Routledge
Taylor & Francis Group

Place attachment as a driver of adaptation in coastal communities in Northern Norway[†]

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Changes in a range of interlinked factors, in social, economic, environmental and climatic conditions, require adaptation in many communities. This paper explores how place attachment affects adaptive responses to a changing social context through analysing adaptation in two coastal municipalities in Northern Norway. The main challenge in these municipalities is declining populations and the consequences accompanying this trend, including livelihood uncertainties and decreased provision of public services. This paper discusses the role of place attachment in motivating adaptation to these changes to contribute to a growing body of literature within climate change adaptation on "subjective" (values, culture and place) dimensions. The findings suggest that people are motivated to act based on their emotional connection with place, and the paper argues that place attachment may offer a better starting point for climate change adaptation than an emphasis on climate change impacts.

Keywords: adaptation; climate change; place attachment; coastal communities; Northern Norway

Introduction

I actually believe that many people who live in places like these are thinking this; that there's something more here, it isn't just about work. (Male ii, Senja)

Municipalities in coastal Northern Norway follow the general socio-economic and demographic trends in the north and face major challenges particularly in relation to declining populations, livelihood uncertainties and decreased provision of public services (Rasmussen 2011). In addition, climate change impacts are expected to present new challenges and opportunities to this region that will require adaptation (AMAP 2011). To deal with these trends, "places will most likely become more dependent on local initiatives and local strategies" (Røiseland *et al.* 2008, p. 1). Previous research in Northern Norway finds that adaptation to climate change is not considered as a major topic in many local communities (Hovelsrud and Smit 2010), and that local communities do not differentiate between the suite of social, economic and climatic challenges they are faced with and adapting to

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[†]Note: All the interviews were conducted in Norwegian and all citations from interviews in this paper are the author's own translation.

(Smit and Wandel 2006). Hence climate change is one of many (challenge)s requiring adaptation in communities (West and Hovelsrud 2010). This suggests that understanding drivers of adaptation in particular communities requires insight into salient local issues and concerns.

To date a consideration of the "subjective" dimensions of adaptation, such as values, culture and sense of place, is largely underrepresented within scientific debates on climate change (Turner *et al*. 2008, O'Brien 2009b). Yet individuals and communities' responses to changes are based on what they value, their history and their attachment to particular places, and such subjective dimensions are increasingly seen as important in studies of adaptation (Scannell and Gifford 2013, Amundsen 2012b, Fresque-Baxter and Armitage 2012, Adger *et al*. 2013, Devine-Wright 2013).

This paper adds new perspectives to understanding motivations for local adaptation through a presentation of an empirical analysis of adaptation in two municipalities in Northern Norway. The findings show that place attachment is a powerful motivator for adaptation to a changing social context. Although climate change is not currently a primary local concern, place attachment is an important driver of adaptation to negative socio-economic trends and motivates collective actions to ensure continued well-being in these places that may enhance communities' resilience to climate change impacts and help inform successful adaptation strategies. The empirical results of this study underscore the subjective dimensions in motivating adaptive responses to interlinked changes at the local level.

By drawing on the literature from both place attachment and climate change adaptation research, the paper enables a discussion of how subjective factors may influence responses to climate change in the context of other social and economic stressors faced by communities. The empirical research considers exactly how and why place attachment serves as a motivating factor for adaptation. Adaptation here refers to "the *process of change* in response to a change in the physical environment or a change in internal stimuli, such as demography, economics, and organization" (Denevan 1983, p. 401, emphasis in original). Place attachment, the focus of this paper, emphasises emotional ties to place and is seen as contributing to well-being and resilience (Hess *et al*. 2008, Ross *et al*. 2010, Amundsen 2012b, Adger *et al*. 2013). This paper shows that place attachment, which includes both the physical characteristics specific to a place and the subjective meaning attached to it, can be a powerful motivating force for adaptation because it directly connects with what matters to people and what they care about. The paper concludes with a discussion of the finding in this paper – that climate change does not currently motivate adaptation in the two case municipalities – and argues that this insight is highly relevant to the climate change adaptation research community, which often assumes climate change to be a primary driver of adaptation. An emphasis on connection to place and well-being may offer a more fruitful starting point for promoting climate change adaptation than climate change impacts.

Conceptualising place and place attachment

There has been a renewed interest in the study of place in the social science literature in general, with links to the 1970s and human geography's focus on places as meaningful spaces (Tuan 1974, Relph 1976). Three key understandings of place can be given, based on the use of the concept in the literature: place as (i) location, (ii) locale and (iii) sense of place (Agnew 2005). The three understandings of place are not mutually exclusive, and a place is commonly seen as a combination of all three. Place understood as a location signifies the spatial area or physical location. Place as locale includes not just the spatial

location but also the activities occurring in that location. The third understanding of place – sense of place – is the broadest, comprising a range of meanings. Sense of place can be seen as an umbrella term for the subjective meaning of place, attachment to place, place identity, belonging, awareness and knowledge of place (Cresswell 2004). Feld and Basso (1996, p. 11) define sense of place as "the relation of sensation to emplacement; the experiential and expressive ways places are known, imagined, yearned for, held, lived, contested, struggled over; the multiple ways places are metonymically and metaphorically tied to identities". Agnew (2005 p. 89) considers it the "identification of a place as a unique community, landscape and moral order".

Physical aspects such as nature, landscape, climate and weather are important aspects of place definition (Rose 1995). Additionally, places encompass past experiences, history, culture, tradition and community (Cresswell 2004). Places are represented in a specific way, based on history, traditions and people's perceptions, and are dynamic and change over time. Various groups in a community commonly hold different perceptions of place. Jess and Massey (1995, p. 134) state that within any given place there are a number of different and often conflicting perceptions of place and argue that this is because "the identities of places are a product of social actions and of the ways in which people construct their own representations of particular places". Hence, there are negotiations over place in most communities and there are different ways of participating and contributing to a place (Massey 1995). There are also discussions over how places should adapt to challenges. In influencing people's responses to challenges and contributing to well-being, the notion of place attachment has been seen to motivate people to engage and act and has thus gained the interest of climate change adaptation researchers.

Places in an increasingly interconnected world

In an age of high mobility and interconnectedness associated with globalisation, it has been argued that all places are now the same and have lost their uniqueness and as a consequence people have lost their attachment to places (e.g. Relph 1976, see Simonsen 2008 for relevant discussion). Yet Geertz (1996, p. 262) argues that, "it is still the case that no one lives in the world in general. Everybody (...) lives in some confined and limited stretch of it." Escobar (2001) has a similar locality-based understanding of place and rejects the notion that globalisation is causing the loss of uniqueness of places:

> Yet the fact remains that place continues to be important in the lives of many people, perhaps most, if we understand by place the experience of a particular location with some measure of groundedness (however, unstable), sense of boundaries (however, permeable), and connection to everyday life, even if its identity is constructed, traversed by power, and never fixed. (Escobar 2001, p. 140)

Escobar further argues that equating global with space and local with place and tradition means that an understanding of culture, knowledge, nature and economy and how these connect the global and the local is lost. Instead, understanding place in a relational perspective, where places are seen as nodes or networks which are interlinked through scales, has been developed by Massey (1991, 1994, 1995) among others. Massey (1991) argues that a focus on place need not be in favour of conserving tradition but that it depends on how the concept place is defined. Places, according to Massey, are sites of flows of social relations which are not restricted by the boundaries of a locality. She argues that places should be understood as constituting social relations across scales, extending the boundaries of

localities to the global. Nuancing these understandings of place, Castree (2004) argues that places are to a certain extent closed and develop within their confined boundaries, while at the same time engage in translocal relations. Hence, he argues that places are less open and fluid than a relational perspective of place proposes.

