

# **Making sense of global warming: Norwegians appropriating knowledge of anthropogenic climate change<sup>1</sup>**

Marianne Ryghaug, Knut H. Sørensen and Robert Næss. The paper has been published in *Public Understanding of Science*, 20(6), 2011, p. 778-795. Check with the journal for a final version of the text. DOI: <http://dx.doi.org/10.1177/0963662510362657>

## **1. Introduction**

In this paper, we analyze how people reason about and make sense of human-made global warming.<sup>2</sup> An important resource in this sense-making work is the coverage of climate change issues in the news media. Consequently, the paper also analyzes how the public appropriate this resource as part of their more general sense-making. The study is based on ten focus-group interviews with Norwegian citizens. In these groups, with the exception of a smaller number of sceptics, it was commonly accepted as a fact that anthropogenic global warming is under way. However, there was also an undercurrent of doubt and uncertainty regarding the seriousness of the issue. The paper explores the ways of reasoning that produce these diverse positions.

Norway offers an interesting context to study appropriation of knowledge and sense-making with respect to anthropogenic global warming. With a small population of about 4,7 million inhabitants, Norway is one of the world's largest exporters of oil and gas, on which its economy is quite dependent. Large hydroelectric resources contribute to a widespread popular perception of energy affluence, while the relative cold climate produces appreciation of access to relatively cheap and abundant energy

(Aune, 2007; Sørensen, 2007). This situation could tempt Norwegian citizens to be sceptical of the claims about anthropogenic global warming.

On the other hand, climate science in Norway is well established at universities and research institutes, and Norwegian scientists have contributed to and supported the conclusions of the IPCC reports regarding anthropogenic climate change. These conclusions have also been accepted by the government, possibly encouraging public acceptance of the scientific claim of human-made global warming.

It seems reasonable to assume that knowledge about climate science and climate policy largely is appropriated from news media coverage. Thus, as a point of departure, in the following section we review research about how news media have covered global warming and what kind of sense-making resources they offer, with a particular emphasis on the Norwegian situation. The ensuing research questions are developed further through the presentation of the theoretical approach in the consecutive section, above all based on the concept of domestication. This approach invites an analysis of media consumption/reception that breaks with assumptions about passive audiences and linear cause-effect relationships between media coverage and public sense-making.

## **2. Presenting human-made climate change to the public:**

### **Media narratives**

How may we understand the way news media covers global warming and what they offer to their readers? Generally, media coverage of science is subject to the same

journalistic standards as other topics (Dunwoody, 2008; Boykoff and Boykoff, 2007). This implies that novelty, controversy, geographic proximity and relevance to readers are considered crucial for newsworthiness. In addition, the ideal of objective, so-called balanced reporting may influence the ways in which media cover climate change (Carvalho, 2005, 2007; Dispensa and Brulle, 2003). Some scholars argue that the goal of a 'balanced view' has resulted in too much attention to so-called climate science sceptics and a biased portrayal of scientific knowledge about anthropogenic climate change. Thus, it is argued that the level of scientific controversy has been overstated, implying a greater level of uncertainty than actually is the case (Boykoff and Boykoff, 2004; Antilla, 2005).

On the other hand, media coverage is not just a matter of journalistic standards. Political and economic interest groups may exercise influence, and media coverage may also reflect how global warming is debated by other institutions, like parliaments. There are at least observations that media coverage of climate change issues seems to be country specific, at least to some extent (Grundmann, 2006). In Germany, Weingart et al. (2000) found that media mainly communicated an image of certainty of scientific knowledge on climate change, while there has been an accentuation of uncertainty in the US news media (e.g. Boykoff and Boykoff, 2004; Antilla, 2005) and considerable, ideological disagreement among newspapers in Britain (Carvalho, 2007).

What then about Norway? According to Ryghaug's (2006) study of the coverage of anthropogenic global warming in eight major Norwegian newspapers between 2002 and 2005, the same newspapers communicated certainty as well as uncertainty with

respect to the underlying scientific knowledge. According to this piece of research most of the reporting drew on two broad modes of narrative strategies in their coverage of climate change issues.<sup>3</sup> One strategy focused thematically on the state of knowledge about anthropogenic climate change as characterised by scientific controversy, similar to the abovementioned ‘balanced reporting’ (Carvalho, 2007; Boykoff and Boykoff, 2007). Ryghaug (2006) calls this frame *Science drama* due to the way points of view from climate scientists and so-called climate sceptics tended to be juxtaposed in the articles.

The other narrative strategy relates to articles that use catchy phenomena of nature like unusual weather or the possible extinction of polar bears as representations of global warming. The popularity of such media approaches have been observed also in Germany (Weingart et al., 2000) and Sweden (Olausson, 2009).

Ryghaug (2006) calls this frame *Nature drama*. The two dramas were used interchangeably by all the Norwegian newspapers studied.

