



A Research study on the role of the built environment stakeholders in climate change adaptation

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Co-funded by the
Erasmus+ Programme
of the European Union

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Contents

1.1	Introduction	3
1.2	Built environment stakeholders linked to climate change adaptation.....	3
1.2.1	Local and National Governments	3
1.2.2	Private Sector	4
1.2.3	Community.....	5
1.2.4	Civil Organisations	6
1.2.5	Academia and research organisations.....	6
1.2.6	Professional bodies.....	6
1.3	Role and Responsibilities of the built environment stakeholders in climate change adaptation.....	8
1.4	Challenges faced by built environment stakeholders in implementing climate change adaptation.....	13
1.5	Educational Training Framework.....	19
1.5.1	Training required to become a professional.....	19
1.5.2	Continuing Professional Development Opportunities.....	20
1.6	Assessment of the regulatory framework for built environment professionals	23
	Is there a regulatory framework for the professionals?	23
	Licensing Requirements	23
	Mutual Recognition Framework.....	23
	Number of Registered Professionals	23
	Employment Statistics	23
1.7	Identification of skill gaps	26
1.7.1	Anticipation of skills needed for climate change adaptation.....	26
1.7.2	Actions to avoid labour shortages.....	26
1.7.3	Incentives in training for climate change adaptation	27
1.7.4	Skill shortages.....	27
1.8	References.....	29



1.1 Introduction

Climate change adaptation in Sweden is governed mostly by each and every of Sweden's 290 municipalities within their respective boundaries. On a national level the ordinance (2018:1428) about governmental agencies climate adaptation work is the framework under which the municipalities work and the broader overall strategy for Sweden (regeringskansliet, 2018). This strategy was set in 2018 and is to be updated in 2023, with a new strategy supposed to be in place during the autumn of 2023. The Swedish Meteorological and Hydrological institute (SMHI) is the responsible authority for coordinating climate adaptation efforts and has the responsibility to report progress to the government. The 21 county administrative boards are responsible for each municipality's work within climate change adaptation, especially focusing on following up on their work, aiding with reports and information, and making sure they follow current regulations.

1.2 Built environment stakeholders linked to climate change adaptation

All relevant stakeholders working with climate adaptation in Sweden have been identified and will be discussed in this section. They are divided into six different categories corresponding to different segments of society that all has importance for climate adaptation work in Sweden.

1.2.1 *Local and National Governments*

This category of stakeholders is by far the most important in Sweden. The Swedish society is organized into local municipalities, of which there are 290. These are grouped together and overseen by county administrative boards, of which there are 21. These are regulated in their task by the Swedish government. Moreover, there are 249 different administrative authorities that answer to the government. Out of these 249, 33, plus all county administrative boards, are directly involved in climate adaptation as regulated by the ordinance (2018:1428) about governmental agencies climate adaptation (regeringskansliet, 2018).

This category is the most critical one. Of Sweden's approximately 10.5 million inhabitants (SCB, 2022), close to 5 million are in a working age (16-64 years old) (SCB, 2022), of these, 1.5 million work in public administration (SCB, 2020). This means that almost every third Swede works in public administration, a number that is the highest in the EU (Thijs et al., 2017, p. 8). This stretches from local municipal work up to ministers in the government. Unfortunately, at least from a research perspective, the local municipalities are not uniformly organized, this means that any attempt to explain how climate adaptation is governed will fall short of reality unless a mapping of all 290 municipalities is made. Having said that, there are of course more general, overarching, ways in which climate adaptation is dealt with in Sweden.

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There are two pieces of key legislation that dictate how climate adaptation in the built environment functions in Sweden, the plan and building act (Regeringskansliet, 2010), hereafter PBL, and the environmental charter, hereafter MBK, (Regeringskansliet, 1998). The latter was reviewed during 2020 and 2021 and is set for being renewed into a 'climate adapted environmental charter' (Statens offentliga utredningar, 2021).

