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Understanding the need for adaptation in a natural resource dependent community in Northern Norway: issue salience, knowledge and values

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Abstract For society to effectively manage climate change impacts, the need to adapt must be recognized. At the same time there is a disconnect between knowledge and action on climate change. The salience of adaptation to climate change may be a precondition for action, but this issue has so far been neglected in the adaptation literature. This indicates a missing link between perception, values and world-views, on one side, and policy formation on the other. The article analyses how actors in three occupational groups in a natural resource dependent community in northern Norway perceive and respond to changes in weather and resource conditions, as well as projections for future climate. The results indicate that the need to adapt is perceived differently, if at all, amongst different actors. By drawing on concepts from governance literatures and cultural theory of risks (CTR), the paper seeks to explain this divergence in perceptions and responses amongst different actors, which can help policy-makers understand when and why autonomous actors are willing to adapt. We find that adaptation to climate change cannot readily be expected among actors who fit the *individualist* category of CTR, who do not directly utilize scientific knowledge when in their work.

1 Introduction

In the recent years there has been a marked increase in climate adaptation research and adaptation plans made by governments and NGOs, while implementation of adaptation measures has been equally limited (Berrang-Ford et al. 2011, 2014). The gap between abundance of adaptation and climate change knowledge and limited policy action is also

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found in the Arctic, where climate change is projected to substantially impact *inter alia* primary industries and public infrastructure (Øseth 2010; Kvalvik et al. 2011; Arctic Council 2013). However, climate change is not perceived to be an immediate concern among primary industry actors when compared to other challenges, such as economic viability, access to markets, outmigration, recruitment, flexible livelihoods, regulations and governance (e.g. Hovelsrud et al. 2010). Most industry actors have observed changes in weather, which they attribute to climate change, but this knowledge does not necessarily trigger adaptation. This provides support for an apparent disconnect, highlighted by numerous scholars, between the abundance of scientific knowledge about climate change, the overwhelming and clear evidence that such changes are caused by human action (IPCC 2013) and the general lack of societal response and political commitment to deal with the challenges (Hulme 2009; Jasanoff 2010; Szerszynski and Urry 2010).

Public concern about climate change is decreasing in several countries (e.g. Norway, UK) (Corner et al. 2014; Hellevik 2012). This raises an interesting paradox: public concern in many countries is decreasing while at the same time scientific knowledge and certainty about cause and effect is increasing. While this paradox initally was observed by Mary Douglas (1978) in relation to other forms of risks, mainstream political science and governance theories have to date failed to properly address why people and institutions do not act on climate (O'Riordan and Jordan 1999; Ney 2009). Attempts have been made to explain the inertia in society to respond to what has been labeled the greatest threat to humanity in modern times. One explanation for the lack of action is rooted in two dichotomies: between experts and lay peoples understanding and perceptions of climate change, and between weather and climate (Thompson and Rayner 1998). People tend to understand the weather but not climate which requires action (ibid). Another explanation for the lack of progress with mitigating greenhouse gases may be the lack of policy or policy based on a "linear knowledge to action model" (McNie 2007). This is analogous to the cases in which adaptation measures are developed but not implemented (Preston et al. 2013). Other studies indicate that adaptation is not likely to take place without stronger policy measures (Dannevig et al. 2013). The lack of effective policies for tackling climate change, whether it is adaptation or mitigation, also influences how salient the issue becomes for the public (Ryghaug et al. 2010; Corner et al. 2014). Salience, understood as the "importance" individuals place on certain issues (Wlezien 2005), is strongly tied to values and norms which play a significant role in shaping how people consider risks (Thompson and Rayner 1998). How lay people define and experience climate change is related to their cultural and social values and norms and therefore have implications for whether they adapt or not (O'Brien and Wolf 2010). Few empirical studies have to date documented this connection. This points to a weakness in current attempts to establish a theory for adaptation governance where an understanding of social valuation in developing such governing strategies is insufficient (O'Brien and Wolf 2010), and more broadly to the limited emphasis in governance literature on the agenda-setting properties of scientific knowledge.

This paper contributes to closing this gap by showing that the salience of an issue is a highly relevant and useful variable in explaning political and societal inertia in responding to climate change. This is done through an analysis of empirical material from studies on climate change adapation carried out in one primary industry dependent community in northern Norway, which according to some definitions (e.g. dependency on climate change sensitive natural resources) can be seen as highly vulnerable to climate change.

