largely operating on basis of group 4 frames) have, to date, had a say in the formal permit granting process. The formal decisions taken to date have generally supported mining development plans, that is they have prioritised economic and growth-related objectives. This support reflects national policy priorities, driven as they are by a strong natural-resource-exploitation, economic development-agenda (e.g. Ministry of Enterprise, Energy and Communication 2013). This agenda leaves only limited space for the participation of local actors that promote alternative sustainability pathways. At the same time, the Swedish state is responding to recurring mining conflicts by calling for consultation (*samråd*), that is dialogue to promote cooperation and synergy between

the mining industry and other interests (Ministry of Enterprise, Energy and Communication 2013). Following the reflective procedure outlined in step 6, we conclude that, whereas consultations may have many merits for those who participate, such as improving the understanding for other actors' perspectives, the use of a deliberative approach did not significantly change actors' positions on substantial matters. In order for choices and trade-offs to be made in ways that are perceived as legitimate, Swedish mineral politics and the permit granting processes need to be opened up to reflect a broader range of actors, frames and Pathways. In this case, however, they closed down around dominant, economic interests, including those operating at the national level.

## 5. Pathways, frames and sustainable development research

As mentioned above, the STEPS Pathways approach offers a number of concepts and ideas that are useful to sustainability research. It acknowledges that the debate around sustainable development is subject to asymmetrical power distribution and offers ways to make competing visions visible. This is not to say that all available options are leading to a sustainable future. However, opening up the range of alternatives for scrutiny may expand the pool of knowledge that can feed into a reflexive exploration of what sustainability might mean in different contexts. It is also a necessary precondition for making choices and trade-offs in informed and democratic ways.

So, what can a rigorous frame analysis add to the Pathways approach? First, a consistent reference to actors 'frames', rather than an interchanging use of 'frames', 'framing', 'framings' and 'narratives', adds both conceptual and analytical sharpness. It helps distinguish between the process of meaning construction, understood as frame construction and the outcome, here captured as alternative frames. We argue that a theoretically grounded frame analysis enables examination of the relationships between actors, frames (its two functions), actions, the governance context and policy outcomes as illustrated by our empirical example. Establishing these linkages contributes to a more robust conceptualisation, and definition of Pathways (including their relation to frames, actions and outcomes). Moreover, a systematic analysis of how actors' frames and actions interlink with existing institutions can help reveal the mechanisms whereby some frames and Pathways are marginalised and others become dominating. Finally, a neo-Durkheimian approach to frame analysis contributes a stronger theoretical base, allowing the origins and

dynamics of frames to be taken into account, and thus providing more robust explanation as to how and why some actors are ready to change, or shift, frames and Pathways whereas others are not.

A marriage between the Pathways approach and frame analysis is not only of benefit to the Pathways approach. Most approaches to frame analysis have their weaknesses, and the neo-Durkheimian approach outlined in this paper risks becoming static (Beland Lindahl 2008). Efforts have been made to incorporate the dynamics of how actors change and shift frames (Perri 2005), but the idea and metaphor of Pathways adds a temporal dimension to the very object of frame construction itself. Thus, it allows a systematic analysis of how actors' perceive change and transition, for example from the present to a future sustainable state. Accordingly, the Pathways approach offers a number of useful tools to explore actors' perceptions of change and knowledge, for example the typologies of different forms of incomplete knowledge and dynamic properties of sustainability. In the Storuman case, these tools helped clarify actors' varying perceptions of impacts and risks associated with a possible mining development. These contributions help explore differences in frames that are expected to be key in many environmental and sustainability contexts. Whereas frame analysis can be very useful to deconstruct the politics of environmental or natural resource management, it may be less helpful when it comes to constructing viable policy strategies that can enable resolution of such controversies. Here, the Pathways approach offers a much-needed bridge between the analysis of multiple frames and a normative discussion of more or less viable and desirable Pathways to sustainability. However, beyond, prioritising the 'marginalised' and the 'poor', Leach et al. (2010a) does not offer much advice as to what should be used as a basis for prioritisation. We suggested above that this issue could be taken further by using the original Brundtland version of sustainable development (WCED 1987; Meadowcroft 2007; Baker 2012), including its reference to ecological 'limits' (Meadowcroft 2013), to provide a normative point of departure for assessing the credibility of particular sustainability options.