PBL regulates who is allowed to build, where, and how. This legislation is very strong in the Swedish system, especially the section on municipal plan-monopoly. This section states that it is up to the municipality to allow building permits to companies or individuals, there is no one else in the Swedish system that can start this process or decide on building permits besides the municipality. This creates a system in which the municipalities have immense power when it comes to the built environment. All permits given by municipalities are reviewed by the county administrative board and can be nullified if it does not follow current legislation. PBL is a very long and complicated piece of legislation and new praxis is established every now and then on how to interpret certain situations. This has gotten even more complicated for both municipalities and county administrative boards in recent times when planning a building that is supposed to last for about 100 years close to coastlines where the sea is expected to rise by an unknown height.

The MBK is slightly older than the PBL but is just as important when it comes to where something is allowed to be built. The MBK is moreover specifically in Swedish legislation to promote sustainable development (Naturvårdsverket, n.d.). It has several key areas of application, all of which aim to protect biodiversity, human health, natural and cultural environments, re-using and recycling, and, the most important for this project, "the use of land, water, and the physical environment in general is such as to secure long-term good management in ecological, social, cultural and economic terms" (ibid.).

These two key pieces of legislation were mentioned as important legislations by several interviewees that work in local or national governance, although, interestingly, not by all which one could expect.

1.2.2 *Private Sector*

The private sector, although not as involved as local and national governance, still plays an important role in climate change adaptation in Sweden. Mainly through three different venues; as consultant doing investigations and writing reports ordered by municipalities, a highly technical aspect involving engineers of different fields, everything from water management, to soil analysis, to heat or rain 'mapping'; the insurance companies which often have good knowledge

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about risk management and analysis; Law firms which are often hired to perform investigations of whose responsibility it is to adapt to climate change in different circumstances, as well as to investigate how it can be legally funded. The insurance industry also collectively forms a sort of praxis of how to interpret future climate-related risks and their monetary aspects for societies. There is a professional body called 'Svensk försäkring' (Swedish insurance), that discusses these issues and partake in national conferences and other events dealing with climate change adaptation.

Beyond these three specific categories, the private sector is not very involved in discussions of climate change adaptation, although some industries ought to be. For example, land developers play an important role in where they wish to build, yet this is a category that was in the interviews seen as 'falling behind' in the increasingly broader understanding of climate change adaptation as an issue. Moreover, landlords have the possibility to take action on a very local level, but this is yet to happen on a larger scale.

1.2.3 Community

On a community level there are a few *ad hoc* responses to adaptation, but in general there is not much activity when it comes to adaptation. On the mitigation side there is much more understanding of the individual's importance and there are several examples of community initiatives. For example, people refraining from flying to reduce CO2 emissions, interestingly there is even a new word in the Swedish language 'flygskam' (flightshame) which entered the official Swedish vocabulary in 2018 (Karlsson and Svensson, 2018). The trend to consume less meat is also quite strong in Sweden, and in bigger cities it is more common to use a bike and public transportation than a few years ago.

On the adaptation side, it is near impossible to find examples of efforts focusing on adaptation at a community level. There are some initiatives to restore biodiversity along coastlines, these efforts do sometimes include an adaptation aspect such as restoring sand dunes or increasing vegetation diversity, although these efforts are mostly done by local government. One interesting example found in the interviews is a neighbourhood in Malmö which invested a significant amount of money, for being such a small-scale actor, to improve water management for that specific block. They did several small-scale measures, such as changing to more permeable surfaces in their inner yard, planting vegetation which can soak up more water, lowered a section of the yard to be used as a 'delay dam' for rainwater. Furthermore, they are working on installing solar panels on the roof and coming together to form a collective to buy and sell energy to reduce everyone's cost. This example is especially interesting since it was done for an older piece of real estate. More newly planned neighbourhoods are generally better at water and land management.