For our purposes, we interpret these two dramas as two different frames (Gamson and Modigliani 1989) or ways of informing about global warming. We read them as representing – potentially – two different sense-making devices. The Science drama may be seen as a frame where climate science knowledge appears to be uncertain due to scientific controversy. Drawing on this kind of interpretative resource could facilitate sense-making that results in scepticism or doubt. The Nature drama type of coverage may be seen as a way of popularizing climate science knowledge about global warming as human made and with serious consequences through a frame that emphasizes the effects rather than the causes of climate change. Such kind of

interpretative resource could afford sense-making that results in acceptance that anthropogenic global warming is happening. In addition, the Nature drama may be read as an invitation to engage with climate change issues by reflecting on observations of changes in weather and other aspects of nature. Such engagement may lead to acceptance, but also to scepticism since there is no obvious outcome.

In this paper we analyse sense-making with respect to human made global warming, with an emphasis on the appropriation of climate change knowledge. A main issue is of course the making of acceptance and scepticism, respectively. The paper studies how news media's coverage of the issues entered into such sense-making. Was the Science drama read to produce scepticism, as suggested above? Similarly, was the Nature drama perceived as providing reasons to accept climate change as human made? Did people use this frame as a way of engaging in the issues? Other media than newspapers, like television or Internet, as well as everyday interaction with other people may provide more frames as well as different kinds of information and knowledge. Sense-making may also involve considerations with respect to wider social and political issues, which also needs to be explored. How may we understand such sense-making processes?

### **3. Appropriating information about human-made climate change**

Silverstone (2007:4) describes the ambiguous significance of media in modern everyday life succinctly: 'We have become dependent on the media for the conduct of everyday life. They have become the *sine qua non* of the quotidian. But they are

also inexplicable and insignificant without the everyday, without in turn their being resources for thought, judgement and action, both personal and political’.

Accordingly, media should be assumed to be important in the sense-making of global warming, but in ways that cannot be predicted by a reading of media messages. The consumption or reception of media is a much more complex issue, also because the actual engagement with media varies considerably (Couldry et al., 2007).

These complexities with regard to the understanding of, engagement with and sense-making of science have been explored through the body of research usually labelled ‘public understanding of science’ (see, e.g., Wynne, 1995). The traditional approach of studying attitudes towards and knowledge about science has been criticized as deploying a deficit model (e.g., Michael, 2002). Alternative approaches have been concerned with scientists and lay people’s relative expertise, exploring lay local knowledge and the rationality of people’s engagement with science (Wynne 1995). For example Martin (1994) has shown how the perceived logic of everyday life in a given context is a main feature of the way scientific knowledge is made sense of and accounted for. The public are not passive recipients, excluded from the production and validation of knowledge. They consider, validate, supplement and adapt the knowledge that is communicated to them (Martin 1994, Weingart, 1998).

In line with the latter approach, we shall analyse sense-making with respect to climate change by drawing on the generic concept of domestication (Berker et al., 2006; Haddon 2006). To analyze domestication of knowledge or information means to study the development of practices, the construction of meaning and learning with respect to a given area of concern like global warming (Sørensen et al., 2000;

Sørensen, 2006). A main advantage of this perspective is that it reminds that sense-making is not just about meaning; there are also cognitive and practical aspects that needs to be looked at. Phrased differently, knowledge about human-made global warming needs to be enacted in everyday life, and this enactment involves articulation of positions with respect to truth and falseness of knowledge claims but also considerations about how to act on the perceived challenges. Moreover, domestication may result in rejection as well as acceptance of climate science knowledge, in addition to a variety of transformations of this knowledge.

Studies of public understanding of science have tended to work from a lay-expert binary, where experts supply the knowledge the public is assumed to appropriate. As Irwin and Michael (2003) remind us, the ‘doing’ of public understanding is much more complex. The lay-expert and the related science-society binary should be transgressed since the distinction between experts and the public, between science and society is blurred. Moreover, as we already have observed, there are many actors involved in the doing of public understanding, like media, politicians, industry, public servants, etc. The domestication of climate science knowledge is not a linear relationship between scientists and the public; there are many mediators contributing to the process. Sense-making with respect to climate change will draw on several sources of knowledge and information, potentially a mix of observations and mediation.

Consequently, in this paper, we study the domestication of knowledge about climate change in a broad and comprehensive way, with particular focus on the how people account for scepticism and acceptance. The news media’s reporting, using the frames

of Science drama and the Nature drama, may have influenced this domestication, as affordances of scepticism and acceptance, respectively. However, this is an empirical issue which will be analyzed since it also may be the case that the two dramas have been overlooked, dismissed or not given any practical consequences. We shall also study the extent to which climate science knowledge have been transformed to accommodate local contexts, since domestication theory suggests that the appropriation of knowledge is thoroughly effected by local perspectives and local sense-making.

#### **4. Method**

We address the above-mentioned research questions on the basis of qualitative focus group interviews. Focus group interviewing is appropriate when interaction between interviewees is thought to contribute importantly to the information produced (Morgan, 1997; Stewart et al., 2007). With our focus on sense-making processes, which we assumed at least partly would be enacted through discussions about knowledge claims, we saw focus group interviewing as a well-suited method, also because it allows observations of how points of views may be shared or contested. Of course, this method does not only produce data about interaction but also information about the individual participants (Morgan, 1997: 18-22).

The participants in the groups were invited to discuss issues regarding anthropogenic climate change. We did 10 focus group interviews. The participants were recruited through existing social networks, discovered through snowballing. We contacted a person operating in each of these networks, like the teacher of a class or the hostess

of a maternity group. These persons helped with recruitment and the practicalities of the focus group interview (time, place, etc). Most of these networks were quite small; thus all members were encouraged to participate and did so, unless they were unable to come. When the potential group was larger, like the high school classes, the interviewees were selected by random drawing. Only one of the social networks we approached declined to take part in the study.

