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Survey on the use of climate scenarios and
climate change research information in
decision making in Finland, Sweden,
and Norway

Report for the project Climate change adaptation in
Norway, Sweden, and Finland
– do research, policy and practice meet? (CAREPol)

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Report on results of Questionnaire 2 – Decision makers

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Abstract
Recently, more emphasis has been placed on the effective use of scientific research results in decision making. This report presents the results of the questionnaire targeted to decision makers working with climate change in Finland, Sweden, and Norway. The aim of the questionnaire was to get an insight into decision makers' views and experiences on the use of climate scenarios and climate change research information. The response rate was 42 % in Finland, 68 % in Sweden, and 31 % in Norway.

Based on the results, climate scenarios are fairly widely used among decision makers. The most cited reason for not using climate scenarios in Finland and Norway is that it does not belong to respondents' job description. In Sweden, the reasons given are more varied. Scenarios are used for adaptation and risk planning purposes and as a background material for strategy papers. Climate scenarios used among decision makers are mostly based on average emission levels.

The respondents are fairly satisfied with the research information they receive from research institutes. However, a large share of the respondents thinks that there is not enough research about consequences of climate change. Also the lack of resources for getting acquainted with the research information is distracting the effective use of research knowledge. Availability of the information should also be enhanced. The most popular source of climate change information was IPCC reports and summaries.

The three most popular issues of which decision makers would need more research information are, in descending order: adaptation measures, climate change progression and climate scenarios, and mitigation measures. Some differences between the countries occurred. Cost effects of mitigation and adaptation were among the top three issues in Finland, but in Sweden and Norway they did not receive that much attention. Of the sectorial research questions, the ones which would best facilitate decision making were energy (alternative energy) and construction and infrastructure.

A majority of the respondents think that communication between researchers and decision makers is not adequate. Basically all the respondents think that results and experiences obtained in Sweden, Norway and Finland could be shared and applied in the other countries as well.

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Introduction

This report presents the results of a questionnaire (Appendix A1) for decision makers using scientific climate change information in Finland, Sweden, and Norway. The questionnaire and this resulting report are part of the ERANET CIRCLE¹ Nordic project CaRePol². CaRePol aims to assess the information flow starting from the producers of climate scenarios, proceeding to the scientific community using climate scenarios, and ending up in decision makers using scientific climate change information in decision making on adaptation to climate change. These issues were mapped by questionnaires targeted to three respective groups in the chain of information flow: 1) Climate scenario providers, 2) Climate scenario users in the research community, 3) End-users (decision makers) of climate scenarios and scientific information. The results of this third questionnaire and the two other questionnaires conducted in the project will contribute to recommendations on future climate, impacts and adaptation research, as well as related research/policy dialogue and policy making.

The aim of the questionnaire was to get an insight of the use of scientific climate change research information and climate scenarios in decision making. A related aim was to find out how communication between researchers and decision makers is functioning. The questionnaire was sent to national and local level decision makers. The questionnaire was conducted during April–May 2009 simultaneously in Finland, Sweden, and Norway.

The questionnaire was sent to 141 organizations from Nordic to municipal level. The total organizational response rate was 44 %, being high in Sweden and lower in Finland and Norway. The individual response rate was calculable only for Finland, because in Finland the questionnaire was sent, with a few exceptions, directly to individual decision makers. In Norway and Sweden, the questionnaire was sent to one e-mail address in an organization (post@, info@, etc) with a request to distribute the questionnaire among employees working with climate change.

The respondent statistics are shown in Table 1.

¹ <http://www.circle-era.net/>

² Climate change adaptation in Norway, Sweden, and Finland – do research, policy and practice meet? Project receives funding from the participating institutes and from the Academy of Finland, the Swedish Environmental Protection Agency, and the Research Council of Norway.

Table 1. Number of respondents (individual and organizational) and recipients of the questionnaire.

Country		Number of respondents	Number of organizations
Finland	National level	25/83 (= 30 %)	11/23 (= 48 %)
	Local level	8/24 (= 33 %)	4/13 (= 31 %)
	Unknown	4	
	Total	37/107 (= 35 %)	15/36 (= 42 %)
Sweden	National level	15	14/19 (= 74 %)
	Local level	14	13/21 (= 62 %)
	Unknown	0	
	Total	29	27/40 (= 68 %)
Norway	National level	11	9/32 (= 28 %)
	Local level	16	11/33 (= 33 %)
	Unknown	1	
	Total	28	20/65 (= 31 %)
Total	<i>National level</i>	51	34/63 (= 54 %)
	<i>Local level</i>	38	28/67 (= 42 %)
	<i>Unknown</i>	5	
	Total	94	62/141 (= 44 %)

In the result analysis, the respondents have been divided into two categories: national and local level decision makers. The latter includes both the regional and municipal level respondents and the respondents who did not state their organization. In this report, however, mainly the collated results for all respondents are presented in tables and figures. Possible major differences between nation levels are mentioned separately.

Due to the low number of responses, no statistics have been applied. The responses presented should be regarded as qualitative rather than quantitative. Any differences between countries in the responses are, at best, indicative of a trend or tendency, rather than to be taken as a distinct difference. Direct quotations from the responses are mentioned separately each time. They have been translated into English from Finnish, Swedish, and Norwegian.

The result analysis in Sections one to five is formatted so that the tables and figures, their captions, and explanatory text of each response are followed by some discussion, if necessary. *The latter is of course interpretative by going beyond listing statistics or quoting the answers and is identified with italics to guide the reader.*

Next follows an overview of all the organizations that received the questionnaire. The lists indicate the number of e-mails sent to general and personal e-mail addresses.

List over the selected Finnish organizations:

	General	Personal
1. Prime Minister's Office		1
2. Ministry for Foreign Affairs	6	11
3. Ministry of Justice		1
4. Ministry of the Interior	1	2
5. Ministry of Defense		3
6. Ministry of Finance		3
7. Ministry of Education		3
8. Ministry of Agriculture and Forestry		18
9. Ministry of Transport and Communication		2
10. Ministry of Employment and the Economy	1	8
11. Ministry of Social Affairs and Health		2
12. Ministry of the Environment		14
13. Finnish National Board of Education		2
14. Finnish Defense Forces		3
15. Finnish Road Administration		3
16. Finnish Civil Aviation Authority		1
17. The Finnish Rail Administration		2
18. Finavia		1
19. Finstaship		1
20. Finnish Maritime Administration		1
21. VR Group		1
22. Energy Market Authority	1	
23. National Emergency Supply Authority	1	
24. Association of Finnish Local and Regional Authorities		3
25. Helsinki Metropolitan Area Council		4
26. Regional Council of South Karelia		1
27. Regional Council of Southwest Finland		1
28. Council of Oulu Region		2
29. City of Mäntsälä		
30. City of Tampere		1
31. City of Rovaniemi		4
32. City of Raase		1
33. City of Oulu		3
34. City of Uusikaupunki		1
35. Municipality of Kuhmoinen		1
36. Municipality of Parikkala		1

List over the selected Swedish organizations:

	General	Personal
1. Swedish Civil Contingencies Agency	1	
2. National Food Administration	1	
3. Swedish Forest Agency	1	
4. Swedish Board of Agriculture	1	
5. The National Board of Housing, Building and Planning	1	
6. Swedish mapping, Cadastral and Land Registration Authority	1	
7. Swedish Environmental Protection Agency	1	
8. Swedish Geotechnical Institute	1	
9. Svenska Kraftnät	1	
10. Swedish Rail Administration	1	
11. Swedish Post and Telecom Agency	1	
12. Swedish Maritime Administration	1	
13. Energy Authorities	1	
14. Geological Survey of Sweden	1	
15. Swedish Road Administration	1	
16. The National Board of Health and Welfare	1	
17. Swedish Institute for Infectious Disease Control	1	
18. Swedish Board of Fisheries	1	
19. National Veterinary Institute	1	
20. County Administrative Board of Blekinge	1	
21. County Administrative Board of Dalarna	1	
22. County Administrative Board of Gävleborg	1	
23. County Administrative Board of Gotland	1	
24. County Administrative Board of Halland	1	
25. County Administrative Board of Jämtland	1	
26. County Administrative Board of Jönköping	1	
27. County Administrative Board of Kalmar	1	
28. County Administrative Board of Kronoberg	1	
29. County Administrative Board of Norrbotten	1	
30. County Administrative Board of Skåne	1	
31. County Administrative Board of Södermanland	1	
32. County Administrative Board of Stockholm	1	
33. County Administrative Board of Uppsala	1	
34. County Administrative Board of Värmland	1	
35. County Administrative Board of Västerbotten	1	
36. County Administrative Board of Västernorrland	1	
37. County Administrative Board of Västmanland	1	
38. County Administrative Board of Västra Götaland	1	
39. County Administrative Board of Örebro	1	
40. County Administrative Board of Östergötland	1	

The 64 Norwegian organizations are:

	General	Personal
1. Ministry of Labour and Social Inclusion	1	
2. Ministry of Children and Equality	1	
3. Ministry of Finance	1	
4. Ministry of Fisheries and Coastal Affairs	1	
5. Ministry of Nation Administration and Reform	1	
6. Ministry of Defense	1	
7. Ministry of Health and Care Services	1	
8. Ministry of Local Nation and Regional Development	1	
9. Ministry of Culture and Church Affairs	1	
10. Ministry of Education and Research	1	
11. Ministry of Agriculture and Food	1	
12. Ministry of the Environment	2	
13. Ministry of Trade and Industry	1	
14. Ministry of Petroleum and Energy	1	
15. Ministry of Transport and Communications	1	
16. Ministry of Foreign Affairs	1	
17. Agency for Public Management and e-Nation	1	
18. Directorate for Nature Management	1	
19. Directorate for Emergency Communication	1	
20. Directorate for Civil Protection and Emergency Planning	1	
21. Directorate of Fisheries	1	
22. Norwegian Directorate of Health	1	
23. Innovation Norway	1	
24. Norwegian National Rail Administration	1	
25. Norwegian Metrology Service	1	
26. Norwegian Association of Local and Regional Authorities	1	
27. Norwegian Agency for Development Cooperation	1	
28. Norwegian Water Resources and Energy Directorate	1	
29. Norwegian Maritime Directorate	1	
30. Norwegian Board of Health Supervision	1	
31. Norwegian Public Roads Administration	1	
32. County Governor of Aust-Agder	1	
33. County Governor of Buskerud	1	
34. County Governor of Finnmark	1	
35. County Governor of Hedmark	1	
36. County Governor of Hordaland	1	
37. County Governor of Nordland	1	
38. County Governor of Nord-Trøndelag	1	
39. County Governor of Oppland	1	
40. County Governor of Oslo og Akershus	1	

41. County Governor of Rogaland	1
42. County Governor of Sogn og Fjordane	1
43. County Governor of Sør-Trøndelag	1
44. County Governor of Telemark	1
45. County Governor of Troms	1
46. County Governor of Vest-Agder	1
47. County Governor of Vestfold	1
48. County Governor of Østfold	1
49. County Governor of Møre og Romsdal	1
50. Governor of Svalbard	1
51. Municipality of Alta	1
52. Municipality of Sør-varanger	1
53. Municipality of Vågan	1
54. Municipality of Vega	1
55. Municipality of Haram	1
56. Municipality of Bømlo	1
57. Municipality of Halden	1
58. Municipality of Trysil	1
59. Municipality of Dovre	1
60. Municipality of Vinje	1
61. Municipality of Lierne	1
62. Municipality of Bardu	1
63. Municipality of Kautokeino	1
64. Municipality of Karasjok	1

In addition, the questionnaire was sent to the Nordic Council / Nordic Council of Ministers.

Responses to questions

Section 1: Respondents' background

The first section of the report combines the results of the first and the last section of the questionnaire to get an understanding of the respondents' and their organizations' background with regard to climate change issues. Note that the questionnaire was specifically targeted to employees and organizations for which climate change is an issue. We also advise caution in the interpretation of the responses due to low number of responses. The distribution of the respondents between sectors and countries may have an effect on the results.

1) How climate change is related to your work?

The responses to this question have been loosely categorized into seven categories, because some of the answers are detailed enough to possibly identify the respondent. Several responses could belong to more than one category, but apart from a few exceptions, each response has been categorized according to its best fit. Some direct quotations are listed after the table. A few responses could not be categorized because of either the generality of the response, e.g. *"I work with climate issues"* or of sectorial approach, e.g. *"... [I] have to work with issues related to forests and climate"*.