The Arctic is a "hot spot" in that the temperature is projected to increase more and faster than the global average (IPCC 2013). Consequences of such changes are already being

observed in many communities in the region (Huntington et al. 2007; Hovelsrud et al. 2012) and there is increasing evidence that impacts are directly attributed to anthropogenic climate change (IPCC 2013). Our focus is on natural resource-dependent communities in northern Norway, which in general are exposed and sensitive to changes in weather and climatic conditions, through the impacts on physical infrastructure, and the timing, profitability, and viability of various primary production and harvesting activities (e.g. Hovelsrud and Smit 2010 and references therein). Arctic communities have throughout history adapted to highly variable environmental and socio-economic conditions (Nuttall 2005; West and Hovelsrud 2010), but the ability to adapt to environmental variability does not necessarily mean that communities are able to cope equally well with the unprecedented changes projected for the future (Amundsen 2012). Successful future adaptation will depend on the adaptive capacity of communities, which warrants investigation into the factors and conditions that determine and shape such capacity. We argue that the climate problem has to be seen as salient for adaptation to take place, and that the saliency has consequences for adaptive capacity. Whether adaptation is undertaken to maintain status quo or to improve conditions will depend on the logic and perspectives of the person or group who adapts. It can be rule, market and/or safety driven, and it can be reactive, planned or proactive. We further argue that issue salience is a useful approach for understanding and analyzing how and why climate adaptation is addressed by municipalities and primary industries. To date these perspectives have not been adequately addressed in the literature (e.g. Smit and Pilifosova 2001; Kofinas et al. 2013).

To remedy this, the paper applies the cultural theory of risk (CTR) framework to explain the variable salience of local adaptation. Our findings on the construction of issue salience also challenge mainstream governance and agenda-setting theories, and the application of the CTR framework allow for multiple approaches for considering complex policy issues (Ney 2009; Thompson 2008).

2 Theoretical perspectives

In political science, issue salience, though rarely defined and applied analytically, is referred to as the "importance" individuals place on certain issues (Wlezien 2005:557), particularly in the context of voting behavior (Epstein and Segal 2000). It is thus related to the problem-recognition and agenda-setting stages in the "stages heuristic" model of the policy process (Sabatier 2007). Agenda-setting a policy issue requires, according to mainstream political science theory, that a problem is coupled with a solution by a policy entrepreneur during a window of opportunity (Kingdon 2003). However useful, because of their inherent methodological individualism these perspectives neglect how culture, public values and worldviews influence problem-definition (Thompson and Rayner 1998). A policy problem can be conceptualized as the degree of certainty or agreement over the knowledge base and the degree of consent on norms and values, resulting in four main types of policy problems: 1) Structured problems with little disagreement over knowledge and values, 2) medium structured problems with disagreements over means, 3) medium structured problems with disagreements over goals and 4) unstructured problems with uncertain knowledge and little agreement over values (Hoppe 2002). According to Hoppe (2002), these four types of policy-problem can be tied to four archetypes, solidarities, or *ways* of *life* defined by the CTR-framework, originally developed by Mary Douglas (Douglas and Wildavsky 1982).

The four ways of life provides a frame that "enables its members to select and focus on the salient aspects of messy issues" (Ney 2009). The four ways of life defined by Douglas and subsequently Thompson et al. (1990) depicts four distinct solidarities and cultural biases based on a group-grid typology: *fatalist, hierarchist, individualist and egalitarian* (see Fig. 1). The ways of life are "patterns of social relationships with shared sets of beliefs and values and a behavioral strategy that is rendered rational by those beliefs and values" (Thompson 2008). According to O'Riordan and Jordan (1999), *hierarchists* tend to trust climate scientists and will accept state intervention as long as it is appropriately legitimized. They also tend to see all problems as structured, or avoid them if they are not. *Individualists* tend to be concerned about problems that impinge on their personal freedom, are more concerned over the means than the goals of a problem, and they evaluate knowledge in terms of its usefulness, not its credibility (Hoppe 2002). *Fatalists* are paralyzed by uncertainties in climate science, and tend to see all problems as unstructured. *Egalitarians* are concerned about climate change, and see problems as conflicts over values and goals (Hoppe 2002). The way of life category someone best fits into thereby influences whether an issue will be viewed as a problem. There is ample evidence in the literature that way of life influence responses to climate change (Thompson and Rayner 1998; O'Riordan and Jordan 1999; Kahan et al. 2012). Kahan and colleagues find that individualists tend to dismiss climate change science, while egalitarians accept it (Kahan et al. 2012). The individualists do not dismiss climate science because they lack science literacy, but because they are skeptical to the solutions to curb climate change, which may restrict their independence. A way of life is not solely a cultural bias and solidarity held by an individual. It can also apply to institutions and systems, and an individual can therefore step into different roles and choose strategies according to different ways of life depending on circumstance (Thompson 2008)