The groups consisted of 4-8 persons. Most of them knew of each other before the interview. This seemed to provide a safe atmosphere, making them speak freely. As should be evident from Table 1, they were interviewed in familiar places like the homes of one participant or where they usually met. The setting did not seem to make people strive towards consensus. A few groups were fairly homogeneous in terms of opinions, in most cases there were quite a lot of conflicting views, but such differences did not have any perceptible impact on the level of discussion activity. Table 1 provides more information about the groups.

(Table 1 about here)

In total, we interviewed 62 people, 24 men and 38 women. We achieved diversity in terms of age as the main age groups were covered, even if there was a predominance of young people as shown in Table 1. With respect to social background, the participants had a higher level of education than the national average. Still, there was considerable variation along this dimension as well as in terms of engagement with environmental issues. Of course, this sample does not allow for statistical generalization. For our purposes, to identify a diversity of domestication processes, it

was important that in terms of age, gender and social background, the most common categories were represented in the data. The overrepresentation of people with higher education could mean a bias in terms of level of knowledge as well as the employed strategies of deliberation, but this is of less importance since we do not make general claims about the distribution of such features. Moreover, the group of people with higher education showed considerable diversity with respect to the analyzed issues.

The focus groups were facilitated by two of the authors who have extensive experience with qualitative interviewing. Their role was to manage the discussion, to follow up on interesting points, and to see that everybody had a say. They also checked that the topics in the interview guide were covered throughout the discussions, but the protocol was flexible enough to allow respondents also to discuss other topics that they felt were important. The main items in the interviews were participants' perception of global warming, their main sources of information and how they assessed the information, their views of climate scientists and whether they were in disagreement, the need for action to curb greenhouse gas emissions, and challenges related to energy use. The questions were used to initiate and guide discussions. Usually, the groups debated eagerly and freely in a way that spontaneously made them cover many of the questions in the interview guide.

As shown in Table 1, the majority of the interviews (8) were conducted between February 29<sup>th</sup> and June 6<sup>th</sup> 2006, the two remaining were done January 12<sup>th</sup> and February 19<sup>th</sup>, 2007. We have not observed that particular events or the increasing focus on climate change issues during this period affected the perceptions of the later

groups, compared to the early ones, in any noticeable way, other than through the examples that were referred to. The interviews lasted around one hour. They were taped and transcribed. The quotes used in the paper have been translated from Norwegian by us, and we have tried to retain their oral qualities.

The strategy of analysis was inspired by grounded theory (Strauss and Corbin, 1998). We began by examining the transcribed interviews for salient categories, which were given a label or a code. We then grouped these codes, to find related subcategories that might be linked to more comprehensive categories. In this process, quotations were selected to represent the various categories and positions as accurately as possible. In the final stage, we tried to integrate categories. In doing so, we made use of the generic properties of domestication theory as a basis for making story-lines.

Where we differ from the tenets of grounded theory is in the use of the two media dramas described earlier in the paper. We examined whether they were salient categories of sense-making of the interviewees, and if so, how they were used in this sense-making. Moreover, the integration process was partly built on juxtaposing them since the two dramas proved to be important. As categories developed and became richer we returned to the interview material to search for more examples and to look for perspectives or observations that we might have overlooked in the first rounds.

As noted above, we observed through the analysis that when the focus groups discussed, accounted for and reacted to climate change issues, they made references to newspaper coverage in ways that clearly resonated with the Nature drama and the

Science drama frames. However, the questions we asked were phrased in a more general way. We did not explicitly refer to the dramas in our questions.<sup>4</sup>

We shall begin by analysing what kinds of sources of information and knowledge that were used by the focus group participants as a point of departure for studying sense-making processes. What was domesticated, and how?

## **5. Encounters with nature: Providing public proofs of human-made climate changes?**

In all groups, the interviewees stated that media was their main source of information about climate change. More specifically, they mentioned newspapers (paper or Internet versions), television and radio. According to media surveys by Statistics Norway, this is a common pattern. In 2006, the average Norwegian spent 29 minutes on an average day reading newspapers. On an average day, about 60 per cent watched news on television, and 60 per cent accessed news through the Internet (Vaage, 2009). Our interviewees did not report that they actively searched for information about climate issue, besides what news media offered. However, the high school students said that going to school provided additional information, and a few of the interviewees also emphasized other people as sources. So what did they learn from media's coverage of climate issues, and how did they relate to the information offered?

A prevalent pattern across the groups was the frequent reference to changes in nature, which appeared to be the main resource in their sense-making processes. This could be caused by the media's use of Nature drama framing to get attention. Studies from

other countries have reported a fairly widespread use of catastrophic scenarios by media (Boykoff, 2008; Lowe et al., 2006, O'Neill and Nicholson-Cole, 2009). The observed effect was that many people seem to be anxious and accept climate changes as a reality (Lowe et al., 2006; Palutikof et al., 2004), but also that potentially severe consequences of climate change were seen as of secondary importance in comparison with other everyday life issues (Lorenzoni and Pidgeon, 2006). Was this how our interviewees received Nature drama coverage and made sense of global warming?

