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# **Inclusion of persons with disabilities in climate adaptation - A study of Lillestrøm Municipality**

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MSc International Environmental Studies

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**Declaration**

I, Vilde Langaas Wegner, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature.....

Date.....

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## **Abstract**

Awareness of the need for climate adaptation is increasing as more people and countries are starting to notice the effects of climate change. Simultaneously, certain groups of people within a society are more vulnerable to the effects of climate change than others. This study investigates how municipal climate adaptation work includes persons with disabilities, and how persons with disabilities are affected by extreme weather events. The site of the study is Lillestrøm Municipality. The aim of the study is to identify the key ways in which the needs and rights of persons with disabilities are being included in climate adaptation measures, and to create more knowledge on how climate adaptation can ensure inclusion of the needs and rights of persons with disabilities, and what the main barriers for this is. I have collected data through qualitative, semi-structured interviews with employees in Lillestrøm Municipality and persons with disabilities. In addition, I have carried out a document analysis of three central documents concerning climate adaptation in Lillestrøm Municipality. This study approaches climate adaptation from a just adaptation framework in order to answer to the research questions. The analysis shows that Lillestrøm Municipality are becoming more aware of the diverse vulnerability and needs within the municipality. However, the study concludes with stating that Lillestrøm Municipality still has a lot of work to do in order to be inclusive of persons with disabilities in their climate adaptation work.

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## **1.0 Introduction**

On the 7th of August 2023, Norway was hit by the extreme weather “Hans”, creating the most severe flooding in 50 years in multiple areas across the south of Norway (Hattrem, 2023). Many people have been evacuated from their homes, and in Asak in Lillestrøm approximately 1000 people were for a period isolated due to severe flooding (NTB, 2023). Extreme weather events like “Hans” are expected to become more frequent and increase in intensity in the years to come due to human induced climate change. Increased extreme weather events are affecting people and societies differently, and with the climate changing rapidly we need to adapt (IPCC, 2022, p. 20).

This thesis investigates how climate adaptation is inclusive of persons with disabilities, and how persons with disabilities are affected by extreme weather events. Despite large variations within the group defined as persons with disabilities, the common ground is that they are to a larger degree than non-disabled people subject to discrimination and exclusion in their communities (Bufdir, 2021). Disability is to a large degree still considered a niche issue, something that relates only to persons who have a disability and their community, despite 17% of the world’s population having a disability (Skarstad, 2019).

Although this thesis is focused on persons with disabilities, one cannot investigate how persons with disabilities are affected by climate change and climate adaptation strategies without looking at how the whole society is affected. As I further investigate in this thesis, the way persons with disabilities are included or excluded in society gives a pointer to how they are included in climate adaptation strategies, as well as how they are affected by extreme weather events. There is a need to get more knowledge on how climate adaptation strategies often fail in including persons with disabilities, and how stakeholders can prevent persons with disabilities from being excluded. In order to do so, I will draw attention to vulnerability and drivers of vulnerability, various understanding and models of disability, and climate adaptation theory. Through qualitative interviews and document analysis, this thesis will answer in what ways climate adaptation in Lillestrøm municipality is inclusive of the needs of persons with disabilities.



## **1.1 Research questions and research objectives**

This study aims to identify the key ways in which the needs and rights of persons with disabilities are being excluded from climate adaptation measures. A key objective is to enhance understanding of how climate adaptation can ensure inclusion of the needs and rights of persons with disabilities and what the main barriers for this is.

### ***Research question***

Research question: In what ways does climate adaptation in Lillestrøm municipality include the needs of persons with disabilities?

### ***Sub-research questions***

Sub-research question 1: How does increased extreme weather affect persons with disabilities?

Sub-research question 2: In which ways are the needs and knowledge of persons with disability integrated in climate plans in Lillestrøm?

### ***Objectives***

- 1) Identify the key ways in which the needs and rights of persons with disabilities are being excluded in climate adaptation measures.
- 2) Enhance understanding of how climate adaptation can ensure inclusion of the needs and rights of persons with disabilities and what the main barriers for this is.

## **1.2 Thesis disposition**

This thesis is divided into 7 different chapters. Chapter 2 presents a topical background to the case study and key fields of relevance, being Norwegian law and obligations with regards to climate and climate obligations, Lillestrøm municipality as an organization as well as geographic, climatic, and demographic conditions. Chapter 3 presents the theoretical framework of the thesis, including climate adaptation theory, ways to approach disability, and the concept of vulnerability. In chapter 4, I present the methods used in this thesis and explain

why these were found appropriate. Chapter 5 analyses the data retrieved from qualitative interviews and document analysis. In chapter 6, I discuss the findings and draw on theory presented in chapter 3. Chapter 7 presents the conclusion and concluding remarks of this thesis.

## **2.0 Topical background**

The purpose of this chapter is to provide sufficient background knowledge on Lillestrøm municipality as a case for this thesis. The thematic areas relevant are Lillestrøm municipality as an organization and the work they conduct relating to climate adaptation. External climatic, geographic, environmental, and demographic conditions will also be described as these are fundamental for the municipality's work related to climate adaptation. Similarly, Lillestrøm municipality's approach to inclusion of persons with disabilities and the protection of their rights.

### **2.1 The case study**

Inclusion of persons with disability in climate adaptation was chosen as a case for this thesis as the thesis is part of the NMBU Sustainability Arena "TOWARDS Sustainable cities and communities" (2021-2024), as one of six sustainability arenas at NMBU. The aim of TOWARDS is to promote interdisciplinary co-learning on the transformation towards socially just and sustainable cities and local communities (NMBU, n.d.). The TOWARDS Master project consists of master students from various disciplines using Lillestrøm municipality as a case for their thesis (ibid.). Adapting to climate change is a necessity, and by looking at the challenges concerning just adaptation and inclusion of persons with disabilities in Lillestrøm municipality the thesis can contribute to increase the knowledge on local and municipal climate adaptation work.

The municipalities in Norway have a comprehensive responsibility when it comes to (sustainable) development, inclusion, resource management, and protection of the inhabitants. Lillestrøm's geographic location, climatic and environmental conditions, and rapid growth and close connection to the capital Oslo makes it an interesting case study. Their ambitions to promote sustainable development within the municipality and become a low-emission

community means they have to cut their annual greenhouse gas emissions per capita with 70% (Lillestrøm Kommune, 2021, p.8).

Norway is obliged under the Paris agreement to cut their greenhouse gas emissions with at least 55% by 2030 compared to 1990 emission levels. Norway is also supposed to be climate neutral by 2030, and a low-emission society by 2050 (Miljødirektoratet, n.d.). In addition, the Norwegian Climate Change Act states that Norway's emissions shall be reduced by at least 50% and up to 55% by year 2030 (Øystese, 2023). These goals and obligations have received criticism for being unrealistic when seen in the light of current emission statistics and predictions for greenhouse gas emissions for the next 7 years (Hovland, 2022). In June 2023, a white paper called 'Klima i endring – sammen for et klimarobust samfunn' (in English: A changing climate – together for a climate resilient society). This white paper presents climate adaptation measures that can create a climate resilient society. It is divided into three parts, where the first part describes climate change and consequences of climate change. The second part presents a new and improved management system for climate adaptation on a national level. The third part is the government's plan regarding climate adaptation on a national level in the period 2024 to 2028 (Regjeringen, n.d.). This white paper acknowledges the different vulnerability persons with disabilities can experience in climate change context, e.g.: "... climate change can worsen existing inequality and vulnerability. The elderly, children, the socio-economically disadvantaged, persons with disabilities, and people with health problems are often more vulnerable to climate change than others." (Meld. St. 26. (2022-2023), p. 17), and "... it is important to have a gender, age, disability and cultural perspective in the work to reduce disaster risk. It requires empowerment and participation processes that are inclusive, accessible, and non-discriminatory." (Meld. St. 26. (2022-2023), p.62).

Nonetheless, it is undoubtedly important to keep working towards serious cuts in greenhouse gas emissions while simultaneously adapting to climate change and the expected consequences. The municipalities play a key role when it comes to both of the above, and in creating a sustainable community and livelihood for their inhabitants.

### ***Lillestrøm municipality***

*"Lillestrøm municipality's fundamental values: trust, inclusion, and innovation"*

(In Norwegian: «Lillestrøm kommunes verdigrunnlag: tillit, inkludering og nyskaping») (Lillestrøm Kommune, 2020b, p.10).

Lillestrøm municipality is located on the border of Oslo municipality, in the northeast. It is close to the city of Oslo, with a coherent settlement between the city of Oslo and Lillestrøm municipality. Within the municipality, 95% of the inhabitants live within the southern parts. Lillestrøm municipality was created in 2020, by the merge of the three municipalities Skedsmo, Fet and Sørumsund. Altogether, the population of Lillestrøm is about 89 000 inhabitants (Askheim, 2023). With approximately 17% of the Norwegian population being persons with disabilities, this means that approximately 15 000 inhabitants in Lillestrøm lives with some kind of disability (Skarstad, 2019, p. 9). However, this is only an estimation. Within Lillestrøm municipality lies Lillestrøm city, which is the administrative centre of the municipality (Thorsnæs & Askheim, 2021).

### *Climatic and geographic conditions*

Lillestrøm municipality is characterized by typical Norwegian inland climate, with cold winters and hot summers (Askheim, 2023). It is expected that average yearly rainfall in the area of Oslo and Viken will increase with approximately 15 %, with the majority of this falling in the winter and spring seasons (Norsk Klimaservicesenter, 2022). The landscape of the municipality is characterized by forests, agriculture, wetlands, and rivers. Lillestrøm city is the meeting point of three rivers, and situated in an area that is particularly at risk of flooding, but also landslides (Ibid.). Throughout history, Lillestrøm municipality have experienced several floodings. The three main waterways in Lillestrøm, Glomma, Nitelva and Leira, affect the risk of flood. The most common reasons for flood in these rivers are the melting of snow, and rainfall. Prediction of flood a few days in advance is normally possible for Glomma and Nitelva, as this is mainly due to snow melting and/or heavy rainfall. In Leira, a flood can occur in the matter of hours, as it is mainly due to heavy rainfall (Lillestrøm Kommune, 2022a). The combination of snowmelt and heavy rainfall therefore increases the risk of a severe flood. Lillestrøm experiences floods and pluvial floods regularly. The largest flood on record was in 1789 with the water rising 15 meters above normal levels (Askheim, 2023). In 1966 and 1967, a flood reached 9 and 9,94 meters above normal levels, resulting in severe damages to houses and infrastructure, and the evacuation of many people. Lillestrøm experienced yet another severe flood in 1995 (Lillestrøm Kommune, 2023, p.47). extensive work on making Lillestrøm municipality more resilient and less exposed to flooding began after the 1995 flood, and a levee was built in 1999 to better secure the city from flooding (Askheim, 2023).

