

# Climate Adaption Justice in Stockholm

Final report from the research project **Climate Adaption Justice in Stockholm**

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2024-11-15

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## 1. Introduction

We know that the climate is changing and that climate change will lead to various problems. To deal with these problems we need to take action in our communities. Today, these measures are usually divided into two main areas: emission reductions and climate adaptation. *Emission reductions* is about reducing emissions of greenhouse gasses to slow down climate change. *Climate adaptation* are measures aimed at reducing the negative effects of climate change, such as extreme weather events. You can also talk about *climate change*, which includes both emission reduction and climate adaptation.

The focus of this report is climate adaptation, i.e. measures to manage risks and negative effects of climate change. We are therefore not looking to discuss measures for emission reductions or climate change in general, but thus limiting us to climate adaptation. Having said that, the areas are connected, for example, more climate adaptation will be required if the global emissions of greenhouse gasses are not greatly reduced and the measures for climate adaptation can also contribute to increasing or reducing emissions.

The second focus of the report is justice. Justice is a concept that has many different meanings and is interpreted in different ways. Justice has long been a central concept for global climate work, not least in the work within the UN Framework

Convention on Climate Change (UNFCCC), which is an international treaty that aims to prevent dangerous human influence on the climate system by stabilizing greenhouse gas concentrations in the atmosphere. Justice has mainly been discussed in connection with measures to reduce emissions, but has recently also been increasingly discussed internationally in climate adaptation.

The report is the final report of a research project carried out during 2023-2024. The project was led and carried out by researchers from KTH in collaboration with Stockholm City. The project was financed with funds from CNCA, the Carbon Neutral Cities Alliance.

The purpose of the project was to identify justice-related aspects in the adaptation to weather- and climate-related risks in the Stockholm metropolitan area. The project also aimed to establish long-term cooperation around climate justice in the Stockholm metropolitan area by involving relevant stakeholders, especially civil society organizations, in a joint creation process. A central ambition in the project was to include these actors early in the project, not only as feedback parties but as active co-creators in identifying problems and formulating questions. To enable a collaborative citizen science design, the project was implemented in two phases. The first phase focused on building relationships, gathering perspectives and creating a shared understanding of justice in climate adaptation through widely-participated workshops. The second phase built on the insights from these workshops to conduct in-depth interviews and develop the project's analysis and reporting.

The workshops constituted a key method in phase 1, where various actors discussed local climate risks and justice aspects linked to adaptation measures. The first workshop aimed to capture a wide range of perspectives and identify central issues and value conflicts, while the second workshop deepened the work by prioritizing informants and thematic areas for further interviews. The insights and relationships from these workshops formed the basis for phase 2, where civil society representatives continued to have influence over the interview process and the design of the report. Throughout the project, collaboration between different stakeholders was strengthened and a forum was created to discuss climate justice in the region

The layout of the report is as follows: Section 2 introduces how to understand the concept of justice in relation to climate adaptation based on a literature review of the international literature. Section 3 provides an overview of climate adaptation and justice in Sweden, as well as in municipalities in the Stockholm area. Section 4 is a compilation of the results of a number of interviews we conducted with officials in the city of Stockholm and people who represent organizations in civil society to understand how they view these issues. Finally, in section 5, we summarize and discuss the results.

## 2. What is meant by fair climate adaptation?

What is meant by justice and what should be considered fair are classic philosophical questions that have been debated throughout history. Philosopher

Michael J. Sandel encapsulates part of the challenge when he writes that issues of justice typically involve three, often conflicting goals or drives: 1) maximizing welfare and prosperity, 2) respecting autonomy, and 3) our relationship to virtues or desirable behaviors such as collective sacrifice for a common good, punishment of greed, or protection of vulnerable individuals or groups (Sandel 2010).<sup>1</sup> How people interpret, value and prioritize among these results in different ideas or theories of justice.

Although it can hardly be said that there is any agreement among philosophers or political thinkers about what justice should mean, there are nevertheless certain aspects that recur in the literature on justice, and which are reflected in the literature on justice in climate adaptation. In this section, we summarize some common definitions and meanings of justice in climate adaptation based on a literature search of review articles published in recent years on justice and climate adaptation.<sup>2</sup>

### Categories of justice

Justice can be divided into different categories. A common division is distributive justice, procedural justice, and recognition justice.<sup>3</sup> Distributive *justice* refers to a fair distribution of opportunities and resources.<sup>45</sup> But what is meant by distribution? Distributive justice can be divided based on three questions: 1) which *form* has the distribution? An example is the classic difference between utility-maximizing ethics, which doesn't really care much about distribution, and its conflict with John Rawls's theory of justice, which focuses on the most disadvantaged groups. 2) What are we distributing, that is, which ones *units* is that what we distribute? Different units can be the interests of people on the one hand, or if we also include the interests of animals, plants or ecosystems. 3) What does the distribution include? The extent, both in time and space, often plays a large role in the distribution. How far into the future should we stretch? And which direct and indirect effects are relevant?

A relevant example of distribution is justice aspects linked to the fact that the negative effects of climate change generally hit developing countries harder than more industrialized countries. This is due, among other things, to the fact that their economies and political institutions are weaker and more vulnerable, something that can lead to the countries being at risk of getting stuck in the so-called poverty traps. This can be perceived as doubly unfair as these countries both contribute less to the harmful climate changes and to a much lesser extent enjoy industrialization's economic and social benefits.

Another relevant issue in distributive justice for climate change that is often talked about is justice across generations – ie. that we who live today have a moral obligation not to live and consume resources in a way that (drastically) reduces the living conditions of future generations. That future generations can be said to have a

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<sup>1</sup> cf. Pearson m.fl. (2021).

<sup>2</sup> See Appendix Method for the method we use for the literature search.

<sup>3</sup> Prall and others (2023) present the three pillars of justice in a 'conceptual framework to help us understand urban climate justice'.

<sup>4</sup> Rawls (1971).

<sup>5</sup> "... the fair spatial and temporal distribution of the material and social advantages and disadvantages of adaptation responses among urban communities regardless of their diverse socio-economic conditions, adaptive capacity, and political voice". (Mohtat & Khirfan (2021, p. 2)

legitimate moral demand on us living now to make sustainable choices. It is a very large debate that we cannot account for here, but it is a perspective that is worth mentioning in the context.

With *procedural justice* refers to inclusion in various decision-making processes. For climate adaptation, it could mean a fair inclusion of different needs, values and interests in decision-making processes related to climate adaptation, so that different voices are heard in the allocation and distribution of resources for adaptation.<sup>6</sup>

With *recognition justice* it is intended that underlying social, economic and political differences that can, and have, affected decision-making processes and outcomes (structural injustices) are highlighted and addressed. It is also about highlighting and legitimizing different perspectives, identities and lived experiences.<sup>7</sup>

In addition to these three, a fourth aspect or dimension is sometimes included, viz *restorative justice*.<sup>8</sup> Structural injustice, for example in the form of historical events that have been going on for a long time, can mean a need to restore dignity and freedom of action for certain groups.<sup>9</sup>

There are thus a number of different ideas and aspects of the concept of justice, different people and different political ideologies can therefore have different opinions about what is fair or unfair.

### **Fair climate adaptation?**

There is great variation in how different ideas about what justice should mean for climate adaptation planning. Chu & Cannon (2021) believe that social, cultural and economic injustices are often not taken into account to a sufficient extent when cities adapt to the climate. Instead, the focus tends to be on regulatory and financial interventions. The researchers call for a better balance between, on the one hand, social dimensions and, on the other hand, tougher control instruments such as laws and regulations when cities plan their climate adaptation strategies. In addition, many cities have tended to adopt a technical or scientific perspective on climate issues. A consequence of that is that climate adaptation measures have in many cases contributed to segregation and exclusion, for example by cities investing in protecting and upgrading infrastructure and land in better-off areas.<sup>10</sup> This in turn has meant that already marginalized groups have been excluded from the benefits

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<sup>6</sup> "...the fair inclusion of different needs, values, and interests in climate adaptation-related decision-making processes so that different voices are heard in the allocation and distribution of adaptive resources." Mohtat & Khirfan (2021), p. 2; Chu & Michael (2019)

<sup>7</sup> Zimm et al. (2023) p. 23; Mohtat & Khirfan (2021) p. 2

<sup>8</sup> Sometimes also called 'corrective' see Zimm et al. (2023) p.23. Some researchers include a fifth dimension. One such example is Zimm et al. Which, in addition to the four dimensions above, also highlights Transitional justice. (Zimm et al. p. 23).