Generally speaking, there was no doubt that our interviewees had observed the frequent references in news media to more or less serious changes in nature, caused by human-made global warming. A clear majority of the people in the focus groups saw climate change as a rather frightening scenario that made them worry about the prospects for the Earth and the living conditions of future generations. When such concerns were voiced, they were often linked to striking incidents like the melting of the polar ice caps and extreme weather. Many were clearly anxious about what was happening, and Nature drama events were important to their sense-making.

On the other hand, the references to changes in nature, above all the weather, which normally produced acceptance that human-made global warming was a reality, also resulted in a form of alleviation with respect to the outlooks for the future and how hazardous climate change was considered to be. We observed this way of reasoning in all focus groups, although to different degrees. What usually happened was that references to Nature drama events were followed by deliberations with regard to the actual risks. In these exchanges, we noted frequent efforts to soften dramatic media accounts by participants who invoked their own experiences, often with reference to

weather, general scepticism towards the trustworthiness of news media, or other interpretative resources. This led the focus groups to discuss a wide range of issues such as how much they themselves would be at risk, how climate change could be related to their own interpretation of weather changes, the complexity of the phenomena, etc. Occasionally, the appeasement also seemed to be a way of accommodating the sceptics in the group and their arguments against believing in human-made global warming. Alleviation could be a compromise to establish some kind of consensus.

Thus, the media narratives with respect to nature were often modified in the receptions process and given a more alleviated, less agonizing meaning. The ensuing sense-making of global warming by many interviewees resulted in efforts to diminish the risks involved: the situation was grave but not as severe as the media would have it. One line of reasoning was to argue that the climate problem was distant in time and space, thus developing a locally framed and less stressful understanding. For example, some of the interviewees saw the real frightening drama to be happening (or going to happen) in far-away places or in a distant future. Quite a few thought that climate change would not have critical consequences for people living in Norway. The reasoning leading to this conclusion is well illustrated by the following extract from a discussion in a group of rural high school students (# 6),<sup>5</sup> although their downplaying of the problem was tongue-in-cheek, indicating that they in reality were fairly concerned:

Trym: I do not think much about it [climate change]. We are doing so fine, so we do not have really big problems.

Tanja: It is not really something that I go around worrying about, but you do think about it when the topic emerges. After I saw the film "The Day after Tomorrow" I was like: "Oh no, what is happening!" No one has said that it cannot happen. However, it might not be as big [a problem].

Interviewer: Are you very worried about the future, or what?

Trym: No, I am fine [humoristic tone].

Hans: We are, after all, not vulnerable, so we do not think much about it.

Filip: I think that we in this generation should be more preoccupied with it so that we can teach our descendants so that they may become even more preoccupied with it. And we too, at the end of our lives.

Trym: So why should we bother? [Ironic tone]

The climate change problems were also described by some as so huge and complex: "with the rain forest disappearing, sea level rise and damage of the biological diversity" (Asbjørn, # 3) that it became difficult to relate to and to deal with. As Else, one of the young mothers in the maternity group (# 2) put it: "I feel that you resign a little, this is too big. This makes you feel like: Help, what can you do other than trouble yourself? You can of course do all these little things you can do – you have to do that – but this is like an enormous problem!"

In such ways, interviewees frequently made use of the Nature drama frame in their accounts of what global warming was, while at the same time trying to resist seeing the resulting changes as scary with respect to the consequences for themselves even if they were concerned as citizens. As noted above, this was based on their perception of climate change problems as distant from their every day concerns,

making global warming less imminent than other problems, similar to what Lorenzoni and Pidgeon (2006) observe in the US and in European countries. In addition, some interviewees also mentioned that they were concerned with other environmental challenges as well as dramatic risks like the bird flu. This is again consistent with research done in other countries. “[P]ublic concern for climate changes appears to be tempered by uncertainty about whether and when climate changes will occur, the degree of change and by competition from other seemingly more relevant issues of individual” (Lowe et al. 2006: 438).

We proposed earlier that the Nature drama could be interpreted as a framing of climate science knowledge that produces popularised representations that emphasize effects rather than causes of global warming. It seems that the Nature drama framing was helpful to most of the focus group participants as a sense-making device. In this way, climate science knowledge appeared as relevant and assessable to the participants since the framing linked the scientific arguments about human-made global warming to observable and understandable phenomena like extreme weather or weather changes.

We proposed in section 2 that, the Nature drama also could serve as an invitation to observe a “public proof” of (Nowotny et al., 2001) or being engaged with global warming: See, it is happening! You can check for yourself! This assumption was supported by the focus group interviews. All participants had appropriated the idea that global warming could be represented through references to the weather, and this representation was central to their sense-making. However, the engagement with observable changes in weather allowed for different ways of domesticating climate

science knowledge. The following excerpt from the discussion among a group of pensioners (# 7) illustrates how the possibility to engage with news media efforts to do public proofs of anthropogenic climate change also allowed for sceptical assessments:

Interviewer: There was great consensus [in this group] that we do not have a climate problem here.

Gunn: Yes, we have.