Table 2. The relation of the respondents' work to climate change. Numbers in bold refer to the most popular categories at the national (nat) and local (loc) level.

Category	Number of responses in each category:		
Policy oriented work: strategy work, funding	Finland nat: 11 Finland loc: 1	Sweden nat: 1 Sweden loc: 5	Norway nat: 0 Norway loc: 1
Mitigation of climate change, emission reduction	Finland nat: 1 Finland loc: 2	Sweden nat: 2 Sweden loc: 1	Norway nat: 4 Norway loc: 1
Adaptation to climate change, risks and vulnerability	Finland nat: 6 Finland loc: 2	Sweden nat: 9 Sweden loc: 4	Norway nat: 3 Norway loc: 2
Local/areal planning	Finland nat: 2 Finland loc: 4	Sweden nat: 0 Sweden loc: 2	Norway nat: 1 Norway loc: 5
Communication and coordination of climate change issues and coordination of research	Finland nat: 2 Finland loc: 0	Sweden nat: 1 Sweden loc: 0	Norway nat: 4 Norway loc: 1
Sustainable development and environment in general	Finland nat: 1 Finland loc: 0	Sweden nat: 0 Sweden loc: 1	Norway nat: 1 Norway loc: 1
<i>Total</i>	<i>Finland: 32</i>	<i>Sweden: 26</i>	<i>Norway: 25</i>

From now on Nat refers to national level (ministries and directorates) and Loc to local level (regional, municipal and unidentified responses)

Below follows some examples from each category. These are direct quotations translated into English.

Policy oriented work; strategy work, funding:

- “My work is related to nation strategies of climate and energy policy.”

Mitigation of climate change, emission reduction:

- “[I am] working mainly with measures to reduce emissions.”
- “Handling and reducing emissions is a central problem and challenge in the transport sector”

Adaptation to climate change, risks and vulnerability

- “It affects the long-term planning of the organization mainly as a threat which has to be taken into consideration both in national and wider perspective.”
- “County Administrative Board is the regional environmental authority and has a coordinating responsibility in adaptation to climate change.”

Local/areal planning

- “As a background phenomenon in urban planning and construction”
- “I am a planning engineer by profession and in my work we can affect the location of housing and operations, construction, transport etc.”

Communication and coordination of climate change research and issues:

- “My work is about climate change and its effects both from the research point of view and regarding applications and communications.”
- “Communication of national climate and energy policies”
- “Coordinating responsibility of the sector”

Sustainable development and environment in general

- “Sustainable development belongs to my responsibilities, climate change is one of the themes”
- “Working with environmental protection; to limit pollution through drainage and waste; to hinder the emissions and spreading of environmental pollutants; to maintain biodiversity.”

At the local level, climate change seems to be an integral part of local and areal planning. Responses indicate that climate change has become an important factor that has to be considered in the planning process. In Finland, the large number of respondents who work with policy oriented issues corresponds to a large number of responses from the national level. Perhaps

more surprisingly, in Finland and Sweden only a few respondents mentioned mitigation related issues as a main climate change related duty. Instead, adaptation to climate change and especially vulnerability and risk preparedness in different sectors belong to the duties of the respondents.

2) Please estimate, how many persons in your organization are working full-time with climate change issues.

Table 3. Estimated number of persons working full-time in the respondent's organization. [Number (#) and percentage (%).]

Persons:	Finland				Sweden				Norway			
	NAT		LOC		NAT		LOC		NAT		LOC	
	#	%	#	%	#	%	#	%	#	%	#	%
0	7	29	5	42	6	40	9	64	8	73	13	81
0.5	0		0		0		0		0		1	
1	4		1		1		3		2		1	
2	4		0		2		1		0		1	
3	2	54	2	42	1	40	1	36	0	27	0	19
4	1		1		2		0		0		0	
4.5	0		0		0		0		1		0	
5	2		1		0		0		0		0	
6	2		1		0		0		0		0	
7	0	13	0	8	0	0	0	0	0	0	0	0
8	1		0		0		0		0		0	
9	0		0		0		0		0		0	
10 or more	1	4	1	8	3	20	0	0	0	0	0	0

In Sweden at the local level, and in Norway at both government levels, over 50 % of the respondents estimate that their organization does not have any people working full time with climate change. In Finland at the local level, a few respondents estimate that their organization has several people working with climate change. At both government levels in Finland, and in Sweden at the national level, the majority of the respondents estimate that they have more than one person working full-time with climate change.

The respondents' background can affect the distribution of responses. The national ministries of Environment, for example, have probably several employees working full time with climate change. In sectorial ministries and at other government levels, climate is often an issue that must be considered but does not comprise someone's whole job description.

3) Please estimate, how many persons in your organization are working part-time with climate change issues.

Table 4. Estimated number of persons working part-time in the respondent's organization in number (#) and percentage (%).

Persons:	Finland				Sweden				Norway			
	NAT		LOC		NAT		LOC		NAT		LOC	
	#	%	#	%	#	%	#	%	#	%	#	%
0	1	5	0	0	0	0	0	0	0	0	0	0
0.3	0		0		0		0		0		1	
1	0		1		1		2		1		2	
2	2		0		0		0		1		3	
3	0	18	2	33	1	43	2	57	1	70	2	80
4	1		1		1		1		1		3	
4.5	0		0		0		0		1		0	
5	1		0		3		3		2		1	
6	1		1		3		1		0		1	
7	0		0		0		0		0		0	
8	0	5	0	8	0	21	1	21	0	0	0	7
9	0		0		0		1		0		0	
10 or over	16	73	7	58	5	36	3	21	3	30	2	13

Organizations with no employees working full-time with climate issues can still have staff that works part-time with climate change, perhaps signifying that climate change is considered when addressing other issues. In some cases it even seems that the whole organization is somehow involved in climate change issues.

4) Please estimate, how much of your working time you spend on average working with climate issues (the number of respondents in brackets in the legend).

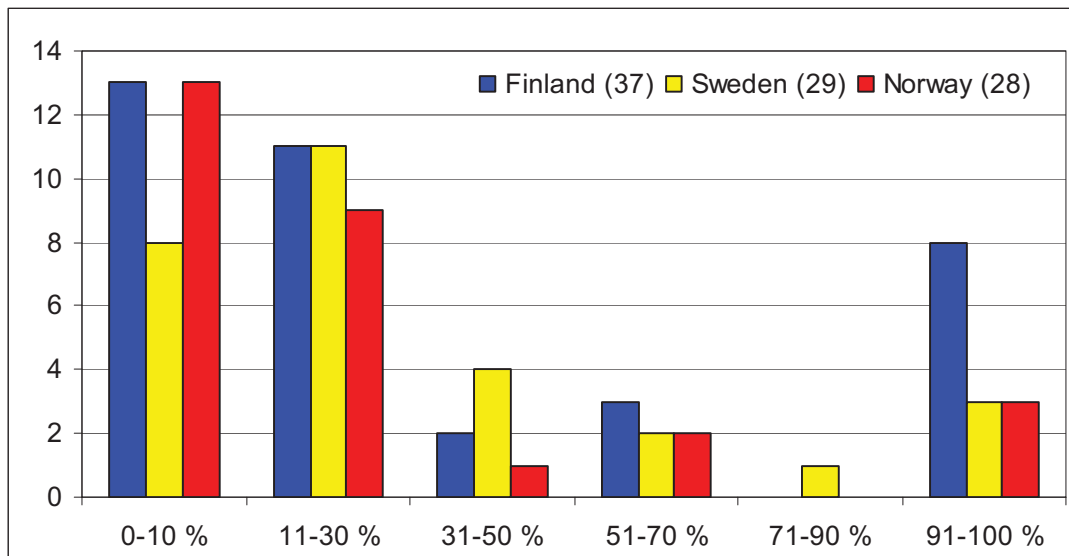


Figure 1. Distribution of the share of time the respondents spend on average working with climate change.

For majority of the respondents, climate change is not the main duty. In Finland and Sweden, about 65 % spend less than 30 % of their working time with climate change issues. In Norway, the share is about 80 %. There are not any significant differences between government levels in Finland and Sweden. In Norway, all the respondents spending more than 30 % of their working time on climate change issues are working at the national level.

5) How many years have you worked with climate change issues?

Table 5 shows the distribution of the years the respondents have worked with climate change.

Table 5. Worked with climate change for --- years, in number (#) and percentage (%).

Years	Finland				Sweden				Norway			
	NAT		LOC		NAT		LOC		NAT		LOC	
	#	%	#	%	#	%	#	%	#	%	#	%
0	1	4	1	9	0	0	0	0	0	0	3	19
0.3 – 3	6		6		6		8		4		6	
3.5 – 5	3	38	1	64	4	77	2	66	0	44	4	63
6 – 10	8	29	1	9	2	15	5	33	2	22	3	19
11 – 20	6		1		1		0		3		0	
> 20	1	29	1	18	0	8	0	0	0	33	0	0
Total	24	100	11	100	13	100	15	100	9	100	16	100

Except for the Finnish national level respondents, a great majority of the respondents have worked less than five years with climate change.

The fact that most respondents have been working with climate change at least for some time indicates that the overall responses to the questionnaire provide distinct information on how decision makers use scientific climate change information.

6) Please indicate your position

Table 6. Position of the respondents.

	Management	Expert/Officer	other, please specify	Total
Finland	5	30	2	37
Sweden	5	23	1	29
Norway	6	5	15	26
Total	16	58	18	92

The distribution between positions is fairly even in Finland and Sweden, where the majority of the respondents are working as experts/officers. The distribution is even also between the government levels. In Norway, the majority of the respondents stated some other position than either of the two given alternatives. Of the 15 Norwegian respondents, five are consultants, six executive officers; one is a chief engineer, one a director, and one a senior advisor. The two “other” positions in Finland are a project assistant and a person elected to a position of trust. In Sweden the one “other” respondent is a handler/desk officer.

7) Please indicate your educational background:

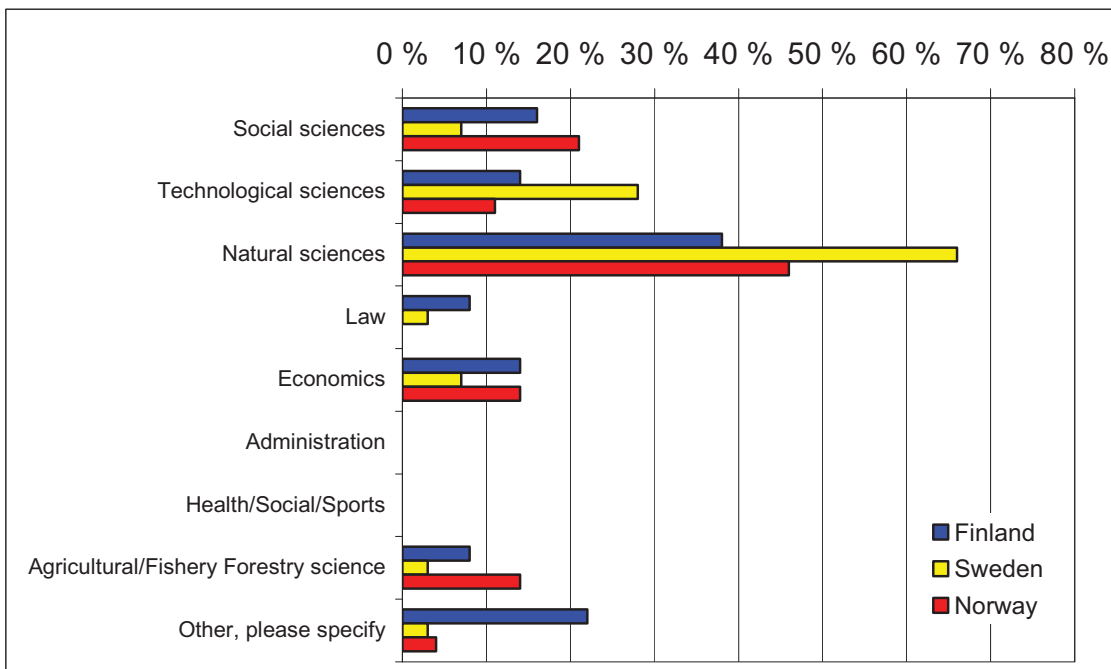


Figure 2. Educational background of the respondents.