<sup>9</sup> Juhola et al. (2022) Page 610: "there may be historical development trajectories that create structural forms of injustices, and restorative justice has been proposed to restore dignity and agency to those who have lost it (Thompson and Otto, 2015), as well as an alternative to loss and damage related climate litigation (Robinson and Carlson, 2021)"

<sup>10</sup> Anguelovski et al. (2019); Thomas & Warner (2019) p. 4; Chu & Cannon (2021)

brought about by the climate adaptations.<sup>11</sup> Such effects, combined with the fact that effects of climate change tend to affect already vulnerable groups to a greater extent, have led to an increased interest in justice issues.<sup>12</sup> In order to reduce injustices, Chu & Cannon and other researchers believe that cities in their climate adaptation plans should strive for a better balance between hard policy instruments and a deeper understanding of social structures, for example those dealing with ethnicity, socio-economics, status and gender as these all contribute to make some individuals and groups more vulnerable to climate justice than others.<sup>13</sup> Chu & Cannon call for a more broken down and applicable way of working that can include the normative aspects when developing policy as well as implementing and evaluating various efforts for climate adaptation.<sup>14</sup> They also call for more research on indicators and models to measure progress in climate justice and better compare different strategies.<sup>15</sup> Although much work remains, Chu & Cannon state that awareness of the justice dimensions in climate adaptation has increased in the United States.<sup>16</sup>

Juhola et al. (2022) develop just such a model for comparability. Based on the dimensions of justice<sup>17</sup> have they formulated a so-called 'Adaptation Justice Index' with a number of indicators. Examples of indicators for distributive justice include, for example, identifying vulnerable groups; to examine the distribution of benefits associated with adaptation; to study the distribution of costs in connection with adaptation. For procedural justice, examples of indicators are mapping who participates in different phases of the adjustment process; to what extent the adaptation strategy has a structured plan for participation in the implementation and whether there is a plan for how the adaptation strategy is to be evaluated and updated.<sup>18</sup> They then apply their indicators to a range of different adaptation strategies in four different cities, of which Stockholm is one. Juhola et al (2022) state that procedural and distributive justice are most common in the adaptation strategies they studied, while recognition and restoration are not at all as common perspectives. One explanation could be that the two latter perspectives are much newer in research and therefore have not begun to be applied in the same way.<sup>19</sup> Juhola et al. further points out that the complexity of climate adaptation processes

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<sup>11</sup> Mohtat & Khirfan (2021) p. 2; Borie et. Al (2019); Long & Rice (20219)

<sup>12</sup> Chu & Cannon (2021) p. 86

<sup>13</sup> Chu & Cannon (2021) p. 86 "...better balance the managerial approaches with greater recognition of social structures – specifically around race/ethnicity, socioeconomic status, citizen status and gender – and their contributions to underlying drivers of vulnerability and climate injustice."

<sup>14</sup> They further suggest that justice within adaptation measures should be evaluated from the following three perspectives "*Equity*: equal and fair distribution of opportunities, resources, and environments free from climate hazards and risks regardless of individual/group identity or background. *Inclusion*: degree to which decision-making processes and procedures are transparent, accountable, and include diverse voices, values, and viewpoints. *Justice*: recognition that minority groups are structurally vulnerable and intergenerationally disadvantaged in terms of their cultural, political, and socioeconomic rights." Chu & Cannon (2021) p. 87

<sup>15</sup> Chu & Cannon (2021)

<sup>16</sup> "Although planning practice in the U.S. has played an ambiguous role in advancing equity and justice in the past, there is evidence that a new generation of equity planners are indeed mobilizing more participatory action, inclusive decision-making, and progressive, redistributive politics." Chu & Cannon (2021) p. 91

<sup>17</sup> That is distributive, procedures, recognition and restoration, see page CC

<sup>18</sup> Juhola et al. (2022) pp. 112-114.

<sup>19</sup> Juhola et al. (2022) page 617

and emphasizes the importance of paying attention to social consequences and different forms of justice when planning and implementing interventions.<sup>20</sup>

### **Inclusion**

The term "inclusion" has also been used in relation to climate adaptation. Pham and Saner (2021) have done a systematic literature search on inclusive climate adaptation. Inclusion is often part of the concept of justice and that it is part of the discussion of diversity, equality and inclusion.<sup>21</sup>

Pham and Saner suggest that inclusion can be used in climate adaptation in at least four ways: (1) inclusive identification of the causes of climate change; (2) inclusive identification of the impacts of climate change; (3) inclusive climate adaptation goals and processes; and (4) inclusive assessment of climate adaptation.<sup>22</sup> Pham and Saner argue that inclusion can be a good tool for evaluating and ensuring fairness and non-discrimination in many different policy areas and practices, and that it has an advantage over other concepts such as "fairness", "equality", "democracy", because it is a relatively everyday word that does not have the same complicated political and theoretical interpretations as many other words.

Inclusion is also highlighted by Newell et al. (2021) who suggest that a research agenda on "transformative climate justice" should consist of three tracks: inclusive justice, deepening justice, and managerial justice.<sup>23</sup> Furthermore, the inclusion perspective is also part of what Shi (2021) calls "the progressive turn" in climate adaptation. Shi has examined ten papers on "ethnically just" climate adaptation, highlighting concepts such as "just resilience" and "transformative cities."

A different perspective is highlighted in an overview article by Pearson et al. (2021) who believe that psychological factors influence people's perceptions of justice in connection with climate change.<sup>24</sup> Justice assessments can both promote and hinder cooperation in climate issues, and that these assessments are often shaped by different driving forces such as welfare, autonomy and collective values. The article also highlights the importance of understanding these psychological processes in order to better design and implement climate policies that are perceived as fair.

Against the background of inclusion, Malloy & Ashcraft (2020) propose three requirements to implement truly just climate adaptation: 1) inclusion of socially vulnerable groups as full participants with the ability to influence the decisions that affect them, 2) that perspectives recognize the causes of systemic injustice . 3) that

<sup>20</sup> Juhola et al. (2022) page 617, "Temporal analyses of how justice concerns play out are also necessary as implementation takes place in a congested policy environment, where costs or benefits of adaptation are unlikely to be static, either spatially, or temporally, across groups in society. The analysis of justice in adaptation should therefore be further connected to the more general efforts to monitor and evaluate adaptation."

<sup>21</sup> (eng. *diversity, equity and inclusion* abbreviated DEI, sometimes also called EDI).

<sup>22</sup> Pham and Saner (p. 13).

<sup>23</sup> "inclusive climate justice, deepening climate justice and governance for climate justice" (s 1).

<sup>24</sup> Pearson m.fl. (2021)

evaluations of the implementation of measures take place in shorter, incremental time frames rather than over longer periods. These requirements could be seen as an operationalization or application of the various justice perspectives addressed in the literature summarized above.

### **Vulnerable groups**

Throughout our report we use the word "vulnerable" rather than e.g. "exposed" as the latter can signal an objectification of the individual or group you are talking about. We have looked in particular at the following groups: socio-economically weak; children; elderly and people with disabilities.

We know that vulnerable groups in society are already more exposed to the negative consequences of various climate risks. Vulnerability can be due to many different things, for example housing conditions, access to coolness and greenery in the immediate area, functional impairments, health, age, etc. A risk with insufficient consideration of the social consequences of climate adaptation in cities is that one inadvertently cements, or even increases, already existing injustices and that individuals and groups who are already vulnerable become even more exposed to various kinds of risks.<sup>25</sup>

Yang et al. (2021) and Byskov et al. (2019) have written about the relationship between the three pillars of justice, climate adaptation and vulnerable groups. Among other things, they have studied who benefits from adaptation and how involved representatives from these groups are, or are not, in different planning phases and write that it is usually the public sector that both distributes the resources and decides who gets to participate in the process.<sup>26</sup>

In the interview part of our report, several of the informants talk precisely about the need to include but also about the challenges in communicating and creating participation. One of the stated goals of our project was to contribute to increased cooperation between civil society organizations and the city in the work with climate justice and adaptation. Therefore, it is interesting to note that both our informants and the academic literature emphasize the importance of just such collaborations in order to achieve a fair climate adaptation.