Rolf: Not compared to what we had before. Everything has been going in cycles, from the time I grew up until today. We have had mild years, cold years. It is changing, and wind and weather have been going in waves all the time. It has been going in cycles. That's my statement.

Ragnar: I have been living in two countries. They have the same conditions down there as here. Cold winters, mild winters. Bad summers and warm summers. Temperature fluctuations are not a new phenomenon. It has been going on for ages.

Reiulv: Yes, but you can see that the ice on the poles melts.

As should be evident, some of the senior citizens accepted news media's reporting of weather changes as a proof of global warming, others did not. However, the exchange above also shows that irrespective of their positions, the participants referred to weather conditions when arguing the issue. Similar discussions also took place in a few other focus groups. Two features of these exchanges are interesting. First, the nearly seamless moving between/amalgamation of own observations about the weather and those reported in the media and/or by scientists. Second, how this amalgamation made it difficult to conclude discussions. Thus, those who accepted

human-made global warming as a fact, would in addition to mentioning observations of the weather also point to what they considered to be established scientific knowledge about changes in temperatures. An example of this was the following exchange between a scientist and an engineer, both belonging to a group of friends in their forties (# 9):

Eskild: I believe it [climate change] is human-made because in the period we have been using fossil fuels the most, there has been an increase [in global temperature] of one or two degrees. It is no longer a question if there is a climate change. At least as far as I have understood [the situation].

Wahid: It is occurring naturally.

Eskild: Yes, but it varies and in the last few years we have seen an increase in the average temperature, and how likely are the consequences of that [increase]? We don't know for sure, but that it [the temperature] has increased has been established as a fact.

Wahid: It may for example snow in Iran but not in Norway. It has never been so cold ever in Iran.

However, as this exchange between Eskild and Wahid exemplifies, skeptics are not necessarily persuaded by references to 'what we know'. The currency of weather-related arguments clearly blurred the distinction between science and the public, facilitating public engagement by giving more room for lay expertise. In principle, everybody has access to information about and experience with the weather and thus may claim some expertise in assessing if there are on-going changes or not. However,

most of the interviewees gave some authority to scientific accounts, unlike Wahid in the exchange above.

So far we have seen that the domestication of knowledge about climate change very much have made this a weather issue, accessible to lay people in local as well as mediated contexts. In this respect the Nature drama framing of the news media was received as a sense-making device as we expected. Global warming was largely understood as ongoing weather changes, which also was considered to allow the focus group participants a role in the assessment of truth claims. The received versions of the Nature drama were employed to provide meaning to climate science's proposal of human-made global warming, whether this proposal was accepted or not.

What role did climate science play in the sense-making with respect to global warming? Was the news media reporting that emphasized scientific controversy, received as an argument in support of a blurring of science and society and a stronger reliance on lay interpretations? Was the Science drama used as a sense-making device to support uncertainty and skepticism?

## **6. Scientific controversy: A reason to be sceptic?**

Climate science was mostly backstage in the focus group discussions. It was seldom explicitly invoked in the arguments, even if many statements reflected climate science knowledge. Basically, as we already have observed, climate science was present in a mediated form. When we asked the groups whether climate scientists agreed about human-made global warming, it became apparent that this was a more up-front issue. Basically, all of our informants had noted the news media coverage of

scientific disputes with respect to anthropogenic global warming – the Science drama – but they received it in different ways.

We proposed earlier that the Science drama framing would facilitate scepticism. In line with this expectation, some focus group participants argued scepticism or uncertainty with respect to the correctness of scientific claims about human-made climate change by asserting that such claims were at the centre of heated scientific disputes. We observed arguments that the scientific evidence of global warming was uncertain per se, that the proportion of climate changes stemming from human conduct was exaggerated, and that climate change was due to natural variations only. This was most clearly voiced in the focus group interview with senior citizens (# 7), where some also claimed that scientists sceptical towards the majority position about human-made global warming had been unduly overlooked:

Rolf: Those that have positive information [about climate change] have been silenced.

Interviewer: What do you mean by 'positive information'?

Rolf: Those that deny that the negative aspects are as big as they are claimed to be.

Thus, Rolf actually thought that media did not sufficiently represent the scientific controversy and his scepticism seemed rather unaffected by the reported Science drama. A different sense-making process may be observed in the following exchange between Kari and Thale of the maternity group (# 2). Here, we see how the Science drama could be received in a way that produced doubt and uncertainty:

Kari: Many scientists say that climate changes are human-made, but then there are always somebody appearing to tell that this is not correct. Thus, there are so many diverging opinions, so it is difficult to decide whom to believe.

Thale: You see the same thing with the melting glaciers. They have measured this even, but at the same time there have been changes – we have had ice ages before, also. Thus, there have been fluctuations, you know, so I'm sure it is difficult to measure, and make claims about, because they really don't know for sure.

Thale went on to explain why she was so receptive with respect to the Science drama:

There are various scientists with different opinions about it [climate change] all the time, so then I think that maybe it isn't so bad. It stands to reason that it is pollution and such that make this [global warming], because we haven't had such things on Earth before, but at the same time you think that maybe this is just natural [...]. I'm influenced a bit by this latter argument, really, maybe because I want to believe that it is occurring naturally.