In relation to this, place attachment is in some instances seen as "roots", while mobility represents "routes", and could thus be considered opposites (Gustafson 2001). Increased interconnectedness and increased mobility are often assumed to lead to a loss of place attachment, as discussed above. However, both in the literature (Gustafson 2001) and in the current study, these contradictions are not valid. Instead, increased mobility and transport options enable living in rural places and makes travelling more accessible.

In her study of rural in-migration in Norway, Grimsrud (2011) finds little evidence of a counter-urbanism trend and preference for rural living and argues that those who migrate are more motivated by family relations and economic concerns. Moving to be close to family and place of origin could be an expression of place attachment; however, available jobs are often a prerequisite for the decision to return. A job is stated as the second most important reason for moving to a rural area, and reflects the fact that rural Norway has attractive jobs, and that the remoteness of many rural areas makes commuting to urban areas difficult (Grimsrud 2011). This is different from, for instance, rural England where a study of commuting behaviour found that recent migrants are more likely to commute longer distances than those long settled in the area (Champion *et al.* 2009). They argue that because of lack of available local jobs, increased long-distance commuting is expected to increase.

Place is in this paper understood as a combination of the three interpretations presented by Agnew (2005): the physical location, the activities at the locale and sense of place. These three dimensions can be integrated through the concept of place attachment, a concept used to describe how individuals connect with place including through social networks, belonging in a community and its physical space. The place attachment concept captures aspects that people value and that are important to them. Place attachment is an expression of this emotional connection with place.

The relationship between place attachment and climate change adaptation

The latest Intergovernmental Panel on Climate Change report established that consequences of climate change are being observed and that adaptation to these changes are taking place (Adger *et al.* 2007); however, most adaptation initiatives are not taking place in response to climate change alone (Tompkins *et al.* 2010, Ford *et al.* 2011). For Northern Norway, downscaled climate models project higher average temperatures throughout the year, but with most warming occurring in the winter, and shifts in the seasons, with winters arriving later in the year (RegClim 2005, Førland *et al.* 2007). Towards year 2100 precipitation is projected to increase by 13% during the summer, and this trend has already been observed (Førland *et al.* 2007).

A number of case studies in the Arctic have established that climate change combined with other factors have already had profound consequences for communities and their livelihoods, especially those reliant on natural resource harvesting (e.g. Krupnik and Jolly 2002, Huntington *et al.* 2005, Ford *et al.* 2006, Berkes 2008, Hovelsrud and Smit 2010). The early climate change case studies from the Arctic were not primarily concerned with emotive aspects of climate change, but these aspects nonetheless emerged as important through field work. For instance, Jolly *et al.* (2002, p. 115) noted that "climate change also has other economic and cultural impacts. For example, the lack of sea ice makes

some people 'lonely for the ice.'" The consequences of climate change to date are not as noticeable in Northern Norway as elsewhere in the Arctic, but are considered as an additional challenge in areas such as municipal infrastructure, land-use and disaster risk planning and in agriculture and coastal fisheries (Hovelsrud *et al*. 2010, Keskitalo *et al*. 2011). The weather and coastal fish stocks in Northern Norway fluctuate significantly annually and seasonally, which makes it difficult to single out a climate change signal that is distinct from factors such as fishing regulations and broader environmental changes (West and Hovelsrud 2010). However, communities not reporting to be affected today are expected to be affected in the future, and it is widely acknowledged that the consequences of climate change will affect individuals, groups, communities and regions differently (see O'Brien *et al*. 2006).

Earlier work has found that a multiple factors approach is able to provide a more holistic picture of adaptation needs and undertakings than studying climate in isolation (O'Brien *et al*. 2004, McCarthy *et al*. 2005, Belliveau *et al*. 2006, Wilbanks and Kates 2010). Challenges to a community come from processes both within and beyond the community (Anderies and Janssen 2011), not only from climate change impacts that are beyond the control of the community. Hence, a wider understanding of adaptation is applied in this paper, to include community responses to a combination of locally relevant social, economic, political and other development factors (Smit *et al*. 2008, Wilbanks and Kates 2010).

Recently, there has been an increased focus on "subjective" aspects of value, culture and place in the scientific discourse on adaptation (e.g. Adger *et al*. 2009b, 2013). O'Brien (2009a, p. 177) argues for the need to consider individual and community values as part of a more holistic approach to adaptation, especially with a view to overcoming limits to adaptation:

> If values subjectively define the limits to adaptation as a response to climate change, as much or more so than objective factors, then the positive and negative outcomes of climate change cannot be assessed without considering what different individuals and communities value, both in the present and future.

In addition, several recent papers, especially in anthropology, argue that in order to respond to climate change and environmental change, cultural aspects must be included (Cruikshank 2001, Strauss and Orlove 2003, Hulme 2008a, Hastrup 2009, Heyd and Brooks 2009). Supporting an increased focus on cultural dimensions in climate change research, Hulme (2008b, p. 5) argues that climate change should be understood both as "physical transformation and cultural object" and that the cultural understanding of climate and climate change should receive much more attention. Similarly, Crate (2008) states that culture is the key concept that encapsulates all aspects of climate change and argues that cultural aspects should be a key concern in climate change adaptation research.

Sense of place and place attachment have received increased attention in climate adaptation research. Adger *et al*. (2010, 2011) focus on the loss of culturally significant aspects of place. They discuss the ways in which places may experience that their identity and values are in conflict with suggested or necessary climate change adaptations, exemplified by relocation of island communities (Adger and Barnett 2009).

While much of the literature referenced here focuses on the loss of sense of place as a negative consequence of climate change, this study focuses on place attachment as a driver of adaptation. It offers an interesting starting point to study adaptation, as attachment to place has been found in some studies to affect the willingness to engage in activities to maintain the valued attributes of the place (Kaltenborn 1998, Stedman 2002). Other

studies found no connection between place attachment and action among farmers, but found connectedness to nature as the important factor leading to pro-environment action (Gosling and Williams 2010). Research in psychology has found that place attachment is one of three important predictors explaining engagement with climate change, the others being gender (female) and locally relevant information (Scannell and Gifford 2013). A number of adaptation policies and plans addressing climate change impacts, such as sea-level rise, are based solely on technical solutions, while failing to take into account emotional attachment to place and the knowledge held by the people living there, which could exacerbate the threat to the community (Agyeman *et al.* 2009). Place attachment is also considered as an important focus for responding to climate change impacts on public health (Hess *et al.* 2008). Hess *et al.* (2008) furthermore argue that place attachment is important for community resilience, and this has also been pointed out in other studies (Ross *et al.* 2010, Amundsen 2012b, Berkes and Ross 2013). Conversely, place attachment and place identities may create barriers to taking up new ideas and for changing practices (Dale *et al.* 2008, Marshall *et al.* 2012).

Attachment to place changes over time and increased expressions of place attachment are often seen at times of threats to place, which could trigger adaptations (Devine-Wright 2013). In the two municipalities studied in this paper, changes other than climate change impacts were seen to threaten the well-being of these municipalities and trigger adaptations, which will be described below.