According to Norwegian law, the high alternatives of national climate predictions are to be taken into consideration when assessing how municipalities will be impacted by climate change and what actions they must take with regard to adaptation (Statlige planretningslinjer for klima- og energiplanlegging og klimatilpasning, 2018). This means that Lillestrøm municipality will have to consider an increase in annual temperature by approximately 4.5 degrees Celsius, more intense, and frequent heavy rainfall, and floods due to heavy rainfall (Miljødirektoratet, 2017, p. 6). Examples of organizations that generate reports and information regarding the impacts and challenges of climate change in the Norwegian context include national authorities, think tanks, environmental and climate organizations, and humanitarian organizations like the Norwegian Red Cross. Increased climate change awareness has also resulted in an increase in academic research on the social aspects of climate change. However, there is still not a lot of research that focuses on the relationship between marginalized groups and climate change in a Norwegian setting.

### *Climate adaptation in Lillestrøm municipality*

Lillestrøm municipality is working with climate adaptation in several ways and areas, and adaptation to climate is an inherent part of much of the municipality's work. Firstly, international obligations and national guidelines are pushing Norway and its municipalities to strive for emission cuts, which naturally demands some form of adaptation in order to reach these goals. In addition, Lillestrøm has included the need for climate adaptation in their Municipal master plan and in their Holistic approach to risk and vulnerability in Lillestrøm municipality (Lillestrøm Kommune, 2023, p. 67). The municipality is currently working on their climate plan, which will build on the knowledge base from three formerly neighbouring municipalities which since 2020 have been a part of Lillestrøm municipality (Lillestrøm Kommune, n.d.e). Local climate influences whether certain places are appropriate for infrastructure, such as roads and homes, as well as agriculture, recreational spaces, parks, or local businesses. In this sense climate adaptation is partly and indirectly intertwined in several areas of the municipality's work. Simultaneously, the municipality have very limited information available regarding their work directly addressing climate adaptation.

A concrete climate adaptation measure taken by the municipality is the REACHOUT project. Lillestrøm municipality is also one of 7 city hubs taking part in a research and innovation programme funded by the European Commission. The programme aims at supporting the

implementation of the Green Deal by advancing user-oriented climate services (REACHOUT, 2022, p.4).

### ***Persons with disabilities in Lillestrøm municipality***

As mentioned earlier in this chapter there are approximately 15 000 persons with disabilities living in Lillestrøm municipality. Norges Handikapforbund (NHF) (in English: The Norwegian Association of Disabled) has a local branch in Lillestrøm. The local branch carries out disability policy work and advocates for the rights of persons with disabilities. They focus on changing attitudes towards persons with disabilities, as well as being in contact with the municipality (Norges Handikapforbund Lillestrøm, n.d.). Other organizations working with persons with disabilities are also present on a local and national level, like the Funksjonshemmedes Fellesorganisasjon (FFO), Unge Funksjonshemmede, and SAFO. Lillestrøm municipality has the Brukerrådet (in English: User Council) consisting of persons with disabilities, which purpose is to provide its representatives with the possibility to speak and be heard in matters that concern them (Lillestrøm Kommune, n.d.d).

## **2.2 Literature review**

I will give a brief overview of existing research on the topic, in order to demonstrate the context and relevance of my thesis, while also providing a broad basis for the thesis.

The literature used in this thesis was identified through searching in online search engines and data bases like Google Scholar, Oria (Norwegian), and ResearchGate, as well as local libraries in Oslo, Bærum, Grimstad and Lillesand. The search words used to identify relevant literature were “climate adaptation”, “disability”, ”vulnerability”, “climate adaptation theory”, “persons with disabilities theory”, these were used in combination with one another and alone. I also used a few sources that I got familiar with when writing my bachelor’s thesis on a similar thematic area, like Priddy (2019) and Skarstad (2019), as my knowledge of their content found them relevant for this thesis as well. Having a basic knowledge and overview of the literature relating to persons with disabilities was useful when looking for further information, and more specifically on the vulnerability, inclusion, and adaptation discourses. In addition, I have investigated the references of articles found particularly relevant to the subject and used these when relevant.

Kosanic et al. (2022) investigates the impact and adaptation concerns associated with climate change, and how persons with disability are disproportionately affected. They highlight the double vulnerability that many persons with disabilities experience, with often being part of to or more marginalized groups, like elderly, women, people of colour, or indigenous peoples. Kosanic et al. (2022) uses the environmental justice framework to explore and understand the dimensions of climate change impacts on persons with disabilities. They question to what extent persons with disabilities are included in decision-making relating to climate change (Kosanic et al., 2022, p. 2). Amongst the findings are the importance inclusion in decision-making concerning climate change and climate adaptation. This is linked to the well-being of the disabled population, as well as necessary in order to achieve climate adaptation that aligns with the needs of persons with disabilities. The lack of inclusion of persons with disabilities in research on sustainability can jeopardize a just and sustainable development (Kosanic et al., 2022, p.8).

In a systematic review conducted by Gaskin et al. (2017), they identify factors that are associated with the vulnerability and adaptive capacity of persons with disability in a climate change context. Similarly to Kosanic et al. (2022), they highlight the double vulnerability that persons with disabilities face due to existing inequalities, and the fact that disability disproportionately often affect already vulnerable groups, like elderly, poor, and ethnic minorities (Gaskin et al., 2017, p. 801). Although the systematic review focused primarily on the United States and hurricanes, similar factors affecting the vulnerability and adaptive capacity can be identified in the context of other extreme weather events. An interesting finding is that twice as many of the reviewed studies focused on vulnerability, compared to those that focused on the factors that contribute to the adaptive capacity of persons with disability. This, they argue, continues to perpetuate the negative and discriminatory perceptions of persons with disabilities as having low adaptive capacity (Gaskin et al., 2017, p. 811). They conclude with stating the that lack of inclusion in adaptation planning and existing inequalities in society makes persons with disabilities more vulnerable to climate change (Gaskin et al., 2017, p. 811-812).

Malloy & Ashcraft (2019) studies climate adaptation from a justice perspective and as an issue of justice. This is grounded in the well-known fact that those who have contributed the least to climate change are those who suffer the most from it (Malloy & Ashcraft, 2019, p. 2). In this

review, they critically analyse literature relating to the role of social justice within the climate adaptation discourse. One of the findings which is quite relevant for the topic of my thesis is that climate adaptation processes usually are implemented through mainstream processes which often is in favour of the so-called elite. This exacerbates inequalities in decision-making processes, leaving marginalized groups out (Malloy & Ashcraft, 2019, p. 4).

Malloy & Ashcraft (2019) also highlights the importance of acknowledging the underlying causes of vulnerability and targeting the factors causing disproportionate vulnerability amongst the population in order to address vulnerability in a socially just climate adaptation perspective (Malloy & Ashcraft, 2019, p. 5). Among the concluding remarks is the need for further research on systemic causes of injustice in climate adaptation policy and framing (Malloy & Ashcraft, 2019, p. 12).

Much of the research conducted on the topic of persons with disabilities and climate change is concerned with the potential health implications and health-related vulnerability. This is often also related to the risk of acquiring new disabilities, rather than persons who are already living with a disability (Lindsay et al., 2022). A narrow field is concerned with persons with disabilities as a marginalized group in society, and the structural barriers and discriminating approaches that are perpetuated in climate change adaptation and green shift policies. In research on climate adaptation and human considerations, the majority appears to focus on urban areas, energy effectiveness and transitioning, greenhouse gas emission reduction, and policy. The aspect of nuances in human vulnerability and human diversity, like persons with disabilities, is under-represented and researched. This is not surprising, as the discourse concerning the rights of persons with disabilities is a relatively young field of research. Persons with disability and climate change has gotten more attention in the humanitarian field over the past decade. Many areas badly affected by the implications of climate change is also areas where humanitarian organizations have been, and currently are, active. These areas often suffer from both climate change implications, and conflict and crises at the same time. The combination of climate change, conflict, and human suffering is the topic of ICRC (2020)'s report *'When Rain Turns to Dust'*. As the barriers and limitations for persons with disabilities are grounded in societal, cultural, economic, and political structures, the increased external pressure from for example conflict or extreme weather events will both create or reinforce new or existing barriers (Priddy, 2019, p.20). Research that investigates how external pressure, threats, and risks affects persons with disabilities can be useful to get a better understanding of vulnerability, inclusion and exclusion of persons with disability under both normal and



abnormal situations. I therefore consider literature like reports, statistics, and testimonies provided by humanitarian organizations to be a precious contribution to increasing the knowledge on how persons with disabilities are affected by climate change and extreme weather events.

### **3.0 Theoretical framework**

In the theoretical approach to the research questions, I focus on the concepts of *climate justice* and *just adaptation*. These concepts are inclusive of the existing inequalities in society and how people are affected disproportionately both by the effects of climate change and climate adaptation. Climate justice and just adaptation addresses the influence of existing inequality and injustice in adaptation measures and aims to present way to go about climate adaptation without sustaining discriminatory practises (Juhola et al., 2022, p. 609). I use this approach in the examination of inclusion of persons with disabilities in municipal climate adaptation in Lillestrøm Municipality.