We see Thale's reflexive observation that it was more convenient for her to be in doubt to be important. It reminds that the domestication of climate change knowledge for some may be slow or difficult, not because the knowledge is difficult to understand but because it may be dissonant with the established practices of everyday life. We shall return to this point in the next section.

As a sense-making device, the Science drama could produce doubt and scepticism. However, several participants actually dismissed this drama. Consider the following exchange in focus group # 4:

Interviewer: Do you have the impression that climate scientists agree about climate change?

Lasse: Now, I feel there is a greater degree of consensus.

Katrin: I think that it seems as if there are more and more scientists that are of the opinion that it [climate change] is human-made than what we originally thought.

Ragna: I don't agree – I think that it [scientists' opinion] still appear much divided.

Liv: Yes, I miss a sort of clear message, I do.

Lasse and Katrin rejected the Science drama, while Ragna and Liv maintained an impression that there was disagreement. However, none of the four participants used the Science drama as a sense-making device. They had domesticated climate science knowledge to imply that human-made global warming was going on and that something needed to be done. Liv nevertheless called for a voice of authority to end the impression of controversy, also because she was a bit fed up by what she saw as sensation-making news media coverage.

Thus, the sense-making quality of the Science drama varied because it was received in different ways. Generally, participants observed that the news media presented such a drama, and many of them added that they thought to have observed shifting opinions, controversies and even inconsistencies in the news media coverage.

However, they might still accept climate scientists' claim about human-made global warming. The most common effect of sense-making through the Science drama as it was received was to support more alleviated positions with respect to the gravity of the situation. News coverage using the Science drama framing was interpreted to provide some room for doubt, but primarily about the risks involved. Some focus group participants also received the Science drama in ways that probably made the Nature drama appear as less trustworthy. When scientists were seen to disagree, this seemed to give more room for personal opinion.

To what extent did considerations regarding scientific controversy with regard to climate change lead to a blurring of science and society and a stronger reliance on lay expertise? As we have learnt from the above analysis, the answer is ambiguous. In most cases, the reception of the Science drama as a sense-making device seemed to facilitate the voicing of personal interpretations and legitimizing lay points of view, but at the same time retaining a certain respect for scientific authority. Only a few contradicted mainstream scientific views in an outspoken manner. Actually, the most striking feature was not a blurring of science and society but a pervasive questioning of the news media as a reliable source of knowledge about climate change. How was this doubt enacted and with what consequences?

## **7. Making sense through media, politics and everyday life**

As we have seen, in their domestication of climate science knowledge the focus group participants employed the Nature drama and the Science drama as sense-

making devices to a varying degree and in diverse ways. This diversity appeared partly to be due to other sense-making processes, not the least the widespread doubt about the trustworthiness of the news media's presentation of global warming and its consequences. This could result in scepticism like Lars, participant in the university student group (# 1), voiced in the following way:

I do not think the climate problems are as big as one may get the impression of. I suspect that the media magnifies the problem... I think there are much more natural changes occurring than the impression one gets [from the media] ... I do not think that it [global warming] is as human-made as it often ... as it allegedly is, according to the tabloids. Because, some times it sounds like the world may go under at any time. I do not think it is as bad as they want to describe it.

However, distrust of the media could lead to quite different conclusions. For example, the group of rural high school students (# 6) deliberated the issue with a twist, as they made use of what they had learnt about reading media at school. Even if all the participants accepted that global warming was human-made without reservations, they had the following exchange regarding news media coverage:

Tanja: It [global warming] certainly is a problem, but maybe they [the media] make it into a bigger problem than it really is.

Frank: In order to get people to buy newspapers and stuff.

Kaja: Like what we learnt in the Norwegian language class; the example with the meteor that was going to hit the earth. It is not completely true what it [the headline] says, but if you read the complete text you will understand it.

Tanja: Yes, yes, are you going to die then! [laughter]

Trym: They represent it [climate change] to make you interested. In order to get your attention ... they push things a little more to the extremes, so that we shall become more interested. So it is really only a trick from their [the media's] side.

The students displayed a quite cynical approach to interpreting news media information about the climate issue. As Kaja indicated above, they had been taught such critical reading of texts at school. However, their critical reading was mainly acts of moderation than of dismissal.

Claims that media staged news in an overly dramatic fashion were fairly common across the groups. Many participants thought like Eva in group # 10: "The media should have calmed down their headlines and written about facts and expertise. They should have presented things at another level than just whipping us with such scare propaganda. They should present facts about what is happening on a global scale, how things are connected". Thus, despite the fact that mass media was their most important source of information about climate change, quite a few of the participants read the news dramas as exaggerated, as the product of sensational writing to sell more newspapers. Some participants also expressed concern that news media coverage of disagreements and shifting opinions among climate experts might be confusing to the public. In this way, also the critical reading of media represented a framing of the coverage of climate change issues that had ambiguous effects. As we have seen, it could facilitate acceptance as well as doubt or scepticism.

