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## Do values subjectively define the limits to climate change adaptation?

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### Introduction

Climate change adaptation is increasingly seen as both a necessary and urgent response to a changing climate, and much research is being undertaken to identify barriers and constraints to successful adaptation. Most discussions focus on limited adaptive capacity as a constraint to adaptation to climate change, and emphasise technological, financial and institutional barriers (Grothmann and Patt, 2005; Yohe and Tol, 2002). It is presumed that once these external barriers are removed or overcome, society will be able to successfully adapt to a changing climate. It has, however, also been suggested that adaptation to climate change may be limited by the irreversible loss of places and identities that people value (Adger et al., 2009a, 2009b). Adger et al. (2009b) argue that social and individual characteristics may likewise act as deep-seated barriers to adaptation. Such perspectives raise important questions about the role that individual and societal values play in adapting to climate change: is adaptation a successful strategy for maintaining what is valued? How do adaptation measures taken by some affect the values of others? In the case of value conflicts, whose values count?

Values are, in effect, an interior and subjective dimension of adaptation. In contrast to systems and behaviours that can be objectively measured and observed, values subjectively influence the adaptations that are considered desirable and thus prioritised. There has, however, been very little analysis in the climate change literature of the relationship between values and climate change adaptation, or more generally of the psychological dimensions of adaptation (Grothmann and Patt, 2005). This research gap can be considered important for three reasons. First, the interior or subjective ability of human actors to adapt can be very different from the objective ability, and these differences can contribute to the underestimation

*Adapting to Climate Change: Thresholds, Values, Governance*, eds. W. Neil Adger, Irene Lorenzoni and Karen L. O'Brien. Published by Cambridge University Press. © Cambridge University Press 2009.

or overestimation of adaptive capacity (Grothmann and Patt, 2005). Second, adaptations to climate change may affect what individuals or groups value, particularly in cases where adaptation measures are imposed by others (for example, by government institutions or private actors) and create their own ancillary or secondary impacts. For example, the construction of barriers and sea walls may limit access to coastal areas and influence coastal processes, affecting what local residents and fishermen value. This draws attention to the importance of recognising how adaptation measures are enacted from – and impact upon – differing prioritised values. Third, prioritised values change as individuals and societies change, thus any outcome of climate change adaptation that is considered acceptable today may be evaluated differently in the future. The relationship between adaptation and changing values thus needs to be assessed. Research on values places a greater focus on the interior dimensions of adaptation, and can provide new insights on the limits to adaptation as a response to climate change.

This chapter discusses the relationship between climate change adaptation and values. I first discuss values and the diverse ways that they are studied, both within and across cultures. I then consider how values are related to human needs, motivations, and worldviews, and discuss how these may change over time. Next, I present specific examples of key values that are evident in Norway, and reflect on how different values may influence adaptation priorities, particularly in relation to changes in snow cover associated with climate change. This preliminary exploration suggests that the limits to adaptation may be subjectively defined, rather than defined solely by objective criteria. Consequently, values that are compromised by climate change and not addressed through response measures may represent limits to adaptation for some individuals, communities and groups in Norway – a country that, as a whole, is considered to have a high capacity to adapt to changing climate conditions. Understanding the relationship between the subjective and objective dimensions of climate change adaptation may provide important insights on the limits to adaptation as a response to climate change, both for present and future generations.

The analysis here acknowledges the diverse understandings of the role that values play in global change processes. The literature on values is diffuse and there is a lack of agreement as to what influences values, and how and why they change (Rohan, 2000). Sociological perspectives tend to emphasise social structural explanations of cultural values and psychological variables, whereas anthropological approaches emphasise values as core elements of culture that are integral to a culture's worldview and that provide purpose and meaning in people's lives (Gecas, 2008). Political science perspectives emphasise the links between economic development, democratisation and changes in values (Inglehart and Welzel, 2005). As Williams (1979, p. 17) notes, '[i]n the enormously complex universe

of value phenomena, values are simultaneously components of psychological processes, of social interaction, and of cultural patterning and storage'. While there is little agreement across disciplines about what is meant by values and how they are formed, there seems to be a consensus that they can be considered as important predictors of behavior and attitudes, that they are contextually conditioned but somewhat resistant to change, and that they are intergenerationally transmitted and cherished across cultures (Pakizeh et al., 2007).