### **3.1 Climate adaptation**

A changing climate make adaptation to new climatic and environmental realities inevitable. Adaptation needs to embrace all societal aspects including, infrastructure, construction and safety policies for housing and buildings, agricultural and irrigation systems; climate change require adaptation towards preparedness for its multifaceted challenges. As posited by the IPCC, adapting to climate change means adjusting ecological, social, or economic systems to the experienced or expected climatic conditions and following climatic events (IPCC, 2022, p. 5-7). Succinctly put, climate adaptation is about reducing the adverse effects of climate change whilst also taking advantage of the new opportunities it creates (Jones & Boyd, 2011, p. 1263). This entails changes in multiple structures and on various levels in society, from mitigating greenhouse gas emissions, to addressing drivers of vulnerability and risk. Consideration of barriers and limitations to climate adaptation is undoubtedly a factor to consider in the discussion of inclusion of persons with disabilities and the thematic of this thesis (Leichenko & O'Brien, 2019, p.158). In contemporary society, the challenges of adaptation extend beyond the biophysical factors associated with climate change. Merely advocating for individuals to seek shelter in shaded or cooler environments during a heat wave proves inadequate, given that

a complex interplay of economic, social, cultural, and political factors engenders divergent prospects and potentials across various groups. The critical discourse encompasses the impact of these factors within the examination of the adaptive capabilities of both individuals and societies. (Jones & Boyd, 2011, p. 1263)

Malloy & Ashcraft (2020) explores the concept of *just adaptation*, a field within climate adaptation that focuses on the role of socially vulnerable groups in climate adaptation policy. The concept of just adaptation employs principles from social justice theory. Social justice theory in the context of just adaptation refers to the inclusion of principles that addresses inequalities with the objective of ensuring equitability in the allocation of the adverse consequences and benefits associated with climate impacts and adaptation efforts (Malloy & Ashcraft, 2020, p.3). The theoretical framework builds on the need for considering the rights, needs, and vulnerabilities of marginalized and disadvantaged groups in societies. These groups often bear a disproportionate share of climate change impacts, due to limited access to recourses and opportunities (Schlosberg, 2013, p. 39-40). Moreover, the theory aims to change structural injustices that exacerbate climate vulnerabilities for marginalized and disadvantaged groups (Schlosberg, 2013 p. 40-41).

Malloy & Ashcraft (2020) argue that climate adaptation typically is implemented through mainstream processes, meaning expert-lead and top-down processes that favours elite interests and the typical “winners” in society. This implication posits that the persisting marginalization of those who are already disadvantaged will likely be continues as an outcome of the approach to climate adaptation policies. Nonetheless, this observation ought not to be regarded as unexpected. Marginalization of specific groups, such as individuals with disabilities, across various societal domains raises the question of why such patterns endure; despite being recognized as an issue. It can be argued that these patterns continue to endure, not only because the there is a multifaceted reasoning to consider, but also because there is an absence of inclusivity within mainstreamed policy development for people with disabilities.

When adaptation fails, it is often attributed to either poor planning or simply a result of adaptation measures implemented on the basis of uncertain and imperfect information (Schipper, 2020). Failing adaptation, or *maladaptation*, can in worst case scenarios contribute to increased vulnerability and risk. Avoiding maladaptation demands acknowledging the factors and contexts that influence on risk and vulnerability. To undertake a comprehensive analysis of

the integration of individuals with disabilities into the adaptation policies, it is imperative to address facets that present constraints and limits to climate adaptation.

### *Limits to adaptation*

Jones & Boyd (2011) categorize limits to adaptation into three distinct categories based on a literature review on the subject. These categories of limits to adaptation are the natural, the social, and the human and informational (Jones & Boyd, 2011, p.1263). The natural limits are the ecological and physical limits, like ecosystem resilience including biodiversity, geographical and geological limitations. Though the natural limitations are not the main focus of this thesis, the threat that ecological degradation, and threat that loss of nature and biodiversity poses to human systems and livelihoods are projected to become more severe in the years to come. The human and informational limitations embrace economical, technological, and knowledge-based limitations. This can be lack of reliable weather forecast, lack of financial opportunities to drive adaptation measures, limited access to necessary technology, like renewable energy. The third category of limits are the social limits, meaning normative, cognitive, and institutional limitational factors. The social limits are found in existing social structures, or emerges from these, and may not be perceptible as barriers before adaptation measures are taken or implemented. The normative barriers refer to how social norms influence on climate adaptation action. This can be how a society through shared values and understanding perceives the threat of climatic events, and how they choose to respond either individually, politically or as a group (Jones & Boyd, 2011, p. 1263-1264). An example of this can be how people who choose not to eat meat due to environmental and climatic reasons will receive more acceptance for their choice and opinion within a group of people where the shared understanding and values are in line with their choice, rather than within a group of people where the shared opinion of environmental and climatic outcomes of meat consumption are neglected. Another example could be how persons with disabilities may fear different consequences of climate change than non-disabled persons, due to their experiences with extreme weather events. The institutional barriers relate to how formal and informal structures enables people's ability and possibility to adapt. The cognitive barriers to adaptation are the psychological reflections and responses to climate risks and vulnerability (ibid.).

This thesis will mainly focus on the social limits and barriers to adaptation. This is because the causes of discrimination and exclusion of persons with disabilities in modern society mainly stems from social factors similar to those for limits to adaptation; cognitive, normative, and

institutional. Through the application of these theories derived from two disciplinary domains, an analytical framework emerges, enabling the identification of barriers pertaining to climate adaptation that encompasses persons with disabilities. Moreover, a more in-depth analysis can be conducted to examine the extent to which Lillestrøm municipality integrates and operationalizes these considerations within their climate adaptation endeavours. This phenomenon arises due to predominant association of challenges related to the inclusion of persons with disabilities with social factors, as opposed to factors of natural or inherent nature.

### ***Community involvement and community-based adaptation***

Climate adaptation planning and action on community, city, or regional level is usually implemented by government agencies. A relatively small group of people evaluate and make decisions for adaptation plans based on budgetary constraints, laws and regulations, local stakeholders, and various interests (Leichenko & O'Brien, 2019, p. 164). This is a typical top-down approach. An alternative to this is *community-based adaptation* (CBA). The idea of CBA is to use the local community in a collective decision-making process in order to include and make use of local knowledge, engagement, and needs. This way the adaptation plans and actions are more likely to be inclusive and suitable for the locals needs. However, it is important to have solid and fact-based knowledge on outcomes, future predictions, and possible scenarios, as CBA can also lead to maladaptation (Leichenko & O'Brien, 2019, p. 164-165). Maladaptation in this context refers to unintended negative consequences to strategies that are intended to mitigate the impact of climate change. Such unintended consequences can include; loss or harm to local ecosystems due to construction of seawalls, dams, excessive deforestation and use of one single crop to enhance drought resilience. Another example can be urbanization development without green spaces which can lead to increased heat in the area. However, Ebi & Semenza (2008) argue that addressing the social, cultural, political, economic, and environmental factors that influence on vulnerability are key in achieving successful interventions. Factors like geographic location, demographics, and social aspects that influence on the local context should best be addressed through community involvement (Ebi & Semenza, 2008).

#### **3.1.1. Extreme weather events**

Extreme weather is weather that occurs rarely compared to the normal in a given place and time of year, and that likely will result in severe damage and/or severe risk for loss or damage to

health and life (Meteorologisk Institutt, 2020). The perception of what is extreme and what is within the range of normal weather will vary depending on geographical location and average climatic condition in the place of occurrence.

Over the course of the past decades, we have seen multiple natural disasters around the globe caused by extreme weather events. The summers in Europe are experiencing longer lasting and more intense heatwaves, as well as unnormal weather patterns (British Red Cross, 2023). Increased extreme weather is a component of climate change. Extreme weather includes extreme temperatures (hot and cold), droughts, heavy precipitation and pluvial floods, river floods, storms and tropical cyclones, and concurrent extreme events (Meteorologisk Institutt, 2020). As a result of human induced climate change, it is expected that the weather will become more unstable and intense. In Lillestrøm municipality it is expected to be more frequent and intense heavy rainfall, rain induced flooding, drought, and landslides (Norges Klimaservicesenter, 2022).

### **3.2 Understanding disability**

The perception we hold regarding persons with disabilities, as well as our comprehension and delineation of the concept of disability, profoundly influence the collective reality that encompasses us. Persons with disabilities have been subject to discrimination on a global scale across various dimensions of societal existence, including; social life, professional environments, economic and political spheres, cultural domains, and fundamental human rights considerations (Bufdir, 2021). In Russel (2019)'s capitalistic understanding of disability, persons with disabilities became a social problem as their bodies did not conform with the idea of a worker's body. As a result, they were excluded from labour and did not have the same possibility to have an income and all that comes with having a paid job (Russel, 2019). She describes disability as a socially created category that stems from labour relations in capitalist societies, and explains the growth in the wealth of the capitalist class to stem from oppression of persons with disabilities (Russel, 2019).

The manner in which we speak of and articulate discussions pertaining to persons with disabilities holds a significant impact on the discourse and the collective perception of the identities included within this group. Jan Grue, a Norwegian researcher, author, and wheelchair user, begins his book *"Body language. Presentations of Functional Disability in Culture and*

*Society*” with describing his choice of words. He talks about the impact of words, moreover, why and how our choice of words in describing and discussing disability is important. He mentions the difference between “common” and “uncommon”, versus “normal” and “deviant/abnormal” (Grue, 2014, p. 9). These words shape our image and perception of persons with disabilities, and further shapes our actions, attitude, and societies. He further explains how “disability” in a Norwegian context often is described as a mismatch between an individual’s mental and physical abilities, and the expectations of society (Grue, 2014, p.10-11). Translations of word used in disability discourse internationally and in Norwegian has also somewhat been inconsistent. An example of this is in the Convention of the Rights of Persons with Disabilities, which in Norwegian directly translates more to “Convention on the Rights of Persons with Reduced Functioning” (in Norwegian: Konvensjon om rettighetene til mennesker med nedsatt funksjonsevne). Historical and modern understanding of disability have been theorized, which we will look further at in chapter 3.2.2.