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<sup>25</sup> Mohtat & Kirfan (2021) p. 1. Mohtat & Kirfan "There are indications that the spatial distribution of climatic risks within cities remains unequal because the vulnerability and exposure of different societal groups to climatic hazards vary based on their socio-economic composition and spatial distribution. Several studies see: Romero-Lankao and Gnatz (2019), Miller (2020), and Moser and Stein (2011) argue that societal groups with high levels of vulnerability and exposure also maintain low levels of adaptive capacities due to embedded patterns of privilege in adaptation responses

<sup>26</sup> "...the measure that appears to be most clearly associated with the issues of environmental justice and social equity would be whether cities have considered procedural justice when adopting urban adaptation policies. If the elderly and vulnerable groups are included and shape the cities' adaptation policies, this would likely be a direct reflection of the consideration of environmental justice and social equity." Yang et al. 2021 page 2. "The current empirical literature shows that the decision regarding the participation in adaptation planning is determined by the public sector both in terms of who participates (Shi et al., 2016) and who is responsible for steering the tools and resources of the public sector (Klein et al., 2018)

### 3. Climate adaptation and justice in Sweden and in the Stockholm area

A starting point for climate adaptation work in Sweden was the Climate and Vulnerability Investigation from 2007.<sup>27</sup> The aim of the investigation was to map Swedish society's vulnerability to climate change and assess both regional and local consequences. The investigation led to climate adaptation receiving greater attention from authorities, public organizations and also to some extent from business. Another milestone was Sweden's first national strategy for climate adaptation that was adopted in 2018 and the year after, a new regulation came into force that formally distributed responsibility for climate adaptation work to 32 national authorities and the country's 21 county administrative boards.<sup>28</sup> In 2024, an updated strategy and action plan aimed at national authorities for the next five years was launched.<sup>29</sup>

The public responsibility for climate adaptation work in Sweden is distributed among many different authorities and organizations. Authorities and county administrative boards must develop action plans that contain targeted strategies and measures for climate adaptation, adapted to each authority's specific area of activity. Municipalities play a central role in climate adaptation in Sweden through their responsibility for community planning and technical infrastructure, including water supply and sewage management. At the regional level, the county administrations have the task of coordinating the regional climate adaptation work, a work that has improved the exchange of knowledge and the cooperation between different actors. Special expert authorities, such as SMHI and the Swedish Agency for Community Protection and Preparedness MSB, are responsible for providing data and analysis tools that support climate adaptation efforts nationally and regionally. The Housing Authority also has a special responsibility for climate adaptation of the built environment and functions as the coordinating authority for these issues. For example, the Housing Agency provides documentation and guidance for both new and existing buildings to ensure that buildings and other infrastructure can withstand future climate-related risks.

A relatively new but central actor in climate adaptation in Sweden is the National Expert Council for Climate Adaptation, established in 2018, which is an independent body tasked with reviewing and making recommendations for Sweden's climate adaptation work. The council reports to the government every five years with proposals for prioritized efforts and an analysis of the effects of climate change on society. The council thus plays a central role in developing and coordinating Sweden's climate adaptation strategies to meet the growing challenges climate change entails.<sup>30</sup> The National Expert Council for Climate Adaptation emphasizes

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<sup>27</sup> "Sweden in the face of climate change - threats and opportunities" (SOU 2007:60).

<sup>28</sup> [https://www.regeringen.se/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300\\_webb.pdf](https://www.regeringen.se/contentassets/8c1f4fe980ec4fcb8448251acde6bd08/171816300_webb.pdf)

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<https://regeringen.se/contentassets/981309b513244d3eb987e0cf8ff69e37/nationell-strategi-och-regeringens-handlingsplan-for-klimateanpassning-skr.-20232497.pdf>

<sup>30</sup> With <https://klimatansningsradet.se>



that justice should be considered in all stages of climate adaptation – from planning and analysis to implementation and follow-up. A recommendation from the council is that aspects of justice are highlighted more clearly in the national climate adaptation strategy and become a separate sub-principle to avoid that justice is made invisible in the broader concept of sustainability.<sup>31</sup> The Council further notes that Sweden has undertaken to promote justice globally in climate work through international agreements such as Agenda 2030 and the Paris Agreement. This means both emission reductions and support for climate adaptation in low- and middle-income countries. Despite this ambition, the challenge remains to translate the justice ambitions into concrete, practical measures.

Sweden's Municipalities and Regions (SKR) published a report in 2023 with the title "Fair and sustainable transition for the climate" from<sup>32</sup> SKR is an important organization in Sweden through its role as a member and employer organization for all Swedish municipalities and regions. SKR's mission is to support and develop the activities of municipalities and regions by offering networks for knowledge exchange and coordination. The report emphasizes that climate change affects rural areas and cities differently, with varying conditions and needs for adaptation. A fair transition means that special efforts are aimed at the most vulnerable and climate-affected groups.

Justice is also highlighted as one of six themes in the research council Formas strategic agenda for the national research program on climate from 2021.<sup>33</sup> Formas highlights the importance of a democratic and fair climate transition, with particular focus on fair and democratic values in both emission reductions and climate adaptation. The theme includes both ethical questions and questions about power, responsibility and representativeness, where cross-generational perspectives are also included. A central aspect of the agenda is justice both between and within countries, where increased understanding of how climate goals can be achieved fairly is needed. This includes questions about how historically high-emitting countries can support those already hard hit by climate change, as well as how rich countries can take responsibility for reducing their own emissions. The theme also includes how international collaborations can be structured to promote global justice and includes issues of power, representativeness and accountability. This also includes investigating the systemic effects of climate change and understanding and reducing any negative side effects. The agenda further emphasizes the need for research on justice in climate work at the national level, especially with regard to differences in the emissions responsibility of individuals and groups, vulnerability to climate change and ability to influence one's own situation. This research includes analyzing how factors such as economic inequality, gender and age influence

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[https://klimatanpassningsradet.se/polopoly\\_fs/1.180277!/16.1%20Rattvis%20och%20jamstalld%20klimatanpassning.pdf](https://klimatanpassningsradet.se/polopoly_fs/1.180277!/16.1%20Rattvis%20och%20jamstalld%20klimatanpassning.pdf)

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<https://skr.se/download/18.136c6cca186922b217179212/1678460427002/WEBB-19-KOMB-Slutrapport-Rattvis-och-hallbar-omstallning-for-klimatet.pdf>

<sup>33</sup>

<https://formas.se/download/18.464f1e6517dc281eb12193b4/1641978321399/r5-2021-kunskap-for-en-genomgripande-klimatomstallning.pdf>

climate impacts and risks, as well as how different groups' perspectives are represented in climate work. The research also calls for studies on differences in challenges for cities and rural areas and how climate action can affect different groups. A power perspective is central to these issues, as is the influence of the expert role and how decisions can be made in a democratic and legitimate way in climate matters.

In summary, climate adaptation is a relatively new area for Sweden, but which is now formalized in laws and regulations for authorities. There also seems to be an increasing focus and interest in justice issues within climate adaptation as indicated in the letters from the National Council of Experts, Sweden's Municipalities and Regions and the Research Council Formas.

### Climate adaptation in the Stockholm area

A current overview of the climate adaptation work is given in the County Administrative Board's report "Regional action plan for climate adaptation in Stockholm County".<sup>34</sup> In the report, the focus is on three main climate risks: floods, high temperatures and the resilience of biological diversity. Flood risks include threats from higher water flows and sea level rises, which threaten communities and infrastructure, especially along the county's coastline and around Lake Mälaren. Changing climate conditions also lead to more and longer heat waves, which particularly affect children, the elderly and socio-economically vulnerable groups, as well as wildlife in the region. Climate change will also affect biodiversity and ecosystems.

Central public actors for climate adaptation in the Stockholm area are the County Administrative Board, Region Stockholm and the municipalities.

**Stockholm County Administrative Board** has a coordinating responsibility for the climate adaptation work at regional level, which includes initiating, supporting and following up the municipalities' efforts to meet climate change. The County Administrative Board also has a role to spread knowledge and information about the current and future effects of climate change. The county board supports the municipalities with practical guidance and recommendations, especially regarding construction near lakes, waterways and coastal areas, to reduce the risks of flooding.

**Region Stockholm** is responsible for healthcare, public transport and regional development, and according to the Planning and Building Act, the region must work to reduce the county's climate impact and strengthen climate adaptation. The region's responsibility for spatial planning aims to make it easier for the municipalities to plan their areas in accordance with the regional climate goals and reduce the risk of climate-related damage.