Educational background of majority of the respondents is in natural sciences. The distribution between countries and also between government levels is fairly even. In Norway, ten out of the 13 respondents with natural science background work at the local level. In Finland, there are also respondents with pedagogical, architectural, military and environmental science background. One of the Swedish respondents was originally a baker and a confectioner. In Norway, one of the respondents has a pedagogical background.

Clearly, not all decision makers working with climate change are trained as natural scientists. This should be kept in mind when reporting research results to decision makers. For example, the different terminology between disciplines can often be misleading or too complicated communication of the research can harm the efficient use of research information.

The aim of the following three questions is to have an insight into the respondents' awareness of climate change issues and of the role these issues play in the respondents' organizations. It must be noted that the responses reflect the personal opinions of the respondents, not necessarily the actual situation in the organization.

8a) I feel well informed about climate change issues.

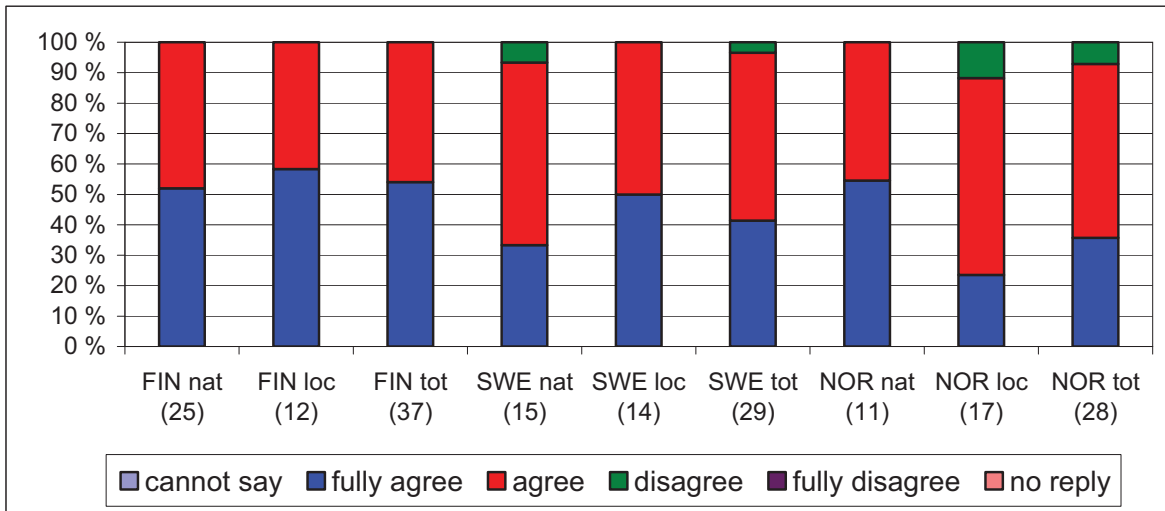


Figure 3. Respondents' view on how informed they are about climate change issues (the number in brackets refers to the number of respondents in each category).

In general, the respondents in each country and at each government level feel that they are very well or well informed.

8b) Climate change is taken into account in your organization's actions.

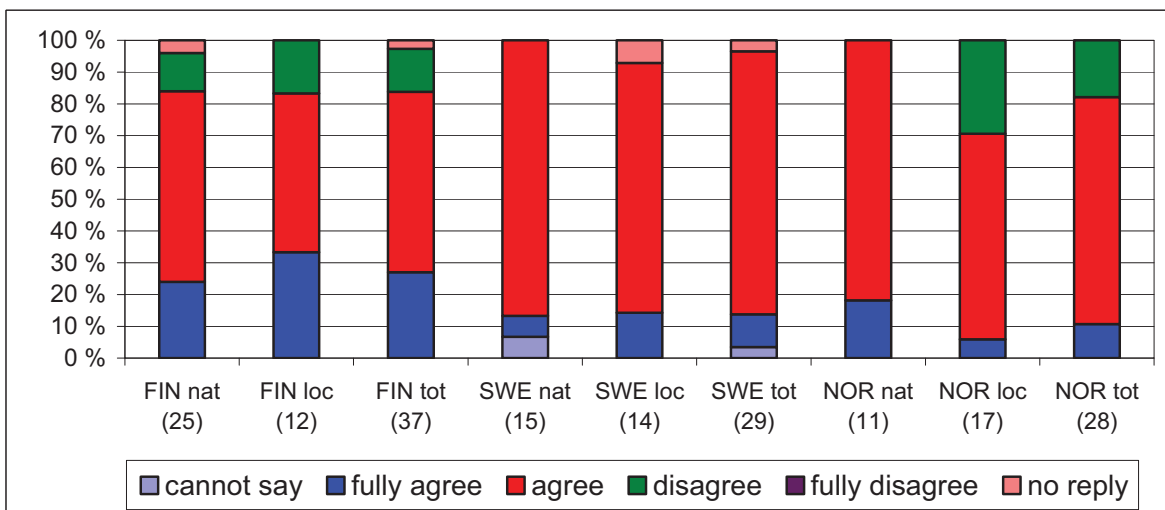


Figure 4. Respondents' view on how well climate change is taken into account their organizations' actions (the number in brackets refers to the number of respondents in each category).

The respondents do not agree with this statement as fully as they do with the previous one. Although climate change is to a large extent taken into account in every country and at both government levels, some Finnish and Norwegian respondents (5/37 and 5/17 at the local level, respectively) say that their organizations do not take climate change into account in their actions. However, none of the Swedish respondents disagrees.

The responses to these two questions indicate that the respondents think they are well informed about climate change and that in general it is taken into account in the actions of organizations.

9) In your opinion, what kind of role do the following issues have in your organization's agenda?

Table 7. The distribution of responses of the role the issues related to climate change have in the agendas of the respondents' organizations.

	Finland (37)				Sweden (29)				Norway (28)			
	0	1	2	3	0	1	2	3	0	1	2	3
<i>0 = cannot say, 1 = small, 2 = moderate, 3 = large</i>												
Mitigation measures	0	7	13	17	0	4	11	13	0	7	12	8
Adaptation measures	0	4	15	18	0	6	16	6	0	3	12	12
Costs due to direct impacts of climate change	0	10	18	9	4	13	8	3	0	18	8	1
Costs of mitigation	1	9	15	12	4	10	10	4	1	13	11	1
Costs of adaptation	0	6	20	11	3	13	10	2	0	16	8	3
Opportunities of climate change	0	11	16	10	1	11	9	7	1	13	11	2
Challenges of climate change	0	2	7	28	0	2	18	8	0	3	13	11
Other, please specify	6	1	1	0	4	0	3	0	5	1	0	3
Share %	3	19	39	39	8	29	42	21	4	38	38	21

Challenges of climate change have, by far, the largest role for Finnish organizations. The distribution between the government levels is fairly even, although six of the seven moderate level responses are from the national level. Mitigation and adaptation measures are the second most important issues. At the local level, mitigation measures did not receive any mentions in the category "small". One respondent from the local level marked adaptation measures to play a small role. Surprisingly, costs do not have as large a role as measures or challenges. Costs of mitigation have a slightly larger role than costs of adaptation, but the difference between the two categories is not large. Costs due to direct impacts do not have as large a role than the mitigation and adaptation costs, but about 50 % have marked it to have a 'moderate' role.

In Sweden, the importance of the issues differs somewhat from Finland, but all in all, the results are similar. Mitigation measures have the largest role, challenges and adaptation measures being right behind in importance. At the local level, only one out of 14 think that adaptation has a large role, whereas ten out of 14 think its role is moderate. Also in Sweden, costs have a smaller role than the other issues.

In Norway, adaptation measures and challenges of climate change have an evenly large role in the agendas of organizations. In general, however, the alternatives given mostly have a small role in the agendas. Thus, it is difficult to find clear differences. Similar to Finland and Sweden, costs play a smaller role than mitigation and adaptation measures.

The lesser role of costs is perhaps an indication of the importance and actual threat climate change is posing to branches of different organizations, or reflects the absence of and difficulty in making cost estimates and calculations on these issues.

Note: The questionnaire was translated into different languages before it was sent out to respondents. There was a small translation error in the Norwegian version. Instead of an option “mitigation measures” the questionnaire included an option “mitigating the consequences of climate change”. This corresponds to adaptation measures. Thus, the comparison of these two alternatives can be used to analyze how well the respondents understand the concepts of mitigation and adaptation. As can be seen, the differences between the two alternatives are so small that the respondents seem to understand adaptation correctly. However, it is also possible that respondents have responded to the first option as if it were mitigation measures.

Some issues that were not given in the question were also raised. Apart from the last entry, they all arose from the national level. These are direct quotations translated into English.

Moderate role:

- “Climate policy as a part of national and global decision making” (*Finland*)
- “Knowledge building and eco-friendly travel (carbon declarations when traveling)” (*Sweden*)
- “Biodiversity” (*Sweden*)

Large role:

- “International shipping discusses greenhouse gases in relation to Protocol 1-Protocol 2 countries and there is great disagreement. The shipping sector will act quickly once a consensus is reached.” (*Norway*)
- “Climate research and research on renewable energy sources and carbon capture and – storage” (*Norway*)

- “County governor environmental division is assigned by Directorate for Nature Management to resolve conflicts and problems arising from nature management due to climate adaptation work, partly regarding nature conservation connected to development of wind-energy” (*Norway, local level*)

One Finnish respondent said that: “In theory the importance of climate change is well understood, but in practice nothing happens”. One Swedish respondent said that their “business has no effect on the environment. The impact we have is paper and electricity consumption in the office”.

All in all, issues mentioned in this question seem to play larger role in the agendas of Finnish than Swedish and Norwegian organizations. *One explanation might be that the share of local level respondents is larger in Sweden and Norway than in Finland. However, it cannot be the full explanation because almost all respondents either fully agreed or agreed in question 1b) that climate change is taken into account in their organizations’ agendas.*

Section 2: Climate scenario use

The second section of the report presents the responses to questions related to climate scenario use in the respondents' work. The respondents, who are not using climate scenarios, did not answer to these questions except for the first question and the question asking for the reason of not using climate scenarios, which is presented at the end of section 2.

1) Do you use climate scenarios in your work?

Table 8. Number of respondents using or not using climate scenarios.

	Finland			Sweden			Norway		
	YES	NO	SUM	YES	NO	SUM	YES	NO	SUM
NAT	17	8	25	8	7	15	4	7	11
LOC	4	8	12	10	4	14	9	8	17
TOT	21	16	37	18	11	29	13	15	28

In each country, decision makers at both government levels are using climate scenarios. Among Finnish respondents, they are more widely used at the national level, while in Sweden and Norway, larger share of respondents at the regional than at the national level are using climate scenarios.

Note: the questionnaire was specifically aimed at people working with climate change. It seems that among them, climate scenarios are fairly widely used in decision making. The purposes of climate scenario use are elaborated further in the next question.

2) For what purpose(s) do you use climate scenarios?

These are direct quotations translated into English.

Finland; *National level:*

- “To provide background for policy assessments”
- “Mostly for taking into account the range of forecasts”
- “To perceive the changes in the Baltic Sea and its catchment basin”
- “Mostly I have commented / being involved in making the climate and energy strategy of the Ministry of Employment and Economy and the Nation foresight report”
- “I make or support learning materials others have prepared, inform in online services, write articles, support schools in making environment programs, hold lectures”
- “In developing the use and management of water resources, especially in tasks related to planning of flood risk management”

- “As a part of applied research”
- “For background papers”
- “In strategic planning of future activities and in revising directives”
- “For strategic preparation of primary production’s branches”
- “Different climate scenarios are being examined in school teaching”
- “I have tried to familiarize myself with and understand them”
- “Possible impacts of climate change to precipitation, dry seasons etc of the target countries. How can we affect with development cooperation funds?”