Our research indicates that different perceptions of climate change risks are present in natural resource based industries in northern Norway (see Hovelsrud et al. 2015). This allows for a categorization of respondents according to the ways of life typology: fishermen as individualists and municipal bureaucrats as hierarchists, while farmers straddle two categories (individualist and fatalists). This categorization implies that salience varies between different industries with implications for how an issue or knowledge is interpreted, accepted and acted upon (e.g. Wildavsky and Dake 1990). Interpretation shapes whether and how knowledge is framed as a problem, which determines the salience that subsequently may lead to action. This will also have a bearing on whether and how adaptation is seen as necessary. It is a reasonable assumption that if different perceptions of risk align with the CTR ways of life, that same will be true for adaptation. It is therefore useful to link CTR with adaptive responses, be they reactive, proactive or planned, aimed at maintaining status quo or at improving the conditions. Worth noting is that adaptation originally was seen as the business as usual response to climate change in contrast to mitigation, and adaptation was therefore deemed the individualist response (Thompson and Rayner 1998). After the third assessment report of the Intergovernmental Panel on Climate Change (IPCC 2001) stated that adaptation would have to take place irrespective of the success of mitigation efforts, adaptation has become a complex policy issue in itself (e.g. Pelling 2011). We argue that adaptation can be approached from all ways of life, even though the dominant position have been a "technocratic" one directional science to policy model (O'Brien and Wolf 2010), corresponding to the hierarchist way of life (Ney 2009).

In summary, the concept of issue salience aids our understanding of how problems are considered "important", while the CTR-framework illustrates why this process is linked to different ways of life. Combining the two approaches guide our quest for understanding why

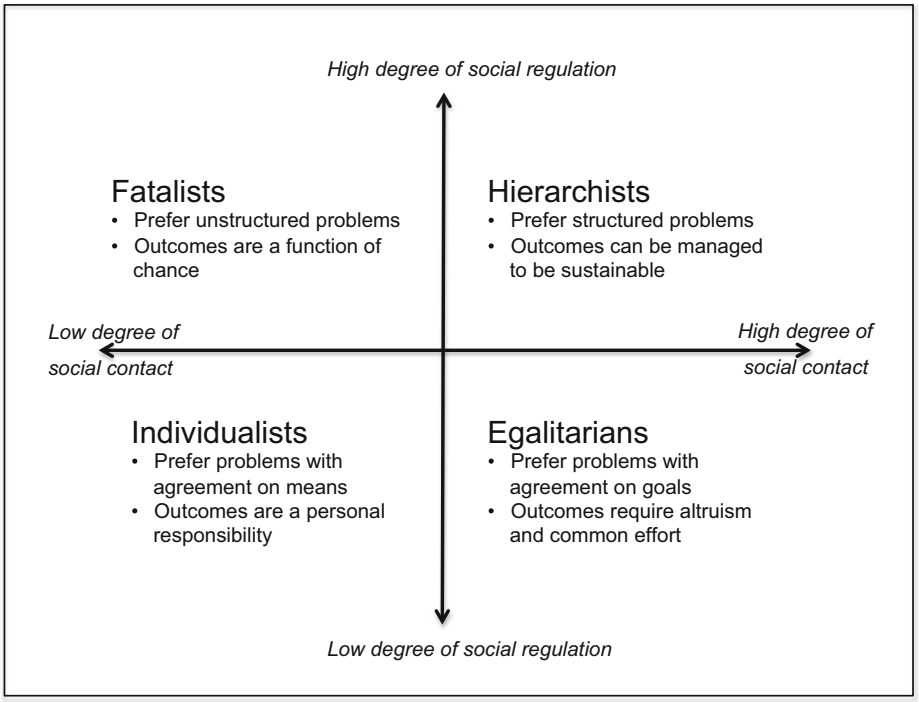

Fig. 1 The cultural theory of risk typology adopted from Thompson et al. 1990 and Hoppe 2002

some consider climate change as a problem requiring adaptive measures while others in the same community do not. This analysis, we argue, is relevant for studies of issue salience and agenda-setting where scientific knowledge and findings call for policy change.