So far, the mutual benefits of integration between frame analysis and the Pathways approach have been highlighted, and in addition, we suggest adding a place-based perspective. Using place as a point of departure for an analysis of natural resource management and sustainable development helps to conceptualise how the environment and socio-political processes are intertwined (see, e.g. Cheng & Daniels 2003; Baker & Durance forthcoming). Place is an integrating concept with the capacity to explore

connections between people, politics and the environment in holistic ways. As shown in our empirical example, it is a concept that is easily understood by lay people and can be used as a point of departure for a joint exploration of Pathways to sustainability. Accordingly, our research framework is well placed to guide integrative research across academic disciplines and between academic and non-academic actors. Consistent with the Pathways approach's call to 'open up' and 'broaden out', a place-based approach expands our inquiry to frames and Pathways that are not formally tied to the resource management system in question – yet may be affected by it. For example, our place-based exploration of the Storuman case revealed that many village community associations in the affected river valley share 'quality-of-life-and-local-benefit-frames' but lacked information, voice and means to influence the permit granting process. Moreover, a place-based frame analysis adds an additional theoretical lens as it pays attention to how actors' place-based activities and experiences shape their frames and preferred Pathways.

By exposing the range of alternative Pathways, this approach helps convey knowledge in ways that allow a plurality of values and preferences to emerge. It contributes to research and policy in pursuit of sustainable development by offering avenues to open up a broader spectrum of available action alternatives (see Leach et al. 2010a; Rickards et al. 2013). However, only by combining this approach with a solid basis for prioritising Pathways that are deemed in keeping with sustainable development, can the transition to sustainability be achieved. Therefore, this paper argues that attention to the capacity of institutions and governance frameworks to handle competing Pathways in fair and equitable ways is essential.

## 6. Conclusions

This paper has demonstrated how the idea of dynamic Pathways may be combined with frame theory. It offers a solid theoretical foundation that helps explain the origin and evolution of actors' varying perceptions of 'sustainability', and their preferred ways to get there. The authors have also expanded on the literature about place and social spatialisation to integrate concerns for place in our analysis of frames and Pathways to sustainability. By understanding how Pathways emerge out of actors' place-related frames, both the role of social organisation and place-based experiences in shaping actors' preferences and action strategies can be explained. It has also been demonstrated how questions of policy influence can be addressed by a systematic analysis of actors' frames, actions and their inter-linkages with existing

institutions and governance mechanisms. Finally, this paper suggests using the original Brundtland version of sustainable development to enable discernment as to which specific Pathways should be prioritised. In order to synthesise our argument, it has been shown how the Pathways approach and a place-based frame analysis may be combined into a coherent and operationalised research framework that is applicable in many different environmental and natural resource management contexts. Our analytical framework provides a way to better understand the origins of natural resource management conflicts, characterise the position of the actors involved, identify the potential for cooperation between stakeholders leading to policy resolution and to judge what pathways helps or hinders the pursuit of sustainable development.

## Note

1. At present, the terms 'sustainable development' and 'sustainability' are taken as synonymous. We are aware of the conceptual differences between sustainability as a long-term goal, that is a more sustainable world; while sustainable development refers to the many processes to achieve it, for example sustainable agriculture and forestry, sustainable production and consumption, good government, research and technology transfer, education and training, institutional and systemic change, etc.

## Acknowledgement

We thank Agneta Setterwall and all actors who have participated in the research meetings in Storuman municipality.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

The research was funded by the Swedish Environmental Protection Agency as part of its research program Storslagna fjäll (Magnificent Mountains, [www.storslagnafjall.se](http://www.storslagnafjall.se)).