Applying a qualitative methodology in two municipalities

The empirical material in this paper is based on field work in two municipalities of Berg and Øksnes in Vesterålen and Senja in Northern Norway (Figure 1). The two municipalities are both located at the outer parts of larger islands, and the landscapes in both places are commonly described as dramatic and stunning. Both municipalities host important fishing harbours with a long history and tradition of fisheries. The fishing industry is the most important economic sector today with respect to the number of employees and income, together with public sector services (e.g. health and education). In the municipality on Senja, mining is also an important industry and a graphite mine is in operation. Population decline is the main concern in both municipalities and it has led to cuts in the public sector and consequently in the provision of public services, such as the closing of local schools and centralisation of health services. The places that the interviewees discuss are the locations where they either live permanently or temporarily and/or work.

The two municipalities selected for this study are representative of many similar, small municipalities in Norway and elsewhere. Coastal and natural resource dependent communities are accustomed to large variations in their resource base are known for their flexibility and adaptability and are found to have a large range of adaptation options available (Denevan 1983, Forbes *et al.* 2009). Coastal communities in Northern Norway in particular have been challenged by fluctuations in resources, shifts in management schemes and changing demographics (Otterstad and Jentoft 1994, West and Hovelsrud 2010).

The municipalities were visited three times over a period of one year, with the longest stay of one month in each municipality during autumn 2009. The methods employed were in-depth interviews, participant observation and document analysis. In-depth interviews were carried out with altogether 40 people in the two municipalities. The interviewees represented various professions and positions of responsibility within their municipality, such as local government officials, fishers, shop owners, representatives from the tourism industry, chairmen of local sports, recreational and civil society organisations and local
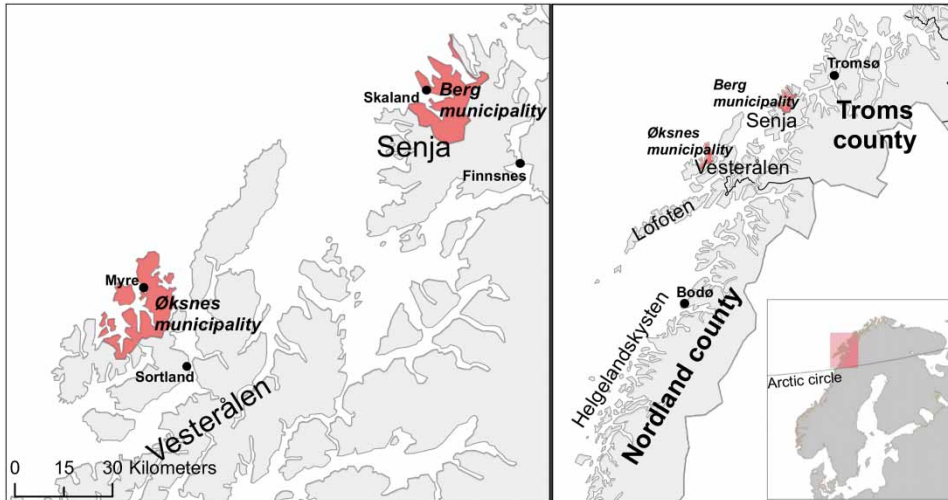
Figure 1.   Location of the study areas: (i) detail of municipalities; (ii) locations of the two municipalities in northern Europe. *Source*: Statens Kartverk (Norwegian Mapping Authority) (adapted by Romstad).

investors. These were selected on the basis of their local roles and responsibilities (professional, voluntary or elected roles). Not everyone that was approached had an interest in participating in the research project and typically those who were willing to participate were also those with various forms of local engagements (i.e. through their roles and responsibilities). In this study, the focus has been on interviewees' perceptions of changes and adaptation in their municipalities. There are, however, numerous negative aspects of place which were not discussed in interviews, including exclusion and uneven local power relations.

The interviews varied in duration, from 40 minutes to more than two hours, depending on the time available and the extent to which the interviewees' elaborated on the interview topics. An interview guide was used and the topics covered include questions about recent changes and adaptive responses to these; interviewees' attachment to place; the community activities they take part in; their relationship to the natural environment; and in particular what makes the community a good place to live for them. The Community Adaptation and Vulnerability in Arctic Regions (CAVIAR) framework[1] was used for analysing adaptation, as it both helped to structure the questions asked in interviews and the analysis of the empirical data (Smit *et al*. 2008, Hovelsrud and Smit 2010). This framework emphasises current and future combined and multiple factors facing a community; the community's sensitivity to changing conditions; and current and future adaptive strategies to deal with the changing conditions. The challenges and adaptations identified through the study will later be presented on the basis of this framework.

A lengthy stay in the municipalities and several visits allowed for participant observation of local activities and events, including local meetings, seminars and gatherings, volunteering at festivals and walking in the landscape with interviewees. Documents and written material were collected, such as local newspaper articles, official documents, tourism brochures, various reports by consultants and local project reports, in order to gain background information about the municipalities and to contextualise issues brought up in interviews.

The text analysis software QSR NVivo8 was used in the analysis of the empirical data. The interviews were coded on the basis of themes, based on the interview guide and refined as the analysis of the material developed.

The purpose of using several methods is complementarity, which "seeks elaboration, enhancement, illustration, clarification of the results from one method with the results from the other method" (Greene *et al.* 1989, p. 259). The use of interviews, participant observation and document analysis together provide a thicker description of the perceptions of place attachment than would be possible to elicit through using only one method. Understanding places requires a comprehensive methodological approach that involves getting to know the place and the complex interlinkages of activities (Meløe 2012, Berg *et al.* 2013). Place attachment and the activities it triggered are somewhat captured through the interviews, and adding both participant observations and documents, such as newspaper articles, help to elicit a more comprehensive understanding of these aspects.

The findings are organised under two themes: (i) various dimensions of quality of life which represent what is valued about place and how place is made meaningful and (ii) overview of challenges and adaptation organised according to CAVIAR framework (see note 1). The discussion will look at the two parts together to discuss how they are linked. There are similarities and differences between the two municipalities, which are noted in the text.

Dimensions of quality of life

When asked about what makes a "good place to live", responses included closeness to nature and the use of nature; the community, social networks and people; the activities in the localities, the connectivity; and a sense of belonging and attachment to place. A high quality of life was brought up by most interviewees as an important characteristic of the place and a reason for wanting to continue living there. One stated that "if you ask about economy here we might not be doing so well, but if you ask about quality of life then it is great here, you know" (Male i, Senja).

The representations of what is valued as quality of life in these places were seen by interviewees as important to maintain. For the interviewees, the bundle of the characteristics associated with quality of life make the municipalities a good place to live. Emotional attachment to place was expressed by several interviewees, stating that "this is where the heart is" (Female vi, Vesterålen) and "my heart is at home here, this is the only place I want to be right now" (Female v, Vesterålen). And some attributed their attachment to place to their relationships with the people in the community.

> Here I have all the things that I need to live, the things that I feel in my backbone that I need to be able to live. It is first and foremost the close contact I have with people here. (Male iv, Senja)

The characteristics of quality of life that were discussed in interviews are shown in Figure 2. The characteristics are interlinked, and it is all the characteristics together that make up the quality of life.