Finland; *Local level*

- “As a material or preparation of adaptation strategy, to recognize the impacts of climate change and to determine measures. Knowledge produced by scenarios is also used in communication, e.g. in presentations”
- “Land use planning, regional land use plan and regional strategic program work”
- “In preparing a Climate strategy”

Sweden; *National level*

- “Adaptation mapping”
- “I use scenarios indirectly in my work with flood problems linked to the height data quality, and in some projects that highlight the strength of the use of geographic information and GIS in support of adaptation and preparedness measures, for example, during a prolonged heat wave.”
- “To see how the cultivation opportunities in Sweden and globally are subject to change.”
- “Changes in fish fauna, both in commercially important species and others”
- “Information, dialogue, assessment”
- “Preparedness planning”

Sweden; *Local level*

- “Flood risk and planning”
- “In the work of climate and energy strategy for the counties and information in different contexts”
- “Indirect use (references) in connection to discussions and writings on different matters and concerns.”
- “In discussion with municipalities”
- “As a basis for flood planning issues in an EU project”
- “I work with the environmental quality objective ”Reduced Climate Impact””
- “Environmental analysis unit has used climate scenarios in order to better adapt the environmental monitoring to the effects expected with future changes. Also in the follow-up of environmental goals, information from climate scenarios has been considered in the evaluation.”
- “Mapping and identification of risks to important activities in the society, infrastructure, housing, etc.”

Norway; National level

- “To assess the need for new regulations for Polar shipping (in Arctic and Antarctic)”
- “To assess the effects of climate change on ecosystem, biodiversity and outdoor recreation”

Norway; Local level

- “Information about climate change”
- “Outreach to municipalities in the context of areal planning and emergency preparedness issues. The basis for evaluations if the municipalities have taken future climate into account in their Risk and Vulnerability Analysis and in relation to areal planning, construction, etc.”
- “Using climate scenarios in connection with planning”
- “To present and communicate climate change and its consequences for the municipality (use in presentations). Have used climate scenarios from senorge.no”
- “Scenarios are not implemented yet + climate as a part of forestry. A project to increase forestry activity through analysis on how information on forestry implications for climate change use should be orientated. Maybe not quite what was asked?”
- “To illustrate future challenges, new problem areas which need to be risk-assessed in order to be able to plan for preparedness and preventive measures.”

3) Climate scenarios you use are based on...**Table 9. Overview of types of emission scenarios used by the respondents.**

	Finland	Sweden	Norway
... high emissions (e.g. IPCC SRES A2 emission scenario)	10	5	3
... moderate emissions (e.g. IPCC SRES A1B emission scenario)	17	13	6
... low emissions (e.g. IPCC SRES B1 emission scenario)	7	4	3
cannot say	4	4	7

Table 9 shows that moderate emissions are most widely used in each country. Emission scenarios with high emissions are slightly more popular in Finland and Sweden but in Norway the distribution is even.

Figure 5 depicts the number of scenarios used by one respondent. The results are based on the responses of the previous question about the types of emission scenarios.

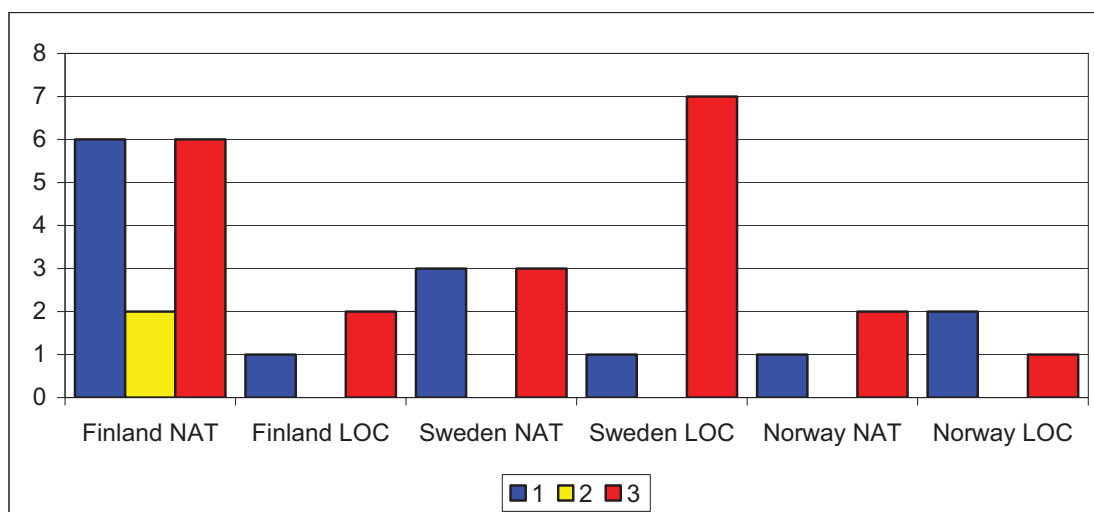


Figure 5. Number of scenarios used by one respondent in each country.

Respondents are using either one scenario type or all three types of emission scenarios. The only exceptions are the two Finnish respondents at the national level who use climate scenarios based on high and moderate emissions. The six Finnish respondents using only one emission scenario type are using scenarios based on moderate emissions. At the local level, one of the respondents using only one scenario type is using a high emission scenario, the other one a moderate emission scenario.

In Sweden at the national level, all of the three respondents using only one scenario use a moderate emission scenario. Also at the local level, moderate emissions are clearly the most popular emission type. Six out of seven respondents using only one scenario use moderate emissions. One is using a climate scenario based on high emissions.

In Norway, moderate emission scenario is used by the three respondents using only one emission scenario.

Table 9 and Figure 5 indicate that moderate emissions (e.g. IPCC SRES emission scenario A1B) are by far the most used emission level. High and low emissions are fairly evenly used.

4) Climate scenarios you use are...

Table 10. Geographical scale of climate scenarios in use.

	Global	Regional	Cannot say
Finland	15	11	1
Sweden	8	16	1
Norway	8	12	0

Global scenarios are more widely used among the Finnish respondents. This may be due to larger share of national level than local level respondents, or reflects the smaller national availability of regional climate scenarios compared to Sweden and Norway. Contrary to Sweden, where regional scenarios are more popular at both government levels, Norwegian national level decision makers use global and regional scenarios evenly.

5) Please select your opinion from the drop-down menu

a) Using climate scenarios is important in your organization.

b) Uncertainties related to climate scenarios are taken into account in the organization's activities.

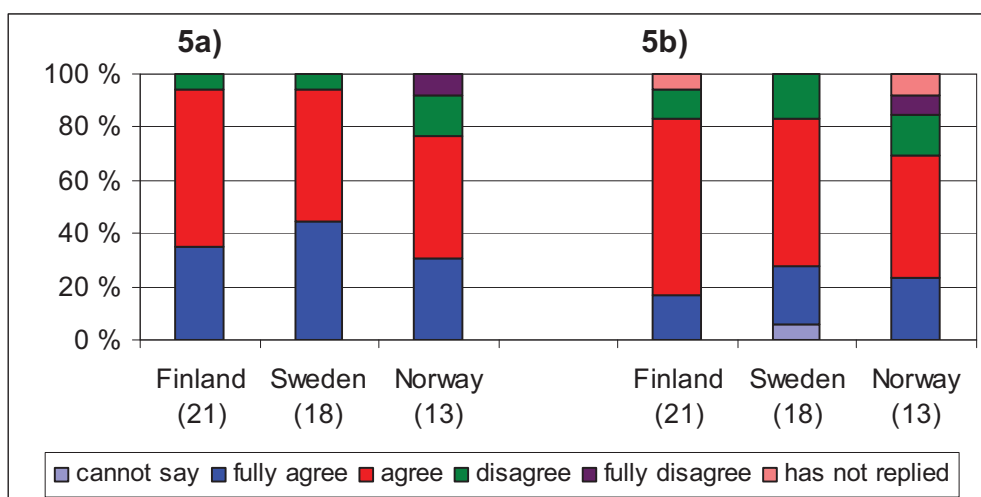


Figure 6. Respondents' views about 5a) the importance of climate scenarios in their organizations and about 5b) how uncertainties related to scenarios are taken into account (number of respondents in brackets).

Questions 5a) and 5b) reveal that only some of the respondents think that climate scenarios are unimportant for their organization and that the basic characteristic of climate scenarios, namely uncertainty, is rather well taken into account.

c) Interpreting climate scenarios should be easier.

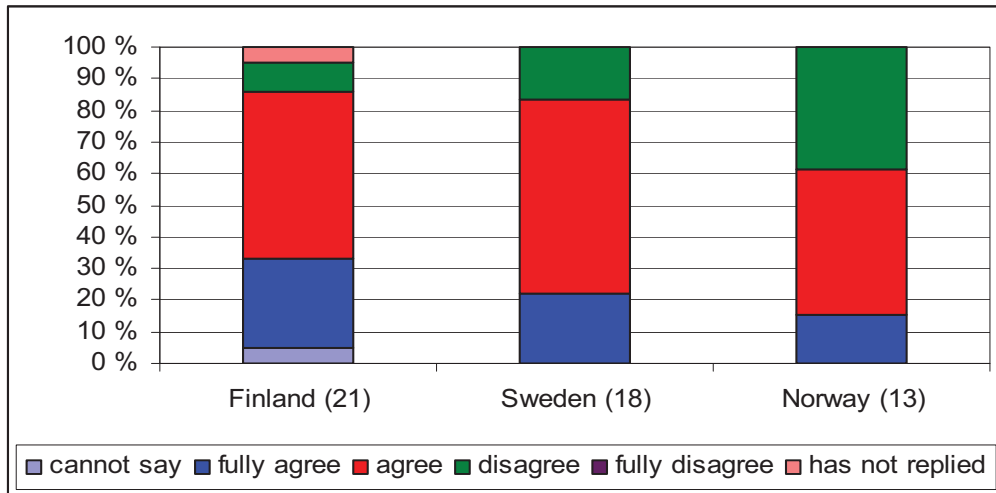


Figure 7. Respondents' view on the statement "interpreting climate scenarios should be easier".

There is a general tendency on a need for climate scenarios that are easier to interpret. The number of users that are content with the presently available scenarios is highest in Norway (40%). In Sweden only about 15 % and Finland about 10% of the respondents share the same view.

6) In your opinion, are current reports on climate scenarios and their consequences adequate?

The results of this question are presented (Table 11) only for Sweden and Norway due to technical reasons. In the Finnish version of the questionnaire, the respondents could not proceed if they replied with the alternative no.

Table 11. Response to if the current reports on climate scenarios and their consequences are adequate.

	YES	NO	TOTAL
Sweden	16	2	18
Norway	7	6	13

The number of responses is small because of the lack of Finnish responses, but it seems that Swedish respondents are in general satisfied with the reports. This is somewhat contradictory to the results of the previous question because over 80 % think that interpreting climate scenarios should be easier.

7) If you chose No on the previous question, in what ways could reports on climate scenarios and their consequences be improved so that they would be more understandable or better suit your purposes? *The underlinings are made by the authors to highlight important points.* These are direct quotations translated into English.

Finland; national level

- “Comparisons that are easy to interpret are needed”
- “Are adequate but intelligibility should be improved. It may be difficult for decision makers and laymen to understand e.g. figures and tables of IPCC-reports and the message from the figures and tables should be brought out intelligibly and clearly. Otherwise there will be misunderstandings.”

Sweden; national level

- “Eventually it would be easier to interpret information through data solution where you can choose from outside which parameters you want to pay attention to and to which area. The data and results from the SOU [Statens Offentliga Utredningar; the Commission on Climate and Vulnerability] were difficult to interpret and time/local adaptation and when you used the underlying map material it became hard.”

Sweden; local level

- “I hope that scenarios would have better regional resolution.”
- “To be able to use and communicate climate scenarios they have to be regional and preferably locally adapted. They could also be sectorial, showing how different sectors in the society are going to be affected.”

Norway; national level

- “There is a need for additional research to improve climate scenarios such that they include different emission scenarios, and they should be downscaled to regional and local conditions”

Norway; local level

- “In my job there is foremost a need for documentation of the expected consequences of climate change regionally and partly locally. Presentations have to be prepared. Uncertainties in scenarios should be presented individually.”
- “Scenarios and consequences should be adapted to local conditions”
- “More adapted to regional conditions to be more operative. Otherwise it is a weakness that there are no guidelines from the state on how climate fits into areal planning”
- “I have not familiarized myself enough with reports on climate change scenarios, but believe these should be more accessible and adapted to regional and municipal level. It is difficult to "select" between the different scenarios and to give good advice for emergency preparedness as there are different numbers and models to take into account. Think that senorge.no has good maps and use these to communicate and presentations. Missing a map about sea-level rise. Also wish more available collected material on different climate scenarios in - and maps on different regions on klimatilpasning.no”
- “This is not part of my tasks - therefore little known with it”

The responses indicate that downscaling of climate scenarios to regional and local conditions is considered to be essential.

8) Why do you not use climate scenarios in your work?