### **3.2.1 What is disability and what does it mean to be disabled?**

The Convention on the Rights of Persons with Disabilities (CRPD) defines persons with disabilities as: “...those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.” (Article 1, Convention on the Rights of Persons with Disabilities, 2006).

Disability is typically divided in four different categories: physical, sensory, intellectual, and mental. About 1 billion people worldwide are disabled, though this number is likely to be higher. due to stigma, and thereby individuals going under the radar, and lack of data (Priddy, 2019, p. 11). In Norway, about 17% of the population have a disability (Skarstad, 2019, p.9).

Disabilities sometimes necessitates adaptation, accommodation and support mechanisms to facilitate equal participation in society. However, as the latter paragraph emphasises; the experience of disabilities is profoundly influenced by societal attitudes. This proves the importance of acknowledging diversity within the disabled community, as it includes a wide range of abilities, challenges and strengths that defy a uniform categorization.

### **3.2.2 Models for understanding disability**

Over the years, multiple models for describing and understanding disability have emerged. From viewing disability as a punishment for sins from God in the moral/religious model, to seeing disability as a result of barriers created by narrow and non-inclusive structures in society in the social model (Retief & Letšosa, 2018). Various models may hold relevance within distinct contexts, regarding social and cultural variables. However, certain models, such as the moral/religious and the medical model, are rooted in discriminatory and segregational ideologies and perspectives. Here, I will give a brief introduction to the four models identified as relevant for the case of climate adaptation in Lillestrøm municipality.

#### **The social model: Disability as a socially constructed phenomenon**

The social model describes disability as a situation that stems from social conditions and the structure of society. This means that disability is a result of lacking or inadequate social structures, creating barriers and disabling certain groups of people. This further means that there is nothing inherent with disability that justifies prejudice and discrimination (Dirth & Branscombe, 2017, p. 416). The social model was developed in the 1960s and 1970s and criticized the medical model which had been dominating the disability discourse (Union of the Physically Impaired Against Segregation, 1976). The social model shifts the attribution of responsibility and causation for the marginalization of persons with disabilities from their inherent conditions to society and its structures and attitudes. By using the social model when approaching issues relating to discrimination of persons with disabilities, we can look at the disabling factors within society rather than individuals or potential medical conditions (Dirth & Branscombe, 2017, p. 416).

#### **The medical model: Disability as a disease**

The medical model describes disability as a medical issue, where the solution to the “issue” is medical care and treatment for the disabled persons in order to “fix” them and make them “normal” (Priddy, 2019). Obviously, this model is strongly based on stereotypical assumptions on what is considered a “normal” body and an “unnatural” body. Skarstad (2019) describes the medical model in its most extreme form as objectifying humans, taking the focus away from them as individuals and rather treating them as sick people defined by their disability (Skarstad,

2019 p.26). According to the medical model, the barriers persons with disabilities encounter in society are due to their disability, and not the widely homogenous structure of society. This leads to further discrimination of persons with disabilities by systematically prohibiting their inclusion in multiple areas of society, as they are first and foremost perceived as patients or individuals in need of medical treatment/healing, and the reason for discrimination is a natural result of their disability (Dirth & Branscombe, 2017, p. 415).

### **The human-rights based model: Disability as a human rights issue**

The human-rights based model has many similarities with the social model in the way it describes disability and the discrimination of persons with disability as a structural problem rooted in society, rather than a medical problem. The human-rights based model claims that this is a result of the UN Declaration of human rights incapability to protect the rights of persons with disability sufficiently. The initial UN human rights does not sufficiently protect the rights of persons with disabilities and in order for the human rights to protect the rights of persons with disability they need to remove barriers in society, prevent violations, and facilitate for equal participation in society. This is what the CRPD aims to do (Priddy, 2019, p. 20-21).

### **The identity model: Disability as an identity (marker)**

This model emphasizes the collective and individual identity of persons with disability and how they belong to a minority in a similar way to gender, race, LGBT+, etc. In the identity model, disability is considered as an experience in interaction with society where the construction of societies lacks inclusion of disabled people. This definition includes any experience where people with disabilities have found themselves as not being considered as the norm amongst the user group when interacting with society. It opens for individualism, but the common ground is that they are treated differently in society due to their disability (Brewer et. al., 2012).

### **3.2.3 Discrimination, barriers, and ableism**

Persons with disabilities face a great variety of challenges, depending on their disability and the society of which they are a part, as well as the disability discourse in general. Persons with



disabilities are to a great extent subject to discrimination and underrepresentation in society, and can face barriers and discrimination in many of society's spheres.

### **Ableism**

There is a growing understanding of underlying issues relating to persons with disabilities as *ableism*. Ableism is a set of beliefs that causes disability in interaction with society. It's a counter-image to able-bodiedness, which is most easily explained as the opposite of disability (Tarvainen, 2019) (Jammaers, 2021). Ableism is a reaction to the understanding of a "normal" person being an average or typical functioning person (Grue, 2014, p. 141). Choice of words and use of language when describing what I in this thesis, like Grue, refer to as "common" and "uncommon" bodies is critically investigated in studies on ableism (Tarvainen, 2019, p. 292). Criticism of ableism, as posited by Grue (2014), contend that it tends to position persons with disabilities in a victimized role, thereby neglecting throughout analysis and the facilitation of discourse concerning particular issues. Grue (2014) compares it to the difficulties men of colour faced in the 1950's in the USA, where they experienced heightened difficulties related to employment, educational access, maintaining a healthy family life, and other comparable spheres. Being a man of colour could but does not necessarily have to be the *underlying reason* for somebody's life struggles (Grue, 2014, p. 141). Similarities can be drawn to the discourse of ableism, with underlying reasons for issues faced in interaction with society not necessarily being rooted in a person's disability.

#### **3.2.4 The Convention on the Rights of Persons with Disabilities**

The Convention on the Rights of Persons with Disabilities (CRPD) emerged as a response to discrimination and human right violations against persons with disabilities. Despite being protected under the Universal Declaration of Human Rights, the rights of persons with disabilities have been in need of further protection, similar to the rights of women (The UN Convention on the Elimination of All Forms of Discrimination Against Women) and children (The UN Convention on the Rights of the Child). The CRPD was adopted in December 2006, and entered into force in May 2008 (UN Department of Economic and Social Affairs, 2016). It covers many of the areas in which persons with disabilities experience human right violations and discrimination, like the right to education, the right to work, and the right to live independently and being included in the community (Convention on the Rights of Persons with Disabilities, 2006).

Norway signed the CRPD in 2007 and ratified it in 2013 (Konvensjon om rettighetene til mennesker med nedsatt funksjonsevne, 2006). The Norwegian government is obliged politically, through International Law, and by the Norwegian Constitution's § 92 to follow the CRPD (Bufdir, 2021). The Norwegian County Governors and Norwegian municipalities are obliged to follow the CRPD and actively work to secure the rights of persons with disabilities (Statsforvalteren, 2023). In addition to supplementing and further securing the rights of persons with disabilities, the CRPD also functions as a change in the attitude towards persons with disabilities (Likestillings- og diskrimineringsombudet, n.d.). The CRPD is not an addition to Norwegian law but has been incorporated into the existing Norwegian law through transformation. The main responsibilities of providing sufficient services to the inhabitants fall on the municipalities, and therefore the responsibility of securing the human rights of their inhabitants (Bufdir, 2021). Norwegian municipalities should look directly to the CRPD when deciding on various actions in order to make sure that the rights of persons with disabilities are covered (Ibid.). A national project was launched in 2023 with the aim of incorporating the CRPD into the County Governors' and municipalities' work. The purpose of this is to strengthen the knowledge and competence on how to secure the rights of persons with disabilities (Statsforvalteren, 2023). According to Norwegian Law, all municipalities shall have a user council for persons with disabilities. The user council stands free to bring up issues or initiatives relating to the rights of persons with disabilities and have the right to speak in cases concerning persons with disabilities (Bufdir, 2021).

### **3.3 Vulnerability**

The concept of vulnerability can be understood in various ways. Vulnerability can be understood as the likeliness of someone being negatively or adversely affected by something. More specifically, vulnerability is a result of external and internal factors in society like social, economic, and political factors, and the combination of these in combination with risks and exposure (Leichenko & O'Brien, 2019, p. 140). The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as: "the propensity or predisposition to be adversely affected and encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt." (IPCC, 2022, p. 5). In the context of environmental vulnerability, Adger (2006) emphasizes that: "Vulnerability is driven by inadvertent or deliberate human action that reinforces self-interest and the distribution of power in addition to interacting with physical and ecological systems" (Adger, 2006, p.270). As we see, vulnerability can be defined and interpreted in many ways depending on context and type

of vulnerability. In this thesis, I focus on vulnerability as a combination of pre-disposition, being both inherent in a person and as a social, economic, or political outcome, exposure to a hazard, and adaptive capacity.

## **4.0 Methods**

### **4.1 Research design**

This thesis aims at investigating in what ways Lillestrøm municipality is inclusive of the needs and rights of persons with disabilities in their work with climate adaptation, and further how persons with disabilities are affected by extreme weather events. It is a qualitative, case-study design where I have used a mixed-methods approach, combining semi-structured interviews and document analysis. These methods were found appropriate after the research questions were formulated, due to the interpretivist and ontological characteristics of the case study (Bryman, 2021, p. 350). Semi-structured interviews were chosen as the most suitable method in order to retrieve detailed information from employees in the municipality on their ways of working with climate adaptation and inclusion of persons with disabilities, as published information describing this was unavailable/non-existent. Semi-structured interviews were chosen as the method to retrieve data from persons with disabilities as well, as available data on their experiences with extreme weather and climate adaptation in Lillestrøm municipality is extremely limited. Through semi-structured interviews they could speak freely about experiences and reflections concerning being disabled in a climate adaptation and extreme weather context (Bryman, 2021, p. 425-426). Conducting a document analysis on the data available on Lillestrøm municipality's work relating to climate adaptation for understanding the content, agenda, focus, and understanding of the municipality's work on climate adaptation. As documents are never completely neutral, combining a document analysis with the interviews of employees in the municipality allowed me to gain a deeper insight into the agenda, focus, and understanding of both climate adaptation and inclusion of persons with disabilities (Asdal & Reinertsen, 2020, p.14). The case is inclusion of persons with disabilities in municipal level climate adaptation, and Lillestrøm municipality is the study site. Lillestrøm municipality was selected as a site due to 1) being the site for the NMBU TOWADS project (see chapter 2), and 2) the climatic and geographic conditions making Lillestrøm municipality particularly exposed to certain types of extreme weather events and weather-related disasters.