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<sup>34</sup> <https://www.lansstyrelsen.se/publikation?entry=546&context=39>

**The municipalities** in the county have a central role through its planning monopoly and responsibility for infrastructure such as water and sewage as well as emergency services. They must assess climate risks in the built environment and ensure that climate adaptation is integrated into the overall planning. The municipalities are also responsible for managing risks in detailed planning by, for example, requiring land permits to reduce hardened surfaces that can worsen floods. In addition, they have the obligation to establish action programs for accidents under the Accident Protection Act (LSO), which often include climate-related risks. However, the municipality does not have a responsibility to adapt existing buildings to the climate, it is a property owner responsibility (even though municipalities are often large property owners).

**Business and property owners** also have an important role with responsibility to protect their properties and businesses through preventive measures that reduce vulnerability to extreme weather events, such as basement flooding and power outages. Larger property owners need to plan to deal with flooding and heat, while property owners with historic buildings have a special responsibility to protect cultural assets from climate-related damage.

As noted above, the municipalities thus have a special responsibility for climate adaptation, both through the municipality's planning monopoly and the municipality's responsibility in the law for protection against accidents. We therefore carried out a literature search and study of overview plans, and possible climate adaptation plans and strategies in a selection of municipalities in Stockholm County (See Appendix B).

The most common climate-related risk identified by the municipalities in the documents we examined was flooding from intense rain. These risks are particularly exacerbated on hard surfaces that impede water runoff and can lead to sewer systems being overloaded. Many municipalities are therefore developing rainfall models and stormwater solutions to identify and manage flood-prone areas. Another major climate risk that most municipalities deal with are heat waves and rising temperatures, which primarily affect densely built-up areas through the urban heat island effect. Heat islands occur when building materials store heat during the day and release it during the night, causing temperatures to rise in cities. Several municipalities are also talking about the problem from rising sea levels, especially coastal and low-lying areas where erosion can lead to the risk of landslides and landslides.

The vulnerable groups that are particularly identified in our review of the municipal plans we examined are the elderly and young children. Elderly people are particularly affected by high heat due to reduced ability to regulate body temperature and increased risk of blood clots and heart failure. Young children are also vulnerable because they have limited ability to adjust their body temperature. Other vulnerable groups are people with disabilities, especially residents of housing with special services for adults and residential care for the elderly (LSS housing) and the socio-economically disadvantaged. Several municipalities also identify specific risk

areas, where socially important operations such as schools and healthcare facilities are prioritized for adaptation measures.

It is unusual for the municipalities we investigated to explicitly refer to aspects of justice in relation to climate adaptation, to the extent that justice is addressed in connection with climate issues, it is mostly about ensuring a fair and inclusive transition to lower emissions. However, some municipalities emphasize the importance that climate adaptation should not reinforce existing inequalities but instead reduce them, especially by taking into account socio-economically vulnerable areas that may be hit harder by climate change. Other justice efforts mentioned by the municipalities in connection with climate issues are to involve residents in the decision-making process, create citizens' councils and strengthen cooperation with civil society to promote equality and give all residents influence in climate work. Equality and gender mainstreaming are also used to ensure that adaptation measures benefit all groups, especially the most vulnerable. In summary, justice aspects in connection with climate adaptation do not seem to be something that the municipalities in the Stockholm area highlight to any great extent in their plans and strategies for climate adaptation and overview plans.

## 4. Results from interviews

The interviews were conducted following a joint creation process to create a basis for interview questions and identify who we would interview. The project therefore began with a co-creative workshop in which both representatives from the city and civil society participated. To achieve such a "collaborative citizen science design", we set up the project in two phases.

In the first phase, we worked to establish contact and begin collaboration with a number of organizations with the aim of formulating a common understanding of central issues and definitions relating to justice in climate adaptation. The three main goals in Phase 1 were:

1. To establish a cooperative relationship with a number of organizations/interest groups and in a way be able to benefit from their experience and expertise in a joint creation process.
2. To identify priority groups that are particularly exposed and vulnerable to
3. climate change-related risks in the Stockholm metropolitan area.
4. To identify equity-related issues in potential adaptation measures affecting these priority groups.

### **Workshop 1.**

We chose a broad grant and offered a large number of organizations/interest groups as well as key people from the city in order to obtain and discuss their perspectives on issues related to local climate adaptation and justice within the framework of our project.

The workshop began with an introduction to climate adaptation and some brief reflections on how to understand justice in these contexts. We deliberately chose exploratory questions rather than set definitions because we didn't want to steer the

actors too hard and thus miss out on important angles and input. Then they worked in groups where they discussed a number of questions, some concrete others more open and we encouraged them to use their experience and perspectives. We wanted to obtain their perspective on justice aspects of (1) Risks linked to weather and climate and (2) Actions taken to meet these risks in the Stockholm area.

In each group there were participants from organizations/interest groups and from the city to promote exchange. Afterwards we talked in a larger group. Workshop 1 was the first step in beginning to formulate a common understanding of the central issues and value conflicts associated with climate justice from the perspective of the organizations

### **Workshop 2.**

In the second workshop, we took as a starting point the results and lessons learned from our first workshop, and asked the participants for help in providing input on three important questions for us in the further work:

1. Identify which organizations and individuals we should interview
2. Prioritize between the potential interview subjects
3. Define central thematic questions to explore in the interviews.

This time a smaller group participated and only representatives from organizations/interest groups.

In Phase 2 of the project, we further built on the results and relationships created in Phase 1. The material provided, among other things, important material for interview questions and helped us select different informants for the interviews we conducted. The participants in Workshop 1 and 2 thus had an influence both on which organizations we talked to and which topics we touched on in our questions. In addition to this, we have also collaborated more deeply with a civil society representative who was at the Workshops (Silvija Simic). Silvija has helped produce material for the final report, in the form of layout planning, written text and feedback. Silvija also conducted a number of interviews and recruited interviewees.

We interviewed people from two groups: officials in the City of Stockholm and representatives from various organizations in civil society. Here follows our compilation of the results of the interviews. The questions dealt with which climate-related risks were most current, which measures had been implemented to manage the risks, with a particular focus on vulnerable groups and justice aspects of the risks and measures. Note that we were not looking for measures aimed at reducing emissions, but focused on climate-related risks, such as heat waves and floods. See Appendix Method for more information on how we conducted and analyzed the interviews and the questions we asked.

## **4.1 Results from interviews with officials in the City of Stockholm**

We interviewed 11 officials with key roles within the city's work for equality, climate and sustainability. The 11 informants had the following roles:

Development manager for Fokus Järva at the City Management Office

1. ILS co-ordinator for the social welfare board in the City of Stockholm
2. Preparedness and security coordinator in the City of Stockholm (city-wide and administration-wide level)
3. Strategist at the Elderly Administration
4. Disability Ombudsman in the City of Stockholm
5. Urban planning strategist at the City Planning Office in the City of Stockholm (focus area: environment, climate and ecological sustainability)
6. City planning strategist at the City Planning Office in the City of Stockholm (focus area: open space structure – public space and quality of stay)
7. City planning strategist at the City Planning Office in the City of Stockholm (focus area: water-related aspects, e.g. quality, flooding, future climate)
8. Children's Ombudsman in the City of Stockholm
9. Climate General in the City of Stockholm

The questions aim to explore both whether/how the concept of climate justice is used and how, within the framework of their respective roles, they reason about climate risks, justice and vulnerable groups.

### ***Which climate risks are most important?***

The vast majority of informants answered that hot environments, inside as well as outside, and floods were the biggest climate risks. "...what the city of Stockholm as a whole has prioritized in the climate adaptation work are heat waves and the problem of flooding, torrential rain and flooding. (15). Several mentioned the heat mapping and said that it clarified the situation for them in a very clear way.

The other examples in the list below were raised by 1-2 informants (per example).

- Warm environments, e.g. preschools (both indoor and outdoor)
- Flooding (due to torrential rain or other causes)
- Rainfall (which can lead to landslides and landslides)
- Hot and cold outside (this is the social service that thinks about the homeless and drug addicts who sleep outside)
- Air and water pollution
- Soil pollution
- Thunderstorms (leading to power outages)
- Geological crises ie. soil stability when it becomes drier, landslides and erosion
- Food preparedness

### **Which groups do you perceive as particularly vulnerable to climate risks and in what way are they vulnerable?**

Here, most informants answered that it is children and the elderly. What the groups have in common is that they are more sensitive to heat, at the same time that they often only have access to limited environments where it is difficult to cool down (for example, the preschool yard or the nursing home). Other groups highlighted included: homeless people and addicts who often sleep outside and are therefore more exposed to heat and cold; socio-economically vulnerable in densely built-up

areas where heat islands form; disabled, both those who live in special accommodation and in their own accommodation.