This is a follow-up question to the first question of Section 2: “Do you use climate scenarios in your work?” Especially in Finland and Norway, respondents not using climate scenarios say that use of climate scenarios does not belong to their job descriptions. In Sweden the reasons given are more varied.

Table 12. Overview of reasons for not using climate scenarios.

	Finland	Sweden	Norway	Total
Unnecessary	1	0	0	1
Difficult	0	1	1	2
Scenarios are unreliable	0	1	0	1
No time to get acquainted	0	3	1	4
Does not belong to job description	9	2	7	18
Necessary information hard to find	1	0	0	1
Other, please specify	3	4	6	13
Total	16	11	15	42

The specified reasons for not using climate scenarios are in the next page (direct quotations translated into English):

Finland; *national level*

- “Climate research is not appreciated in the organization. Research results are not utilized in practice. Particularly the management of the organization thinks climate research is not important.”

Finland; *local level*

- “Unfamiliar issue”
- ”They have not been mentioned earlier in the training sessions related to planning; only in this years’ training they were mentioned briefly.”

Sweden; *national level*

- “We assume that Sweden will use common models and projections and that it will not be up to each individual authority to decide which planning conditions we are supposed to use.”
- ”Has not been an issue because poorly informed”

Sweden; *local level*

- “Relatively little interest in the organization, few feel that they are responsible, it would be very desirable but difficult to apply”
- “I work with opportunities for growth in combination with reducing the climate impact. Cooperate with the University and their expertise. No time to get acquainted with climate scenarios and the issue is not directly related to adaptation.”

Norway; *national level*

- “Relevance varies from sector to sector”

Norway; *local level*

- “Have not started with that but we are making an energy and climate plan for the municipality in 2009”
- “As yet not familiar with the tool, other than use by Oslo Municipality and at County level”
- “County governor environmental division does not work with climate scenarios directly but participates in other parties' plan processes where these are included”
- “Do not have this as concrete task”

Section 3: Climate change research information

1) Please select your opinion from the drop-down menu.

a) Information on the consequences of climate change currently available is sufficient for designing strategy plans in your organization.

b) Enough resources are available to get acquainted with research information.

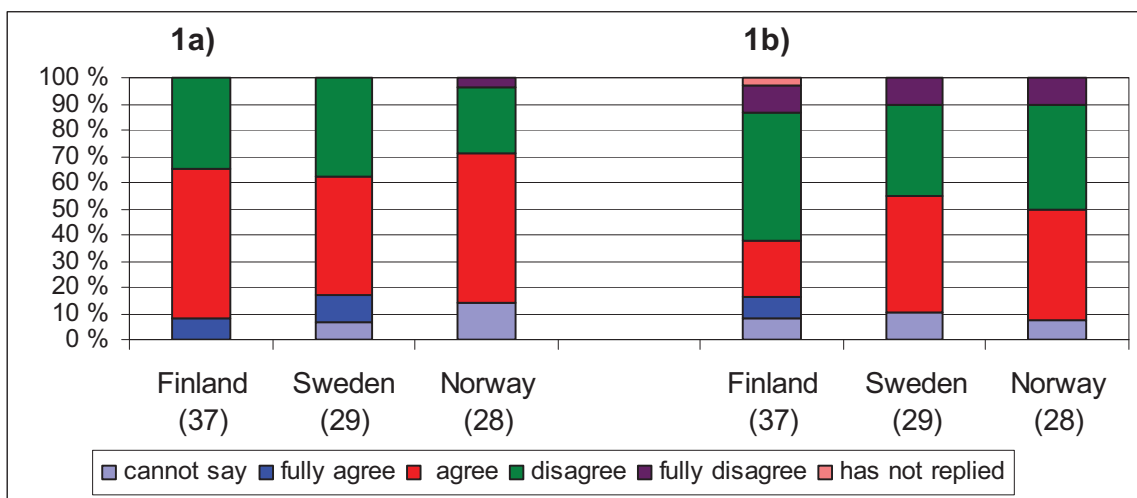


Figure 8. Respondents' view on the statements 1a) "Information on the consequences of climate change currently available is sufficient for designing strategy plans in your organization" and 1b) "enough resources are available to get acquainted with research information".

In each country, about 1/3 of the respondents (fully) disagree with the first statement. Also the share of respondents who (fully) disagree with the second statement is large. Especially remarkable is that the distribution of responses is even between the countries, so the fact that there are problems is common.

The responses indicate that more impact studies and/or better communication and exploitation of such results are needed by decision makers. Probably an important resource needed to get acquainted with the information is time. This is something that would need to be resolved within the organizations themselves, rather than in the research process. Researchers could nevertheless provide information as easily and clearly as possible so that decision makers could make use of it even with fewer resources.

2) Information provided by research institutes...

a) ...about mitigation of climate change is useful for your organization.

b) ...about adaptation to climate change is useful for your organization.

c) ...is easily available.

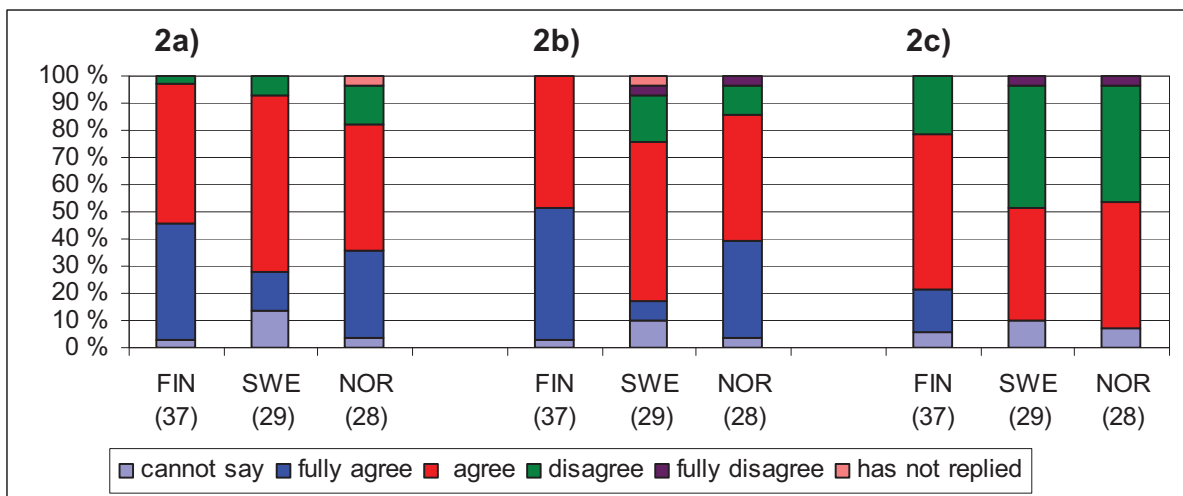


Figure 9. Respondents' view on three statements: Information provided by research institutes... 2a) "about mitigation of climate change is useful for your organization"; 2b) "about adaptation to climate change is useful for your organization"; 2c) "is easily available".

All in all, it seems that the respondents are rather satisfied with the research information they receive from the research institutes. Responses to questions 2a) and 2b) indicate that the quality of the information is good although in Sweden only a few respondents fully agree. Responses to question 2c) show somewhat more dissatisfaction. In Sweden, 14 out of 29 respondents think that climate change information is not easily available and no one fully agrees with that it would be easily available. Also, among the Norwegian respondents zero out of the 28 fully agrees with the statement about the availability of information and almost 50 % disagrees. In Finland, the share of respondents disagreeing with the statement about availability is not as large as in Sweden and Norway, but still more than 20 % disagrees.

It seems that research information about mitigation and adaptation was considered useful, but it is not easily available.

3) What is the current order of importance of sources of climate change related research information you are using at work?

The respondents were asked to select the four most important sources of climate change related research information and rank these in order of importance (see Tables 13, 14 and 15). Different options are sorted in descending order according to the total number of mentions. Unfortunately, the actual figures of the Finnish results cannot be compared with the Swedish and Norwegian results, because in the latter two countries the respondents were able to put more than one option in the same position and thus choose altogether more than four options.

Table 13. Order of importance of sources of climate change related research information in Finland. Most popular and least popular in each position is colour coded (resp. green and red).

FINLAND	1		2		3		4		Total	
	#	%	#	%	#	%	#	%	#	%
Seminars	4	11	6	16	12	32	3	8	25	68
Expert authority	7	19	7	19	8	22	1	3	23	62
IPCC reports and summaries	9	24	1	3	4	11	7	19	21	57
Other reports	4	11	4	11	6	16	7	19	21	57
Media	3	8	5	14	1	3	7	19	16	43
Short texts	3	8	5	14	3	8	4	11	15	41
Working groups	4	11	6	16	1	3	3	8	14	38
Scientific articles	2	5	2	5	1	3	4	11	9	24
Other, please specify	0	0	1	3	0	0	0	0	1	3

Table 14. Order of importance of sources of climate change related research information in Sweden. Most popular and least popular in each position is colour coded (resp. green and red).

SWEDEN	1		2		3		4		Total	
	#	%	#	%	#	%	#	%	#	%
IPCC reports and summaries	9	31	6	21	5	17	3	10	23	79
Expert authority	12	41	5	17	1	3	1	3	19	66
Other reports	2	7	4	14	7	24	5	17	18	62
Scientific articles	2	7	4	14	5	17	7	24	18	62
Seminars	0	0	9	31	5	17	2	7	16	55
Media	3	10	5	17	3	10	1	3	12	41
Short texts	0	0	4	14	2	7	4	14	10	34
Working groups	2	7	5	17	2	7	1	3	10	34
Other, please specify	1	3	1	3	0	0	1	3	3	10

Table 15. Order of importance of sources of climate change related research information in Norway. Most popular and least popular in each position is colour coded (resp. green and red).

NORWAY	1		2		3		4		Total	
	#	%	#	%	#	%	#	%	#	%
Seminars	8	29	7	25	4	14	3	11	22	79
Other reports	4	14	5	18	5	18	5	18	19	68
IPCC reports and summaries	8	29	4	14	2	7	3	11	17	61
Media	5	18	5	18	5	18	2	7	17	61
Expert authority	8	29	4	14	2	7	2	7	16	57
Short texts	3	11	4	14	5	18	4	14	16	57
Scientific articles	3	11	5	18	2	7	4	14	14	50
Working groups	2	7	2	7	6	21	1	4	11	39
Other, please specify	1	4	2	7	0	0	3	11	6	21

A similarity between the three countries is that ‘IPCC reports’ and ‘other reports’ are among the top four of the most mentioned ones overall. In Finland and Sweden, ‘expert authority’ was the second most popular source in terms of the total number of mentions, but in Norway it was not among the top four. ‘Seminars’ were the most popular source in Finland and Norway. ‘Media’ was among the top four in Norway and it ranks high in Finland and Sweden, too. ‘Scientific articles’ are fourth on the list in Sweden, whereas in Finland and Norway they are one of the least used sources.

On the other hand, sources that received most mentions overall not necessarily rank as the first source. Focusing on the mentions in the first, second, third and fourth place, the results are somewhat different. The order of sources changes but the most popular ones remain the same. In Sweden, ‘IPCC reports’ received mentions evenly in each ranking, but it was not the most popular in any of the rankings. The three other of the most popular sources per ranking are the same as in the analysis based on the total number of mentions. The fourth most popular one according to the rankings is ‘seminars’, instead of ‘IPCC reports’. In Norway, ‘media’ was replaced by ‘working groups’ when focusing on the rankings instead of the total mentions. Otherwise the most popular ones were the same.

There were some differences between national and local level responses among the Finnish respondents. ‘IPCC reports’ were the most popular source at the former, but one of the least popular ones at the latter level. ‘Media’, which was one of the most popular sources at the local level, was at the national level the least popular. In Sweden and Norway, no major differences between regional and national level occurred.

The specifications of the options ‘expert authorities’ and ‘other’ are listed below. These are direct quotations translated into English.