For each interview I made 6 to 7 questions that were asked, but also formulated in a way that would allow the interviewee to answer broadly and freely. This allowed for multiple follow-up questions to retrieve further details and information from the interviewees. The interview guides had minor varieties depending on the interview object, especially among the interviewees working in Lillestrøm municipality. This was due to the variation of the employees' fields of work and relation to climate adaptation. In the interviews with persons with disabilities, the sole difference in the interview guide was that one was formulated in a more general way, as the interview was living outside of Lillestrøm municipality, and the other had questions more specifically on the Lillestrøm municipality context. However, the overarching theme in the questions were related to climate adaptation processes from beginning to end, inclusion of vulnerable groups and specifically persons with disabilities within these processes, challenges that had or potentially could arise regarding climate adaptation and inclusion of persons with disabilities/vulnerable groups. Persons with disabilities were in addition asked about their experiences with extreme weather events and their perception and thought of how climate change and extreme weather events might affect them differently. I avoided asking leading questions, and therefore had to formulate the questions somehow widely, and follow up on their responses where relevant. I encouraged the interviews to give examples and to share their thoughts concerning the thematic of the interview.

## **4.2 Sampling**

### **4.2.1 Interviews**

The process of sampling for the interviews was divided in two different categories. One category was for subjects that was directly involved with the work of the municipality, meaning employees in Lillestrøm municipality working with the two fields of climate change and climate adaptation, and persons with disabilities. I was interested in interviewing persons who worked with climate adaptation directly. The relevant subjects were then identified both through Lillestrøm municipalities online overview of employees and their field of work, which due to the limited number of employees and protection of privacy will not be named concretely. In addition, I participated in a meeting with Lillestrøm municipality relating the TOWARDS project and identified potential informants through this meeting. The second category of the sampling was persons with disabilities living in Lillestrøm municipality. These were relevant in order to get the user-perspective on how persons with disabilities are affected by climate

adaptation measures, extreme weather, and to what degree they were included in the work relating to climate adaptation. To find participants from this group proved to be more difficult than anticipated. I reached out to multiple organisations working with and for persons with disabilities on a national and local (Lillestrøm municipality) level and asked if they could forward my request for potential candidates for interviews concerning my master thesis to their members. I received very few replies, but Norsk Handikapforbund (NHF) identified one participant with whom I conducted an interview. The difficulties with finding subjects that suited my criteria which were 1) over the age of 18 years, 2) a person with a disability, and 3) an inhabitant of Lillestrøm municipality, made me look for alternative solutions. Therefore, I decided to include persons with disabilities from nearby areas that have similar climatic and geographic conditions. However, amongst this group I was able to get one participant who was selected through the organisation Unge Funksjonshemmede. This data has not been directly included in the analysis of Lillestrøm municipality, but rather to exemplify and diversify the range of challenges faced by persons with disabilities in situations of extreme weather events.

#### **4.2.2 Documents**

The documents used in the document analysis are all official documents from Lillestrøm municipality. These documents are the ‘Klimastrategi for Lillestrøm’ (in English: Climate Strategy for Lillestrøm) ([https://www.lillestrom.kommune.no/globalassets/pdf/planer-og-strategier/2021.10.11\\_klimastrategi\\_for\\_lillestrom\\_print.pdf](https://www.lillestrom.kommune.no/globalassets/pdf/planer-og-strategier/2021.10.11_klimastrategi_for_lillestrom_print.pdf)), ‘Helhetlig risiko og sårbarhetsanalyse for Lillestrøm kommune’ (in English: Holistic risk and vulnerability analysis for Lillestrøm Municipality) (<https://www.lillestrom.kommune.no/globalassets/pdf/samfunnsutvikling---prosjektsider/2023.04.26.-h.ros-2023.-del-2.-underlagsrapport.pdf>), and ‘Kommuneplanens Samfunnsdel 2020 - 2031’ (in English: the social element of the municipal master plan 2020 – 2031) ([https://www.lillestrom.kommune.no/globalassets/pdf/kultur-miljo-og-samfunn/kommuneplan/kommuneplanens\\_samfunnsdel.pdf](https://www.lillestrom.kommune.no/globalassets/pdf/kultur-miljo-og-samfunn/kommuneplan/kommuneplanens_samfunnsdel.pdf)). It is worth mentioning that the ‘Helhetlig risiko og sårbarhetsanalyse for Lillestrøm kommune’ is a background report. It is a revised version of the previous holistic risk and vulnerability analysis from 2018. It has been available for the public to give feedback until May 2023, and will be forwarded to the Municipal Council in September 2023 (Lillestrøm Kommune, n.d.c). These documents give information about what Lillestrøm municipality does, aims to do, and plans to do, relating to climate adaptation. They give an overview of the prioritized areas and approached of the municipality,

now and in the coming years. These are the main reasons for selecting these three documents for the document analysis. In addition, a few other documents have been used in the discussion to either demonstrate contradictions or strengthen findings. Through analysis they also give information about the municipality's focus, realistic outcomes of their plans and actions, and what areas receive little to no attention.

#### **4.2.3 Meeting with Lillestrøm Municipality**

In May 2023 I attended a meeting with Lillestrøm municipality, NMBU, and representatives from Brukerrådet, in relation to the TOWARDS project. The meeting focused essentially on inclusion of persons with disabilities in Lillestrøm municipality's work, and risk and vulnerability assessment in relation to climate change, extreme weather events, and natural disasters. Data in the form of notes from this meeting have also been included in the results section and discussion section of this thesis.

#### **4.3 Data collection and analysis**

The data was collected through qualitative, semi-structured interviews and document analysis. The interviews took place both physically and over telephone. The physical interviews took place in one of the interviewees offices, and another in a private meeting room in a public library. The duration of the interviews was between 30 minutes and 1 hour. All together I conducted 4 interviews. There were 5 planned interviews, where one withdrew without further explanation. The physical interviewed were recorded, while the interviews conducted over telephone were not. I transcribed the interviews that were recorded and took detailed notes of those that were not recorded. For the analysis of the interviews, I used coding to draw out the relevant findings and themes in the interviews.

In the document analysis I used the web page of Lillestrøm municipality ([www.lillestrom.kommune.no](http://www.lillestrom.kommune.no)) to get an overview of Lillestrøm municipality's work on climate adaptation, persons with disabilities, and related areas of relevance. Their superior plan and ambitions for Lillestrøm municipality has also been taken into consideration in order to gain better understanding of their work related to climate adaptation and persons with disabilities. In the documents selected, I searched for these key words: adaptation (tilpasning), climate (klima), disability (funksjonsnedsettelse), vulnerability (sårbarhet), and minority (minoritet).

These words were used in their Norwegian form, but I will refer to them with their English translation in this thesis. As these words gave little results, which was a finding in itself, I began to conduct more of a thematic analysis (Bryman, 2021, p. 516). This allowed me to zoom out and gain better understanding of what the text as a whole is and is not.

#### **4.4 Ethical considerations**

There were multiple ethical aspects to consider with the work of this thesis. Firstly, the principle of writing about and doing research on persons with disabilities as a non-disabled person myself, was something I was aware of from the very moment the idea of this topic came to mind. Persons with disabilities often experience discrimination and may have needs that are not always accommodated for in public spaces in some situations. As I did not have any criteria on types of disabilities amongst the interviewees, I had to make sure the interviews were conducted in a way that would be suitable for the interviewees. This was solved by suggesting various ways of doing the interviews, where the interviewee could choose what suited them. I thought about my role as a non-disabled master student, and how the interviews might observe me as perhaps naïve, or unable to relate or understand their perspective and experiences. For the one interviewee who asked about why I chose this topic and where the interest came from, I answered honestly and mentioned my Bachelor thesis (Inclusion of persons with disabilities in humanitarian work in Syria during the civil war), my 7 years of working in a physical rehabilitation centre, and fundamental values of equality, human rights, and sustainability. The slogan “Nothing about us without us” is frequently used in the international disability sphere and meant to me that including persons with disabilities in this thesis was a necessity. Secondly, how the selection of interviewees and the execution of the interviews were conducted poses multiple ethical considerations. When reaching out to potential participants, I was careful to make the intention and aim of the thesis and study very clear. As the reasoning for me contacting and interviewing the interviews were solemnly due to where they live (Lillestrøm municipality) and to the fact that they have some form of disability. In this process, I considered aspects of identity markers and how people perceive themselves, versus how they are perceived by society. I did not intend or want the interviews to feel as if I perceived them only as persons with disabilities, and not as persons with multiple identity markers and roles, even though this is what is emphasized in the thesis. Therefore, it was important for me personally and for the validity of the thesis to emphasize the structural challenges and on-going discrimination that persons with disabilities face. This was done through the formulation of the questions, and in

addition stated through context brief in the beginning of the interview where I repeated information from the initial contact with the interviews about the thesis and what participating in an interview involved.

Ethical considerations towards interviews with employees in Lillestrøm municipality was made as well. As the interviews were concerned with their job, I made sure to clarify that I had no intentions in “attacking” the municipality and their work, nor present them in a negative way. My aim and intention is simply put to retrieve data, analyse, and shed light on a thematic that is highly under-researched and where persons with disabilities are often forgotten or left out. Making this clear from the moment I reached out to them was important in order for the interviewees to feel comfortable talking freely to me, and the consent form for clearly stated that they could withdraw from the study at any point if they wanted to. The Norwegian Center for Research Data (NSD) was contacted and informed about the research project and data collection. The process of data collection and storing have been in line with their recommendations throughout the process. All participants have received and consented to a consent form. I have given the participants randomized pseudonyms, and the data containing information any personal information which are stored on safe, external hard disk, will be deleted once the thesis is finalized in line with NSD’s recommendations.