We observed two more frames of thought among the focus group participants that were important in their sense-making. The first was their accounts of political action, or rather the lack of such initiatives. Some participants were critical of what they saw as passive politicians, while others were puzzled by what they saw as a contradiction between the scientific claim about a very serious global problem on the one hand and the lack of visible, concerted political action to remedy the situation on the other. They tended to think that, in principle politicians had the will and the ability to solve really serious challenges. Thus, when politicians were seen not to propose radical, large-scale initiatives to for example curb CO<sub>2</sub>-emissions, this was interpreted as yet another proof that the impact of climate change was exaggerated by climate scientists as well as the media. Liv, of the alternative housing group (# 3), put it poignantly: “I do not think it [global warming] is human-made only – I don’t – because if it had been, I think that the governments in various countries would have done something!”

This indicates that the domestication of knowledge of global warming could be influenced by the way the problem was acted upon (or not) by politicians. Lack of political action was by some interpreted as a question-mark with respect to the reliability of scientific knowledge. Arguably, these participants observed a failing co-production of knowledge and politics (Jasanoff 2005), a lack of reinforcement between science and policy to achieve stability of both these sides of the equation. Some participants also pointed towards the increasing availability of cheap air tickets or the support of motor sports as inconsistent with the messages from climate scientists. Largely, the interviewees expected problems of such magnitude as global warming to be dealt with by industry and government. Wahid (# 9) put it straight: “It

is big industry and governments that may do something. We [ordinary people] cannot really do anything. To turn off the light doesn't help”.

The second frame of thought emanated from reflections about everyday life issues. At the centre of these reflections was the problem of how to act on the challenges related to global warming. Most of the interviewees felt fairly powerless in the face of what seemed to them to be insurmountable challenges. Besides engaging in recycling as they were asked to by the government, perhaps also save a little on energy use and car driving, most focus group participants found it difficult to see how their individual acts could matter. Some used this as an excuse to continue to live the way they did. Others stated more bluntly, like Eskild in focus group # 9: “I don't think any of us around this table is willing to reduce their standard of living”.

How did this thinking from everyday life influence the sense-making with respect to global warming? We saw earlier how Thale of focus group # 2 mused about whether she was in doubt about the reality of anthropogenic climate change because that was more convenient for her. Other participants also seemed to make sense of global warming in a way that was affected by their considerations with respect to remaining within their established practices of everyday life. In general, it appeared that the notions of what could be called a post carbon society at best were quite vague. Some, like Eskild, saw the potential call for a more frugal way of living, which was not appreciated. Thus, an important challenge to the domestication of climate science knowledge was to translate it into practice: How to act upon global warming? Many saw it as frustratingly difficult to answer this question.

## **8. Making sense of global warming: Four ways of domesticating knowledge**

In this paper, we have studied how people make sense of anthropogenic global warming. Generally, the participants in the focus groups had domesticated knowledge about global warming; cognitively by accepting that climate change was happening at least partly due to human action and symbolically above all by associating such changes to the weather. In this way, global warming was made sense of through potential effects rather than with reference to the mechanisms producing the effects, besides noting that emissions of CO<sub>2</sub> was at the hearth of the matter. Domestication in terms of practice was limited. The participants in the focus groups engaged in what we could call discursive activities but besides 'the small things' like engaging in recycling and use their car a little less frequently, they found it difficult to figure out what they ought to do.

As we have observed, the domestication of climate science knowledge was shaped through five sense-making devices: the Nature drama, the Science drama, the media critique, political inaction, and considerations with respect to everyday life. Further, we found that these sense-making devices allowed for ambiguous outcomes, which may explain the diversity with respect to the domestication processes of the focus group participants. When we focus on outcomes with respect to acceptance versus scepticism, it seems a reasonable summary of the findings to claim that the following four main categories of domestication emerge from the sense-making processes:

1. *The acceptors*. This category of participant fully accepted the idea that global warming is going on, that it is the result of human actions, and that

consequences are grave and call for comprehensive responses. They seemed to have arrived at this position partly through the Nature drama, which worked as some kind of public proof for them, while they more or less dismissed the Science drama framing. They joined in on the critique of media, but this sense-making device did not really affect their position, neither did political inaction or considerations with respect to everyday life.

2. *The tempered acceptors.* Participants in this category also accepted the claim about anthropogenic climate change, but they were less sure of the gravity of the problems that could emerge. Consequently, they were also more doubtful with respect to comprehensive action. Also they seem to have arrived at their position through the Nature drama as public proof. The temperedness was caused by one or more of the other sense-making devices. Some received the Science drama to doubt the gravity of the consequences of climate change, some thought media overstated the issues in a way that made them a bit uncertain; political inaction and everyday life considerations could also cause a tempered sense-making.
3. *The uncertain.* These participants knew about the claims of climate science but were in doubt if they really were true. All sense-making devices could be seen to provide reasons to be uncertain about the issue or, rather, it seems as if it was the totality of the sense-making that led them to this conclusion – perhaps fuelled by a wish to maintain their present way of living.
4. *The sceptics.* Participants belonging to this category rejected that anthropogenic climate change was happening; some rejected the idea of global warming altogether. To the sceptics, it seems as if they arrived at this position mainly through the Nature drama. They took the invitation to engage

in this kind of public proof and privileged their own experiences and observations. The Science drama as well as the media critique could be used to support this conclusion, while the sense-making devices of political inaction and everyday life considerations appeared to be unimportant. However, we suspect that the latter sense-making device actually was more important than the sceptics would admit.