### Values and worldviews

Values can be defined in many ways: the term has been used to refer to a wide variety of concepts, including interests, pleasures, likes, preferences, moral obligations, desires, wants, goals, needs, aversions and attractions (Williams, 1979). Values are generally considered to be core conceptions of 'the desirable' within every individual and society. Rokeach (2000, p. 2) argues that '[t]hey serve as standards or criteria to guide not only action but also judgment, choice, attitude, evaluation, argument, exhortation, rationalization, and, one might add, attribution of causality'. It is widely recognised that values differ between individuals, groups, institutions, societies, cultures and other supra-individual entities. Yet it is also acknowledged that values are not unlimited or random. Despite great cultural diversity across the globe, 'the number of human values [is] small, the same the world over, and capable of different structural arrangements ...' (Rokeach, 2000, p. 2). Although essential features of values may be shared, they are nonetheless expressed uniquely, depending on culture and context: 'Values always have a cultural content, represent a psychological investment, and are shaped by the constraints and opportunities of a social system and of a biophysical environment' (Williams, 1979, p. 21).

Both individuals and groups have associated value systems, which are described by Rohan (2000, p. 270) as meaning-producing cognitive structures, or 'integrated structures within which there are stable and predictable relations among priorities on each value type'. Personal value systems, or 'judgments of the capacity of entities to enable best possible living', are distinguished by Rohan (2000, p. 265) from social value systems, which reflect people's perceptions of other's judgements about value priorities. Personal or social value systems can be used to select objects and actions, resolve conflicts, invoke social sanctions, and cope with needs or claims for social and psychological defences of choices that are either made or proposed (Williams, 1979). Value systems thus can be considered to play an important role in responding to climate change, both in terms of mitigation of greenhouse gas emissions and adaptation to changing climate conditions.

Value priorities have been measured using the Rokeach Value Survey (Rokeach, 1973). This method, based on a ranking of words representing terminal (i.e. goals)

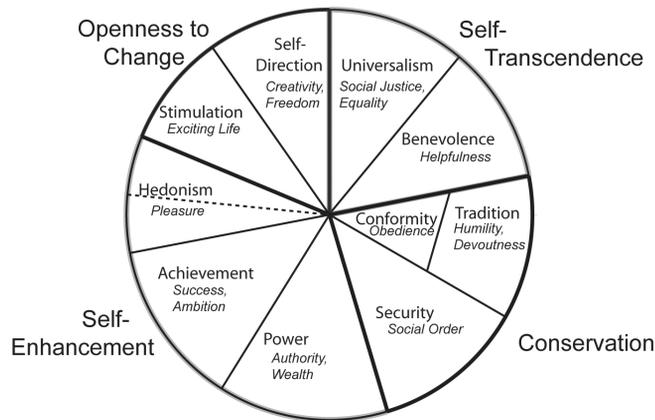


Figure 10.1 Theoretical model of relations among ten motivational types of values. (Source: Schwartz, 2006).

or instrumental (i.e. modes of conduct) values, is based on the understanding that individuals organise their beliefs and behaviours in ways that will serve to maintain and enhance their self-conceptions as moral and competent human beings (Rokeach, 1973). However, as Rohan (2000) notes, the survey offers no theory about the underlying value system structure. Such a structure was proposed by Schwartz (1994), who considers values as integrated, coherent structures that may be influenced by factors such as age, life stage, gender and education. Schwartz identifies ten types of universal values that are found in all cultures and societies: security, tradition, conformity, power, achievement, hedonism, stimulation, self-direction, universalism and benevolence (Schwartz, 1994).