Nature

Both areas are coastal localities on the outer part of large islands. When asked to characterise their place, one stated: "Nature is so obvious that I don't see the need to mention it. I guess many would mention the nature, I take it as a given" (Male x, Vesterålen). Other interviewees were keen to describe the landscape in superlatives; some called it as "sensational"
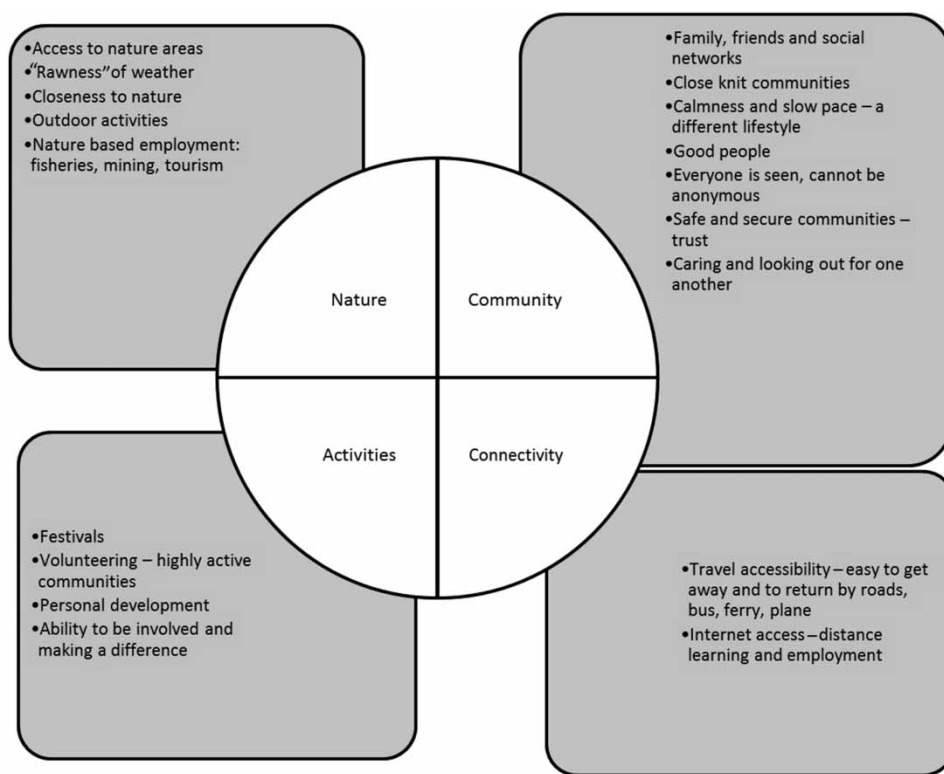
Figure 2.   Characteristics of quality of life which are important in both municipalities.

(Male iii, Senja), others as "a gemstone" (Male i, Senja), and that "I have the most beautiful drive to work in the world" (Female vii, Senja). However, nature was mainly described through visitors' and tourists' experiences of it and some interviewees argued that the visitors appreciated and experienced the landscape differently than the inhabitants: "There are some qualities here that we ourselves don't consider an attraction but which are special experiences for visitors, such as wind and waves" (Male ii, Vesterålen).

Although the physical appearance of the landscape is present in the interviewees' perception of the place, the actual use of nature was much more salient. It is the various opportunities for using and being in nature that are important to people. Nature and natural resources are strongly present in people lives, as the main employer through the fisheries and mining, but also for recreation. More than half of the interviewees stated that closeness to nature and the availability of outdoor recreation activities were important aspects of living in the place. The fluctuations in the weather were also seen as a part of life and to feel a storm was equally important as a calm, clear day. "The wind blows the 'goo' out of the head. I can sit and watch the sea and it's never the same. I like wind, it should be windy here" (Female ii, Vesterålen).

In the interviews, the importance of livelihoods related to natural resources was strongly evident and was seen as the reason for living there. "It is the natural resources which are our backbone. Obviously we cannot all sit here and cut each other's hair" (Male ii, Senja). The current trends in the fisheries are also a cause for concern locally and some expressed fear of losing the fisheries, not only as a livelihood but also in terms of its cultural and historical

value to the place. "Just thinking that the fisheries might end is quite scary because it is a part of our tradition and culture" (Female iii, Vesterålen).

Community

Interviewees described their communities as close-knit with good people, and which provide safe environments for their children. A strong sense of community was expressed, such that people know and trust each other and are concerned with each other's lives; they care for each other and the community, and this is exemplified through the activities that people engage in for their community. Some interviewees described difficulties in being different in a largely homogenous community and some who had moved to the municipality said that it had taken time before being considered as part of the community. For many, safety was a salient characteristic of the quality of life. There is hardly any crime and the places are considered safe to such an extent that many do not feel the need to lock houses or cars: "I cannot recall ever locking my car, you know, this is paradise. That part of life here has a very high quality of life" (Male iii, Senja).

Activities

The extent to which people care for their place and the people in it can be exemplified through their willingness to use their own spare time to run various activities. Interviewees in both municipalities describe a highly active population that carries out a large number of voluntary activities. Some are active in operating sports clubs and other recreational activities, some organise festivals and several participate in one-off activities, such as maintenance of communal playgrounds and community buildings (*dugnad*),[2] or baking cakes or making handicrafts to raise money for local organisations. It was said by several interviewees that because they live in small communities, it is easy to be involved and to make a difference. Inhabitants are proud of this high level of community involvement in local activities and it is seen as one aspect that keeps the community together.

Connectivity

Interviewees were keen to point out that increased connectivity, both in terms of high-speed Internet access and travel accessibility through roads, public transport and airports, increased the well-being of living in these communities. Transportation options make it easy to travel to larger urban centres and make use of services and activities there, such as theatres, shops and restaurants. Internet access was seen as providing improved opportunities for long-distance learning and for relocating Internet-based jobs to the community. The sometimes harsh weather conditions were not considered as a security threat to interviewees or to significantly restrict their mobility. Road closure during winter due to avalanches was seen as normal part of living in this region.

Challenges and adaptation in the municipalities

The two municipalities are facing a combination of changes in social, economic and other factors, which interviewees discussed when prompted to talk about changes in their communities and which are discussed in municipal plans, newspaper articles and other documents. These results are presented in Table 1 according to the changes they are facing, how they are affected by these and how they are responding (Hovelsrud and Smit 2010).

Table 1. Aspects of changes discussed in interviews (B-Berg, Senja; Ø-Øksnes, Vesterålen).

What are the changing conditions?	How does it affect community?	Why are people or livelihoods sensitive to change?	What are their adaptive strategies?
Negative population growth, low birth rate, aging population, out-migration	Erode the availability of jobs, particularly in public services Problems with replacing working population which are about to retire	Less people mean less tax income and direct transfers from national government. Fewer resources with which to run public services. Less need for public services	Local government collaborate with local industry: tourism development for new employment options Local place development to encourage immigration and increase well-being
Livelihood uncertainty in fisheries and mining Change due to fire (in mine, B) and bankruptcy (fishing industry, Ø) and changing market prices Abundant cod stocks	Employment in mining and fishing industries no longer to the same extent seen as secure livelihood options	Loss of key industries means fewer employment opportunities overall Fewer people want to work in the fisheries Seasonal aspect of fishing industry does not attract year-round inhabitants	Local governments invest in fishing harbours to give better conditions for fishing fleets Attempting to attract new businesses by offering cheap office space rental (B)
Tunnel connecting formerly separated northern and southern parts of Berg municipality	Less economic transfers from national government and no need to provide double set of public services due to shorter travel between the two parts of the municipality	Sensitive to reduced public services Increased tension between the two parts of the municipality over distribution of resources School closure	Villagers initiated private school opened in old school building

Both municipalities are represented in the table. They are surprisingly similar, but particularities are noted in the table.