Some reflected on the fact that you can be vulnerable because where you live geographically, for example heat islands form even in the inner city. Having said that, many who live in Stockholm's inner city tend to be more resourceful than many who live in marginalized areas. In other words, the overall vulnerability is greater and the possibilities of being able to compensate for the effects of climate change (generally speaking) are smaller.

### **Actions and adaptations?**

Here, the informants gave a long series of examples that deal with everything from urban planning to communication and outreach activities. Some examples that show the breadth:

- Design and renovation of properties and courtyards in nursing homes
- Planting trees
- Reduce hard surfaces, other ground cover
- Sun protection in preschool yards
- Ventilation and cooling
- Arrange meeting points for the elderly who do not yet have interventions at home - where they receive information about heat, cooling, drinking and sun hats.
- Outreach activities aimed at addicts and the homeless

Some of the informants reflected on the connection between tree planting as a heat-reducing measure that can at the same time contribute to the city becoming more attractive to the residents:

*"...it will probably be seen in the upcoming new environmental program where the position of the trees in the planning will be a little stronger, or whatever shall say. That we talk more about canopy coverage, permeable soil, the strengths and weaknesses of the physical environment when it comes to dealing with heat effects. And there it is a bit ... at the beginning or what to say, to find those are the planning instruments that allow us to understand where measures are needed to manage heat that at the same time contribute urban quality from a social perspective."*

One informant reflected on what type of measures are actually required:

*"But to some extent it is a bit like patch and fix measures, or whatever you want to call it. We would need this larger lifestyle change across the city, or ... and in all of Sweden really"*

Another informant described what she perceived as conflict between, on the one hand, safety and, on the other hand, climate adaptation. In order to increase safety, for example, many schoolyards have become increasingly open and hardened, which is not desirable from a climate adaptation point of view.

### **Communication and justice**

A number emphasized that it is difficult to reach various vulnerable groups with information. The challenges lie both in making the information comprehensible to the target group and in the fact that it cannot be fully digitized because it excludes certain groups.

One of the informants talked about participation and particularly emphasized the importance of communicating with the target group. Not just talking to the staff or making changes in the accommodation, but actually actively involving the target group and explaining:

*"But precisely this, that it is not only about the staff, but also making information available so that the individual feels that it is involved. That it understands what is happening, that it can make conscious choices and be involved."*

### **The chicken and the egg**

In a number of the interviews, questions emerged about what kind of injustice it actually made the most sense to address if the overall aim is to create a more equal and cohesive city. At which end should one start? Simplistically, one can say that one view was: The discussion around, and work with, climate justice will provide synergies and can become a way to access other injustices within the city. The other view was: we should first of all address other more fundamental justice and security issues and then this in turn will increase robustness and resilience which contributes to increased climate justice.

The following quote captures many of the informants' thoughts well

*"... if it is socio-economic factors that make some people more affected in a climate crisis, then the answer is not to take the right climate adaptation measures to deal with it, but then the most powerful tool is clearly to level socio-economic differences in the city, and that is done within the framework of another policy area, and I think that ... I don't think that discussion is fully present in Stockholm yet."*

and

*"We will not be able to adapt to the climate for good protection, but it will have to be measures in other areas."*

Interestingly, most informants expressed both perspectives and alternated between them. Perhaps it can be interpreted as that there is a great commitment to the issue but that it is not always clear what the best method to achieve the goal of justice is?

Related to the discussion of fundamental injustices, a number of respondents talked about lifestyle effects on the climate (e.g. cars, consumption, etc.) and emphasized that it is not those who live in socio-economically vulnerable areas who drive that development, but that it is often they who are affected of climate justice, even though they (generally speaking) contribute less. So doubly unfair so to speak. They also reflect on how injustices are stacked on top of each other and that climate justice is



another one. Furthermore, they consider that perhaps one should not only think about raising the standard for those who are worse off, but also limit some consumption for those who are better off.

### **Is "climate justice" used as a concept?**

A number of informants said that the concept of climate justice is a helpful perspective that captures important aspects and that it is positive that it is included in the new Environmental Plan.

*"...we talk a lot about climate risks and the effects of, for example, heat, high temperatures, and when you look at how Stockholm's inner city functions from a heat perspective, we have a very hot urban environment, we have heat islands but we have cool parks. And if you move the map so that we see Järva, you can see that we have a very hot urban environment and we don't have cool parks. And then the consequences will be ... anyone who sees that picture gets a very clear idea that climate risks are greater on Järva, and I think that then ... the association trajectories then rather go to the concept of climate justice than social sustainability."*

Climate risks or climate justice are not part of the daily agenda. It is during specific events – heat wave, flood – or if there is such a risk forecast, then those terms appear in the conversation.

Having said that, it is very clear that there is no common definition of what is meant by the concept of climate justice. No one said they used the term often or in an integrated way. No one said they felt completely comfortable with the term. One interpretation is that they are unsure of what the term covers with respect to their own field. In general, the informants seemed to find it easier to talk about climate justice on a higher or more general level than what it would mean in their daily activities. It is a new term:

*"I would say that we have very recently started using it. Last year it came as a new goal in the budget, which the city council adopted, that the city of Stockholm must be climate fair and we must also include residents in our climate work."*

A majority said they use social sustainability as an accepted concept of justice, but it seems that they perceive climate justice to be broader, so the concepts do not completely overlap.

Some informants spoke about inclusion, albeit more indirectly, such as making, for example, users or others whom one represents, involved in agenda-setting or that certain information should be directed to them rather than, for example, operational managers.

### **What climate risk justice issues are they working on?**

Overall, so considered informants that climate risks reinforce already existing injustices such as e.g. inequality with regard to access to housing in areas where there is greenery, cool proximity to water, etc. Those who live completely without a

home today will be more vulnerable if the weather changes – it becomes warmer or perhaps wetter and the air quality deteriorates. One informant thought a lot about which perspective should be prioritized - was it justice in a vision, e.g. to reduce emissions, or should one assess aspects of justice in every measure and change that is introduced as being able to reach the overall objective.

On the specific question "which justice issues related to the climate crisis are you working on", many had difficulty finding concrete examples. A typical response:

*"I can't say that there is anyone ... It is not so clear, and it is not so concrete where I am at the moment that 'this' ... just connected to the climate, I think."*

Of course, they all work with many justice issues from different perspectives, but it is rarely linked specifically to climate risks and it does not seem to be discussed in terms of climate justice very often. Having said that, many of the respondents are looking ahead and expect it to be an important dimension. A majority say they are more used to working with social sustainability, participation and agenda-setting and think about structural injustice in that context.

Several informants reflected on the increasing gap between areas where the land is very valuable - for example Norra Djurgårdsstaden - and others - e.g. Järva - where the land is worth less and how much influence it has on how the quality of the existing public space can be developed. One informant highlighted the city's stormwater problem in particular.

*"It is difficult to calculate a housing project where there are stormwater risks or these heat risks, or something like that. In other words, it adds to the injustice that it is not possible to get a profitable project together in Järva, unlike in the inner city where the land is more expensive. Where there is a higher willingness to pay, there you can make more of that type of investment."*

#### **Other examples of justice perspective in different issues / in different areas:**

Speaking of justice across different generations, i.e. that we who live now have obligations towards future generations, for example not to live in an unsustainable way, and trust in public actors:

*"...if we were to more clearly address this generational justice, we would at the same time show children and young people that we have confidence in them and that they are important and that they are in demand. And in that way, trust in public actors would increase and then turnout would increase, I think, and community involvement would generally increase."*

An informant raises the term 'equality' in reference to justice in elderly care:

*"We can take heat. It shouldn't matter where you live, but you shouldn't have to suffer from too hot premises in your accommodation if you live in care for the elderly, somewhere"*.

And further

*"And you look at the climate risk, so if you think about the city's principle of equality. It does not matter which provider it is or which person receives the care, but it must be the same for everyone. There must be good care and care for everyone"*

Another perspective was fair and inclusive transition and a number of informants emphasized the importance of political governance at the state level rather than different solutions at the municipal level.

### **Could climate justice issues lead to new collaborations?**

Many within the city have of course worked with both climate and justice long before they started calling it climate justice. But could this new term lead to new collaborations? Or is the risk greater that it will become another buzz word? A number of the informants were cautiously positive about the concept and thought that it could perhaps open up new collaborations, counter culverts and become a meta-perspective. A comprehensive view of both climate and justice at the same time, where you are forced to connect the two issues in a way that has not always been done, at least not from a Stockholm perspective, before.