Schwartz's (1994) 'Values Theory' holds that the distinguishing feature among values is the type of motivational goal that they express. Motivationally distinct personal value orientations are, according to Schwartz, derived from three universal requirements of the human condition: 'needs of individuals as biological organisms, requisites of coordinated social interaction, and survival and welfare needs of groups' (Schwartz, 2006, p. 2). Schwartz recognises that there are dynamic relations among values, and argues that a single motivational structure organises the relations among sets of values and behaviour (Bardi and Schwartz, 2003). Schwartz's structure is represented as a circle that captures conflicts and congruities among the ten basic values, with an emphasis on values that focus on organisation, individual outcomes, opportunity and social context (see Figure 10.1). The motivations and needs described by Schwartz are structured such that priorities on adjacent value types in the value system will be similar, while those that are opposite each other represent maximum differences. Schwartz (1996) argues that values are most likely to be activated, entered into awareness, and used as guiding principles in the presence of value conflicts. Importantly, he points out that '[t]his

integrated motivational structure of relations among values makes it possible to study how whole systems of values, rather than single values, relate to other variables' (Schwartz, 2006, p. 4).

Seligman and Katz (1996) challenge the traditional view of a value system as a single ordered set of values that is important to self-concept and helps guide thought and action, and argue instead that values systems are dynamic and creatively applied to situations, rather than rule bound. Their research shows that value systems are only stable in a particular domain, and are very much dependent upon context. Using a study about environmental values as an example, they found that 'value reordering takes place depending on whether individuals are asked to rank order values as they are important to them as general guiding principles or as they are important to them with regard to a specific issue' (Seligman and Katz, 1996, p. 63). Their view is compatible with Schwartz's value structure, but suggests that different value types may be reordered in different contexts and for different purposes.

### *Worldviews*

Worldviews describe the basic assumptions and beliefs that influence much of an individual or group's perceptions of the world, their behaviour, and their decision-making criteria (Kearney, 1984). The concept of worldview, or *Weltanschauung*, has developed along various religious and philosophical trajectories, leading Sire (2004) to conclude that how one conceives of a worldview is dependent on one's worldview. From the postmodern perspective of Foucault, a worldview can be neither true nor false in any objective sense, and is instead linked to relationships between knowledge and power (Naugle, 2002; Sire, 2004). Rohan (2000) notes that worldviews and ideologies are often erroneously labelled as values, but argues that there is nonetheless an inescapable link between people's personal value priorities and the way they view the world, and that value system structure can be used to guide investigations of people's worldviews. At the personal level, worldviews have been linked to cognitive structures, which have been shown to change as individuals develop (Kegan, 1982, 1994). Inglehart (1997, 2000) describes how values are linked to traditional, modern and postmodern worldviews, and shows through a series of World Values Surveys, that there are links between the values identified by Schwartz and traditional, modern and postmodern worldviews. Traditional worldviews may, for example, place a greater emphasis on the set of values associated with conservation, which include tradition, conformity and security. Modern worldviews may place emphasis on values associated with self-enhancement, such as power, achievement and hedonism. Values linked to openness to change, such as stimulation and self-direction, may bridge both modern and postmodern

worldviews. Finally a postmodern worldview may emphasise values that focus on self-transcendence, such as universalism and benevolence. The conflicts between opposing values in Schwartz's Value Theory may potentially be associated with differing worldviews, with consequences for social change and democratisation (Inglehart and Welzel, 2005).