The three changing conditions are described in the table (negative population growth, livelihood uncertainty and building of new tunnel) and their consequences are closely interlinked. The most salient challenge in both communities is the negative population growth caused by out-migrations and low birth rates combined with aging populations. The population decline has been steady since the early 1980s in Berg municipality and mid-1970s in Øksnes. However, Øksnes has experienced an increased birth rate and in-migration since 2009, which is raising hopes for population stabilisation (Statistics Norway 2010, 2013). Population decline is a common challenge for many rural communities. Since the early 1970s, population stabilisation in the periphery has been a major rural policy goal in Norwegian politics and has concurrently received significant research attention (Berg 2007). A recent study of a number of communities in Northern Norway analysed why some communities survive and some perish (Borch and Førde 2010). They focused on factors that contribute to innovation and particularly the role of the social entrepreneur in initiating new activities, and found that important factors are the establishment of networks and the

combination of tradition and innovation, as well as local nature and culture. In many Norwegian natural resource-based communities, the gender balance is skewed as women migrate out to seek education and employment (Hamilton and Otterstad 1998). To counteract this trend, particularly Øksnes is aiming to make it attractive and possible to find employment in the municipality after completing education and several interviewees stated that they had returned because of their connection to place, in addition to available jobs.

Interviewees described how over time the negative population growth led to reduction in available jobs, particularly in public services such as teachers, nurses and local government administrators. A smaller population means less financial transfers from the national government and a smaller local tax base, which in turn could force cuts in locally provided public services due to lack of funds to cover the cost and fewer users of the services. Additionally, the work force available in the fisheries has diminished.

The tunnel connecting the northern and southern parts of Berg municipality was built to improve accessibility (it reduced travel time from 1.5 hours to 20 minutes), but it has also led to a significant cut in subsidies from the national government which had been awarded to compensate for the inconvenience of the distance. This resulting decrease in the financial base for the municipalities implies a reduction of locally provided public services, which is feared to accelerate the out-migration. Additionally, good public services were seen as instrumental by interviewees in attracting new inhabitants and there is a concern that their relative advantage to other similar, small municipalities is lost if they cannot offer equal level or better public services than elsewhere (see also Amundsen 2012b on importance of local institutions and services for community resilience). Second, an aging population is likely to demand more health services. As people grow older, there will be an increased need for health personnel to look after them, and people who retire will need to be replaced. Economic uncertainty in both fisheries and mining, which previously were considered as secure employment, affects the way in which people relate to these industries. Fishery is the main livelihood in both municipalities and consequently changes that affect the fisheries are important for their future. The fisheries are affected by changes in the fish stock; international market prices for fish; recruitment base to coastal fleet and land-based activities; and location of fish landing facilities. Currently, a northward shift in the spawning ground for the cod stock due to warmer ocean temperatures means that it is spawning in the coastal areas outside both municipalities, resulting in high levels of fishing activities during winter (Sundby and Nakken 2008). The fisheries are an integral part of communities, and depend on land-based activities and landing facilities, as well active communities with public and commercial services (see relevant similarities in West and Hovelsrud 2010).

Local development processes include infrastructure, housing and job development, but also more intangible aspects of place such as increasing well-being and image-building. Among the majority of interviewees in the municipalities, there are strongly expressed wishes and a willingness to continue living in their communities, which translates into activities and actions to counter the negative trend of population decline. People that are involved in local projects and activities are driven by their place attachment and expressed this in interviews; "We have done this because of our love for this village" (Male i, Senja). They value their place and their aim is to make it possible to continue living in the communities and to make those good places to live.

Climate change is not observed or perceived as a problem locally, and other issues are seen as much more significant and topical (similar to e.g. Moser and Dilling 2004). Natural variability masks the climate change signal and hence climate change is not perceived as a challenge, and climate change impacts were not stated as a motivating factor for adaptations

by those interviewed. Yet, the challenge of climate change is complex and non-perception and inaction could be attributed to a range of factors, such as cognitive denial (Norgaard 2011), insufficient information and knowledge (Moser and Dilling 2004, Moser and Dilling 2007, Adger *et al*. 2009a), inadequate visualisation and use of climate change scenarios (Nicholson-Cole 2004, Dessai *et al*. 2005, Sheppard *et al*. 2011), lack of institutional support and resources and structures (Amundsen *et al*. 2010) among others. This paper does not discuss these various factors, but acknowledge the complexity of perception of climate change and the subsequent research literature.

Discussion: place attachment as a driver of adaptation

Adaptation is a continuous process in local communities to respond to the challenges and opportunities that they perceive and experience, and adaptation to climate change cannot be separated from adaptation to other challenges or ongoing processes (O'Brien *et al*. 2004, Hovelsrud and Smit 2010, Wilbanks and Kates 2010). Local development strategies aim to make the municipalities better places to live and to increase well-being through adaptation processes and activities. The ways in which place attachment is important for these adaptations are analysed in this section. One approach to improving well-being has been to create and organise activities that inhabitants are proud of. A number of festivals are organised with themes such as music, fish, sports, film, literature and outdoor recreation, where the uniqueness of place is used to attract both performers and audiences, as in many other communities (e.g. Borch and Førde 2010, Villa 2012). These festivals make people proud because they are of high quality, require significant work, and are run on a voluntary basis. The interviewees state that they enjoy creating activity and that something different happens. "I think it is fun when there are things happening, and we need it. We need jobs and, yes, to improve our reputation" (Female vii, Senja).

The closure of one of the two remaining primary schools in Berg due to lack of financial resources and fewer schoolchildren was seen as a major threat to well-being and resilience of the village. Prior to the closure there was strong opposition among the parents, especially since the village school is perceived as a key local institutions without which it was expected to increase out-migration and make it more difficult to attract families with children. Furthermore, it meant that the children would have to travel 30 minutes by bus along a road which is prone to rock slides and avalanches. A group of individuals started an initiative which resulted in the school reopening as a private school after one year, and 19 out of the 27 children that geographically belong to this school have transferred back. The reopening the school is an example of the refusal to allow a key institution to disappear from the village. It could be seen as a conservative practise to not accept that demographic changes in the village necessitate school closure. Yet it could also signify an attempt to counteract the demographic trend. The actual success of reopening the school gave a renewed local optimism as regards what is possible to achieve. New developments became more plausible after the success of the school.

The fisheries are intrinsically linked to sense of place and are to a certain degree guiding the development paths that people are envisioning for the future. Many of new business developments and jobs are within the fisheries sector, representing continuity and familiarity. Yet these municipalities are not solely defining themselves as fishing communities, although it remains the main identifier. A successful IT business in Øksnes municipality is an example of redefining available local job opportunities and developments within tourism in both municipalities is another example (Amundsen 2012a).

To a certain degree the municipalities are aiming to promote a particular meaning attached to their places, exemplified by the local development project in Berg named as "good – close and generous". There is a focus on reinstating pride in the history and traditions of the communities, especially concerning fisheries and mining. A sub-project led by the voluntary village organisation in one of the fishing villages in Berg encouraged the local population and visitors to use and experience the nature, culture and history within the surrounding areas. One of their initiatives was marking an old trail from the village to an old summer farm. Along the trail features used to measure the distance and places connected to myths, such as the "wishing tree", were marked. In this way, cultural history related to farming, which no longer takes place in the village, is preserved and transmitted and is part of building a common place identity.