#### **4.5 Limitations**

One of the limitations for this thesis was time restriction. The thesis would have benefitted from more time to collect and analyse more data, especially from persons with disabilities within Lillestrøm Municipality. The fact that I have few participants is also a weakness with regards to reliability (Bryman, 2021, p. 154). The process of sampling was very time consuming and gave little result. I contacted multiple organizations working with and for persons with disabilities both on a local and national level, where only one organization responded and was willing to forward my request for participants to potential interviewees, which resulted in the one interviewee in Lillestrøm Municipality. Another limitation has been that most of the work on this thesis has been during the summer holidays, meaning that many people have been unavailable as they are on leave. The data collected from interviews in this thesis is limited due to the above reasons. Limited number of participants does not in this case affect the validity to a great extent, as the data retrieved from interviews of persons with disabilities is used more as examples and not with the intention of generalising (Bryman, 2021, p. 155).



## **5.0 Results**

The main findings emerging from the analysis is presented here, divided into two sections each addressing the two research sub-questions. Firstly, in chapter 5.1, I examine key informant interviews in order to identify how persons with disabilities are affected by extreme weather. Second, in chapter 5.2, I present findings from analysis of key informant interviews, document analysis, and meeting in Lillestrøm municipality relating to how persons with disabilities are included or not in Lillestrøm Municipality's climate adaptation work.

### **5.1 Persons with disabilities and extreme weather**

Key informant interviews as well as examination of relevant literature suggest that persons with disability are disproportionately affected by climate events, also in cities in wealthy societies, as exemplified by Lillestrøm. Interviewee "Tom" spoke of the difficulties navigating the streets during wintertime. "Tom" lives in a rural area and is dependent on a service dog due to blindness. When I asked about whether he had any examples of weather situations that had caused difficulties, he answered: "Snowfall is the most extreme, it becomes impossible to find your way... it does not have to be a lot of snow before it does not work" ("it" meaning navigating the streets). In an event with sudden heavy snowfall over a few days' time, navigating the streets became very difficult, and on one occasion he experienced being lost for 2 hours. When asked about what could perhaps make the situation easier, "Tom" did not have any suggestions. There are several issues related to managing heavy snowfall. Obviously, having heated pavements in rural areas in Norway would be unimaginably expensive. To plow the streets in unusual heavy snowfall often means that the most trafficked streets will be prioritized, while rural or calm streets will have to wait. In heavy snowfall, similarly to heavy rainfall and stormwater, it becomes difficult to use the white cane and to use tactile paving. "Tom" experienced his service dog being confused by the heavy snowfall and changed scenery, resulting in the dog not being able to guide him back to where he lived after a walk. This is an example of how weather events affect a person with a disability differently than non-disabled persons. Examples like this one can be seen as rare or out of the standard, but some people experience these situations rather often. With more extreme weather, situations like this are likely to become more frequent for some persons with disabilities. It might be difficult to find

a solution, but either way these stories and experiences should be listened to and accounted for by the municipality both with regards to preparedness planning and climate adaptation.

“Tom” stated that with his service dog, white cane, and some assistance from an assistant, he manages just fine in every-day life. Despite that, some persons who may not be in need of assistance or help from others might have different needs in a situation of for example extreme weather. This is something interviewees from the municipality have said in interviews that they do not have adequate knowledge about or concern for in existing preparedness and emergency planning. However, they also stated that this is a highly relevant issue that will be taken into account.

Interviewee “Kareem” is dependent on a wheelchair and car to get around. When asked about experiences with extreme weather events, “Kareem” stated that: “To go out, especially in a *manual* wheelchair in snowy weather, you can just forget about that. It doesn't work. Therefore, much of the year I am dependent on a car”. However, being dependent on a car poses challenges as well. “Kareem” mentioned difficulties relating to find handicap parking lots multiple times during the interview. We will look further into this in chapter 5.2.1.

The document analysis gave little results with regards for persons with disabilities and extreme weather. The most profound and interesting finding is in the *Helhetlig risiko og sårbarhetsanalyse for Lillestrøm kommune* (in English: Holistic risk and vulnerability analysis for Lillestrøm Municipality). In this analysis document, the aspect of vulnerability with regards to certain climate exposures are considered, however, not extreme weather. Amongst the natural disasters analysed that can be caused by extreme weather events (but can also be caused by other factors) we find flooding in the main waterways, flooding in the smaller waterways, wildfire, and landslides. In the analysis, either one of these events include aspects of social vulnerability or considers persons with disability specifically.

One of the representatives from the municipality who was involved with risk and vulnerability mapping gave a presentation about the municipality’s work concerning risk and vulnerability in the context of natural disasters like flooding and quick clay landslides. He stated that the municipality had not considered persons with disabilities nor people who potentially could become vulnerable in an extraordinary event like a natural disaster. This shows how persons with disabilities are not being sufficiently accounted for in mapping of risk and vulnerability in the context of natural disasters. Preparing for an increase in natural disasters and extreme weather events is part of climate adaptation, and in this area of work Lillestrøm has the potential

to make many improvements that will better secure the needs and rights of persons with disabilities.

“Amara”, one of the interviewed employees in Lillestrøm municipality, stated that: “ ... a population that is as robust as possible is perhaps the foremost advantage of a good preparedness, so that the publicly organized preparedness can concentrate on assisting those who are unable to look after their own interests.”. This statement is logical, but who the municipality considers as part of a robust population, and who goes into the category of those who are unable to look after their own interest is less clear.

“You kind of have some extremes, that's the robust part of the population with its own contingency and oatmeal in the attic, who will manage almost no matter what. And then there is the other extreme, those who need daily municipal services to be able to live their lives at home. And then there is an aspect in between, where the municipality's encouragement for good self-preparedness is the target group. [It is] Those closest to the robust side, then we must also have a preparedness to catch those closest to those who cannot manage themselves in everyday life.” – “Amara” (interviewee).

This shows how certain groups in society does not fit into the municipality's categorization of who are in need of their assistance and who is not in the context of municipal preparedness.

### ***The Gjerdrum quick-clay landslide***

The problematics described above are well illustrated by the case of the evacuation from the Lillestrøm quick-clay slide, a recent weather-related extreme event. A quick-clay landslide occurred in Gjerdrum municipality, north of Lillestrøm, on the 30th of December 2020. 11 people died in the landslide and over 1600 people were evacuated from their homes. Quick-clay landslides have occurred in both Gjerdrum and Lillestrøm municipality on several occasions previously. These areas are well known to be rich in quick-clay, and the landscape is characterized by smaller hills and waterways. This in combination of erosion in a small stream, human activity, and heavy rainfall the previous fall resulted in the Gjerdrum quick-clay landslide (Olje- og energidepartementet, 2021). Although Lillestrøm municipality was not

directly affected by the Gjerdrum quick-clay landslide, the responsibility of facilitating for the evacuated people was taken by Lillestrøm municipality in Lillestrøm municipality on request from Gjerdrum municipality. Gjerdrum municipality opened Olavsgård (normally a hotel) as an evacuation centre, which was then taken over by Lillestrøm municipality. According to “Amara”, one of the interviewees working in Lillestrøm municipality, about 1000 persons out of the 1600 people that had to evacuate, organized accommodation themselves either with friends or family, or by evacuating to their cabins. Many of these persons visited the evacuation centre at least once in order to receive information. When asked to elaborate on the challenges faced in a large evacuation like this, “Amara” responded:

“... [the municipality] evacuated a cross-section of the population, where there were all possible kinds of challenges in the first place. Recipient of municipal services, child welfare cases, reinforced housing. We eventually had to map out what needs they had, and those with the most specialized needs were gathered at another evacuation reception which is almost a small institution.”.

This is an interesting observation as the cross-section of the population naturally will involve persons with a great variety of needs and prerequisites. It is unrealistic to be prepared for every potential need or situation, but simply to be aware of the diversity in the population and their existing needs can be helpful in an emergency, or the evacuation situation described above. “Amara” highlights this as one of the greatest lessons learned from the evacuation situation after the Gjerdrum quick-clay landslide.

## **5.2 Inclusion of persons with disabilities in Lillestrøm Municipality’s climate adaptation**

When analysing the selected municipal documents, I found little information relating to their approach towards inclusion of persons with disabilities specifically. With regards to climate adaptation and the climate strategy, persons with disabilities were not mentioned at all (Lillestrøm Kommune, 2021). Using the search words mentioned in the methods chapter gave zero results.

When I was looking for information on Lillestrøm municipality’s work on climate adaptation, I began with searching for information on the municipality’s web page. They have a section called “Climate adaptation” under “Energy, Climate, and Environment”, however the section

contains information strictly related to weather events and natural disasters. It includes a paragraph on the EU project REACHOUT, which is related to sustainable city-hubs and environmental adaptive solutions (Lillestrøm Kommune, n.d.b.). In the introduction to the “Climate adaptation” section, it says that: “Here you can read about how Lillestrøm municipality works with climate adaptation.” (Lillestrøm Kommune, n.d.b.). However, the information available from the section is as mentioned, very limited, and in addition does not give much information about what exactly Lillestrøm is doing with regards to climate adaptation. Naturally, a part of climate adaptation is preparedness and risk analysis of the potential and expected increased threats, like flooding and landslides (both of which are mentioned in the section). But as seen in the theory chapter of this thesis, it is also about generally adjusting the economic, social, and environmental systems in a way that is sustainable and robust in the years to come.

The ‘Climate adaptation’ section on the web page encourages to a large extent inhabitants to take action themselves in order to protect their house, surrounding, and themselves. They suggest multiple actions one can take to avoid the exposure and risks. Related to floods and flood preparedness, these are to find out where the water close to you flows and make sure the terrain has a slope, create drainage channels, and pay attention to the municipality’s web page for updates and information, to mention some (Lillestrøm Kommune, n.d.b.). These are good initiatives, and assumingly functional and useful as they are proposed by the municipality. However, not everyone has the possibility to neither receive these recommendations nor follow them. In the cases where inhabitants does not take these actions themselves, and does not have neighbours or family to do it for them, what happens then?