Although there has generally been a greater emphasis on value differences than value change, the theoretical and empirical links between values, needs, cognition and worldviews suggest that values do change over time. Rokeach (1979) identifies two factors that influence value changes and related changes in attitudes and behaviour: (1) changes in self-conceptions or definitions of the self; and (2) increases in self-awareness about hypocrisies, incongruities, inconsistencies or contradictions between self-conceptions or self-ideals and one's values, related attitudes and behaviours. At the personal level, value changes can be linked to changes in social status or age, which are generally accompanied by changes in self-conceptions and consequently, by changes in value systems and in value-related attitudes and behaviour (Rokeach, 1979). At the social level, '[a]ny society must change in its value constitution to cope with changing adaptive problems, yet it must retain some coherence in its appreciative system (based on some minimal consensus) or the social order will break down' (Williams, 1979 p. 21). Values thus result from both psychological needs and societal demands, both of which may change as a result of changes in society, life situation, experiences, self-conception and self-awareness (Rokeach, 1979).

Maslow's holistic–dynamic theory of a 'hierarchy of needs' holds that an individual's dominating goal at any stage is a strong determinant of their worldview and philosophy of the future, as well as of their values (Maslow, 1970). A hierarchy of needs suggests that values change as needs become satisfied and new motivations emerge. This has been confirmed through longitudinal studies of values carried out through the World Values Survey, which shows that socio-economic development tends to produce intergenerational value differences and a shift from survival values to self-expression values (Inglehart and Welzel, 2005). Indeed, the human development and developmental psychology literatures show that individual and societal value structures change over time, and may in fact be evolving to new structures and worldviews in the future (Maslow, 1970; Williams, 1979; Kegan, 1994; Inglehart, 1997; Wilber, 2000).

It is important to point out that although value priorities may shift with changing worldviews, values associated with earlier worldviews do not necessarily disappear – they simply decrease in priority. Traditional values and modern values remain within postmodern worldviews, but they may be considered to be a lower priority and visible only in some contexts and situations. Economic stagnation and political collapse may lead to a re-prioritisation of these values (Inglehart, 1997).

Rokeach (1979, p. 3) emphasises that 'changes in values represent central rather than peripheral changes, thus having important consequences for other cognitions and social behaviour'. In other words, values can change, but such changes are neither trivial nor arbitrary.

Different and dynamic values have significance for climate change adaptation. The values associated with traditional, modern and postmodern worldviews are hypothesised to correspond to different priorities for climate change adaptations. Traditional worldviews may prioritise adaptation strategies that emphasise needs for belongingness and group identity, that recognise local knowledge, and that support traditional sectors and livelihoods and preserve cultural icons and identities (including, for example, strong connections to nature). Modern worldviews may prioritise adaptations that reduce climatic threats to economic modernisation and growth through, for example, rational, scientifically based technological adaptations based on cost–benefit analyses and quantified scenarios of future climate change. They may also emphasise responses that promote freedom and achievement, particularly market-based strategies for responding to climate change. Postmodern worldviews may prioritise adaptations that promote well-being, equity and justice, with attention to the poor and marginalised, future generations and the role of ecosystem services.

The potential for value conflicts in adaptation to climate change must be recognised. Adaptations that are imposed or enacted by a modern state may, for example, influence the values of individuals or communities with a more traditional worldview. As mentioned in the introduction, a 'modern' adaptation response to storm surges and sea level rise might involve the construction of sea walls and floodgates to prevent damage to property, infrastructure and individual lives. Such coastal defences may be effective in reducing loss of income and lives, yet they may have a negative impact on local knowledge, traditional livelihoods, a sense of belonging or cultural identity. They may also negatively influence postmodern values such as ecosystem integrity and social equity. The following section considers some of the factors that will be explored in future empirical research on the relationship between values and adaptation to climate change in Norway. The key assertion is that values do matter in adaptation decisions and strategies, and that value conflicts may result if values are not overtly acknowledged. Ignoring values can lead to misleading conclusions about the limits to adaptation.