## References

- Baker S. 2012. Climate change, the common good and the promotion of sustainable development. In: Meadowcroft J, Langhelle O, Ruud A, editors. Government, democracy and sustainable development: moving beyond the impasse. Cheltenham: Edward Elgar; p. 249–270.
- Baker S. 2015. Sustainable development: a new perspective. London: Routledge.
- Baker S, Durance I. [forthcoming](#). Resilience and adaptation in coupled natural-social systems: a place based



- perspective. In: Marsden T, editor. *Handbook of nature*. London: Sage.
- Beland Lindahl K. 2008. *Frame analysis, place perceptions and the politics of natural resource management: exploring a forest policy controversy in Sweden* (dissertation). Uppsala: Swedish University of Agricultural Sciences.
- Beland Lindahl K, Baker S, Waldenström C. 2013. Place perceptions and controversies over forest management: exploring a Swedish example. *J Environ Policy Plann*. 15:201–223.
- Biermann F. 2013. Curtain down and nothing settled: global sustainability governance after the 'Rio+20' Earth Summit. *Environ Plann C Gov Policy*. 31:1099–1114.
- Bruff G, Wood A. 2000. Making sense of sustainable development: politicians, professionals, policies local planning. *Environ Plann C Gov Policy*. 18:593–607.
- Bulkeley H, Jordan A, Perkins R, Selin H. 2013. Governing sustainability: Rio+20 and the road beyond. *Environ Plann C Gov Policy*. 31:958–970.
- Cheng AS, Daniels SE. 2003. Examining the interaction between geographic scale and ways of knowing in ecosystem management: a case study of place-based collaborative planning. *For Sci*. 49:841–854.
- Demeritt D. 2011. Pathways to sustainability: perspectives and provocations. *Environ Plann A*. 43:1226–1237.
- Dobson A. 2011. STEPS – norms, complexity, deliberation. *Environ Plann A*. 43:1226–1237.
- Durkheim E. 1897/1951. *Suicide: a study in sociology*. Spaulding JA, Simpson G, translator. London: Routledge.
- Durkheim E. 1925/1961. *Moral education: a study in the theory and application of the sociology of education*. Wilson EK, Schnurer H, translator. New York (NY): Free Press.
- Durkheim E. 1912/1995. *The elementary forms of religious life*. Fields KE, translator. New York (NY): Free Press.
- Ely A, Smith A, Stirling A, Leach M, Scoones I. 2013. Innovation politics post-Rio+20: hybrid pathways to sustainability? *Environ Plann C Gov Policy*. 31:1063–1081.
- Ely A, Van Zwanenberg P, Stirling A. 2014. Broadening out and opening up technology assessment: approaches to enhance international development, co-ordination and democratisation. *Res Policy*. 43:505–518.
- Goffman E. 1974. *Frame analysis: an essay on the organisation of experience*. Boston (MA): Northwestern University Press.
- Ingold T. 2000. *The perception of the environment: essays in livelihood, dwelling and skill*. London: Routledge.
- Jacobs M. 1995. Justice and sustainability. In: Lovenduski J, Stanyer J, editors. *Contemporary political studies. Proceedings of the Political Studies Association of the UK*. Belfast: Political Studies Association. Vol. 3; p. 1470–1485.
- Lafferty WM. 1995. The implementation of sustainable development in the European Union. In: Lovenduski J, Stanyer J, editors. *Contemporary political studies. Proceedings of the Political Studies Association of the UK*. Belfast: Political Studies Association. Vol. 1; p. 223–232.
- Leach M. 2008. Pathways to sustainability in the forest? Misunderstood dynamics and the negotiation of knowledge, power and policy. *Environ Plann A*. 40:1783–1795.
- Leach M, Bloom G, Ely A, Nightingale P, Scoones I, Shah E, Smith A. 2007b. *Understanding governance: pathways to sustainability*. STEPS Working Paper 2. Brighton: STEPS Centre.
- Leach M, Scoones I, Stirling A. 2007a. *Pathways to sustainability: an overview of the STEPS centre approach*. STEPS Approach Paper. Brighton: STEPS Centre.
- Leach M, Scoones I, Stirling A. 2010a. *Dynamic sustainabilities: technology, environment, social justice*. London: Earthscan.
- Leach M, Scoones I, Stirling A. 2010b. *Governing epidemics in an age of complexity: narratives, politics and pathways to sustainability*. *Global Environ Change*. 20:369–377.
- Leach M, Stirling A. 2011. *Dynamic sustainabilities: a response*. *Environ Plann A*. 43:1235–1237.
- Li TM. 2011. Pathways to sustainability: perspectives and provocations: connections and disconnect. *Environ Plann*. 43:1232–1234.
- Massey D. 1995. The conceptualisation of place. In: Massey D, Jess P, editors. *A place in the world: places, cultures and globalisation*. Oxford: Oxford University Press; p. 46–79.
- Massey D. 1997. A global sense of place. In: Barnes T, Gergory D, editors. *Reading human geography: the poetics and politics and inquiry*. London: Arnold; p. 315–323.
- Massey D, Jess P. 1995. *A place in the world: places, cultures and globalisation*. Oxford: Oxford University Press.
- Meadowcroft J. 2007. Who is in charge here? Governance for sustainable development in a complex world. *Environ Policy Plann*. 9:193–212.
- Meadowcroft J. 2013. Reaching the limits? Developed country engagement with sustainable development in a challenging conjuncture. *Environ Plann C Gov Policy*. 31:988–1002.
- Miller TR. 2013. Constructing sustainability science: emerging perspectives and research trajectories. *Sustain Sci*. 8:279–293.
- Ministry of Enterprise, Energy and Communication. 2013. *Sweden's minerals strategy for sustainable use of Sweden's mineral resources that creates growth throughout the country*. Stockholm: Government Offices of Sweden.
- Muller-Mahn D, Rettberg S, Getachew G. 2010. Pathways and dead ends of pastoral development among the Afar and Karrayu in Ethiopia. *Eur J Dev Res*. 22:660–677.
- O'Riordan T. 1985. What does sustainability really mean? Theory and development of concepts of sustainability. In: *Sustainable development in an industrial economy. Proceedings of a conference held at Queens' College; Jun 23–25; Cambridge*. Cambridge (UK): Centre for Economic and Environmental Development.
- Perri 6. 2002. What is there to feel? A neo-Durkheimian theory of the emotions. *Eur J Psychother Counsel*. 5:263–290.
- Perri 6. 2005. What's in a frame? Social organization, risk perception and the sociology of knowledge. *J Risk Res*. 8:91–118.
- Randhawa P, Marshall F. 2014. Policy transformations and translations: lessons for sustainable water management in peri-urban Delhi, India. *Environ Plann C Gov Policy*. 32:93–107.
- Relf E. 1976. *Place and placelessness*. London: Pion Limited.
- Rickards L, Ison R, Fünfgeld H, Wiseman J. 2013. Opening and closing the future: climate change adaptation, and scenario planning. *Environ Plann C Gov Policy*. 31:587–602.
- Rodriguez I, Sletto B, Bilbao B, Leal A. 2013. "Opening up" fire conflicts: reflexive governance and transformative knowledge networks in culturally fragile indigenous landscapes. STEPS Working Paper 54. Brighton: STEPS Centre.