An informant highlights Grönare Stockholm as an example of cooperation:

*"It is the Transport Office that develops the existing public space, and they then receive funds from the central budget to make investments. And this year, they have a special focus on heat, and we have collaborated then. The Environmental Administration produces heat data, the City Planning Office analyzes the physical environment linked to this heat data, and we discuss together with the Transport Office what we can see as interesting places to improve then, for example Järva. And it helps them in their work, to select these places that can then receive extra investment resources that are not then connected to the finances of the detailed plan projects. "*

### **Is climate justice an important/priority perspective compared to other issues?**

In principle, all of them answered that it was not a priority now, but that it probably will be in the future. There was a curiosity about the concept but it is clear that it needs to be defined and contextualized to become really useful. At present, it seems both unclear what it covers and what it would mean in practice within different parts of the city. Some representative voices:

*"...I think you need a little help to understand what it is you have to work with when someone says "climate justice". And you need to get it broken down into what it means for us, and what we could do in such cases. And maybe even, who could we join hands with, or who can we learn from."*

*" ... since the concept is so new, I perceive it as ... important I think is the wrong word. There is a curiosity about that concept and a willingness to explore it, and thus*

*important. And there is also a political dimension that makes it a concept that unites two different levels of political importance. "*

*"... I think climate justice is a good concept because it connects so well that social equality and biological and economic justice are connected. So I think that's a good concept. And then we have to know what that means too."*

Many informants once again expressed that they work with various vulnerable groups and identify climate risks such as heat and torrential rain but do not necessarily usually talk about it in terms of justice.

### **What would be needed to work more/better with climate justice issues?**

Several informants wanted clear definitions, terminology and more knowledge. Concrete examples and training to increase understanding of the concept and application.

*"...above all, you need to understand what something is. First, some kind of understanding of the concept and understanding of "what this means for me and my business. What can we do here? And then maybe you also need help to break it down into goals, if you get it as an indicator for example, and understand what it is we have to do."*

One informant spoke about the need for a common action plan. There are many different administrations and companies in the city and it is not always easy to get them to 'go in step' as he put it. Someone mentioned resources, but not only new resources but existing ones could be redistributed and you could work with climate justice within various urban development projects.

Some informants felt that it could be helpful to use technology such as digital twins to simulate, for example, torrential rains and other events. It could increase understanding of how it actually affects different people and clarify opportunities for improvement (the informant exemplifies a research project that is a collaboration between KTH, MIT and the City of Stockholm within the Stockholm Senseable Lab). The informants also reflected on the importance of not only focusing on the most dramatic potential events when talking about climate justice. Even minor injustices that have a concrete effect on quality of life and health are experienced as very negative.

### **Concrete examples of climate justice?**

One informant had worked with heat maps, consumption-based emissions and how acceptance is affected by participation. None of the others had any clear examples at the moment, but one told about a planned project that contains aspects of climate justice and deals with the effects of torrential rain.

### **How do you work with different interest groups and civil society organizations on these issues?**

A few of the informants had developed collaborations. Some examples:

"The authority for youth and civil society issues, which has contact with many civil society organizations as well, and also the Swedish Youth Council, there is a lot of information and knowledge for the municipality."

*"...another group that we collaborate a lot with, which perhaps still touches on the climate issue and at least the green transition, is that in Järva there are very active colony and cultivation associations and garden associations and so on. And many of them have a strong environmental interest, and where farming is not just a food production, local food production issue. So there, I think it quite tangibly comes into supply issues and food transport, and contributes positively to climate issues."*

Another person said they were starting up and looking for partners. All were positive about such collaborations.

## 4.2 Results from interviews with representatives from organizations

We interviewed representatives of various organizations within civil society. Potential organizations to interview were identified with the help of two workshops we arranged (see Appendix Method). Based on that list, we contacted organizations to get hold of informants.

Several of the organizations refused because they didn't think they had anything to say, but finally we got in touch with get on 6 people from different organizations:

1. Public Housing Sweden, the organization of municipally owned housing companies and long-term private housing companies that contribute to the public interest in Sweden.
2. FUB, The Swedish National Association for People with Intellectual Disability, is an advocacy organization working to enable children, young people and adults with an intellectual disability to live a good life.
3. PRO, The National Organization of Pensioners.
4. The Tenants' Association, National association for tenants.
5. People in Skärholmen, local NGO for Skärholmen suburb.
6. The Interreligious Council in Stockholm

### **Which risks and effects of climate change are particularly important for your organisation?**

Three of the informants mention that flood and heat as important, and one also cold. The other three said that climate risks were not a particular focus. One informant highlighted concerns about the climate as a factor. Another informant pointed out that there is a large proportion of Swedes who live in apartment buildings, about 3 million (out of a population of about 10 million in Sweden), and for these it is temperature and flooding that has been discussed the most.

### **Which groups do you perceive as particularly vulnerable to climate risks and in what way are they vulnerable?**

The groups that were highlighted were the elderly, children, disabled, socio-economically vulnerable. One informant highlighted that the 50,000 people

who live in special accommodation may be particularly exposed to high temperatures and torrential rain, and that the experiences from the pandemic showed that these accommodations were not particularly well prepared for unusual risks and extreme situations. Individuals who do not have Swedish as their first language may find it difficult to access information in extreme events.

### **Actions and adaptations to manage the risks?**

Information material was mentioned by the informants from Sweden's Allmännyttan and the Tenants' Association. Study circles were also something that the Tenants' Association uses, for example they have had study circles on "This is how you can protect yourself against heat".

### **Is "climate justice" used as a concept?**

Climate justice was not a concept that was used very much by most of the informants. The exception was the informant from the Tenant's Association who said that they use it centrally in their work. Rather than justice, it was more common to use concepts such as inclusion, participation and social sustainability. The informant from FUB highlighted that there are UN conventions on disability rights that aim for the disabled to have the same opportunities as all other people, for example in terms of self-determination, participation and influence.

### **Measures or adaptations to reduce the risks can also generate new problems including other injustices?**

The only aspect that was highlighted here was that actions such as renovating properties can mean increased rents, creating problems for those who cannot afford to stay. This phenomenon has been called "renoviction".

### **What different types of justice issues are most important (e.g. distribution, process, agenda-setting, systematic, historical)?**

Systematic and structural injustices as well as historical injustices were mentioned by a couple of the informants, but others had difficulty saying which type of injustice was most important.

### **Is climate justice an important/priority perspective compared to other issues?**

It is not a high priority issue among the informants. But they also say it's a new and growing issue.

### **Have you worked with climate justice explicitly?**

All answered no to this question.

### **What would you need to work more/better with climate justice issues?**

Here were some different suggestions: *money* and *personal* said one informant, *knowledge* and *training* another. *Social projects* and fairer taxes and subsidies between renting and owning your home were other things that were suggested.

### **Do you work with other organizations on these issues? If so how?**

Here, most people answered no. However, one informant mentioned that they have cooperation with the nature conservation association.

**What could a climate-just society look like?**

That all groups in society receive the same protection and the same opportunities to continue living their lives in a safe way, that there should be no difference if you own your own home or rent an apartment. "That whoever litters has to pay for the littering." "That there is good street maintenance, for example in terms of anti-slip." "That you have a good relationship with people in other countries."

**Could actions around climate adaptation have a positive effect on other social problems? How then?**

Examples mentioned by the informants were pleasant environments with pools of water and shade. This is where several of the informants note issues which have to do with emission reductions, such as that you can live frugally in terms of emissions, and that even then you can live well, such as discovering the small contexts you don't have to travel so far to experience something.

**Is there anything else you'd like to add or something we haven't touched on that you think is important to the topic of climate impacts and justice?**

That the municipalities don't seem to care about the temperature of accommodation for those with special needs. That when building new, you should try to do it right from the beginning. Here, too, measures to reduce emissions are coming up.