### **Climate change adaptation and values in Norway**

Different and dynamic values mean that climate change adaptations prioritised by some actors may not be considered as successful responses by others. In fact, some adaptation measures may directly affect the values of others, both in the

present and future. In theory, the inability to respond to different value priorities may represent a limit to adaptation. For some individuals, communities and cultures, climate change may lead to the irreversible loss of objects, places, species or ecosystem functions that are valued by current generations, not to mention a loss of experiences and perceived rights that are valued. In this section, I present general examples of traditional, modern and postmodern values in Norway and discuss how they are changing. I then consider how adaptations to changing snow cover may correspond to different values in Norway, which may lead to conflicts within present generations, or with future generations.

'Norwegian values' are frequently associated with nature, rural livelihoods, simplicity, honesty and humility (Eriksen, 1993). However, Norway's national identity and culture are continually being constructed and created, and they embody many of the contradictions that exist between traditional, modern and postmodern values (Eriksen, 1993). Although Norwegian identity is closely linked to traditional values (for example, an emphasis on rural areas, nature and the family), there is at the same time an increasing emphasis on modern values (for example, individualism, economic development, material wealth, technology and scientific progress) (Slagsvold and Strand, 2005). Yet there is also evidence of the emergence of postmodern, pluralistic values in Norway. Norwegian identity has been characterised as egalitarian individualism, which includes a pluralistic rejection of social hierarchies and the promotion of equity across gender and classes, and between rural and urban areas (Eriksen, 1993). An emphasis on social democracy, equality and individual integrity includes traditional and modern values, but also transcends these values to embrace a broader notion of 'Norway'. As articulated by the Norwegian Foreign Minister Jonas Gahr Støre (2006), Norway is in the process of shaping a new and bigger 'we' that is valid for all and that can be adjusted as Norway changes. Norway increasingly sees its role in the international community as one of responsibility, and its commitment to international peace processes and high levels of development assistance might be interpreted as part of its postmodern identity. Norway – and the Nordic countries in general – is one of the countries described by Inglehart (2000) as having shifted over the past decades towards a post-materialist, postmodern worldview, which is reflected in the current government's world-centric social discourse and ethics (for example, democracy, equality and social responsibility).

While the predominant discourse appears to be moving from modern to postmodern, as evidenced through the World Values Survey (Inglehart, 1997), a full spectrum of values coexists in Norway. Distinctions between traditional, modern and postmodern structures can be clearly observed at the individual and community levels in Norway, where there are likely to be value distinctions between rural and urban areas, and between generations and social classes. Below, I draw attention

to some very general values that are associated with these three worldviews in Norway, and then discuss how they may be changing.

### ***Traditional worldviews***

In Norway, values associated with traditional worldviews include an emphasis on family, equality, belonging to the local community, identity and security. Traditional values favour recollectivisation over individualism and cultural homogeneity over diversity (Aukrust and Snow, 1998). The agricultural landscape in particular provides a sense of stability, historical connection, identity and a sense of belonging (Lindland, 1998). Norwegian social welfare policy in recent decades has emphasised family values and economic and social security, as evidenced by increases in old-age pensions, the extension of parental leave and the introduction of a Family Cash Benefit scheme (Botten et al., 2003). The Lutheran state church dominates religious life in Norway, and an estimated 88% of Norway's population of 4.3 million were members in 1999 (Leirvik, 1999). In some parts of the country, a strong Protestant influence actively tries to prevent the moral decay of the simple Norwegian identity.

### ***Modern worldviews***

The rise of modernity first appeared in Norwegian cities, where it culminated as 'classic modernity' in the 1950s and 1960s (Gullestad, 1996). Individuals that valued progress, technology and development transformed Norway into an oil nation with enormous economic power. Modernity combined with wealth placed increasing emphasis on individualism, materialism and the role of the private sector. The modern social welfare system has placed a greater focus on private welfare sources, such as the family, the market and voluntary organisations, and on the idea of 'mutual obligations' and 'personal responsibility' (Botten et al., 2003). Even outdoor recreation is increasingly being carried out in a modern context which, according to Riese and Vorkinn (2002) can be expected to influence the process of meaningful construction. The Norwegian notion of *friluftsliv* ('outdoor life') is constructed as a traditional Norwegian value, yet it has been transformed and adapted to modern values, and indeed can be considered 'both a consequence of and a reaction against the industrialized and urbanized society' (Sandell, 1993, p. 2).