1.2.4 Civil Organisations

There is a severe lack of civil organisation dealing with climate adaptation issues. On the mitigation side there are several vocal actors pushing for people, government, and companies to reduce their emissions. On the adaptation side there is nothing of the sort. No one interviewed highlighted any type of civil organisation that they had heard about or worked with in any capacity. There were also no one who in the interviews that reflected upon why this is the case, or if it could benefit the work with climate adaptation.

1.2.5 Academia and research organisations

There are several research institutes that fund research connected to climate change, such as RISE, Visma, Formas, IVL, among others. Some of these are connected to the national government and perform research as part of their obligations to the government, while others are privately funded. RISE is one of the biggest actors and gets its funding from the Swedish state. They perform research mainly on mitigation, but have in recent years started to do more research on adaptation, but mostly very detailed and technical research on how to best build buildings, or water management as a technical issue, etc.

There is also an expert council on climate change adaptation which was formed with the new climate change legislation in 2018. They have thus far released one report in which they had 168 suggestions of what Sweden should do to become more resilient and adapt to the future (Schultze et al., 2022). These suggestions vary widely in scope and difficulty of implementation and are supposed to inform the soon-to-be updated version of the Swedish climate strategy.

1.2.6 Professional bodies

There are not many active professional bodies in the Swedish context. The entire field of climate adaptation is quite decentralized from a national level, but very centralized locally in the sense that public administration workers within each municipality are the ones who, almost exclusively, deal with these questions. The two most important professional bodies highlighted in the interviews are 'Svensk försäkring' (Swedish insurance) and 'Svenskt Vatten' (Swedish water). Swedish insurance is a body representing all insurance companies in Sweden and their best interests. They are often spoken about as a potential driver of the intensity of climate adaptation work, especially when it comes to monetary values. They regularly sponsor reports written by different research organisations on the topic. IVL and 'Svensk Försäkring' have five years in a row sent out a survey to all Swedish municipalities to map their climate adaptation efforts (Matschke Ekholm et al., 2021). Swedish water deals with water management issues across Sweden, everything from rainwater to a rising sea level is on their table. One example of where they are shaping the field is what 'climate factor' municipalities should plan for when trying to anticipate future

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rainwater magnitudes, the current recommendation is 1.2-1.4. This is something often referred to by municipalities when they take decisions regarding how to take water management decisions.

One industry that has a professional body but which seem to not work that much with these questions is the building industry. One of the largest professional bodies is 'Byggföretagen' (the building companies). Unfortunately, none were reachable for an interview, nor any of the larger building companies.

1.3 Role and Responsibilities of the built environment stakeholders in climate change adaptation

No	Stakeholder Description	Key role in climate change	Responsibilities related to climate change adaptation	Current status and any remarks
1	Local and National Governments	<p>National government coordinates internationally, especially with the EU and UN for long-term strategies. They are especially important in funding questions for agencies and municipalities dealing with climate change.</p> <p>Regional government forms collaborations between municipalities; tries to find synergies where several municipalities can enjoy benefits of one or a few adaptation measures; Oversees and reports to</p>	<p>National government:</p> <ul style="list-style-type: none"> • Oversees the more strategic targets for Sweden when it comes to adaptation. • Is the one who can make legislative changes to better deal with adaptation issues. • Allocates funds to different governmental agencies dealing with the questions. • Invests in research projects about adaptation. <p>Regional government:</p> <ul style="list-style-type: none"> • Has no decision-making power, but are responsible for following up on the climate adaptation work of municipalities. • Reviews and approves building permits. 	<p>National government:</p> <ul style="list-style-type: none"> • A new national strategy is supposed to be done during autumn 2023. The current one was decided on in 2018. <p>Regional government:</p> <ul style="list-style-type: none"> • Is the level of government that houses most experts but there are major differences between different regions in Sweden, both in terms of expert knowledge of climate adaptation, but also in terms of how to interpret current legislation.