Analysis of key informant interviews and municipal documents suggest that inclusion of persons with disabilities is not prominent in Lillestrøm municipality's climate adaptation work, and that this lack of focus on inclusion may potentially also contribute to persons with disabilities experiencing double exclusion. A part of climate adaptation is also to adjust the risk and vulnerability plans and strategies in line with the expected climate changes and effects. Like every municipality in Norway, Lillestrøm municipality has a risk and vulnerability analysis. Concerning the inclusion of persons with disabilities in Lillestrøm municipality’s climate adaptation work, there were not many findings amongst the interviews with persons with disabilities. The one interviewee, “Kareem”, who is an inhabitant of Lillestrøm municipality, did not have much knowledge with the municipality’s climate adaptation work. However, he described multiple situations where he had experienced discrimination, lack of

accessibility, and absence of universal design. This has particularly been an issue within Lillestrøm city centre, but also in areas around Lillestrøm city. As described in chapter 5.5.1, “Kareem” is dependent on his car and wheelchair in order to get around. “Kareem” mentions the Måsan activity centre, a municipal venue drifted by the Frivillighetssentral. The activity centre offers meeting rooms for local and volunteer organisations in Lillestrøm municipality and is frequently used for this purpose. “Kareem” is part of an organisation working for persons with disabilities, and they were offered to hold their meetings in the locations of the activity centre. However, as “Kareem” describes it:

“But there too we are excluded, because there are only two disabled parking spaces in front of the main entrance. And when we have board meetings, we are four to five people coming, each with a car and a wheelchair. So, we cannot have it there.”

Although this is not directly in relation to climate adaptation, it is an example of how the municipality lacks to include persons with disabilities and facilitate for their needs. “Kareem” mentions how the municipality has removed the possibility to park temporarily (10 minutes) in order to embark and disembark in front of the cultural centre. This made the cultural centre accessible for wheelchair users, as they could take a taxi there and be let off in front of the building. After the possibility to park temporarily was removed, “Kareem” states that the cultural centre has become much less accessible for wheelchair users, and that he no longer bothers to look for events and happenings there due to the unavailability. “Kareem” says:

“But the case with the cultural centre is a big deal, and so is the volunteering [at the Måsan activity centre]. That we are in a way excluded from our own... After all, it is both exclusion and prevents us from gathering and working. So, it is kind of a double exclusion.”

This experience of double exclusion is concerning with regards to the rights of persons with disabilities and the responsibility of the municipality to prevent discrimination. The examples mentioned by “Kareem” are examples of how the municipality does not sufficiently manage to include the needs or rights of persons with disabilities in this part of their work.

In May 2023 I attended a meeting in Lillestrøm with NMBU, representatives of Lillestrøm Municipality, and two representatives from Brukerrådet, as part of the TOWARDS project. The representatives from Brukerrådet are a part of Tilgjengelighetsgruppa (in English: the availability group). Tilgjengelighetsgruppa is involved in the municipality's development of new buildings by approving the universal design and to inform about potential improvements that needs to be done. The representatives from Tilgjengelighetsgruppa shared their experiences, and stated that they are too often included and consulted too late in decisions that affect them. The building of a new bus stop, which proved to be highly impractical and inaccessible for persons with disabilities, served as an example of this. The result was that the municipality had to rebuild the entire bus stop, which was more expensive and time-consuming than it would have been had they involved Tilgjengelighetsgruppa to begin with. In addition, it serves as an example of discrimination.

One of the challenges that have been repeated in the conducted interviews with employees in Lillestrøm municipality is that the municipality does not have a very clear distribution of responsibility when it comes to climate adaptation. There appears to be little clear organizational structures when it comes to climate adaptation and the municipality's responsibility and actions within this area of work. Out of the mentioned reasons, one interviewee in the municipality said that climate adaptation is very interdisciplinary, and so it does not fall naturally under any section in the municipality. Another interviewee in the municipality stated that it simply is not *their* prioritized area of focus. However, the consideration of climatic and environmental concerns are already existing in much of the municipal work, but perhaps not from a fundamental environmental protection, or climate adaptation point of view.

In order to achieve what "Faixa" refers to as *good* adaptation, she states that: "What is important in achieving good climate adaptation in the municipality is good allocation of responsibility... we have now established a climate adaptation network in the municipality so that we will work more interdisciplinary..."

### ***Klimastrategi for Lillestrøm (in English: Climate Strategy for Lillestrøm)***

Lillestrøm municipality's climate strategy is based around the main goal concerning climate and environment in the municipality plan, which is to "reduce greenhouse gas emissions and have a good resource management, while also managing an expected population growth." (Lillestrøm Kommune, 2020a, p. 13.) When using the key search words, as described in the

methods chapter, in this document, little result came up except for ‘climate adaptation’, which was mentioned six times. The five climate risks listed in the climate strategy are also not direct risks, but rather risks that occurs if the municipality does not take climate action at all. For example, one of the climate risks is: “Insufficient infrastructure for new low-emission solutions results in outdated, inefficient solutions” (In norwegian: Mangelfull infrastruktur for nye lavutslippsløsninger gir umoderne, ineffektive løsninger) (Lillestrøm Kommune, 2021, p.4). While this is a good point, it is a rather diffuse climate risk. The climate opportunity stated as a response is:” Modern infrastructure provides a multitude of new and efficient, climate-friendly solutions” (in Norwegian: Moderne infrastruktur gir et mangfold av nye og effektive, klimavennlige løsninger) (Lillestrøm Kommune, 2021, p.4). This “climate opportunity” is indeed an example of climate adaptation. However, new and efficient so-called climate-friendly solutions does not in itself mean that it is robust against climate exposure.

In section 3.5 concerning physical climate risks and responsibility risks, it says that: “Ensure that climate adaptation work is prioritized and that the focus is on preventive measures rather than repair, including through strategic use of the municipal plan.” (Lillestrøm Kommune, 2021, p. 20). This suggests that the municipality aims at taking climate adaptation and preventative measures seriously. The climate adaptation strategy generally focuses mainly on promoting green development, reduce greenhouse gas emissions and contribute to green technology, and to approach physical climate risks, though the latter is also approached from an emission-reduction perspective, and not from a perspective of drivers to social vulnerability and inclusion (Lillestrøm Kommune, 2021, p. 10).

The main findings in the climate strategy are that the strategies presented throughout the document are inclusive and necessary, however the measures suggested does not pay attention to the various aspects of climate vulnerability and the ways in which climate adaptation measures can inflict on existing and arising vulnerability.

## ***REACHOUT***

One of the key efforts by Lillestrøm with regard to climate change adaptation is REACHOUT, and the ways in which it includes persons with disabilities or not is important to understanding adaptation in Lillestrøm. REACHOUT is the European Union (EU) funded project in which Lillestrøm is one out of 7 European city hubs participating. The aim of the project is to test out



different user-oriented climate adaptation measures, where Lillestrøm municipality is specifically focusing on ecosystem-based adaptation and setting up a tool in order to explore this (REACHOUT, 2022, p. 4). From a theoretical climate adaptation perspective, the idea of having user-oriented climate adaptation is both necessary and beneficial in order to have successful adaptation. However, user-oriented climate adaptation is a quite wide and non-specific concept. Interviewee “Faisa” stated that the municipality is working interdisciplinary on climate adaptation and the REACHOUT project. Faisa considered this as a good cooperative and interdisciplinary project. One of the measures in the REACHOUT project is a digital story map that is under development and will be available on the municipality’s web page during the fall of 2023. “Faisa” states that: “the main purpose is to increase the understanding of both builders and residents about why it is important to take climate adaptation measures.” I followed up by asking whether the digital story map would have a universal design, or in other ways be made accessible for e.g., persons with reduced hearing or persons with reduced vision. “Faisa” responded that this had not been looked into and was unsure if it would be possible to do, while also repeating that this is a project in cooperation with the EU

Interdisciplinary is a key word when working with climate adaptation at a local and regional level as there are multiple stakeholders and elements to consider. The initiative to participate in this kind of project also has a symbolic effect. It signalises that Lillestrøm wants to cooperate and find solutions with regards to climate adaptation.

### ***Helhetlig risiko og sårbarhetsanalyse for Lillestrøm kommune (in English: Holistic risk and vulnerability analysis for Lillestrøm Municipality)***

The holistic risk and vulnerability analysis for Lillestrøm Municipality is a review of unwanted events that Lillestrøm municipality is at the risk of being exposed to, and an assessment of the probability of unwanted events occurring and what the implications can be if it occurs (Lillestrøm Kommune, 2023, p. 3). The analysis is divided into 21 separate chapters and analysis, each describing different potential risks. The chapter meant to analyse the risks related to extreme weather events is still under development and therefore not included in the analysis.

The analysis defines vulnerability as a trait. It is defined as the trait to withstand unwanted events, where the opposite of vulnerability is strength or robustness (Lillestrøm Kommune, 2023, p. 6). This understanding of vulnerability is rather limiting for the scope of the analysis

with regards to predicting the vulnerability of Lillestrøm commune in the occurrence various unwanted events.

The document points to flooding in the main waterways as an event that is likely to occur, but with low potential of damage to health and life. This is grounded in the predictability of flooding in main waterways and the measures the municipality has in place to handle this. Simultaneously, it states that climate change can affect the occurrence of this type of flooding. In the suggested new measures, the analysis suggests both to improve existing flood measures and to develop a superior preparedness plan for flooding in the main waterways (Lillestrøm Kommune, 2023, p. 44-45). As Lillestrøm has experienced flooding in the main waterways several times and are aware of the likeliness of increasing occurrence, it appears strange that they have not had a superior preparedness plan in place earlier. With regards to vulnerability, the analysis states that the society to a large extent is robust. This statement is not further explained.