### ***Postmodern worldviews***

Many individuals and groups in Norway exhibit postmodern worldviews and associated values, which emphasise self-expression and self-realisation, pluralism

and integration. The transmission of values in families has gone from the notion of 'obedience' to the notion of 'being oneself' (Gullestad, 1996). Gullestad (1996, p. 37) argues that '[t]hese new tendencies resonate with the kinds of flexibility and creativity needed in the present stage of capitalism'. In recent years there has been a call for a new architecture for social welfare, which challenges universalism and instead focuses on improving the welfare of the poorest (Botten et al., 2003). Since the 1970s, religious pluralism has increased in Norway, mainly as a result of Muslim immigration (Leirvik, 1999).

The different values associated with traditional, modern and postmodern worldviews are not static among individuals, communities or social groups. Rather, they are changing in response to a constellation of factors, including economic changes (neo-liberal economic policies, increased material wealth and consumption), demographic changes (urbanisation and an aging population), cultural changes (an increase in immigrants and changing youth cultures) and geopolitical changes (consideration of European Union membership, increased competition for natural resources in the Arctic). There is evidence that traditional values in Norway have become more liberal (Statistics Norway, 1996). Although differences between traditional and modern values have been closely linked to differences between rural and urban areas, Bæck (2004) found that many young people in rural areas express values and preferences that are closely associated with urban settings, or what he refers to as an urban ethos, which is closely linked to modern values. The difference in values between rural and urban areas is decreasing as rural areas gain better access to communication, media, and the spread of lifestyles and modes of living. Furthermore, Inglehart and Baker (2000, p. 49) found that '[i]ndustrialization promotes a shift from traditional to secular-rational values, while the rise of postindustrial society brings a shift toward more trust, tolerance, well-being, and postmaterialist values. Economic collapse tends to propel societies in the opposite direction.' However, their research also shows that the influence of traditional values is likely to persist, as belief systems can exhibit both durability and resilience. In any case, modern values are not unproblematic in Norway, and there is a concern that increased materialism may erode support for the social welfare system, particularly among younger generations (Edlund, 1999).

### *Adaptations to changes in snow cover*

How might these different and dynamic values in Norway influence adaptation to changes in snow cover associated with climate change, and how might values be affected by adaptation measures? It is well recognised that climate change will result in differential impacts within Norway (RegClim, 2005). Vulnerability to

these impacts is, however, considered to be a function of exposure, sensitivity and adaptive capacity (McCarthy et al., 2001). The capacity to adapt to climate change is frequently considered to be a function of wealth, technology, education, information, skills, infrastructure, access to resources, and stability and management capabilities (McCarthy et al., 2001). Norway ranks high in all of these areas, thus in theory has a high capacity to adapt to a changing climate (O'Brien et al., 2004). However, empirical research shows that this capacity is not always translated into successful adaptations (Naess et al., 2005), and this has contributed to a growing recognition that there are barriers to adaptation, both in countries with developing and developed economies (Adger et al., 2007).

Values are seldom considered as an important factor within the wider discourse on adaptation. They represent an interior and subjective dimension of adaptation that is not easily observed and measured. Nonetheless, the relationship between values and climate change adaptation can be studied and analysed by looking at how the impacts and adaptations associated with a decreasing snow cover affect traditional, modern and postmodern values in Norway. It is projected that snow cover will decrease in many areas of Norway as temperatures rise over the next century. Climate models project that winter temperatures will increase by 2.5–4 °C by 2100, and that the number of mild days (with temperatures above freezing) will increase at lower elevations and in the Arctic. Precipitation is expected to increase in many parts of Norway, including during winter in the eastern part of the country (RegClim, 2005). In terms of skiing conditions, it is projected that there will be an average of 60 days with conditions suitable for skiing by 2050, which represents a 40% decrease compared to the period 1981–1999 (RegClim, 2005).