		<p>government on the progress of climate adaptation at the local level.</p> <p>Local government is the key actor in Sweden. They are in charge of practically all decisions when it comes to adaptation, and are the closest communicator to the general public about what is done and what needs to get done.</p>	<ul style="list-style-type: none"> • Supports local government with reports and surveys about climate change adaptation. <p>Local government:</p> <ul style="list-style-type: none"> • Has plan and building monopoly in each Swedish municipality, thereby is in charge of all societal planning decisions, a key question for adaptation along the coast. • Is the driver of all work connected to adaptation. • Is responsible for societal planning decisions and liable if they give out building permits in areas not suitable. • Must pay for adaptation measures taken in the local municipality, although this is not as straightforward as it seems (see more on challenges for local government). 	<p>Local government:</p> <ul style="list-style-type: none"> • Often understood as divided into the political leadership, and the workers. Within climate adaptation there is frustration towards the political leadership that it lacks knowledge and will to treat the issue. A lot of time and energy is spent on meaningless arguments about the validity of climate change research.
2	Private Sector	<p>Consultants performing investigations and writing reports, mostly for</p>	<p>Consultants in the private sector are responsible for most of the material concerning detailed reports and</p>	<p>One of the biggest questions in climate adaptation in the built environment today is who pays for the measures that could/should</p>

		<p>municipalities and regional government on their technical expertise. As land developers investing in infrastructure in more or less appropriate areas.</p> <p>Insurance companies deciding on interest rates connected to potentially risky investments in areas that may be severely affected climate change related disasters.</p> <p>Lawyers to investigate and write reports on legal frameworks of how to fund and where it is possible to take action or not when it comes to adaptation.</p>	<p>investigations conducted, thereby shaping praxis of how to understand future climate impact and what levels of rainwater, heat, sea level rise, etc. to refer to.</p> <p>Insurance companies the field is affected by what they are willing, or not, to insure. Insurance companies can be a driving force of where it is appropriate to build, both private houses, but also bigger infrastructure projects.</p> <p>Lawyers can make recommendations to municipal, regional, or national government about what legislative venues ought to be investigated to accommodate a better framework for climate adaptation efforts.</p>	<p>be taken. In this question a few law firms have written reports on how the legislative framework could accommodate certain measures, as well as to suggest possible legislative changes that would make it easier for municipalities to fund measures.</p>
3	Community	<p>Communities can be a force to instigate change in society. In recent years communities in Sweden have pushed for transition into a</p>	<ul style="list-style-type: none"> • The key thing about climate adaptation for communities, and maybe even more so for individuals, is that in Sweden it is currently the land/home-owner 	<p>Similar to previous category the finance/responsibility question is of the most interest for communities around Sweden.</p>

		greener lifestyle in general, although this has seen some backlash in the last two or three years. Generally, communities' role in climate change is mostly to shape the discourse around the issues.	<p>who must finance any adaptation efforts themselves.</p> <ul style="list-style-type: none"> • Collaboration between individuals, and between communities is key to achieve synergetic effects of climate adaptation. 	
4	Civil Organisations	-	-	-
5	Academia and research organisations	Deal with the more complex issues, as well as mapping both mitigation and adaptation efforts.	To pursue different ideas of how to best adapt the society, as well as dealing with complex issues i.e., broader societal changes that accommodate adaptation as something in everyday life not as a one off solution, what actions could be taken by government to better deal with climate adaptation.	There is a growing trend of dealing with adaptation, although mitigation research is still what receives the most funding.
6	Professional bodies	One part of forming praxis of how to handle climate adaptation in different arenas, through insurance, building norms and practices, water and land management, etc.	<p>The professional bodies that dealt with climate adaptation can be divided into:</p> <ul style="list-style-type: none"> • Insurance, with a lot of expertise in risk management and shaping acceptable levels of climate risk 	There may be more professional bodies that somehow deal with climate adaptation, but through the interviews these broader categories seem to be the most important. Water management is one of the more complex ones because they are not responsible of dealing with rainwater that exceeds 'a 10-20