3 Case study site and method

3.1 The case study site

Our case study is coastal communities in Vestvågøy municipality at 68°N, in the Lofoten Archipelago, Nordland County, northern Norway (see Fig. 2). Vestvågøy has 11,000 inhabitants residing in small communities, with the majority settled in the commercial center of Leknes and in the fishing villages of Ballstad and Stamsund. The main employer in Vestvågøy is the service sector. Fisheries and associated industries remain the cornerstones of several smaller communities despite the decrease in fisheries employment in recent decades. Agriculture is also an important sector with the same trend as in fisheries; fewer farmers but with a relatively stable yield. Many farmers hold other part-time jobs, while the interviewed fishermen worked full-time.

Lofoten is selected as a case study site because of its reliance on climate sensitive natural resources (fishing and farming) that, based on climate change projections and top down vulnerability assessments, would be expected to be vulnerable to climate change (ACIA 2005). From a scientific point of view, it constitutes an *extreme case* (Gerring 2008); on the basis of the

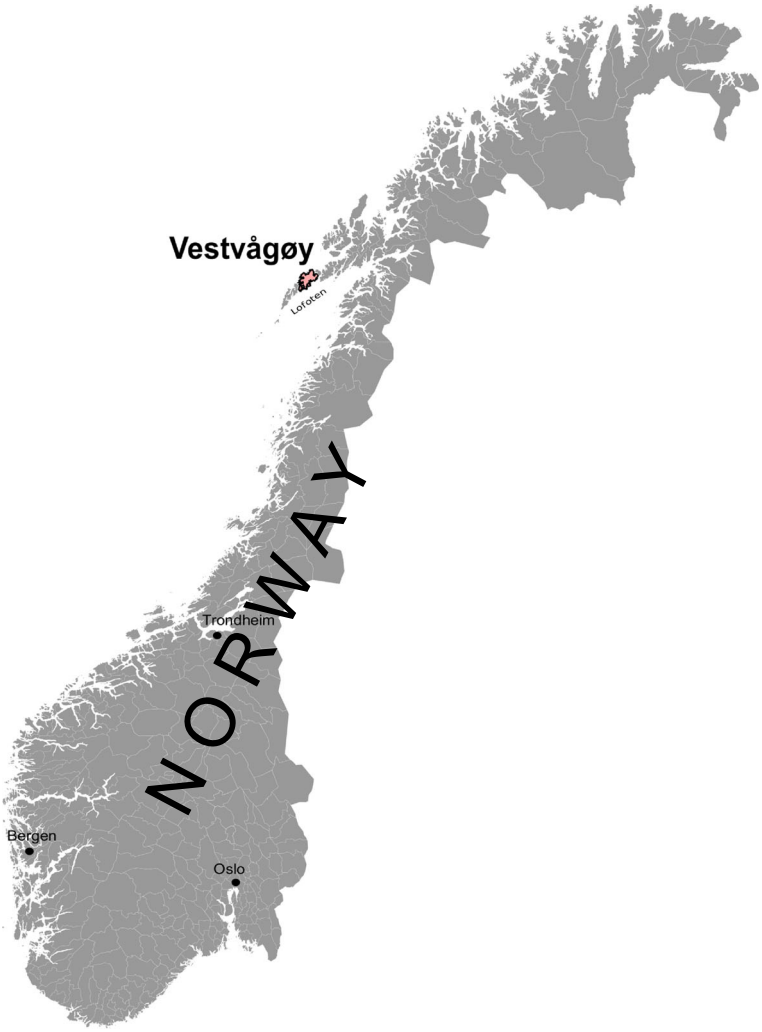

Fig. 2 The case study site, Vestvågøy municipality, Nordland County, Norway

climate projections and local observations of weather changes we would expect the inhabitants to worry about the impacts of climate change (Kvalvik et al. 2011; Hovelsrud et al. 2010).