Finland; *national level*

Expert authorities

- “Finnish Environment Institute and Finnish Meteorological Institute, partners in cooperation”
- “Finnish Meteorological Institute, WMI, foreign researches”
- “Experts at Finnish Meteorological Institute and at universities”
- “Ministry of Environment, Regional Environment Centers”
- “Finnish Meteorological Institute”
- “Finnish Meteorological Institute”
- “Background material produced by responsible ministries (of Environment, of Foreign affairs, of Employment and the economy, of Finance)”
- “Climate scientists”
- “All research institutions and research groups of universities”
- “Researchers”
- “Researchers – I do not have time to sit down and read scientific articles although I would be interested”
- “In discussions it is possible to specify how things can be best said in a specific context. Handling of uncertainty”

Other

- “Reporting related to host countries of Finnish embassies”

Finland; *local level*

Expert authorities

- “Climate change expert in our organization”
- “Finnish Meteorological Institute, Finnish Environment Institute”
- “Finnish Environment Institute”
- “Finnish Environment Institute
- “Environmental administration, researchers of climate change”
- “Universities and consulting firms”

Sweden; *national level*

Expert authorities

- “SMHI, SGI”
- “SMHI”
- “It should be SMHI as ranking 1. But to make it so they must of course have a mission.”
- “SMHI, Swedish EPA”
- “SMHI, Swedish EPA”
- “SMHI, SGI, Swedish EPA, National Board of Housing, Building and Planning, MSB”
- “Energy authorities, SMHI, Swedish EPA, SCB”

Other

- “underlag till SOU 2007:60”
- “authority co-operation”

Sweden; local level**Expert authorities**

- “SMHI”
- “Swedish EPA”
- “SMHI, Energy authorities”
- “Swedish EPA. Energy authorities, Swedish Forest Agency”
- “Swedish EPA, SMHI.” This combination was mentioned three times.
- “Swedish EPA, Energy authorities, MSB, SMHI, DG Environment”
- “Energy authorities”
- “SMHI”
- “newsletter from inter alia Swedish EPA”
- “SMHI, SGI, National Food Administration, National Board of Housing, Building and Planning, Swedish EPA, Swedish River Basin District Authorities”

Other

- “Underlag”

Norway; national level**Expert authorities:**

- “Departments and directorates, especially the Ministry of Environment, Ministry of Petroleum and Energy, Norwegian Water Resources and Energy Directorate, Norwegian Building Technical Authority, The Housing Bank, The Norwegian Pollution Control Authority, Energy efficiency and renewable energy agency”
- “Especially Norwegian Pollution Control Authority and its established working groups (such as the Norwegian Public Roads Administration's "transport group")”
- “CICERO Bjerknessenteret”
- “Norwegian Water Resources and Energy Directorate, Directorate for Nature Management, Norwegian Public Roads Administration”
- “Norwegian Pollution Control Authority, Statistics Norway, Directorate for Safety and Emergency Preparedness”

Norway; local level**Expert authorities**

- “Information to County governors from Norwegian Pollution Control Authority, Directorate for Nature Management and Ministry of Environment”
- “Several, a.o. Norwegian Water Resources and Energy Directorate, Det Norske Meteorologiske Institutt. High expectations about the nations new webpages "Climate Adaptation in Norway”
- “Norwegian Pollution Control Authority and Ministry of Environment and Climate news”

- "Scientific environment web pages such as Bjerknæssenter etc. »
- "Norwegian Water Resources and Energy Directorate"

Other

- "Information from regional climate relevant planning processes, such as the County plan for Energy and Climate in Rogaland"
- "Climate News from CICERO"
- "Websites - for example klimatilpasning.no and klimakommune.no; journals, for example KLIMA"

Several expert authorities were mentioned in each country. The most typical combination of expert authorities used in Finland and Sweden was the national environment institute and the national meteorological service. In Norway, the most popular expert authority is the Norwegian Pollution Control Authority while the national weather service (met.no) received only one mention. Also nation departments and directorates are an important source of information.

Expert authorities were ranked high in Finland and Sweden. The most typical expert authorities in Finland are combined expert organizations and research institutes. The results suggest that the most efficient way to deliver the information produced by the institutes is through seminars and other reports. Scientific articles were the least popular source of information, which indicates that decision makers do not utilize these when searching for information.

4) What, if the current order is not optimal, would in your opinion be the best source of climate change related research information?

This question did not receive many answers so it seems that respondents are satisfied with the sources that are currently available to them. Some additional sources mentioned were expert authorities. A respondent who is a member of a steering group of a project thinks that it is the best source of information.

5) To facilitate decision making in your organization, research should focus more on the following issues:

Table 16. Climate change related issues that require (green colour) and do not require (red colour) more research in number of responses (#) and percentage (%).

	Finland		Sweden		Norway		TOTAL	
	(#)	(%)	(#)	(%)	(#)	(%)	(#)	(%)
Causes of climate change	3	8	3	10	7	25	13	14
Climate change progression and climate scenarios	23	62	15	52	10	36	48	51
Cost effects of climate change mitigation	19	51	10	34	5	18	34	36
Mitigation measures	9	24	12	41	19	68	40	43
Adaptation measures	14	38	23	79	19	68	56	60
Cost effects of adapting to climate change	18	49	10	34	6	21	34	36
Disadvantages of climate change	10	27	4	14	6	21	20	21
Advantages of climate change	4	11	1	3	0	0	5	5
National impacts of climate change	15	41	10	34	12	43	37	39
Global impacts of climate change	15	41	4	14	4	14	23	24
Uncertainty related to climate change	10	27	7	24	3	11	20	21
Frequency of extreme weather events	9	24	11	38	11	39	31	33
Other, please specify:	1	3	4	14	5	18	10	11

All in all, the most popular issues that would require more research are 1. Adaptation measures; 2. Climate change progression and climate scenarios; 3. Mitigation measures. Two clearly least popular issues are the advantages of climate change and causes of climate change. Among the Finnish respondents, the three most popular ones are the same between national and local level. At the local level, cost effects were more important than at the national level. The differences are, however, small. In Sweden, the most and the least popular options are the same at both government levels. When it comes to the first and second most popular options, adaptation measures are more in focus than mitigation measures. In Norway, no major differences between government levels occurred.

A clear difference between the countries is related to the research need about cost effects. In Finland, the cost effects of both mitigation and adaptation are ranked in top three issues, whereas in Sweden and Norway, fewer respondents think that cost effects would require more research. On the other hand, mitigation and adaptation measures are ranked in top three in Sweden and Norway, but in Finland they received only moderate interest. The difference between Finland and the two other countries is largest in adaptation measures. In every country, more research is

needed about the national impacts of climate change, but about global only in Finland. Advantages of climate change were clearly the least interesting issue.

Advantages of climate change are an issue which has not yet been fully raised in the research agenda. This is interesting, because the North may benefit from climate change. Based on the results of this question, decision makers still do not consider it as an interesting subject from a decision making point of view.

Other issues of interest that were mentioned are (these are direct quotations translated into English):

Finland; *national level*

- “Role of climate change on international policy agenda”

Sweden; *local level*

- “What it costs to not to do something like the Stern report showed, and cost of solutions”
- “Guidelines for decisions and interpretation of data”
- “Regionalization of the scenarios, similar to the SMHI work”

Norway; *national level*

- “Significance of research for society”
- “Clarification of the follow-up of the 'Climate Deal' in the nation”

Norway; *local level*

- “Cost-Benefit analysis connected to measurements against causes and adaptation”
- “Sectorial plans, for measures, for example in the municipalities”
- “Regional and local effects of climate change”

6) To facilitate decision making, research should focus more on the following sectorial issues:

Table 17. Sectors of interest from each country in number (#) and percentage (%). Most popular and least popular sectors are colour coded (resp. green and red).

	Finland		Sweden		Norway		TOTAL	
	(#)	(%)	(#)	(%)	(#)	(%)	(#)	(%)
Agriculture and food production	7	19	6	21	7	25	20	21
Forestry	9	24	2	7	5	18	16	17
Opening of new shipping / trade routes	0	0	0	0	2	7	2	2
Energy (alternative energy)	17	46	16	55	10	36	43	46
Oil and gas exploitation	1	3	0	0	2	7	3	3
Access to / use of renewable resources	14	38	9	31	8	29	31	33
Access to / use of non-renewable resources	1	3	1	3	2	7	4	4
Fresh water resources and management	8	22	7	24	7	25	22	23
Construction and infrastructure	15	41	14	48	9	32	38	40
Safety and security issues	6	16	12	41	9	32	27	29
Urban or other spatial planning	13	35	11	38	15	54	39	41
Tourism	1	3	0	0	1	4	2	2
Transport	9	24	7	24	9	32	25	27
Erosion / flooding of coastal areas	3	8	8	28	8	29	19	20
Biodiversity	7	19	8	28	10	36	25	27
Human well-being and health (public health)	6	16	5	17	2	7	13	14
Air quality	1	3	1	3	1	4	3	3
CO2 capture and storage	7	19	1	3	3	11	11	12
Economy (cost or benefit of climate change)	19	51	7	24	4	14	30	32
Indigenous peoples issues	2	5	0	0	0	0	2	2
Other, please specify:	3	8	0	0	2	7	5	5

All in all, the most interesting sectorial issues that respondents would like to see more research are on: 1. Energy (alternative energy); 2. Urban or other spatial planning, 3. Construction and infrastructure. Safety and security issues, transport, biodiversity and economy were also ranked high in at least one of the countries. The least popular options overall are 1. Opening of new shipping / trade routes, tourism, and indigenous peoples issues.

A major difference between countries is in what the respondents think about research on climate change economics. In Finland, this issue would by far facilitate decision making the most, but in Sweden and Norway it does not rank high among the options.

Other sectors of interest mentioned are (these are direct quotations translated into English):

- “Importance of consumption reduction” – **Finland**; *national level*
- “Energy efficient construction and use of premises” – **Finland**; *local level*
- “Emissions connected with energy use, heating - energy efficiency” – **Norway**; *national level*
- “Transition and technology for environmentally friendly fuel sources in shipping” – **Norway**; *local level*

One Finnish respondent commented that “These questions are very general; are we talking about measures or purely scientific issues, e.g. alternative ‘agriculture’”.

Section 4: Adaptation to climate change

1) Has your country a National adaptation strategy (NAS), or some other political document or strategy which deals with adaptation to climate change?

This question was used to measure how well the respondents are aware if their country has a national adaptation strategy or some other document related to adaptation. Thus, the question does not reflect whether such documents exist or not, but the awareness of the respondents. All countries have some kind of political document about adaptation to climate change, but only the Finnish document is an official strategy. However, as all the countries have some sort of a document, the expected response to this question is YES.

Table 18. Respondent's view on if their country has a national adaptation strategy or some other relevant policy document.

	FINLAND		SWEDEN		NORWAY	
	Nat	Loc	Nat	Loc	Nat	Loc
YES	18	8	4	10	7	6
NO	1	0	10	0	6	0
Cannot say	6	4	9	4	4	11

The responses reveal that the existence of an adaptation strategy document is by far best known in Finland. In Sweden and Norway, more than 50 % of the respondents responded either that no such document exists or that they do not know about it. We also asked the respondents to indicate which document they mean and since when it has been available. In Finland, six out of 26 who responded yes to the previous question did not mention anything about the document and three answered some other document than the official adaptation strategy. One answer was ambiguous so 16/26 was aware of the official adaptation strategy. In Sweden, altogether 14 out of 29 answered YES, but three of them did not mention which document was meant and three indicated some other document than the "Regeringens proposition 2008 / 09:162 – En sammanhållen klimat- och energipolitik". Norway does not have an official adaptation document, but "Klimatilpasning i Norge, regjeringens arbeid med tilpasning til klimaendringene" from 2008 published by the nation of Norway is considered as the official paper. Six out of 11 respondents who responded YES to the previous question mentioned the nation document, and the rest of the respondents also mentioned some existing adaptation related document.

Potential reasons for why the Finnish national adaptation strategy was best known among the respondents is the official status of the report which may be the reason for that it is widely used in decision making. The strategy was also made in an early stage, in 2005. The two documents in Sweden and Norway are made several years later.

2) Do you utilize the previous mentioned document in your work?

Table 19. Overview of the usage of the adaptation policy relevant document.

	YES	NO
Finland	18	8
Sweden	11	3
Norway	8	4

3) Is the document used as a tool for preparation of policy-making in your organization?

Table 20. Overview if the adaptation document is used a tool for preparation of policy-making in the respondents' organizations.

	Yes, often	Yes, occasionally	No
Finland	4	16	6
Sweden	1	11	2
Norway	2	7	3

The only significant deviation between government levels occurs in the Finnish local level where none of the respondents indicated that the document would be used often. Otherwise the shares between the two government levels are fairly similar.

4) Is adaptation to climate change delegated to other levels of administration in the sector your organization operates?