			<p>connected to small- and large-scale building projects.</p> <ul style="list-style-type: none"> • Land developers, a segment that has been characterised as ‘falling behind’ in the interviews, but can play an important role of deciding where the built environment is planned for the future. • Water management, divided into private and quasi municipal professional bodies dealing with water management. Where the quasi municipal (often a collaboration between several municipalities in a local area with the aim to handle sewers, rainwater, drinking water, treatment plants, etc.). The private is a national professional body working more strategic and implementing general guidelines. 	<p>year rain’ meaning that it is the municipality who are liable for any damages occurring in such instances.</p>
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1.4 Challenges faced by built environment stakeholders in implementing climate change adaptation

No	Stakeholder Description	Challenges	Reasons for the challenges	Possible solutions
1	Local and National Governments	<ul style="list-style-type: none"> • Lack of legislative clarity in questions regarding who can/should finance climate adaptation efforts. • Lack of resources for dealing with climate adaptation. • Lack of knowledge among politicians about these issues. • The governance of the current built environment that may be affected by climate change (not the one that is in planning stages, because it is easier to plan smarter and to decide on responsibility areas). • Heat islands is more ignored than water issues, but forecasts say that this will 	<ul style="list-style-type: none"> • All the responsibility of climate adaptation lies on either the individual or on the municipality, this leads to an overload of responsibilities and these stakeholders do therefore often take the easiest measure, not the best long-term ones. • There is a lot of pressure, especially in attractive parts of Sweden that are often near the coast in the south, to build more houses. This also yields a significant increase in income for smaller municipalities, thereby creating competing interests of focus-areas and land. • Due to very strong ownership rights in Sweden, it is difficult for state actors to plan on a broader and more long-term scale. It is 	<ul style="list-style-type: none"> • More resources • A higher priority from political leadership all the way from national to local government • More focus on communication and collaboration with citizens in each municipality where climate adaptation is needed. • Clearer mandates of who can/should do what in the field. • A more dynamic legislative framework when it comes to land ownership, financial possibilities for climate

		<p>also become a problem in Sweden.</p> <ul style="list-style-type: none"> • Difficulty of communicating the upsides of taking action now, and what possible negative future scenarios that may avoid. • The competence in smaller municipalities is often lacking. • Difficult for municipalities to plan long-term, especially for smaller ones, and climate adaptation is an issue that will be dealt with over several decades at least. • There is a lack of people who are experts in this field, and the ones who are often deal with very local issues, when they instead should focus on more strategic questions. 	<p>difficult and controversial to take someone’s land and use it for climate adaptation efforts, even if they get compensated.</p> <ul style="list-style-type: none"> • The general knowledge about climate change, and especially climate adaptation, is quite low in society and therefore difficult to communicate. This can also lead to a dissonance between the planning of a function in a newly developed area, and the way that function is realized by builders. • There is more a lack of people working in the field than a lack of adequate education or knowledge about climate adaptation from the people who work with these issues. 	<p>adaptation, and land management.</p>
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		<ul style="list-style-type: none"> • This field should be more directed by processes, not the way it is today, that you just know who to go to for answers about a specific question. • The groundwater issue seems like it can be a major problem in the future. • The importance of nature-based solutions, or just the general importance of ecosystems, for climate adaptation efforts to succeed is highly underestimated. • Climate adaptation is often treated as technical 'hard' questions, while it is just as much about knowledge-spreading and adapting organisations, legislation etc. 		
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		<ul style="list-style-type: none"> • Land availability for municipalities to implement measures is difficult. 		
2	Private Sector	<ul style="list-style-type: none"> • To treat climate adaptation as one holistic question, not as several piece-meal instances in neighbourhood after neighbourhood. • Collaboration between local government, consultants in the private sector, and citizens that have land ownership (most of the time). 	<ul style="list-style-type: none"> • Lack of clarity in who is in charge of what makes collaboration more difficult on all levels. • Rigid legislation leads to a problem of taking action even if there is a will and someone willing to invest. The financing question is one of the key questions to come out of the interview process. • The geodata that exists is not coordinated so that everyone can make use of it. There is no efficiency in how data is managed. 	<ul style="list-style-type: none"> • Someone to be in charge of the more holistic aspects, to coordinate information, be the link between national government who are in charge of legislation and municipalities and private persons who often are the actor that have land ownership and can take real action.
3	Community	<ul style="list-style-type: none"> • Lack of involvement in climate adaptation. • Lack of capacity to take action. • Lack of knowledge about how they can benefit, or how they can reduce risk. 	<ul style="list-style-type: none"> • Community level climate adaptation is basically non-existent in Sweden, besides very few neighbourhood-scale exceptions. • There is a general lack of knowledge about these issues. 	<ul style="list-style-type: none"> • Communicate more clearly what climate adaptation is to the broader society, why it is needed, how we can achieve that, etc.