There is a belief in the municipalities that a good image and reputation make a community more attractive and that it will receive more positive media attention, which in turn will encourage people to visit and move there. This attention to image-building is observed in many communities (Nyseth and Viken 2009). Emphasising certain aspects of what the inhabitants' value about their communities and on what outsiders might value are seen as a way to improve well-being, in the sense that positive images of communities improve the way in which a community is perceived.

> We have to start with ourselves, of course, because if we fail to be good ambassadors for ourselves when we are out travelling, . . .you will not get anyone to come here if you talk the place down. So it is also about creating awareness among ourselves about our qualities here. (Female v, Senja)

Some believe strongly in the qualities of the communities and are active in making these qualities known to attract and accommodate new inhabitants:

> The challenge facing the municipality is to collectively present all these luxury products that we have and then I honestly believe that things will change here. It will become attractive to live in Øksnes. It is attractive today and will be increasingly so in the future. For some people, moving here will be completely out of the question, but for more and more it will be a real alternative, as long as it is accommodated for. (Male i, Vesterålen)

In both municipalities, groups of engaged individuals have decided to get together to act with the aim of turning around negative trends. They focus on how emphasising positive aspects of the communities have the ability to increase well-being and potentially create new activities, employment and attract new inhabitants.

> We are paving the way for change and this is extremely important. I can see that the more we talk with people about ideas and opportunities for the future, the more it rubs off on people, so we are little by little starting to achieve something. (Male i, Senja)

These groups were more positively viewed among interviewees in Berg than in Øksnes, and could partly be attributed to the fact that in Berg the local government was part of the initiative. The groups could be seen as powerful and with their own power to define local place identity and developments. It seems that embedding adaptation processes in local government institutions are considered important for their legitimacy.

The perceived threats to the communities' existence as well as an aim to improve well-being have led to a push to reverse this trend through projects to improve their image. This includes organising festivals to create activities and increase pride and imaging potential

future developments such as museums, underwater hotels, local university courses, a new marina and a sea front promenade. Some of these projects, e.g. marina, have been realised, which inspire the communities to continue pursuing new developments.

Conclusions

The opening quote of this paper refers to the meanings and values attached to place. Place remains a key aspect of life in these two municipalities in the same way that Escobar (2001) and Geertz (1996) argue that places are important in peoples' lives. The places that people live in are meaningful to them. The way in which people relate to place affects how they express what they value and the quality of life that they value.

Many of the interviewees for this study are individuals who are strongly engaged in their communities and attached to place. They are thus not representative for all inhabitants in the municipalities, but were selected, or self-selected, for this study in order to investigate the role of place attachment as a motivation in adaptation processes. Experiences elsewhere could be very different, and the adaptation processes in these municipalities may not be applicable elsewhere. In some contexts, place identity and attachment can hinder new ideas and developments (Dale *et al.* 2008, Marshall *et al.* 2012). It is also the case that places are dynamic and current demographic trends that are shifting populations towards urban centres will lead to depopulation of some rural communities. However, as shown by both this and other studies, place attachment can also be a powerful motivation for adaptation (Feitelson 1991, Dale *et al.* 2008, Adger *et al.* 2010, Gosling and Williams 2010, Fresque-Baxter and Armitage 2012, Devine-Wright 2013). It is clear through the interviews and interactions in the communities that place attachment means commitment to respond to the challenges facing the communities. This is the same as is found by Scannell and Gifford (2013) in their study of Canadian residents, and they suggest that drawing on people's attachment to place will increase engagement in climate adaptation and mitigation activities. Adaptations in the current study are responses to the challenges stemming from population decline, which threatens the very existence of these communities. However, there is an expressed willingness to continue living in there. The previous school principal in Berg expressed that "I wish that there will be people and activities here. We want to live here" (Meyer, Principal Berg School, interview NRK national news, 29 August 2010). Inhabitants in these communities have agency to act and see results from their efforts to counteract the demographic trend.

What people value and why has been overlooked in the social sciences (Sayer 2011). Particularly in the climate change adaptation literature, the potential contribution of sense of place and place attachment as a motivation for adaptation to respond to challenges is underexplored. The findings in this paper show that place attachment, in motivating collective responses to change in municipalities, may be an important motivator of climate change adaptation. In the two municipalities, people are committed to their place and act to improve the image of their communities and to create activities on the basis of an emotional connection to place. Climate change does not currently motivate adaptation in the two case municipalities. This insight is highly relevant to the climate change research community, which often expects climate change impacts to be a driver of adaptation. Hence, emphasising place attachment may offer a better starting point for climate change adaptation than an emphasis on climate change impacts. In particular, place attachment might determine the success or failure of proposed or implemented climate adaptation strategies, not least in relation to the values and visions of a community that climate interventions are designed to protect (see also Agyeman *et al.* 2009). Further studies on the linkages

between place attachment and climate change adaptation can help to inform successful climate change adaptation strategies. As this paper shows, understanding adaptation in particular places requires a holistic approach to analysing the adaptation priorities of communities and the factors that motivate adaptation. Such contextual understanding can provide a strong entry point for engaging communities in activities and strategies that improve their quality of life in a changing climate.

Acknowledgements

Notes

1. Framework developed for the CAVIAR International Polar Year project (presented in Smit *et al*. 2008, Hovelsrud and Smit 2010).
2. Dugnad is a Norwegian term referring to voluntary activity. It means participating in organised, but voluntary, community work and completing tasks together, e.g. building, rehabilitation and amelioration of communal areas.

References

Adger, W.N. and Barnett, J., 2009. Four reasons for concern about adaptation to climate change. *Environment and Planning A*, 41 (12), 2800–2805.

Adger, W.N., *et al*., 2007. Assessment of adaptation practices, options, constraints and capacity. *In*: M.L. Parry *et al.*, eds. *Climate Change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, 717–743.

Adger, W.N., *et al*., 2009a. Are there social limits to adaptation to climate change? *Climatic Change*, 93 (3–4), 335–354.

Adger, W.N., Lorenzoni, I., and O'Brien, K., eds., 2009b. *Adapting to climate change. Thresholds, values, governance*. Cambridge: Cambridge University Press.

Adger, W.N., Barnett, J., and Ellemor, H., 2010. Unique and valued places. *In*: S.H. Schneider, A. Rosencranz, M. Mastrandrea, and K. Kuntz-Duriseti, eds. *Climate change science and policy*. Washington, DC: Island Press, 131–138.

Adger, W.N. and Barnett, J., *et al*., 2011. This must be the place: underrepresentation of identity and meaning in climate change decision-making. *Global Environmental Politics*, 11 (2), 1–25.

Adger, W.N., *et al*., 2013. Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*, 3 (February), 112–117.

Agnew, J., 2005. Space: place. *In*: P. Cloke and R. Johnston, eds. *Spaces of geographical thought. Deconstructing human geography's binaries*. London: Sage, 81–96.

Agyeman, J., Devine-Wright, P., and Prange, J., 2009. Close to the edge, down by the river? Joining up managed retreat and place attachment in a climate changed world. *Environment and Planning A*, 41 (3), 509–513.

AMAP, 2011. *Snow, water, ice and permafrost in the Arctic (SWIPA): climate change and the cryo-sphere*. Oslo: Arctic Monitoring and Assessment Programme (AMAP).

Amundsen, H., 2012a. Differing discourses of development in the Arctic: the case of nature-based tourism in Northern Norway. *The Northern Review*, 35 (Spring) (Special Issue: Tourism and Travel in the Circumpolar North), 125–146.