Flooding in the smaller waterways is also categorized as an event with low potential for damage to health and life. However, flooding in the smaller waterways are highly difficult to predict, as it is mainly dependent on rainfall and weather patterns, and therefore can occur on short notice (Lillestrøm Kommune, 2023, p. 66). The insecurity is further strengthened by the increase in extreme weather events due to climate change, and the fact that the municipality is expected to experience an increase in heavy rainfall occurrence and intensity. This predicted increase in extreme weather events is considered in this analysis, but still, it states that there is low potential for damage to health and life (Lillestrøm Kommune, 2023, p. 66). A proposed measure to implement with regards to flooding in the smaller water waterways is to develop a climate plan and a climate adaptation plan (Lillestrøm Kommune, 2023, p. 66). These measures would indeed be beneficial with regards to securing infrastructure and decrease the potential economic losses. With regards to vulnerability in this chapter, the analysis suggest that individuals in the municipality reflect on how the consequences a flood can affect them, and what they can and should do with it (Lillestrøm Kommune, 2023, p. 78). This implies a rather narrow understanding of vulnerability, as well as a leaving out a great percentage of the municipality's inhabitants who may not have the same prerequisites to take action themselves on such a short notice.

*Kommuneplanens Samfunnsdel 2020 – 2031. (In English: The social element of the municipal master plan 2020 – 2031)*

The social element of the municipal master plan deals with challenges concerning development and presents the solutions and strategical steps and plans the municipality takes to deal with the challenges faced (Miljøverndepartementet, 2012, p. 6).

The municipal master plan states that it is supposed to be in line with all of the 17 UN Sustainable Development Goals (SDGs), however, it focuses specifically on 13 out of the 17 goals. In the municipal master plan these goals are divided in 1) Climate and Environment, 2) Urban and rural development, 3) “All through life” (Norwegian: Hele livet), and 4) Innovation (Lillestrøm Kommune, 2020a, p. 13). For this thesis, the 1-3 categories are considered relevant.

On climate and environment, the municipality has chosen to highlight SDG 12 Sustainable production and consumption, 13 Climate action, and 15 Life on land. The overarching goal of the municipality concerning climate and environment is to «reduce greenhouse gas emissions and have a good resource management, while also managing an expected population growth.» (translated from Norwegian) (Lillestrøm Kommune, 2020a, p. 13.)

The municipal master plan focuses to a high degree on sustainability, which is frequently mentioned in all parts of the master plan. The definition of sustainability is also included in the plan, however the plan does not include any guidelines or references on how they aim to secure sustainability as a concept.

## **6.0 Discussion**

Building on the results from the previous chapter, this chapter will discuss and interpret the findings in the context of the case study. As we have seen in the results, Lillestrøm municipality is aware of the changing climate and the expected outcomes of climate change in Lillestrøm, like increased risk of flooding, and more extreme and unpredictable weather events. They are also determent to cut their greenhouse gas emissions, and they have sustainability as a key element throughout the plans and strategies analysed in this thesis. Simultaneously, there is a lack of attention towards persons with disabilities and vulnerable groups in general. Lillestrøm municipality’s fundamental values are as previously mentioned 1) trust, 2) inclusion, and 3) innovation (Lillestrøm Kommune, 2020b, p.10). These words

symbolise 1) openness, autonomy, and respect, 2) belonging, well-being, and cooperation, and 3) participation, new ways of thinking, and adaptation (Lillestrøm Kommune, n.d.a). My impression is that these are important fundamental values in any governing democratic body, and highly relevant regarding inclusive climate adaptation. I find these words and concepts to be continuous throughout the documents analysed, but largely absent in the results from the interviews both with persons with disabilities and with employees in the municipality. This thesis purpose is to answer 1) In what ways climate adaptation in Lillestrøm municipality includes the needs of persons with disabilities, 2) how an increase in extreme weather events affects persons with disabilities, and 3) in which ways the needs and knowledge of persons with disability are integrated in climate plans in Lillestrøm municipality.

## **6.1 Persons with disabilities and extreme weather events**

Based on what we have seen examples of so far in this thesis and based on previous research, existing barriers for persons with disabilities in society are either continuing or added to by new arising barriers in a crisis situation. In a climate change context, we know that Lillestrøm municipality will experience more extreme heavy rainfall. These effects of climate change are already occurring and are expected to increase in frequency and intensity in the future.

As the results demonstrated, persons with disabilities can experience difficulties during extreme weather events that other people may not experience in the same way. The story “Tom” shared about getting lost and not finding his way home during heavy snowfall is also an example of how people who to a great extent are independent in daily life can become vulnerable during extreme weather events, or even just regular weather events. The examples shared by “Kareem” about being dependent on his wheelchair, car, and accessible handicap parking lot are also experiences that demonstrate the different barriers that persons with disabilities face compared to other people.

If we zoom out and look at what this means on a more general basis, we can see that awareness about the population, their needs, local knowledge and previous experiences play a key role in caring for the population both in normal every-day situations and in emergency and unexpected events. However, how does one obtain this information? This is an example of where community-based involvement can be used as a tool to utilize local knowledge and needs in a way that is beneficial to the population and to the municipality as they avoid having to re-build or re-do projects due to absence of accessibility. By collecting information, needs,

limitations, and possibly even solutions from the various groups in the population, this information can be used to better secure their needs and rights. This does not strictly relate to emergency preparedness or risk analysis. Another aspect of this is the previously stated issues related to the increased vulnerability of persons with disability experience in abnormal situations. People who are already vulnerable in a community often become even more vulnerable in abnormal situations. This can be linked to economic, political, cultural, and social structures in the community. Through literature review, document analysis and the exemplified personal experiences shared by interviewees, it is clear that persons with disabilities have different experiences with extreme weather events and are affected in other ways than non-disabled people. The lack of inclusion in society creates vulnerability, and the top-down approach that is carried out by the municipality in certain areas that also concerns persons with disabilities, the lack of understanding and knowledge of their perspective can contribute to increase the vulnerability.

## **6.2 Approaches and understandings of climate adaptation in Lillestrøm municipality**

The intention of climate adaptation is to reduce the negative impacts of climate change, and benefit from the changes where that is possible. Amongst the suggested criteria for successful adaptation according to climate adaptation theory (chapter 3.1) is to acknowledge and understand the risks and take that information into account when initiating and developing climate adaptation actions. According to Lillestrøm Municipality's climate strategy, they intend to look at the "climate opportunities" rather than to focus too much on the "climate risks". This in itself is both a part of climate adaptation, and an underestimation of the actual consequences of climate change. As mentioned in chapter 2.1.2, the municipalities have to consider for the highest predictions when approaching climate change and their actions towards reducing the impacts as much as possible. For Lillestrøm municipality, this means an increase in occurrence, duration and intensity of rainfall, more runoff water, increased risk of rain flood, landslides, and storm surge (Norsk Klimaservicesenter, 2022). It includes a higher risk of heatwaves and drought, as well as increased erosion and the possibility of quick-clay landslides (ibid.). These events have the potential of being severely devastating and a risk to human health and lives. Hence, they should be approached and accounted for both in the holistic risk and vulnerability analysis for Lillestrøm Municipality and the climate strategy.

Lillestrøm municipality has to a large degree a top-down approach to climate change. The policies and measures presented in the climate strategy is to a very little degree based on involvement of the community population. This is in itself a potential weakness, however as the climate plan is not yet developed and available for analysis in this thesis, I will not make a strong statement on how impactful this weakness is in itself. However, the combination of top-down approach and unclear responsibility division is indeed a finding that according to climate adaptation theory is not compatible with successful adaptation, but rather maladaptation, like described by Malloy & Ashcraft (2019).

As written in chapter 3.1, Jones & Boyd (2011) categorized limits to adaptation into three distinct categories: the natural, the social, and the human and informational. The cultural and social factors that influence on how people react to climate stimuli are the focus of the social limits to adaptation. These limits exist within or derive from the social structures that already exist in society, and they may not be recognized as limitations prior to the implementation of adaptation strategies. Social factors that can influence on climate adaptation are values, perception of risk, and formal and informal institutions (Jones & Boyd, 2011, p.1263).

If we look at perception of risk and the document analysis of the The holistic risk and vulnerability analysis for Lillestrøm Municipality (Lillestrøm Kommune, 2023), the perception of risk presented in the analysis bares little consideration to social factors. The concept of risk in the analysis is presented indirectly as a combination of hazard/threat and likelihood of its occurrence. A few places in the analysis the aspect of exposure is included, but in these cases, it is for the most part related to the risk of damage to property or infrastructure. By excluding the social factors that influence on perception of risk, one simultaneously excludes the social barriers that increases the vulnerability of persons with disabilities. However, the issue here starts with the latter. “Kareem” shared his story of experiencing what he referred to as “double exclusion”, with both being excluded from accessing a communal building (Måsan activity centre), and through that being prevented for doing work related to the rights of persons with disabilities. Though I do not doubt that this has never been the intention of the municipality when opening the activity centre, this is exactly a part of the problem. Exclusion of persons with disabilities in cases that concerns them. Persons with disabilities have the right to be included in cases that concern them, and this is grounded in Norwegian law, the CRPD, and in the municipality’s own Social element to the master municipal plan (Lillestrøm Kommune, 2020a, p. 24).

## **7. Conclusion**

In this thesis I have investigated how persons with disabilities are affected by extreme weather, how they are integrated in the municipal climate work, and to what extent the municipality includes persons with disabilities in their climate adaptation work. Through interviews with persons with disabilities and employees in Lillestrøm municipality, as well as through a document analysis of key documents concerning climate adaptation, inclusion, and holistic risk and vulnerability planning, the thesis has shed light on the dynamics within the field of inclusive climate adaptation and just adaptation. As demonstrated in the discussions, Lillestrøm municipality does not sufficiently include persons with disabilities in their climate adaptation work. The municipality lacks to integrate the social aspects of vulnerability and presents a narrow idea of vulnerability that does not contribute to strengthen the resilience within the community nor adaptation strategy. However, as Lillestrøm focuses on climate possibilities rather than climate risks, I suggest focusing on inclusion of persons with disabilities in climate adaptation work rather than to risk reinforcing and perpetuating existing exclusion and barriers.

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