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		<ul style="list-style-type: none"> • Lack of collaboration and coordination. 	<ul style="list-style-type: none"> • Many people trust that the government will take care of these issues, the “someone else will do it” mentality. 	
4	Civil Organisations	-	-	-
5	Academia and research organisations	<ul style="list-style-type: none"> • Communicating the complexities of research projects 	<ul style="list-style-type: none"> • The dangers of heavy rainwater moving quickly is very difficult to communicate clearly to decision-makers, and to the public. • Difficult to communicate the complexities of how ecosystems interact with society and their importance in having a stable climate. • Difficult to persuade people in Sweden that heatwaves and dry spells might be a significant problem in the future. 	-
6	Professional bodies	<ul style="list-style-type: none"> • Lack of clarity in areas of responsibility. • Financing climate adaptation measures. 	<ul style="list-style-type: none"> • The important professional bodies in Sweden when it comes to climate adaptation “Svensk försäkring” and “Svenskt vatten” are as unclear as the officials in 	<ul style="list-style-type: none"> • Create a more flexible legislative framework when it comes to financing climate adaptation, as well as land management questions.

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			<p>who is responsible for what and why. This lack of clarity leads to inefficient work to build resilience.</p> <ul style="list-style-type: none">• Who is allowed to finance is an important question, and is very important for the insurance industry, since some investments will be more or less risky depending on if local or national government are the co-investors.	
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1.5 Educational Training Framework

1.5.1 Training required to become a professional

No	Professionals (Provide where applicable and additional)	Formal Education in Climate Change Adaptation	Educational Institute / Provider	Link	Additional remarks
1	Architect	There are no formal requirements of having any type of climate adaptation education on any level, for any profession that has been uncovered through interviews or other research within the scope of this project.	There are no formal requirements of having any type of climate adaptation education on any level, for any profession that has been uncovered through interviews or other research within the scope of this project.		There are no formal requirements of having any type of climate adaptation education on any level, for any profession that has been uncovered through interviews or other research within the scope of this project.
2	Engineer	Same as above	Same as above		Same as above
3	People working with physical planning, city planning etc., mostly with municipalities and country administrative boards.	Same as above	Same as above		Same as above

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4	Insurance experts	Same as above	Same as above		Same as above
5	Local political leadership in municipalities	Same as above	Same as above		Same as above

1.5.2 Continuing Professional Development Opportunities

No	Professionals (Provide where applicable and additional)	Formal Education in Climate Change Adaptation	Educational Institute / Provider	Link	Additional remarks
1	Architect	Nothing that is specifically for architects, although they could benefit from the same courses as category 3.			Nothing that is specifically for architects, although they could benefit from the same courses as category 3.
2	Engineers working with water management, land management, technical solutions etc., mostly	There are no set courses, but they are created responding to demand.	SMHI (Swedish Meteorological and Hydrological institute)	https://www.smhi.se/klimat/klimatanpassning-at/klimatanpassning-samhallet/utbildning-inom-klimatanpassning-1.119313	These courses are more for planners or climate strategist or similar occupations, but it can be relevant for engineers. Although, through the