Amundsen, H., 2012b. Illusions of resilience? An analysis of community responses to change in Northern Norway. *Ecology and Society*, 17 (4), 46.

Amundsen, H., Berglund, F., and Westskog, H., 2010. Overcoming barriers to climate change adaptation – a question of multilevel governance? *Environment and Planning C: Government and Policy*, 28 (2), 276–289.

Anderies, J. and Janssen, M.A., 2011. The fragility of robust social-ecological systems. *Global Environmental Change*, 21 (4), 1153–1156.

Belliveau, S., Smit, B., and Bradshaw, B., 2006. Multiple exposures and dynamic vulnerability: evidence from the grape industry in the Okanagan Valley, Canada. *Global Environmental Change*, 16 (4), 364–378.

Berg, N.G., 2007. Social and cultural geography in Norway: from welfare to difference, identity and power. *Social & Cultural Geography*, 8 (2), 303–330.

Berg, N.G., et al., 2013. Introduksjon: Metodologiske utfordringer i stedsanalyser. *In*: A. Førde, B. Kramvig, N.G. Berg, and B. Dale, eds. *Å finne sted. Metodologiske perspektiver i stedsanalyser*. Trondheim, Norway: Akademika forlag, 9–22.

Berkes, F., 2008. *Sacred ecology. 2nd ed*. New York: Routledge.

Berkes, F. and Ross, H., 2013. Community resilience: toward an integrated approach. *Society & Natural Resources: An International Journal*, 26 (1), 5–20.

Borch, O.J. and Førde, A., eds., 2010. *Innovative Bygdemiljø. Ildsjeler og nyskapningsarbeid*. Bergen: Fagbokforlaget.

Castree, N., 2004. Differential geographies: place, indigenous rights and "local" resources. *Political Geography*, 23 (2), 133–167.

Champion, T., Coombes, M., and Brown, D.L., 2009. Migration and longer-distance commuting in rural England. *Regional Studies*, 43 (10), 1245–1259.

Crate, S., 2008. Gone the bull of winter? Grappling with the cultural implications of and anthropology's role(s) in global climate change. *Current Anthropology*, 49 (4), 569–595.

Cresswell, T., 2004. *Place: a short introduction*. Malden, MA: Blackwell.

Cruikshank, J., 2001. Glaciers and climate change: perspectives from oral tradition. *Arctic*, 54 (4), 377–393.

Dale, A., Ling, C., and Newman, L., 2008. Does place matter? Sustainable community development in three Canadian communities. *Ethics, Place & Environment*, 11 (3), 267–281.

Denevan, W.M., 1983. Adaptation, variation and cultural geography. *The Professional Geographer*, 35 (4), 399–407.

Dessai, S., Lu, X., and Risbey, J.S., 2005. On the role of climate scenarios for adaptation planning. *Global Environmental Change*, 15 (2), 87–97.

Devine-Wright, P., 2013. Think global, act local? The relevance of place attachments and place identities in a climate changed world. *Global Environmental Change*, 23 (1), 61–69.

Escobar, A., 2001. Culture sits in places: reflections on globalism and subaltern strategies of localization. *Political Geography*, 20 (2), 139–174.

Feitelson, E., 1991. Sharing the globe: the role of attachment to place. *Global Environmental Change*, 1 (5), 396–406.

Feld, S. and Basso, K.H., 1996. Introduction. *In*: S. Feld and K.H. Basso, eds. *Senses of place*. Santa Fe, NM: School of American Research Advanced Seminar Series, 3–12.

Forbes, B., et al., 2009. High resilience in the Yamal-Nenets social-ecological system, West Siberian Arctic, Russia. *Proceedings of the National Academy of Sciences of the United States of America*, 106 (52), 22041–22048.

Ford, J.D., Smit, B., and Wandel, J., 2006. Vulnerability to climate change in the Arctic: a case study from Arctic Bay, Canada. *Global Environmental Change*, 16 (3), 282–292.

Ford, J.D., Berrang-Ford, L., and Paterson, J., 2011. A systematic review of observed climate change adaptation in developed nations. *Climatic Change*, 106 (2), 327–336.

Førland, E.J., et al., 2007. *Climate change and natural disasters in Norway. An assessment of possible future changes*. Oslo, Met. no. report 6/2007, 120pp.

Fresque-Baxter, J.A. and Armitage, D., 2012. Place identity and climate change adaptation: a synthesis and framework for understanding. *Wiley Interdisciplinary Reviews: Climate Change*, 3 (3), 251–266.

Geertz, C., 1996. Afterword. *In*: S. Feld and K.H. Basso, eds. *Senses of place*. Santa Fe, NM: School of American Research Advanced Seminar Series, 259–262.

Gosling, E. and Williams, K.J.H., 2010. Connectedness to nature, place attachment and conservation behaviour: testing connectedness theory among farmers. *Journal of Environmental Psychology*, 30 (3), 298–304.

Greene, J., Caracelli, V.J., and Graham, W.F., 1989. Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, 11 (3), 255–274.

Grimsrud, G.M., 2011. How well does the "counter-urbanisation story" travel to other countries? The case of Norway. *Population, Space and Place*, 17 (5), 642–655.

Gustafson, P., 2001. Roots and routes: exploring the relationship between place attachment and mobility. *Environment and Behavior*, 33 (5), 667–686.

Hamilton, L.C. and Otterstad, O., 1998. Sex ratio and community size: notes from the Northern Atlantic. *Population and Environment*, 20 (1), 11–22.

Hastrup, K., 2009. The nomadic landscape: people in a changing Arctic environment. *Geografisk Tidsskrift-Danish Journal of Geography*, 109 (2), 181–189.

Hess, J.J., Malilay, J.N., and Parkinson, A.J., 2008. Climate change: the importance of place. *American Journal of Preventive Health*, 35 (5), 468–478.

Heyd, T. and Brooks, N., 2009. Exploring cultural dimensions of adaptation to climate change. *In*: W.N. Adger, I. Lorenzoni, and K. O'Brien, eds. *Adapting to climate change. Thresholds, values, governance*. Cambridge: Cambridge University Press, 269–282.

Hovelsrud, G.K. and Smit, B., eds., 2010. *Community adaptation and vulnerability in Arctic regions*. London: Springer.

Hovelsrud, G.K., *et al*., 2010. Adaptation in fisheries and municipalities: three communities in Northern Norway. *In*: G.K. Hovelsrud and B. Smit, eds. *Community adaptation and vulnerability in Arctic regions*. London: Springer, 23–62.

Hulme, M., 2008a. The conquering of climate: discourses of fear and their dissolution. *Geographical Journal*, 174 (1), 5–16.

Hulme, M., 2008b. Geographical work at the boundaries of climate change. *Transactions of the Institute of British Geographers*, 33 (1), 5–11.

Huntington, H.P., *et al*., 2005. The changing arctic: indigenous perspectives. *In:* ACIA, ed. *Arctic Climate Impact Assessment*. Cambridge: Cambridge University Press, 61–98.

Jess, P. and Massey, D., 1995. The contestation of place. *In*: D. Massey and P. Jess, eds. *A place in the world?* Milton Keynes: Open University Press, 133–174.

Jolly, D., *et al*., 2002. We can't predict the weather like we used to: Inuvialuit observations of climate change, Sachs Harbour; Western Canadian Arctic. *In*: I. Krupnik and D. Jolly, eds. *The earth is faster now. Indigenous observation of Arctic environmental change*. Fairbanks, AK: Arctic Research Consortium of the United States, 92–125.