3.2 The occupational groups' way of life

The informants selected for this study are associated with livelihoods and occupations that allow for prescreening the ways of life outlined in the CTR group-grid typology. This is in line with the recognition that the way of life also is a system logic (e.g. markets or hierarchies), not just a property of an individual (Thompson 2008). Fishermen, fish industry actors and farmers are all small to medium sized firms. They sell their products in a market and their livelihoods and economic profitability are largely dependent on their own effort. They also tend to work independently from others and with a low degree of

social contact during work hours; characteristics that correspond to *individualists*. On the other hand, farmers are exposed and sensitive to changes in government subsidies and regulations in addition to weather conditions, factors that the farmer cannot control. Therefore, they can, to some degree, also be categorized as *fatalists*, which means that this occupational group straddles both ways of life. Municipal planners better match the characteristics of the *hierarchists*. They work in a hierarchical system that provides social control and with a general acceptance of scientific knowledge. The municipal officers require a degree of predictability, and use knowledge from legitimate sources, creating a "culture" accepting scientific knowledge as authoritative. The authoritative status is ensured by the institutionalized use of such knowledge in the municipal administration, for example by using environmental impact assessments for spatial planning.

3.3 Data

The analysis draws on material from research conducted in Vestvågøy municipality over the past 7 years. The research is primarily sector-based community studies of adaptation strategies and assessment of communities' vulnerability to interlinked climatic and societal changes. The approach involves local participants in defining relevant research foci and in interpreting the results (e.g. Smit et al. 2010).

Downscaled projections for future climate were discussed with the informants along with scientific knowledge about the impact of climate change on agriculture (Hanssen-Bauer et al. 2010) and fisheries (Sundby and Nakken 2008; Drinkwater 2011). After consultations with key actors the projections were tailored to their priorities and needs (e.g. changes in extreme precipitation events for municipal planners). By translating and communicating scientific knowledge for policy the researchers acted as boundary workers (e.g. Guston 2001). Interestingly, of the three occupational groups only the municipal officers found the tailored projections instructive for their work.

Semi-structured interviews were carried out with 37 individuals including fishermen ($n=15$), stockfish producers and processors ($n=5$), municipal officers ($n=8$), and farmers ($n=9$). The fishers and farmers were selected to reflect the range and diversity (age, type of farming, type of fishery), while the informants among municipality and stock fish producers represented nearly the full available population. Interviewees were identified through scoping interviews with key informants in the municipal administration, and snowball sampling (tip from informants). In the municipality, the officers responsible for planning, environmental issues, harbors, industries and agriculture, and the chief of development, were interviewed. Field discussions with fishermen were conducted, along with group interviews with municipal planners and industry advisors, and one town hall meeting with approximately 30 participants. Scoping fields visit and key informant interviews took place in June 2008, with four field trips in September 2008, February 2009, October 2009, and July 2010. Interview data have previously been applied in Hovelsrud et al. 2010, 2015, and in Kvalvik et al. 2011. Interviews with municipal officers in Vestvågøy have not previously been published.

The interview data were analyzed through coding of current challenges; social and environmental stresses, attribution to climate change, and to other drivers of change. Climate adaptation salience is indicated by a) attribution of possible future livelihood challenges to climate change b) relative importance (threat to livelihood compared to other exposure-sensitivities) and c) the manifestation or extent of adaptive responses.

4 Findings – different perceptions of the need to adapt

This section presents findings of the degree to which climate adaptation was seen as a salient issue among the informants in the three occupational groups. Examples of identified changes, attribution to cause of change, and adaptation measures are given in Table 1.

4.1 Fishery sector

The discussion of vulnerability to climate change in Lofoten is currently accentuated by a recent shift in the distribution of the most important fish stock – cod (*Gadus morhua*). The traditional winter fisheries for spawning cod, one of the largest cod fisheries in the world now takes place further north. The northward shift of cod have more notable consequences for the land based industry than for the fishermen; they can follow the fish and land their catch further north (Hovelsrud et al. 2010). The cod fisheries are subject to a continuous rationalization process, which recently has been amplified by the introduction of tradable fish quotas. This has led to soaring prices for fishing vessels with quotas and fewer, but larger vessels.