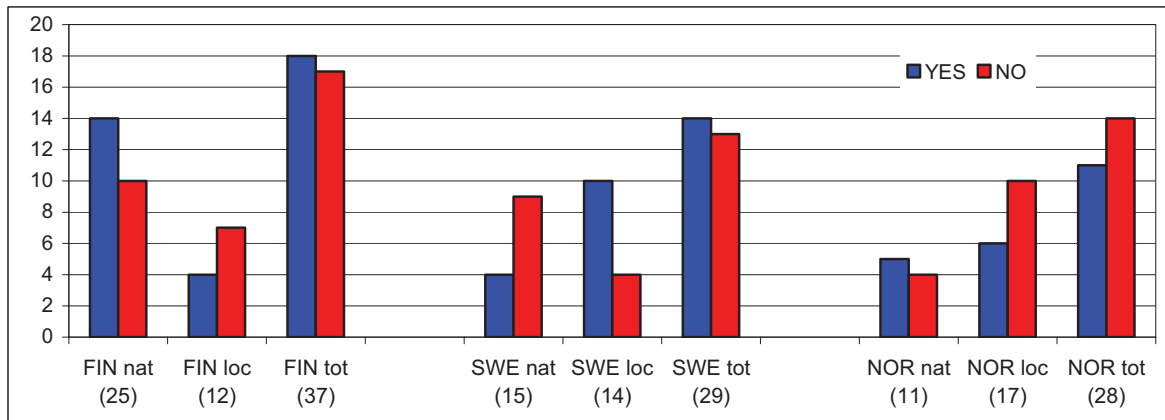


Figure 10. Overview of the delegation of adaptation to climate change to other levels of administration in the sector your organization operates.

It would be expected that adaptation to climate change would be delegated from national level to local level. Adaptation is usually considered to happen in the local level and the decisions implemented in the local level. However, there is no clear indication about this in the results. The elaboration below also indicates that some of the responsibilities are delegated to other government levels, but municipalities are, at least not yet, responsible for the adaptation.

Respondents' comments on who are responsible for adaptation to climate change:

Finland; national level

- “The ministries are responsible for their administrative sectors, each of which has to take adaptation issues into their own activities.”
- “Adaptation to climate change is done widely in cooperation with different administrative sectors”
- “I do not think there is any directorate which would clearly be responsible, although the Ministry of Environment plays an important role. However, the issue is too broad for responsibility of one ministry only. “
- “Ministry of defense”
- “To local level”
- “Regional environment centers”
- “I have understood that Ministry of Environment in cooperation with the Ministry of Employment and the Economy”
- “Regional nation, Rescue departments”
- “Local actors”
- “Each department for its part”
- “Ministry of Agriculture and Forestry is in charge of preparing adaptation issues”
- “Everyone has their own responsibility for its part, the Ministry of the entire sector”

Finland; *local level*

- “Towns and in them individual administrative branches”
- “Ministry of transport and communication”
- “Regional environment centers and Regional councils”

Sweden; *national level*

- “Authorities, Swedish Board of Agriculture”
- “Different expert authorities are responsible”
- “I do not understand the question (other government levels than what?)”
- “County Administrative Boards and certain authorities”
- “Authorities like The Swedish Forest Agency and county administrative boards and others”

Sweden; *local level*

- “Emergency department”
- “Part of the issues are handled in the County administrative board”
- “Among other things commissions to the County administrative boards”
- “Municipalities. County Administrative Board are responsible for coordination, decisions and support and are inspirers”
- “County Administrative Board”
- “Delegation to the County Administrative Board by climate bill and Letter of regulation.”
- “Mainly crisis management unit”
- “Not determined. Probably the person responsible and the working group will be appointed soon.”

Norway; *national level*

- “Adaptation is to a large extent about a choice of technical solutions and standards and is looked after by the nation agencies”
- “Our nation agencies, especially "The Norwegian Public Roads Administration" and the "The Norwegian Railway Administration"”
- “Responsibility is shared across government levels”
- “County governor, Public Construction and Property Management”

Norway; *local level*

- “The County governor has no direct underlying organization but cooperates with the county administration and municipalities which also have and take responsibility in the area”
- “All levels of management and professions within their respective sphere of responsibility (Responsibility, Proximity; Equality)”
- “To the municipalities”
- “Department”
- “Leadership”

Section 5: Cooperation and communication

5) Please select your opinion on the following statements:

a) Communication between decision makers and researchers is adequate.

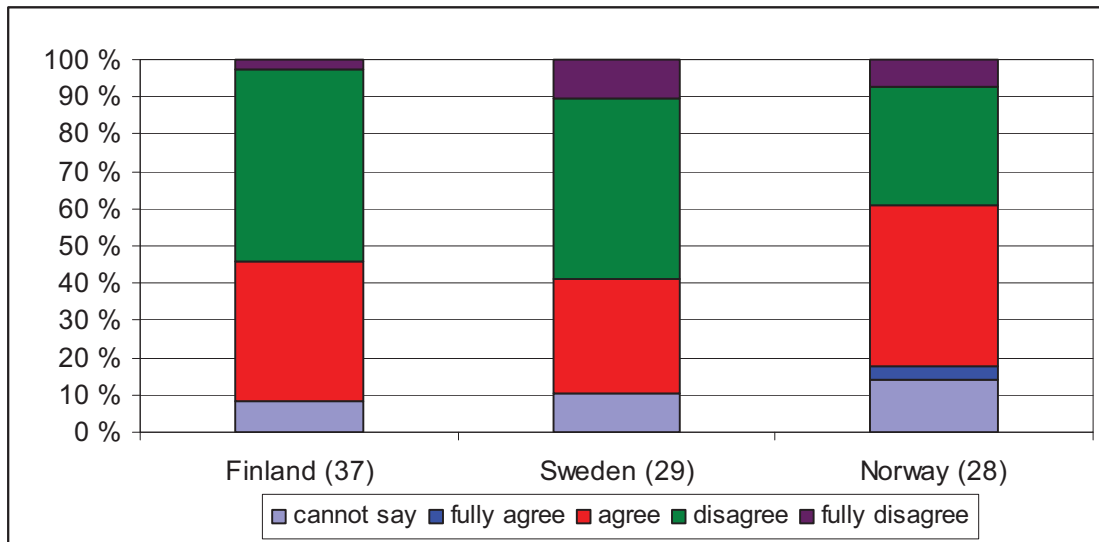


Figure 11. Respondents' view on the statement if communication between decision makers and researchers is adequate.

In Finland and Sweden over 50 % of the respondents (fully) disagreed with the statement. In Norway, the share is almost 40 %. There are no major differences between the government levels. *The responses indicate that there are quite some problems in communication between researchers and decision makers.*

b) Results and experiences obtained in Sweden, Norway and Finland concerning adaption to climate change can potentially be applied in all three countries.

c) Results and experiences obtained in Sweden, Norway and Finland concerning adaption to climate change can potentially be shared in all three countries.

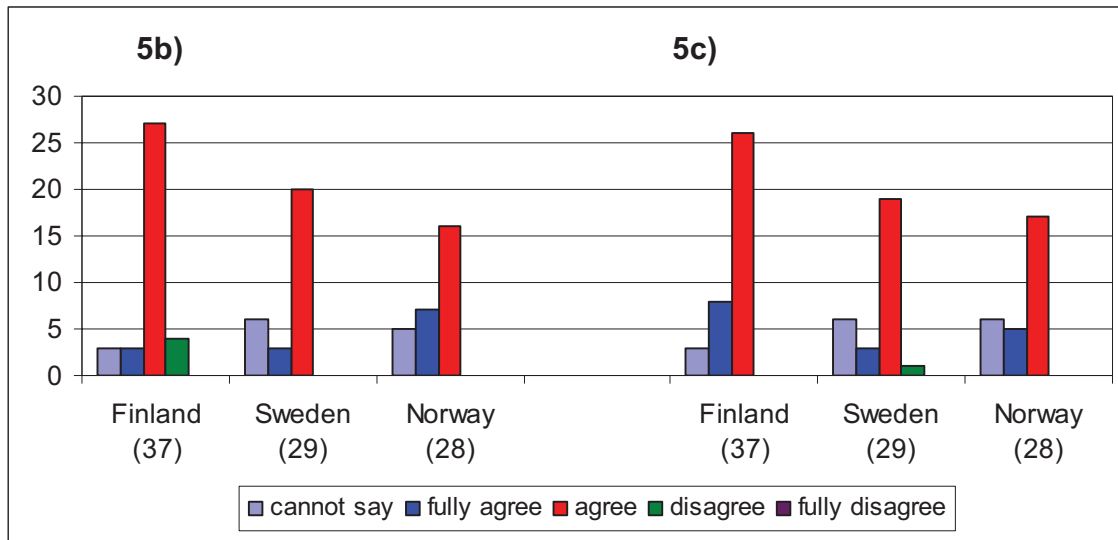


Figure 12. Overview if the results and experiences obtained in Sweden, Norway and Finland concerning adaption to climate change can potentially be 5b) applied and 5c) shared in all three countries.

Practically, the respondents think that results and experiences from other Nordic countries could be shared and also applied in the three countries. *This indicates that there is potential to increase the collaboration in both research and in decision making in the Nordic level.*

Summary of results

The purpose of this questionnaire was to get an insight into decision makers' views and experiences on the use of climate scenarios and climate change research information. The response rate to the questionnaire was fairly low, so the results should be used only as a qualitative indication of experiences. Although ministries, directorates and authorities across sectors and government levels were contacted, some key sectors are missing. Thus, the results may give a skewed view of reality. The questionnaire was targeted to decision makers working with climate change issues.

The analysis of the results is divided into five categories: Respondents' background, Climate scenario use, Climate change research information, Adaptation to climate change, and cooperation and communication.

The results of the first section indicate that the respondents have high awareness of climate change issues. Most of them work only part-time with climate change using clearly less than 50 % of their work time for climate change. The majority of the respondents have natural science training. Based on the respondents' views their organizations take climate change issues fairly well into account in their actions. Some disagreement on this exists in Finland and Norway.

In the three countries, the challenges of climate change and adaptation measures play a large role in the agendas of the organizations. In Finland and Sweden, mitigation measures are also important. In Norway, due to a small translation error in the questionnaire, the question about mitigation cannot be analyzed. Surprisingly, costs seem to have a less important role in the agendas than measures. Based on the results, in Finland, climate change seems to have a more important role in the organizations' agenda than in Sweden or Norway.

The second section of the report concerns the use of climate scenarios. In each country, at both government levels, climate scenarios are used. In Norway, a small majority of the respondents are not using scenarios. In Finland and Sweden, the majority uses scenarios. In Finland, especially at the national level, climate scenarios are widely used (17 out of 25 respondents use scenarios). At the local level in Finland and in Sweden and Norway, the distribution is more even. The most cited reason for not using climate scenarios in Finland and Norway is that it does not belong to the respondents' job description. In Sweden, the reasons are more varied.

Climate scenarios are used for adaptation and risk planning, such as flood risk mapping or land use planning. They are also used as a background material for strategy papers. Climate scenarios are mostly based on moderate emissions (e.g. IPCC SRES A1B emission scenario). High and low emissions are almost evenly used, perhaps with slightly more emphasis on high emissions. In Finland, a small majority of the respondents are using global scenarios instead of regional ones. In Sweden and Norway, regional scenarios are more popular. Results for Finland might be explained by the large number of nation level respondents with no regional focus in their work or by the fact that the Finnish climate scenario research community has worked directly based on global scenarios.

Based on the views of the respondents who are using climate scenarios, the use of scenarios is important in their organizations. In each country, only a few disagree with this. A slightly larger share of respondents disagrees with the statement about uncertainties related to climate scenarios and how they are taken into account in the organization's activities. In each country, about 10-15 % of the respondents think that uncertainties are not taken into account, but a great majority still thinks that this basic characteristic of scenarios is considered. However, especially in Finland and Sweden, a majority of the respondents think that climate scenarios should be easier to interpret. In Norway, a small majority of the respondents think so.

Although interpreting climate scenarios should be easier, a great majority of the respondents in Sweden think that current reports on climate scenarios and their consequences are adequate. In Norway, there are about as many respondents who agree and who disagree with the statement. Due to technical reasons, results from Finland cannot be used in the analysis. Respondents also elaborated on this question. Especially "scenarios with regional and local level focus" were asked for in several of the responses. Also sectorial scenarios were requested. Finally, the understandability of the scenarios should be improved.