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	working as consultant in the private sector.				interviews there was no knowledge of anyone attending these courses.
3	People working with physical planning, city planning etc., mostly with municipalities and country administrative boards.	There are no set courses, but they are created responding to demand.	<ul style="list-style-type: none"> • SMHI (Swedish Meteorological and Hydrological institute) • Pusselkonsulterna (private consultants focusing on climate adaptation) • Boverket (Swedish Housing Agency) • Svenskt Vatten (Swedish Association for Water Management) 	https://www.smhi.se/klimat/klimatanpassning-samhället/utbildning-inom-klimatanpassning-1.119313 https://www.aktuellhallbarhet.se/utbildning/klimatanpassning-riskbedomning-och-atgarder-for-din-verksamhet/ https://www.boverket.se/sv/PBL-kunskapsbanken/pbl-akademin/pbl-webbutbildningar/klimatanpassning/ https://www.svensktvatten.se/om-oss/kontakt/natverk/klimatanpassningsnatverk/	SMHI has the overall responsibility of knowledge of climate adaptation in Sweden and do therefore come out with new courses every now and then, they also create tailormade courses for industries that need it. There are a select few other actors conducting climate adaptation education.

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4	Insurance experts	Nothing about CPD, although there are some seminars.	Svensk Försäkring (Swedish Insurance)	https://www.svenskforsakring.se/sokresultat/?q=klimatanpassning&language=sv&f=&s=relevance&h= https://www.svenskforsakring.se/tema/hallbarhet/	Not specifically CPD, but seminars, workshops and other knowledge-sharing platforms
5	Local political leadership in municipalities	Awareness and knowledge raising informal courses or seminars.	Climate adaptation experts within the local municipality.	These are informal courses and are not posted anywhere.	These courses/seminars take place has been confirmed by several interviewees as well as being a talking point at the national climate adaptation conference organized by SMHI.

1.6 Assessment of the regulatory framework for built environment professionals

No	Professionals (Provide where applicable and additional)	Is there a regulatory framework for the professionals?	Licensing Requirements	Mutual Recognition Framework	Number of Registered Professionals	Employment Statistics
1	Architect	The 'Yrkeskvalifikationsdirektivet' (occupation qualification directive) states the standards and requirements for architects on the skills set before they are certified and accredited as architects after a study programme. (SOU 2014:19, p. 250, p.360, p.400)	5 years of studying architecture, as well as certain requirements of what must be known for an architect. Although, it is not a protected title, so anyone can call themselves an architect.			There are just over 15,000 architects in Sweden. https://www.arkitekt.se/om-oss/
2	Engineer		Similar requirements as for architects with five years of university education at a			There are about 130,000 engineers in Sweden, with another

			licensed institute. Although, it is not a protected title, so anyone can call themselves an engineer.			15,000 doing research within engineering. (https://www.saco.se/studieval/yrken-ao/civilingenjor/)
3	People working with physical planning, city planning etc., mostly with municipalities and country administrative boards.		Usually a three year degree, there are also several two year masters degrees to build on to a planners degree. Although, it is not a protected title, so anyone can call themselves a planner			Difficult to find any reliable numbers on this category, but there are some sources, although unreliable. 2,900 employed as city planners. (https://yrkeskollen.se/lonestatistik/stadsplanerare)
4	Insurance experts		This is more loosely connected to climate adaptation but an important category of experts, it is an occupation without			About 21,000 people employed as of 2019 (https://www.svenskforsakring.se/aktuellt/nyheter/2019/forsakringsbranschen-omfattar-bade-stora-

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			any licensing requirements. Not a protected title.			och-sma-forsakringsforetag/)
5	Local political leadership in municipalities		Not a protected title.			