Fishermen pointed to changes in the distribution of commercially important fish stocks, such as the northward shift in the cod fisheries. But the shift in the winter fisheries was of limited importance to them because their vessels are equipped for longer offshore trips. One coastal fisherman stated: "There have always been periods with a lack of fish, and the weather has always been changing. I believe the reason why the cod is no longer near Lofoten now is the use of trawlers". The absence of cod was thus blamed on other types of fisheries: the "trawlers". Two of the informants referred to events during the 1860s in order to illustrate the variability of fish stocks: "In the 1860s there were 13 years without cod in the sea. But it came back. It has always been changing, we are used to that" (Fish buyer and stockfish producer in Lofoten). This kind of statement was made by several fishermen and illustrate their perception of high adaptive capacity to a variable resource. The stockfish production is a seasonal activity starting during the winter fishery for spawning cod, but stockfish will be destroyed if it freezes, and the drying normally starts in March. In recent years, however, it has started as early as January, while May, traditionally a good month for finalizing the production, has been too warm for ensuring a high quality product. Despite what appears to be high climate sensitivity, most of the stockfish producers attribute the earlier onset of favorable conditions for stockfish production to natural variation and are not overly concerned about the prospect of even warmer and wetter conditions.

The northward shift in cod stocks is, according to fisheries scientists, caused by increased ocean temperatures due to climate change (Drinkwater 2011). While none of the fishermen interviewed outright rejected that climate change is happening, they did not attribute the changes they observed to global warming. It is noteworthy that the fishermen do not readily accept the conclusions drawn by marine scientists. This correlates with a general distrust of marine science which delivers advice on fish stocks and quotas to fisheries management, exemplified by the fishermen's opinions about how wrong the stock assessments of the marine scientists were (see also Dale 2012). Fishermen reported that they only rely on their own knowledge and that of their peers when making decision on when and where to fish. Additionally, the fishermen expressed little or no interest in receiving better or tailored downscaled climate projections that could inform proactive adaptive measures. Similarly, there was no indication that climate adaptation was on the agenda of the fishermen's organizations. This illustrates that climate change is not salient in fisheries.

Table 1 The observed changes and responses across sectors

Actor	Perceived changes in climate and ecosystems	Attribution	Adaptation	Way of life
Fishermen	Changes in magnitude and distribution in important fish stocks Storminess at sea	Natural climate variability; competing fishermen's fishery activities; fisheries management system.	Follow the fish	*Individualist* Reactive adaptation and little interest in climate change knowledge.
Fish buyers	Changes in magnitude and distribution in important fish stocks.	Other fishermen's gear and methods; natural climate variability; fisheries management system affects fish distribution	Attract fishermen by price or other financial agreements; invest in the local fishing fleet to secure landings; attract and market higher quality fish	*Individualist* Reactive adaptation and little interest in climate change knowledge.
Farmers	Precipitation in autumn - > difficult to harvest and damage to soil	Increasingly heavier equipment damages wet soil.	Use lighter (but less efficient) equipment; wait for drier periods	*Individualist farmers.* Opportunistic adaptation. *Fatalist farmers* Adaptation not relevant.
Municipal officers	Avalanches and winter floods	Climate variability and change	Additional assessments. stronger focus on natural hazards in spatial planning	*Hierarchists* Adaptation necessary, climate change knowledge requested.
Municipal officers	Sea level rise and storm surges	Climate change	Additional assessments; increase minimum distance to sea for new buildings in zoning plans.	*Hierarchists* Adaptation necessary, climate change knowledge requested.

4.2 Farmers

Farmers in our studies identified a longer grazing season and wetter autumns as climate related changes currently affecting their livelihood. The increased grazing season is seen as an opportunity and an advantage. Wetter autumns may pose challenges for farmers cultivating bog soils, but the challenges are, first and foremost, related to their use of increasingly heavier equipment, which damage the soil when saturated with water. The increased use of heavier equipment is nested within a suite of interrelated structural and economic factors which will not be addressed here (see Kvalvik et al. 2011). Some of the farmers requested more knowledge about new crop varieties that would be better adapted to warmer temperatures. Such requests and focus signify a certain level of salience for the climate change issue.