These changes will translate into different impacts for individuals and communities in Norway, depending not only on where they are located, but also on what they value. Traditional values associate snow cover and winter sports with local or national identity, and many communities are dependent upon winter tourism for income and livelihoods. The link between traditional values, identity and national heritage was particularly visible during the planning of the Winter Olympics in Lillehammer in 1994 (Eriksen, 1993). Traditional modes of winter transportation, including cross-country skis, the *spark* and the *pulk* (two types of sleds) are likely to become less viable and visible as snow cover decreases. While these changes are often considered trivial in comparison to the impacts of climate change on the basic needs for food, water and shelter in many parts of the world, the point is that they will directly affect what many people in Norway value. Adaptations to climate change directed towards traditional values might therefore emphasise the preservation of heritage, tradition and identity, which often occurs through the preservation of traditional landscapes and cultural icons, such as the Holmenkollen ski jump in Oslo (Antrop, 2005). Acknowledging the decrease in

snow cover as a loss, preserved through museums and festivals, may be one way of adapting to change, but transforming livelihoods and maintaining a sense of community and belonging could represent a greater challenge to adaptation under climate change.

Modern values emphasise snow as a medium for winter sports, particularly skiing, which is considered an important economic sector in Norway because of the links to tourism, winter cabins, producers of equipment, and local businesses. Adaptations to decreased snow cover that are directed at modern values may include advanced snow-making technologies, indoor snow domes, artificially cooled cross-country ski tracks, and other technological responses. In terms of identity, modern societies are capable of reconstructing identities fairly easily, whether it is through roller-skis (i.e. cross-country skis on wheels) or skating on synthetic ice. These adaptations are unlikely to appeal to the values associated with traditional worldviews. In other words, from the perspective of traditional values, artificial snow on green mountains may not be a satisfactory replacement for snow-covered mountains, and roller skis may not be an acceptable substitute for traditional winter sports. Furthermore, reduced access to snow may turn cross-country skiing into an elite sport for those with access to resources, rather than a sport available to all Norwegians. Alpine ski centres at higher elevations may benefit from the loss of competition from other ski areas in Europe, while those at lower elevations may reinvent themselves as centres for recreation and relaxation. However, as Lund (1996) notes, 'The striking tendency of alpine skiing to reinvent itself every decade may be invisible to those relatively new to the sport but it is certainly not lost on longtime skiers who can all remember, very clearly, just how skiing used to be.'

Postmodern values are likely to view changes in snow cover from a larger, systems perspective. The role of snow in biological, physical and social systems may be emphasised, with the integrity of social–ecological systems considered a priority. Adaptations to climate change may address not only human needs, but the needs of different species, as well as ecosystem functions and services. Such values are not unique to postmodern worldviews, and instead may have a strong basis in some traditional worldviews. For example, snow cover is important to reindeer, thus snow is likely to be valued by Saami reindeer herders in Northern Norway. As Reinert et al. (2008, p. 5) point out, a loss of nature quality cannot be compensated by a gain in other values: 'The cultural values of Saami reindeer herding, in the past and the present, are intertwined with the nature values of the tundra landscape, and the values that need to be preserved must be understood in terms of the spatio-temporal particularity they represent.'

Postmodern values may emphasise the relationship between snow cover and hydrological regimes, including the implications of melting snow for sea level rise.

The relationship between less snow cover, decreases in the planetary albedo and the global energy balance may be a concern, as this could accelerate warming (Holland et al., 2006). The distant impacts of climate change on other populations and groups are also likely to be of relevance to postmodern values, as they raise issues of equity, justice and rights. Adaptations that take into account postmodern values may very well focus on creating dramatic changes in energy systems in order to reduce greenhouse gas emissions. Such changes are often discussed separately as examples of climate change mitigation, but they nonetheless represent an important adaptive response to a changing climate.