1.7 Identification of skill gaps

1.7.1 Anticipation of skills needed for climate change adaptation

Throughout the interview process, as well as in previous research on the topic for the case of Sweden, it is quite clear that the skills, education and the knowledge needed, is mostly in place among experts at different segments of society. What is lacking is coordination, collaboration, general knowledge among politicians and the general public, and urgency about dealing with the issues related to climate adaptation. People working with these questions on a daily basis seem to have adequate knowledge and skills for their tasks, but in many cases they work in isolation instead of collaborating. Geographically collaborating with neighboring municipalities, cities, regions, countries, as well as integrating adaptation into already existing processes about questions that affect or will be affected by climate adaptation is an issue that is more pressing than efforts to raise specific knowledge about climate adaptation.

Having said that, there is still a general lack of understanding of how climate change can affect every citizen. This seems to be most problematic at political leadership in municipalities. At least that can be concluded from the interviews, then again, they may receive more criticism than deserved in many cases. Focusing on adaptation, most people do not understand what that means except building walls to protect them from the sea.

Therefore, what is needed in Sweden boils down to better collaboration, overview, and intensity of working with the issues. What is more specifically needed is to integrate climate adaptation into already existing processes so that the question is dealt with on every level of government, by any segment of society, be it private or public, and that current legal issues, especially about financing climate adaptation and who has the responsibility, are sorted out.

1.7.2 Actions to avoid labour shortages

No one interviewed had any suggestions or ideas of how to attract more people to work with these issues where labour shortages were experienced. At the municipality level it is mostly a question of resources. With a local political leadership that do not prioritize long-term work with climate change, there will not be enough funding to hire qualified people for dealing with these questions, especially in smaller municipalities. Another issue for some municipalities is their location in Sweden. It seems more difficulty to attract qualified people, even if you the resources are available, to smaller municipalities that are further away from major cities.

Consultants, research institutes, and ‘VA-collaboration’, does not seem to have any problems finding qualified personnel. All three of these actors deal mainly with water management and its connection to climate adaptation though, and the argument that ‘we know a lot about water, but not about heatwaves, dry spells, pandemics, invasive species, soil degradation, etc.’ has been heard in multiple interviews from different types of actors.

As for specific actions to avoid labour shortages the simple and straight answer is, there is none taking place today. Although, people already working in the field argue for, as with most sectors, more resources and putting it higher on the political agenda.

1.7.3 Incentives in training for climate change adaptation

There are more and more actors who realize that they need to understand the complexity and width of how to adapt to a changing climate. For every city in Sweden that is struck by a climate related disaster, especially the rainfall in Malmö in 2014, and in Gävle in 2021, nearby cities understand that they may be affected as well. Unfortunately, it is often after something has happened that action is taken. Experience sharing seminars are more and more common, organized by a variety of actors from SMHI to county administrative boards to local municipalities. At the national conference of climate adaptation in Sweden, organized by SMHI in October 2022, a multitude of actors highlighted the need to educate the politicians in these issues, and specifically to frame it as how much money could be saved if we act now, instead of after something has happened. Framing this as a pure economic issue is of course quite cynical, and reflects a strong shift towards neo-liberal approaches, although is still what many believe is the best way of taking decisive action as early as possible.

The training for climate adaptation is therefore more to increase general knowledge about the complexities and uncertainties about dealing with climate change related questions among the general public, especially among politicians, and crucially among local politicians. The incentives, as cynical as it may sound, is likely best framed as cost-saving measures.

1.7.4 Skill shortages

As highlighted in 1.7.1, it is mainly overview, or coordination efforts that are lacking. Some interviewees emphasized that some specific expertise were lacking within their organization, at the same time they argued that these expertise are probably more efficiently used as a centralized resource that can be distributed to whomever needs it currently. This does require good coordination and collaboration structures in place.

Partners Report - Sweden

The way that Sweden is governing climate adaptation one could argue that climate adaptation specialists should be in place in every municipality, which is not the case today. The main focus of the interviews, as well as the research done within the scope of this project has been mostly about the southern parts of Sweden, that are seen as the ones best at working with this issue. Since the south of Sweden has more complicated climate impact issues this makes sense, but it can also mean that skill shortages are more pressing further north. Generally speaking about skill shortages, for many organisations it is a case of not knowing what they don't know.

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Partners Report - Sweden

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