Some of the farmers in our study perceive themselves to be vulnerable to the lack of recruitment to the industry, changing policy conditions and the clear trend towards decreasing economic earnings from farming. While the yield has remained stable, the number of farms has declined in Vestvågøy (Kvalvik et al. 2011). The farmers expressed concern that it will be difficult to maintain a viable farming community if the decline continues. "Without fellow farmers in the neighborhood, it is very hard to keep going", one farmer said. Other farmers were more optimistic and invested in increased capacity or in niche production of cheese and vegetables. The salience of the problem can in the case of the farmers be seen as determined by the economic importance and its impact on the ability to continue farming. Unlike the fishermen, the farmers depend on scientific knowledge, provided largely by the agricultural extension service, to guide their decisions. The farmers expressed an interest in the downscaled projections for changes in growing season, but interestingly expressed far more concern over scenarios for future agricultural policies (see also Kvalvik et al. 2011). One farmer said: "I do really worry about climate change, in general I mean. But I can't really see how it will have a big impact on the farming". This indicates that global warming is salient for farmers whilst showing confidence in their adaptive capacity.

4.3 Municipal sector

The results show that the environmental officer, the chief of development and the agricultural advisor are all quite concerned about the consequences of climate change. They are interested in knowing how climate change would impact upon coastal fisheries and whether the favorable drying conditions for producing stockfish would deteriorate as a result of climate change. The agricultural advisor feared the impacts of increasingly wet conditions and invasive species and pests on agriculture, while also considering longer growing season and improved growing conditions to be beneficial for agriculture. The planners and the harbor officer were concerned about sea-level rise and an increase in extreme weather events, such as storms and snow avalanches. They requested projections for future climate elements relevant for local adaptation planning.

At the time of study, no national regulations or policy for adaptation had been developed, which means that any adaptation initiative was locally driven. One planner stated: "it is natural for a municipal planner to include climate change adaptation in planning, as we make plans for the future".

The municipal officers consider proactive adaptation measures for reducing climate change impacts as being a "natural part of the duties of a planner", implicitly accepting scientific knowledge. During the period of study the municipality implemented regulations that would

protect against sea-level rise in the municipal spatial plans and mapped areas susceptible to avalanches, illustrating that climate adaptation was a salient issue, or a structured problem with an uncontested knowledge base and agreement over aim (protection against future natural hazards) and means (spatial planning) (Hoppe 2002).

5 Discussion

A common denominator for the actors interviewed in this study is that their work is directly or indirectly exposed to weather variability and climate change; fishermen and farmers to the highest degree in directly facing impacts of weather conditions on their livelihoods, and fish buyers and municipal officers to a lesser degree in that they do not have to deal directly with weather conditions during their workday. All three occupations have also identified climate and weather elements, which contribute to or cause vulnerability. Still, the salience of climate change and recognition of the need to adapt differs considerably (see Table 1).

The fishermen—perhaps the occupational group most affected by weather in their professional life—express the least need for climate adaptation. They show little or no interest in tailored climate projections; such projections do not contain salient information. We surmise that the lack of salience of climate change information is a consequence of their distrust of science and it reflects the fishermen's *individualist* way of life. The expressed distrust towards marine science is extended to that of climate change. In addition as independent businessmen they align with the individualist way of life by not being likely to trust science or other forms of knowledge-based policies that somehow may restrict their independence (O'Riordan and Jordan 1999) or that are not useful to them (Hoppe 2002). To consider climate change adaptation as salient may be perceived as a threat to the flexibility needed to *inter alia* follow a northward-shifting cod stock, or target new fish species.

Farmers acknowledge that climate change will mainly have positive consequences for their livelihood. And in this capacity some express more interest in the consequences of future climate change on farming, as projected in the downscaled scenarios. This opportunistic view on adaptation corresponds well with an individualist way of life (e.g. Thompson and Rayner 1998). Farmers also rely on scientific knowledge through advice from the agricultural extension service, and none of the farmers reject climate science outright. Nevertheless, few expressed a need for proactive adaptive measures directed towards current and future climate change impacts. For some of the farmers, agricultural policy changes, lack of recruitment and economic challenges emerged as more significant for their livelihood, and are therefore more salient than climate change. These farmers have a pessimistic outlook and see no incentives for development. This corresponds better to a fatalistic way of life than an individualist of life, and to a fatalist adaptation is pointless. The intermediate salience of the adaptation issue for farmers, we argue, is a consequence of the acceptance of climate change science and a perception of limited relevance for their livelihood.

Of the three occupations, municipal planners were most concerned about climate change, and acknowledged the necessity to plan for adaptation. Furthermore, municipal officers had already added climate adaptation to their planning agenda, in terms of preparing for sea-level rise and requesting vulnerability assessments for primary industries, treating adaptation as a structured policy problem and thereby making it salient. The municipal planners were also the only group that actively requested downscaled climate change projections, seeing the relevance for their work. This "managerial" and technocratic take on adaptation correspond to a

hierarchist way of life (Ney 2009). By being engaged in the development of the scenarios they partook in co-producing relevant climate change knowledge (Cash et al. 2003).