## 5. Discussion

The officials in the City of Stockholm believe that climate justice is an important concept that will become even more relevant in the future due to climate change. At the same time, it is a new concept. There is a lot of involvement in the matter, but currently the problems are discussed rather in terms of climate risks and justice and social sustainability. To feel more comfortable, they require clear definitions, terminology and more knowledge. Concrete examples and training to increase understanding of both the concept itself and various applications. There were also requests for an action plan. When they look ahead, several say that it is a useful concept that can open up new collaborations. At the same time, several informants worry that the more fundamental justice issue that has to do with socio economic differences and segregation, for example in the housing market, become invisible. A number of people took up the heat mapping and the heat maps gave a strong picture of the situation, which gave them an overview and a better understanding of how uneven increases in heat and its consequences affect different geographical locations and thus also different groups in society.<sup>35</sup>

Several informants from The city returned several times during the talks to the importance of clear definitions. What would climate justice mean in different businesses? There seems to be a great need to contextualize. "Otherwise it can become one word among many others, which just goes over your head" as one

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<sup>35</sup> "The heat mapping done in 2022 shows that Stockholm today has around 180 heat islands that are over one hectare in size and have maximum temperatures over 35 degrees during heat waves. The largest heat islands are around Bromma airfield, in Östberga, Rinkeby-Tensta and Kista, and Stockholm's inner city comes first in fifth place." from DN.

informant put it. A more comprehensive target image was also called for. Several people said that they would like the city to develop a vision, a target image of a climate-just society (or at least for the city) so that we have something to strive towards.

*A wider conversation was welcomed, "...it (the concept of climate justice) raises a lot of thoughts for me, and I think it does for a lot of other actors as well. And we may not think exactly the same, but I think it's very interesting if this can bring several different initiatives together in a good way."*

One informant envisioned how climate justice as a concept could marry two different, major challenges – a hope for synergistic effects. *"...one is climate change, and the other is growing inequality in the city. And then it is ... And then we work in one bag with lots of different things, and in the other bag with lots of different things. And climate justice is a kind of bridge between these two really big challenges."*

One proposal that came up was to have focus groups or other forums on a city-wide level where children can speak with regard to climate and the environment, which would contribute to climate justice and equality between generations.

In general, climate adaptation did not seem to be something that had been discussed particularly much within the organizations from civil society judging by the answers from the interviewees. The civil society informants appeared overall less talk on justice in connection with climate adaptation. Having said that, large parts of the organizations' activities deal precisely with issues of justice and inclusion in various contexts, and they are very used to working with a justice perspective.

The dominant climate risks raised were heat and floods, and the vulnerable groups highlighted were particularly the elderly, children, people with disabilities and socio-economically disadvantaged people. It is possible that negative effects of climate change do not introduce new dimensions of injustice, but rather exacerbate pre-existing injustice.

Despite the fact that climate justice has not yet been identified as a priority area for most of the organizations, several obstacles to a justice perspective in climate work appear. One of the main obstacles raised in the interviews is a lack of prioritization of climate risks and adaptation to them. Several informants indicated that neither climate risks nor justice linked to climate adaptation were discussed significantly internally, which suggests that a lack of justice in climate measures is not perceived as acute, at least not in comparison to other justice issues that the organizations work with. To facilitate the work with climate justice, support efforts such as training and increased funding could contribute to raising awareness, freeing up resources and creating capacity for work within the organizations.

There is also a clear discrepancy between the conditions that apply to tenants and private homeowners. As tenancies are often dependent on property owners making decisions about adaptation measures, tenants in socio-economically disadvantaged areas (where a majority do not own their home) can be particularly vulnerable to



climate-related risks such as heat and floods. At the same time, larger landlords often have greater resources for climate adaptation than smaller property owners, which creates further differences between different residential areas. Here, policy reforms, for example fair tax incentives, can be important to create equal conditions for climate measures in both the rental and condominium sectors.

Cooperation with other actors and international partners where climate issues with a justice perspective are more developed could also strengthen climate work for Swedish organizations. For example, knowledge exchange and network building with organizations in countries that have progressed further in their climate adaptation work could inspire new perspectives and methods. Furthermore, more focused and accessible communication efforts could ensure that all social groups receive the information they need to be able to manage climate risks. This is particularly important for groups whose mother tongue is not Swedish or who find themselves in vulnerable positions in terms of information. Developing and implementing targeted information initiatives and improving accessibility could reduce the gap between groups with different conditions in the face of climate risks.

### **Important steps:**

- Agree on a definition of climate justice – the informants ask for both a definition of the concept and examples of contextualization (what this means in the form of actions in practice);
- Agree on a target image: what is required for Stockholm to be considered a (more) climate-just city. Indicators and milestones;
- Rank the most important justice aspects, for example involvement and distribution, and identify concrete, defined pilots where you work to promote them;
- Identify which vulnerable groups you want to prioritize and which representatives of these you want to collaborate with: civil society organizations, interest associations, user/patient organizations, individual committed citizens, etc.;
- Choose collaboration methods based on the dimensions of justice the city wants to promote and the vulnerable group(s) you want to collaborate with,

A way to consider **procedural justice** and **involvement** is to establish various collaborations with civil society organizations and other citizens. That type of collaboration can take the form of panels or focus groups (adults, youth and children). It is important to consider that this type of collaboration should begin at an early stage so that the respondents can also influence the agenda, rather than only being allowed to have opinions on prepared decisions. Furthermore, the collaboration should be long-term and the conversations must be followed up so that it becomes clear to those who are involved that they can actually have an influence. There must be a clear link between, on the one hand, time spent and commitment and, on the other hand, influence. Examples of successful projects involving cooperation with residents in order to influence and develop the local living environment can be found in Denmark (eg the XX project in Copenhagen). The collaboration is complex and time-consuming, therefore you need to adapt the schedule for different projects where you plan different forms of exchanges. It is also central that you communicate in a way that makes the target group both understand

the overall purpose of the collaboration but also get a realistic picture of the type of influence they can have on planning and processes.

An important tool for measuring effects and comparing the effectiveness of different strategies for climate justice is **indicators**. Examples of indicators for distributive justice are, for example, identifying vulnerable groups; to examine the distribution of benefits associated with adaptation; to study the distribution of costs in connection with adaptation. For procedural justice, examples of indicators are mapping who participates in different phases of the adaptation process; to what extent the adaptation strategy has a structured plan for participation in the implementation and whether there is a plan for how the adaptation strategy is to be evaluated and updated.<sup>36</sup>

As described in the section on fair climate adaptation, a number of researchers are asking for a deeper understanding of **social structures**, for example those dealing with ethnicity, socio-economics, status and gender as these all contribute to making certain individuals and groups more vulnerable to climate justice than others.<sup>37</sup> That kind of normative aspects must be included both when designing policy and evaluating different forms of interventions.

With respect to **distributive justice** i.e. distribution of opportunities and resources, it may seem reasonable to focus on the groups that are most vulnerable and try to ensure that their, in many cases, already vulnerable situation is not further aggravated due to the effects of climate change. In the report, we have identified the following groups as the most **vulnerable**: elderly, children, socio-economically weak and people with disabilities. Vulnerability can be due to many different things, for example housing conditions, access to coolness and greenery in the immediate area, functional impairments, health, age, etc. A risk with insufficient consideration of the social consequences of climate adaptation in cities is that one inadvertently cements, or even increases, already existing injustices and that individuals and groups who are already vulnerable become even more exposed to various kinds of risks

Thus, measures should be designed to take special account of these groups and their situation. In concrete terms, it can take the form of temperature-lowering measures in indoor and outdoor environments in nursing homes and preschools. Collaboration projects with resident influence in socio-economically vulnerable areas, and collaboration with people (and user organizations) with disabilities around, for example, accessibility and communication.

It is our hope that a contribution that the project can make is to create heightened awareness, but also to stimulate curiosity about the many challenges associated with climate change and justice. One of the goals of the project was to facilitate cooperation between the city and civil society organizations for a more joint work with climate justice. We hope that some of the meetings that took place during our workshops, interviews and during the final seminar will be continued.

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<sup>36</sup> Juhola et al. (2022) pp. 112-114.

<sup>37</sup> Chu & Cannon (2021) p. 86 "...better balance the managerial approaches with greater recognition of social structures – specifically around race/ethnicity, socioeconomic status, citizen status and gender – and their contributions to underlying drivers of vulnerability and climate injustice."



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## Appendix A. Method

### Literature review

#### **Method for the overview of part of the international literature that discusses the concept of justice in relation to climate adaptation**

We limited the search to include review articles between the years 2015 and 2024

We searched for different combinations of the words: JUSTICE, FAIRNESS, CLIMATE ADAPTATION, CLIMATE JUSTICE, ETHICS, EQUITY

We used: Google Scholar, Scopus, Philosopher's Index

We selected 60 articles and went through the abstract, given relevance we selected 30 which we then read carefully.

The work was carried out in May and June 2024.