The respondents are fairly satisfied with the research information they receive from research institutes regarding mitigation of and adaptation to climate change. When asked about the usefulness of mitigation and adaptation research information, the majority of the respondents agree that it is useful. However, there are also some drawbacks. About a third of the respondents in each country think that there is not enough information of the consequences of climate change for designing strategies. The share of the respondents who disagree is even larger when asked if there are enough resources available to get acquainted with the research information. Availability

of research information is not good enough according to quite many. In Sweden and Norway, almost 50 % of the respondents think that information provided by the research institutes is not easily available.

The ranking of the most popular sources of research information somewhat differed between the countries. IPCC reports and summaries were among the most popular sources in each country. Other popular ones were expert authorities, which especially in Finland and Sweden were the national meteorological institute and the national environment institute. Scientific articles were popular in Sweden, but ranked low in Finland and Norway. Seminars and other reports were also mentioned quite often. Working groups were among the least popular sources in each country.

The three most popular issues of which decision makers would need more research information are, in descending order: adaptation measures, climate change progression and climate scenarios, mitigation measures. Some differences between the countries occurred. Cost effects of mitigation and adaptation were among the top three issues in Finland, but in Sweden and Norway they did not receive that much attention. Instead, mitigation and adaptation measures were far more popular in Sweden and Norway than in Finland.

Of the sectorial research questions, the ones which would best facilitate decision making were energy (alternative energy) and construction and infrastructure. In Finland, the economics of climate change was felt to be much more important than in Sweden and Norway. Otherwise the differences between countries are not very marked.

The third section of the report discusses adaptation to climate change. Finnish respondents are best familiar with the policy document related to adaptation to climate change. Finland is the only country with an official national adaptation strategy, but also Sweden and Norway have policy documents related to adaptation. These were, however, not as well recognized by the respondents as the one in Finland by the Finnish respondents. Policy documents related to adaptation are fairly widely used in each country.

About half of the respondents think that adaptation to climate change is delegated to other levels of administration in the sector their organization operates. At the national level, adaptation is delegated to local levels, but also to other ministries and directorates. At the local level, adaptation is delegated to ministries but also to county administrative boards and municipalities.

The final section of the report discusses cooperation between countries and with communication between researchers and decision makers. A majority of the respondents think that communication between researchers and decision makers is not adequate. Basically, all the respondents think that results and experiences obtained in Sweden, Norway and Finland could be shared and applied in other countries as well.

Conclusion

The questionnaire covers several issues related from climate scenario use to communication between researchers and decision makers. The response rate of the questionnaire was fairly low, which can bias the analysis. The questionnaire was directed to persons and institutes working with climate change.

The questionnaire reveals that decision makers are overall fairly satisfied with the research information provided. However, there also are some complications. Due to the lack of decision makers' resources research results should be provided in a more efficient way so that the results would be easy to understand. Also, communication between researchers and decision makers should be enhanced. Regarding a more efficient use of climate scenarios, they should be downscaled to regional and local conditions.

There were some differences between countries in the topics and sectors where more research should be conducted. Finnish decision makers stress the economics of climate change more than those in Sweden and Norway. In the latter two countries, mitigation and adaptation measures are emphasized. Common for all three countries is interest in more research on the challenges of climate change.

Appendix

Climate change research and policy making

Dear recipient,

The aim of this questionnaire is to get an insight into the use of climate scenarios in impact and adaptation research and how subsequent results are communicated to policymakers. This questionnaire is conducted simultaneously in Finland, Sweden and Norway as part of the ERANET Circle Nordic project, to compare the status and differences in research and strategies as well as the information flow to policymakers with regard to climate change adaptation policies between the Nordic countries.

The results of the questionnaire are used to evaluate how research could better serve policymaking. It takes about 15-20 minutes to answer the questionnaire.

We appreciate your cooperation!

Information about us:

ERANET Circle Nordic is a part of the European CIRCLE action that collects research funders and managers to provide better research related to climate impacts and adaptation. The present questionnaire is prepared by CAREPol, which is a research project funded by ERANET Circle Nordic. We aim to provide information on the use of climate scenarios in providing information to policymaking on climate adaptation. The results will contribute to recommendations on future climate, impacts and adaptation research, research/policy dialogue and policy.

Please answer the questions based on your own opinion. Answer the questions either by

- Selecting your opinion from a drop-down menu.
(1= strongly agree 2= agree 3= disagree 4= strongly disagree 0= don't know)
- Marking four (4) suitable options
- Free form

The following section deals with general questions on climate change issues

1. Please select your opinion from the drop-down menu.

	strongly agree	agree	disagree	strongly disagree	don't know
a) I feel well informed about climate change issues.	1	2	3	4	0
b) Climate change is taken into account in your organization's actions.	1	2	3	4	0

2. In your opinion, what kind of role do the following issues have in your organization's agenda. Please express your own opinion by selecting from the drop-down menu. (1= small role, 2= moderate role 3= large role)

	small	moderate	large	don't know
• how to mitigate climate change	1	2	3	0
• how to adapt to climate change	1	2	3	0
• costs due to direct impacts of climate change	1	2	3	0
• costs of climate change mitigation	1	2	3	0
• costs of climate change adaptation	1	2	3	0
• opportunities of climate change	1	2	3	0
• challenges of climate change	1	2	3	0
• other	1	2	3	0

If you chose other, please specify:

The following section deals with climate scenario use

3. Do you use climate scenarios in your work? 1 No 2 Yes

If you answered NO, please continue with question 4; if you answered YES, please go to question 5.

Please go to question 11.

4. For what purpose(s) do you use climate scenarios?

5. Climate scenarios you use are based on

- a) high emissions (e.g. IPCC SRES A2 emission scenario)
- b) average emissions (e.g. IPCC SRES A1B emission scenario)
- c) low emissions (e.g. IPCC SRES B1 emission scenario)
- f) not aware of

6. Climate scenarios you use are 1 global 2 regional 3 not aware of

7. Please select your opinion from the drop-down menu.

	strongly agree	agree	disagree	strongly disagree	don't know
a) Using climate scenarios is important in your organization	1	2	3	4	0
b) Uncertainties related to climate scenarios are taken into account in the organization's activities.	1	2	3	4	0
c) Interpreting climate scenarios should be easier.	1	2	3	4	0

8. In your opinion, are current reports on climate scenarios and their consequences adequate? 1 Yes 2 No

If you answered NO, please continue with question 10; if you answered YES, please go to question 11.

If you chose *No* on the previous question, in what ways could reports on climate scenarios and their consequences be improved so that they would be more understandable or better suit your purposes?

9. Why do you not use climate scenarios in your work? (Please indicate the most important reason.)

1. unnecessary
2. difficult
3. scenarios are unreliable
4. no time to get acquainted
5. does not belong to job description
6. necessary information hard to find
7. Other, please specify _____

The following section deals with climate change research information

10. Please select your opinion from the drop-down menu.

	strongly agree	agree	disagree	strongly disagree	don't know
a) Information on the consequences of climate change currently available is sufficient for designing strategy plans in your organization.	1	2	3	4	0
b) Enough resources are available to get acquainted with research information.	1	2	3	4	0

11. Information provided by research institutes...

1. about mitigation of climate change is useful for your organization.	1	2	3	4	0
2. about adaptation to climate change is useful for your organization.	1	2	3	4	0
3. is easily available.	1	2	3	4	0

12. What is the current order of importance of sources of climate change related research information you are using at work? Please put the most important four in order by marking them with 1, 2, 3 and 4 respectively, (1= most important).

- scientific articles
- IPCC reports and summaries
- other reports
- short texts
- seminars
- working groups
- media
- expert authority
- other, please specify

If you chose *expert authority*, please specify:

If you chose *other*, please specify:

13. What, if the current order is not optimal, would in your opinion be the best source of climate change related research information _____

14. To facilitate decision making in your organization, research should focus more on the following issues: Please indicate up to four most important ones by marking the corresponding checkbox.

- causes of climate change
- climate change progression and climate scenarios
- cost effects of climate change mitigation
- actions to mitigate climate change
- actions to adapt to climate change
- cost effects of adapting to climate change
- disadvantages of climate change
- advantages of climate change
- national impacts of climate change
- global impacts of climate change
- uncertainty related to climate change
- frequency of extreme weather events
- other, please specify: _____

15. To facilitate decision making in your organization, research should focus more on the following sectoral issues: Please indicate up to four most important ones by marking the corresponding checkbox.

- agriculture and food production
- Forestry
- Opening of new shipping/ trade routes
- Energy (alternative energy)
- Oil and gas exploitation
- Access to / use of renewable resources
- Access to / use of non-renewable resources
- Fresh water resources and management
- Construction and infrastructure
- Safety and security issues
- Urban or other spatial planning
- Tourism
- Transport
- Erosion / flooding of coastal areas
- Biodiversity
- Human well-being and health (public health)
- Air quality
- CO₂ capture and storage
- Economy (cost or benefit of climate change)
- Indigenous peoples' issues
- Other, please specify: _____

The following section deals with adaptation to climate change

16. Has your country a National adaptation strategy (NAS), or some other political document or strategy which deals with adaptation to climate change?

1 Yes, please indicate since when and which one 2 No 3 Not aware of

If you answered “NO” or “Not aware of”, go to question 21; otherwise continue with question 17.

17. Do you utilize the previous mentioned document in your work? 1 Yes 2 No

18. Is the document used as a tool for preparation of policy-making in your organization?

1 Yes, often 2 Yes, occasionally 3 No

19. Is adaptation to climate change delegated to other levels of administration in the sector your organization operates?. (e.g. from ministry level to some local level) 1 Yes 2 No

20. If you chose yes on the previous question, who is responsible for adaptation to climate change?

The following section deals with cooperation and communication

21. Please select your opinion on the following statements:

	strongly agree	agree	disagree	strongly disagree	don't know
	1	2	3	4	0
a) Communication between decision makers and researchers is adequate.	1	2	3	4	0
b) Results and experiences obtained in Sweden, Norway and Finland concerning adaption to climate change can potentially be applied in all three countries.	1	2	3	4	0
c) Results and experiences obtained in Sweden, Norway and Finland concerning adaption to climate change can potentially be shared in all three countries.	1	2	3	4	0

This final section deals with questions on basic information

22. Please describe how climate change is related to your work.

23. Please estimate, how many persons in your organization are working full-time with climate change issues.
Around ____ persons

24. Please estimate, how many persons in your organization are working part-time with climate change issues.
Around ____ persons

25. Please estimate, how much of your work time you spend on average working with climate issues.

- 0-10 %
- 10-30 %
- 30-50%
- 50-70 %
- 70-90 %
- 90-100 %

26. How many years have you worked with climate change issues? years, around ____

27. Please select your country: Finland 2 Sweden 3 Norway

28. Please indicate your organization: _____

29. Please indicate your department / unit _____

30. Please indicate your position 1 Management 2 Expert/Officer 3 Other, please specify

31. Please indicate your educational background:

- | | |
|---------------------------------------|--------------------------|
| Social sciences | <input type="checkbox"/> |
| Technological sciences | <input type="checkbox"/> |
| Natural sciences | <input type="checkbox"/> |
| Law | <input type="checkbox"/> |
| Economics | <input type="checkbox"/> |
| Administration | <input type="checkbox"/> |
| Health/Social/Sports | <input type="checkbox"/> |
| Agricultural/Fishery Forestry science | <input type="checkbox"/> |
| Other, please specify: _____ | <input type="checkbox"/> |

Thank you for your cooperation!

If you want more information about the study, please follow the link below and fill in your contact information. Your answers will not be connected with your contact information.

RAPORTTEJA — RAPPORTER — REPORTS

- 1986:
1. Savolainen, Anna Liisa et al., 1986. Radioaktiivisten aineiden kulkeutuminen Tshernobylin ydinvoimalaonnettomuuden aikana. Väliaikainen raportti. 39 s.
 2. Savolainen, Anna Liisa et al., 1986. Dispersion of radioactive release following the Chernobyl nuclear power plant accident. Interim report. 44 p.
 3. Ahti, Kari, 1986. Rakennussääpalvelukokeilu 1985-1986. Väliraportti Helsingin ympäristön talvikokeilusta 18.11.-13.3.1986. 26 s.
 4. Korhonen, Ossi, 1986. Pintatuulen vertailumittauksia lentoasemilla. 38 s.
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