Based on the comparison of fishermen and farmers, we conclude that the difference in the salience of adaptation is shaped by the perception of how climate change will affect livelihoods. The fishermen's inclination to dismiss climate change as not being of any greater threat than normal weather variability may originate in their general distrust of scientific knowledge. Farmers more readily accept such knowledge and therefore consider climate adaptation as more important than fishermen. When comparing fishermen and municipal officials we find similar differences in the salience of adaptation. We conclude that this difference is rooted in the application of different types of knowledge in their professions and their ways of life. We argue that an individualist way of life combined with limited use and acceptance of scientific knowledge results in low salience of climate adaptation as an issue, while a hierarchical way of life combined with professional use of scientific knowledge produces high salience. This corresponds to Hoppe's findings that hierarchists recognize a problem if they can view it as structured, while individualists do not recognize a problem when the means to solve it and the knowledge underlying is not useful for them. This speaks directly to the challenge of developing policy solely on the basis of scientific knowledge. By ignoring why such knowledge is accepted and applied, the policy may fail in developing necessary proactive adaptation measures. Such linkages between knowledge uptake, ways of life and issue salience is neglected in main stream agenda setting theories (e.g. Kingdon 2003). Our findings show that under certain conditions, scientific knowledge can indeed have agenda-setting properties, but that the acceptance varies between different occupational groups.

6 Conclusion

The results presented infer that the agenda-setting ability of scientific knowledge in occupational groups is highly contingent on the combination of how scientific knowledge is used and seen as salient in the group and the way of life ascribed to the occupational group members. The study has focused on livelihood activities and recognize that the municipal planners, fishermen and farmers may fit into other categories within the CTR depending on the context. A study of multiple contexts is beyond the scope of this paper.

If it is accepted that climate change impacts require action, and that planned adaptation to the consequences is necessary, then climate change science becomes critical. But in the cases where climate change is not perceived as a risk, adaptation will not be high on the agenda, and it will not receive any human or financial resources in competition with more pressing and mandatory tasks (Dannevig et al. 2013). The investment in increasingly more advanced and accurate downscaled projections of future climate change may be of little use for others than municipal officers in aiding adaptation locally, as this mode of pursuing adaptation first and foremost correspond to the hierarchist way of life. This begs the question of how climate adaptation can be advanced as a salient issue at the community level. Our results corroborate other findings that climate change science must be conveyed in a way that harmonizes with peoples different ways of life (Kahan et al. 2012). The boundary work that is required to produce knowledge for adaptation must be tailored to each way of life, not just the hierarchical, in order to resonate with the actors' perceptions of risks and problem recognition, which to a high degree is rooted in past experiences, and historical and political developments. It is largely agreed that because adaptation takes place locally it requires local knowledge input to

be successful. We expand on the notion of the local by showing that the salience of adaptation is inextricably linked to different occupations within the same municipality, holding different forms of knowledges. This raises the question of how to integrate these different forms of knowledges, and at what scale and how to analyze this in an agenda-setting context. If future adaptation needs can be better understood through climate change science, scientific knowledge as one knowledge source, has a role to play in such boundary work. This presents particular challenges towards occupational groups, such as the fishermen that we have worked with, who do not use scientific knowledge in their profession. If the individualist category is taken at face value, then the perception of high adaptive capacity and independence of fishermen indicates that adaptation has typically been viewed too simplistically.

If scientific climate change knowledge calls for changes at the local level and beyond, it is a matter of democracy to involve local stakeholders in both the production and dissemination of such knowledge. This insight is in line with suggestions from Hulme on public engagement with climate science (Hulme 2013). How this is to be achieved at the local level is a matter for further research, which could benefit from combining insights from climatology, political science, cultural theory of risks, and science and technology studies. Furthermore, the finding that ways of life in combination with professional application of knowledge seems to determine the salience of the adaptation issue adds an important dimension to adaptation studies. We conclude that assessments and analyses of adaptive capacity need to take salience of the adaptation issue into account as a source of adaptive capacity. More emphasis on the cultural foundation of salience could also inform governance theories in general and in particular on agenda-setting and the policy process.

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