- Roe E. 1994. Narrative policy analysis: theory and practice. Durham (NC): Duke University Press.
- Rose G. 1995. Place and identity: a sense of place. In: Massey D, Jess P, editors. *A place in the world: places, cultures and globalisation*. Oxford: Oxford University Press; p. 87–132.
- Schön D. 1984. *The reflexive practitioner: how practitioners think in action*. New York (NY): Basic Books.
- Schön D, Rein M. 1994. *Frame reflection: towards the resolution of intractable policy controversies*. New York (NY): Basic Books.
- Shields R. 1991. *Places on the margin: alternative geographies of modernity*. London: Routledge.
- Stirling A. 2008. "Opening up" and "closing down": power, participation, and pluralism in the social appraisal of technology. *Sci Technol Human Values*. 33:262.
- Stirling A, Leach M, Mehta L, Scoones I, Smith I, Stagl S, Thompson J. 2007. *Empowering designs: towards more progressive appraisal of sustainability*. STEPS Working Paper 3. Brighton: STEPS Centre.
- Thapa S, Marshal F, Stagl S. 2010. *Understanding peri-urban sustainability: the role of the resilience approach*. STEPS Working Paper 38. Brighton: STEPS Centre.
- Tuan YF. 1974. *Topophilia: a study of environmental perception, attitudes and values*. New York (NY): Columbia University Press.
- Van Gorp B. 2007. The constructionist approach to framing: bringing culture back. *J Commun*. 57:60–78.
- Voss JP, Kemp R, Bauknecht D. 2006. Reflexive governance: a view on an emerging path. In: Voss JP, Bauknecht D, Kemp R, editors. *Reflexive governance for sustainable development*. Cheltenham: Edward Elgar; p. 419–437.
- [WCED] World Commission on Environment and Development. 1987. *Our common future*. Oxford: Oxford University Press.