The potential for value conflicts in relation to climate change adaptation has not been widely discussed in the literature on climate change. To successfully address different and dynamic values, climate change adaptations may have to both recognise and address a wide spectrum of values, including threats to physiological needs and safety needs (both in Norway and elsewhere), as well as values that influence modern and postmodern values such as individual identity, achievement, universalism and ecosystem integrity. Human development research has shown, however, that the values that emerge as priorities from a postmodern perspective (for example, equity, justice and ecosystem integrity) may not be prioritised by those holding traditional or modern worldviews (Maslow, 1970; Kegan, 1998; Wilber, 2007). Similarly, modern values such as those related to growth, technological advances and scientific rationalism may not be recognised or prioritised by individuals and communities with traditional worldviews. Furthermore, those with postmodern worldviews may not recognise or prioritise the values associated with 'post postmodern' worldviews, which might, for example, include a greater emphasis on aesthetic and spiritual values, such as the experience of snow, a sense of place, or non-dual relationships with other living organisms. Some of these 'post postmodern' values are, however, dominant values in some traditional societies, a fact that may be captured by the circular structure of Schwartz's 'Values Theory'. Nonetheless, the fact that many of these values may not be recognised or addressed through adaptations potentially represents a limit to adaptation as a response to climate change.

### Conclusion

What do different and dynamic values and worldviews imply for adaptation to climate change? On the one hand, one could argue that climate change adaptations should first and foremost satisfy security and survival values that are linked to physiological needs, safety needs and social order. Such adaptations can be considered as a foundation for human development and human security. On the other hand, one could argue that climate change adaptations should aim to preserve values

that are associated with postmodern and other worldviews, such as universalism, benevolence, altruism and biospheric values. These values may dominate in future generations, if material needs and survival values are satisfied (Inglehart, 1997). Surprisingly, there is an implicit assumption in most current discussions of climate change adaptation that what is valued by individuals and societies today is likely to be equally valued by future generations. An exception is future economic values, which are often addressed through discounting (Toman, 2006). However, as Adger et al. (2009a, p. 15) point out, '[t]he loss of place and its psychosocial and cultural elements (the loss of a "world") can arguably never be compensated for with money'.

The challenge then is to identify adaptation strategies that acknowledge and address a spectrum of values. If this is not feasible, it is important to identify value conflicts and consider whose values count. The capacity to respond to different and dynamic values may be closely linked to the perspectives of those holding power, those making adaptation decisions, and those carrying out the adaptations. The values and worldviews of so-called stakeholders who are directly involved in climate change adaptation thus matter, both to present and future generations. As Williams (1979, p. 23) emphasises, '[v]alues make a difference; they are not epiphenomenal'.

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. Successful adaptation will depend on the capacity of individuals and societies to perceive and respond to a spectrum of legitimate values that extend beyond those that are relevant to oneself or one's group. One clear challenge of climate change adaptation is to take into account values that correspond to diverse human needs and multiple perspectives and worldviews. This includes values that many individuals and groups do not currently prioritise, yet which are likely to become important as humans further develop. As values change, the outcomes of climate change are likely to be reassessed and re-evaluated. The emergence of more pluralistic, integral and holistic worldviews would suggest that aggressive reductions in greenhouse gas emissions may turn out to be the adaptation that is most valued by future generations.

### Acknowledgements

I thank Michael van Niekerk and Marianne Bruusgaard for research assistance, and Gail Hochachka, Lise Kjølrsrød, Svein Jarle Horn, Jonathan Reams, Johanna Wolf, Irene Lorenzoni and Neil Adger for valuable comments on earlier drafts. This research is part of the PLAN project on 'The Potentials of and Limits to Adaptation in Norway', funded by the Research Council of Norway.

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