Kaltenborn, B.P., 1998. Effects of sense of place on responses to environmental impacts: a study among residents in Svalbard in the Norwegian high Arctic. *Applied Geography*, 18 (2), 169–189.

Keskitalo, E.C.H., *et al*., 2011. Adaptive capacity determinants in developed states: examples from the Nordic countries and Russia. *Regional Environmental Change*, 11 (3), 579–592.

Krupnik, I. and Jolly, D., eds., 2002. *The earth is faster now: indigenous observations of Arctic environmental change*. Fairbanks, AK: Arctic Research Consortium of the United States.

Marshall, N.A., *et al*., 2012. Transformational capacity and the influence of place and identity. *Environmental Research Letters*, 7 (3), 9pp.

Massey, D., 1991. A global sense of place. *Marxism Today*, pp. 24–29.

Massey, D., 1994. *Space, place and gender*. Cambridge: Polity Press.

Massey, D., 1995. The conceptualization of place. *In*: D. Massey and P. Jess, eds. *A place in the world*. Milton Keynes: Open University Press, 45–86.

McCarthy, J., *et al*., 2005. Climate change in the context of multiple stressors and resilience. *In:* ACIA, ed. *Arctic Climate Impact Assessment* (Chapter 17). Cambridge: Cambridge University Press, 945–988.

Meløe, J., 2012. Steder. *In*: S. Jentoft, J.I. Nergård, and K.A. Røvik, eds. *Hvor går Nord-Norge? Tidsbilder fra en landsdel i forandring*. Stamsund, Norway: Orkana Akademisk, 67–81.

Moser, S.C. and Dilling, L., 2004. Making climate hot. Communicating the urgency and challenge of global climate change. *Environment*, 46 (10), 32–46.

Moser, S.C. and Dilling, L., eds., 2007. *Creating a climate for change: communicating climate change and facilitating social change*. Cambridge: Cambridge University Press, 576pp.

Nicholson-Cole, S.A., 2004. *Imag(in)ing climate change: exploring people's visual imagery, issue salience and personal efficacy*. Doctoral thesis. School of Environmental Sciences, University of East Anglia, Norwich, UK.

Norgaard, K.M., 2011. *Living in denial: climate change, emotions and everyday life*. Cambridge, MA: MIT.

Nyseth, T. and Viken, A., eds., 2009. *Place reinvention. Northern perspectives*. Farnham, Surrey: Ashgate.

O'Brien, K., 2009a. Do values subjectively define the limits to climate change adaptation? *In*: W.N. Adger, I. Lorenzoni, and K. O'Brien, eds. *Adapting to climate change: thresholds, values, governance*. Cambridge: Cambridge University Press, 164–180.

O'Brien, K., 2009b. *Responding to climate change: the need for an integral approach*. Integral Institute, Resource Paper No. 4.

O'Brien, K., *et al*., 2004. Mapping vulnerability to multiple stressors: climate change and globalization in India. *Global Environmental Change: Human and Policy Dimensions*, 14 (4), 303–313.

O'Brien, K., *et al*., 2006. Questioning complacency: climate change impacts, vulnerability, and adaptation in Norway. *Ambio*, 35 (2), 50–56.

Otterstad, O. and Jentoft, S., eds., 1994. *Leve kysten? Strandhogg i fiskeri-Norge*. Oslo: Ad Notam Gyldendal.

Rasmussen, R.O., ed., 2011. *Megatrends* (Vol. TemaNord 2011:527). Copenhagen: Nordic Council of Ministers.

RegClim, 2005. *RegClim: Norges klima om 100 år: Usikkerheter og risiko*. Oslo: met.no.

Relph, E., 1976. *Place and placenessless*. London: Pion.

Røiseland, A., Jenssen, S., and Aarsaether, N., 2008. Local governance and the challenges of global change. *In*: N. Aarsaether, A. Røiseland, and S. Jenssen, eds. *Practicing local governance: northern perspectives*. New York: Nova Science Publishers, 1–10.

Rose, G., 1995. Place and identity: a sense of place. *In*: D. Massey and P. Jess, eds. *A place in the world*. Milton Keynes: Open University Press, 87–132.

Ross, H., *et al*., 2010. *Understanding, enhancing and managing for social resilience at the regional scale: opportunities in North Queensland*. Report to the Marine and Tropical Sciences Research Facility. Cairns: Reef and Rainforest Research Centre Limited.

Sayer, A., 2011. *Why things matter to people. Social science, values and ethical ilfe*. Cambridge: Cambridge University Press.

Scannell, L. and Gifford, R., 2013. Personally relevant climate change: the role of place attachment and local versus global message framing in engagement. *Environment and Behavior*, 45 (1), 60–85.

Sheppard, S.R.J., *et al*., 2011. Future visioning of local climate change: a framework for community engagement and planning with scenarios and visualisation. *Futures*, 43 (4), 400–412.

Simonsen, K., 2008. Place as encounters: practice, conjunction and co-existence. *In*: J.O. Bærenholdt and B. Granås, eds. *Mobility and place: Enacting Northern European peripheries*. Aldershot: Ashgate Publishing Limited, 13–25.

Smit, B. and Wandel, J., 2006. Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, 16 (3), 282–292.

Smit, B., Hovelsrud, G.K., and Wandel, J., 2008. *CAVIAR: Community Adaptation and Vulnerability in Arctic Regions*. CAVIAR framework document: University of Guelph, Department of Geography, Occasional Paper No. 28.

Statistics Norway, 2010. *Befolkningsendringer i kommunene. 1951–2009* [Changes in population in the municipalities. 1951–2009] [online]. Oslo, SSB. Available from: www.ssb.no/folkendrhist [Accessed 19 March 2010].

Statistics Norway, 2013. *Folkemengde og kvartalvise befolkningsendringar* [Population statistics and changes per quarter]. Oslo: Statistics Norway.

Stedman, R.C., 2002. Toward a social psychology of place: predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behaviour*, 34 (5), 561–581.

Strauss, S. and Orlove, B.S., eds., 2003. *Weather, climate, culture*. New York: Berg Publishers.

Sundby, S. and Nakken, O., 2008. Spatial shifts in spawning habitats of Arcto-Norwegian cod related to multidecadal climate oscillations and climate change. *ICES Journal of Marine Science*, 65 (6), 953–962.

Tompkins, E.L., *et al*., 2010. Observed adaptation to climate change: UK evidence of transition to a well-adapting society. *Global Environmental Change: Human and Policy Dimensions*, 20 (4), 627–635.

Tuan, Y.F., 1974. *Topophilia. A study of environmental perception, attitudes, and values*. Upper Saddle River, NJ: Prentice-Hall.

Turner, N.J., *et al*., 2008. From invisibility to transparency: identifying the implications. *Ecology and Society*, 12 (2), 7.

Villa, M., 2012. Småsamfunn tek sats. *In*: M.B. Bringslid, ed. *Bygdeutviklingas Paradoks*. Oslo: Scandinavian Academic Press, c/o Spartacus forlag AS, 37–62.

West, J.J. and Hovelsrud, G.K., 2010. Cross-scale adaptation challenges in the coastal fisheries: findings from Lebesby, Northern Norway. *Arctic*, 63 (3), 338–354.

Wilbanks, T.J. and Kates, R.W., 2010. Beyond adapting to climate change: embedding adaptation in responses to multiple threats and stresses. *Annals of the Association of American Geographers*, 100 (4), 1–10.