Most of the participants in our study belonged to the first two categories. This seems to be in accordance with survey-based findings in many other countries (Lorenzoni and Pidgeon, 2006; Lowe et al., 2006); the majority accepts the claim about anthropogenic global warming. However, at the same time, the focus group discussions gave evidence about a fairly strong undercurrent of doubt, not only among the uncertain and the sceptics. The undercurrent of doubt was also influential with the tempered acceptors.

As argued above, the ambiguous sense-making we observed had many sources, including the news media and the way they have covered global warming. In a fundamental sense, climate change has been mediated but in a way highly dependent on the way people live and how they interpret everyday life (Silverstone, 2007). We proposed initially that the two main framings of the issue found in Norwegian newspapers, the Nature drama and the Science drama, would be received as providing grounds for acceptance and scepticism towards climate change, respectively. We have seen that the outcome was more complicated, partly because the reception of these two dramas was more equivocal than we assumed, but also due to the influence of other sense-making devices. The news media coverage was

received in critical and reflexive ways. Still, it was notable how news media's translation of 'human-made global warming' into changing weather made the phenomena appear as more accessible and understandable. In particular, the Nature drama served as an invitation to engage with the issues in ways that transcended the expert-lay dichotomy often deployed in studies of how people engage with scientific knowledge.

Hulme (2009) propose that disagreement about climate change is caused not only by the complexity of the issue but above all by its scope. He claims that climate change is not a well-defined problem to which there is a well-defined solution; it raises a broad set of questions with regard to modern life. Our findings may be interpreted to support this view, in particular through the observation of how the domestication of climate science knowledge was influenced by interpretations of climate change politics and sense-making with respect to everyday life. Probably, the precarious relationship between what we call the undercurrent of doubt and the readings of climate change politics deserve particular attention. We seem to be in a paradoxical and problematic situation where politicians are waiting for their constituencies to have a clear opinion, while voters look to politicians to take the lead. Climate science cannot be expected to break this stalemate on its own.

## **Notes**

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<sup>2</sup> Global warming and climate change are used interchangeably in this paper, even if the two concepts sometimes are given a slightly different meaning. For our purposes, such distinctions are not important.

<sup>3</sup> The analysis was based on the identification of a total of 394 articles on climate change issues published in eight main Norwegian newspapers across the political spectrum between 2002 and 2005: Adresseavisen, Aftenposten, Bergens Tidende, Dagsavisen, Dagbladet, Dagens Næringsliv, Klasskampen and Nordlys. The articles were identified through the use of the database Atekst (now Retriever) which contains all articles published in these eight newspapers. They were analyzed through qualitative content analysis, using open coding (Strauss and Corbin, 1998). A small number of articles had a different focus, for example on practical implications. But in the period covered, they were very few.

<sup>4</sup>We asked questions like this: Is the information you get (from the scientists and the media) difficult to understand? Is there much or little information about the subject? Is it nuanced or not? Reassuring or frightening? Interesting?

<sup>5</sup> The number identifies the focus group in Table 1.

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Table 1. Overview of focus groups and the participants

Group no.	Group characteristic	Age span	Social background	Given names of participants	Date of interview	Place of interview
1	2 men and 2 women students, bachelor-level	20-25	Students in Media studies	Kai, Lars, Hilde, Hanne	04.05.2006	At the university
2	6 women in a maternity group	30-35	Manual therapist, physiotherapist, Ph.D.-student, university administration	Aina, Kari, Else, Thale, Åsne, Siri	06.06.2006	At the home of one of the participants
3	5 men playing soccer together	35-40	Three with higher education, one carpenter, one unemployed	Gunnar, Sturla, Jens, Asbjørn, Haldor	19.05.2006	At a football field
4	1 man and 3 women engaged in alternative housing	23-35	Three students (two in health professions, one in education) and one unemployed journalist	Ragna, Liv, Katrin, Lasse	23.05.2006	At the home of one of the participants
5	3 men and 5 women from a class at a private urban high school with many adult students	20-27	High school students, but with previous experience from various forms of manual labour	Mona, Eira, Kristin, Paul, Ørjan, Grethe, Monica, Edvard	29.02.2006	At the school
6	5 men and 3 women from a rural high school class	16-17	High school students	Sara, Trym, Filip, Hans, Tanja, Kaja, Frank, Sander	24.03.2006	At the school
7	4 men and 4 women from a group of retired people	57-71	Previously worked as skilled labourers or in services	Ove, Gunn, Esther, Hanna, Trond, Reiulv, Ragnar, Rolf	08.03.2006	Meeting room at Fellesforbundet, a large trade union.
8	7 women running a series of home-parties	32-39	Varied, three worked in marketing, one sales person, one teacher, one student and one school counselor,	Merethe, Anja, Silje, Terese, Irene, Heidi, Malin	11.05.2006	At a home party, hosted by one of the participant
9	4 men and 4 women that were meeting frequently for social purposes	39-47	3-5 years of higher education, four working in health care, one restaurant owner, one engineer, one research scientist, one Ph.D.-student	Eskild, Wahid, Heine, Tea, Laura, Karim, Hildur, Harriet	12.01.2007	Meeting room in an office building were one of the participants worked.
10	4 women meeting often for handicraft and conversation	58-65	Nurses	Mariann, Edith, Eva, Kate	19.02.2007	At the home of one of the participants