#### **For the literature study of climate adaptation in municipalities in the Stockholm area**

We first selected a number of municipalities in Stockholm County based on their proximity to central Stockholm. The municipalities we selected were: Stockholm City, Solna, Danderyd, Nacka, Sundbyberg, Järfälla, Lidingö, Sigtuna, Norrtälje, Täby, Värmdö, Tyresö, Vaxholm, Botkyrka, Ekerö, Sollentuna and Huddinge.

For each of these municipalities, we looked for documents about climate adaptation using three methods: 1) manually go to the municipality's own pages and see if we found anything about climate adaptation, 2) if the municipality had its own search box, we searched for "climate adaptation", 3) search via google.com where we searched for the word "climate adaptation. For example: "site:stockholm.se climate adaptation"

We then selected the most relevant pages/documents and summarized the content focusing on the climate risks identified by the municipality, as well as any vulnerable groups and justice aspects raised in connection with climate adaptation.

### Semi-structured interviews

We chose a method that is often called an 'interpretive interview' in Swedish.<sup>38</sup> The method was deemed suitable as we wanted to explore the informants' experiences and reflections on the ethical issues that have arisen/can be expected to arise in their work. For that type of broader probing, it works better to ask open, semi-structured questions around different themes, rather than specific and hypothesis-driven questions (note, however, that the same questions were asked to all informants). The method gives the interviewer both a necessary structure and flexibility.<sup>39 40</sup>

<sup>38</sup> Se t.ex. kap 14 i Bryman, A. (2011). Social science methods. Liber. In English the method is called *interpretivist* qualitative methodology.

<sup>39</sup> Walsham, G. (1995). Interpretive case studies in IS research: nature and method. *European Journal of information systems*, 4(2), 74-81.

<sup>40</sup> "The interpretivist paradigm and qualitative methods would enable researchers to gain further depth through seeking experiences and perceptions of a particular social

The primary weaknesses of the sample and the method are (i) relatively few people were interviewed and (ii) the report below is based in part on the interviewer's interpretation of the answers. Another reservation concerns the generalizability of the answers – one could argue that they are too context- and individual-dependent.<sup>41</sup> However, this does not mean that the method is arbitrary, but rather depends on the fact that the method (as a whole) is based on a holistic epistemological thought, i.e. "...that it is not possible to separate the world outside the individual from the subjective, individual ideas and experiences of this world."<sup>42</sup> Without problematizing that position too much, one can state that a certain measure of subjectivity is unavoidable in this type of interview study. This need not be problematic - the interviewees were selected precisely because of their personal professional experiences and it was in the light of those experiences that they would answer the questions. The generality of the answers is difficult to measure, but we note that there is a large overlap between the answers in the various interviews and between the justice aspects the informants raise and those that are noticed in the academic literature.<sup>43</sup>

Specific comment on the interview question: What justice issues related to climate risks do they work with? We chose to introduce this question with some short examples of different dimensions of justice to have a basis to start the conversation from. We highlighted distributive justice and gave the example of allocation of resources. We also addressed procedural justice, which can deal with aspects such as agenda setting, who gets to participate and be heard and decide, who sits in the room, etc. Then we also talked about structural injustice, i.e. the idea that there are systematically built-in injustices in the social system that have (very) negative consequences both for the individuals and groups that are affected but also for society as a whole (one can assume that a society that is equal and equal is, in a substantial sense, better ).

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context." Alharahsheh, H., & Pius, A. (2020). A Review of key paradigms: positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, 2(3), 39-43, p 43.

<sup>41</sup> Saunders, M., Lewis, P. & Thornhill, A. (2012). *Research Methods for Business Students*. 6<sup>th</sup> edition, Pearson Education Limited.

<sup>42</sup> DePoy, E., & Gitlin, L. N. (1994). *Research: an introduction*. student literature, sid 31

<sup>43</sup> Having said that, one can of course think of several explanations for why there is (certain) agreement in the answers - for example that they are talking to each other or know what one \*should\* worry about when using, and developing, this type of technology and that this has influenced their responses.

## Appendix B. Climate adaptation in Stockholm county municipalities

### *Stockholm City*

In Stockholm City's Action Plan for Climate Adaptation 2022–2025 is **downpour** and **heat waves** the primary focus areas.<sup>44</sup> For these two focus areas, the Action Plan provides a description of current climate challenges, legal conditions, division of responsibilities and organization within the city as well as activities and which committees and boards within the City are responsible for implementation.

Examples of measures implemented in Stockholm are the New Slussen project, which enables a doubling of the withdrawal of water from the Salt Lake, and increased security for rising sea levels. Another example is Norra Djurgården, where the City has adopted a plan to adapt its stormwater management. This plan includes measures such as making the land able to handle large amounts of rain and collecting rainwater that can be reused during periods of drought.<sup>45</sup>

Measures against temperature increases in Stockholm City include increasing shaded places in both schoolyards and in the public environment, which will reduce the urban heat island effect (eng. *Heat Island effect*). This effect occurs because hard and massive building materials store heat during the day and release heat during the night. Stockholm has also created a new online platform in the urban development project Norra djurgårdsstaden that provides real-time events about local weather conditions, including air temperature, humidity and solar radiation. With this tool, residents can understand how green spaces affect local weather, especially during heat waves. Thematic risk and vulnerability analyzes are used to identify where preventive measures are needed (RSA).

The City of Stockholm also has a climate adaptation page on torrential downpours that describes how intense rain, mainly during the summer months, can cause local flooding in the city.<sup>46</sup> Hardened soil makes water runoff more difficult, which increases the risk of the sewage system becoming overloaded. The city has therefore developed a rainfall model that simulates possible flood areas, adapted to future climate forecasts. The model supports both physical planning and stormwater management in order to reduce the consequences of torrential rain.

The City of Stockholm further writes in the Action Plan for Climate Adaptation 2022–2025 that **older** people are particularly vulnerable during heat waves, as their ability to regulate body temperature and sense thirst is reduced. The elderly are also more often affected by chronic diseases, which worsens the situation in high heat. The heat causes dilated blood vessels and increased sweating, which leads to more concentrated blood if the fluid supply is not sufficient. This increases the risk of blood

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<https://miljobarometern.stockholm.se/content/docs/tema/klimat/klimatanpassning/Handlingsplan-klimatanpassning-Stockholm-2022-2025.pdf>

<sup>45</sup> sid 14 i <https://miljobarometern.stockholm.se/miljomal/handlingsplan-for-klimatanpassning/>

<sup>46</sup> <https://miljobarometern.stockholm.se/klimat/klimatanpassning/skyfall/>



clots and can cause heart failure when the heart cannot cope with the increased strain, with circulatory disorders being a common cause of death among the elderly in these situations. **Small children** are also negatively affected, as their ability to regulate body temperature is limited.

Stockholm city measures in the form of business adaptation for various businesses during heat waves, especially to protect children and the elderly and to ensure a safe working environment for staff. Responsible for this planning are the district councils, the education committee, the elderly committee and the social welfare committee, in collaboration with the property committee, SISAB and Micasa (municipal companies). The goal is that all businesses – including schools, preschools, care homes and home care – have implemented plans and routines for dealing with heat waves. This also includes evaluating and adapting the premises in question based on needs to optimize protection against heat.

In Stockholm Stad's Environmental Program is one of seven goals to "A fair and inclusive transition". The city writes that "The aim is to have a perspective of justice in environmental and climate work to contribute to a more equal society. The city's operations must be designed so that they strengthen a fair transition and groups that are most affected by the environmental problems must be protected. The people of Stockholm must be involved and have influence in the transition." Examples of measures taken up in connection with the goal are to include an environmental and climate justice perspective in the city's governance model for large investment projects and to promote residents' involvement in climate issues by developing a citizens' council and strengthening cooperation with civil society.<sup>47</sup>

### *Solna*

The city of Solna writes in its strategy for reduced climate impact and adaptation to a changing climate how they plan to adapt their urban planning and operations to the expected climate changes through strategies in urban planning, health and crisis preparedness.<sup>48</sup> The strategies include actions to manage **intense rains, heat waves and increased precipitation** to protect the health of residents and the city's infrastructure. Solar focuses on identifying areas with **high heat risk**, especially near preschools, nursing homes, health centers and LSS residences. The aim is to protect the health of children and the elderly from the effects of climate change. Proposed measures include increased greenery to provide shade, cool and manage stormwater in particular in five identified heat islands within densely built-up areas with little green space. Sola has also developed a rainfall model that identifies areas at high risk of flooding during intense rain. The model aims to help the city plan effective measures for stormwater management and reduce the load on the sewage system during future downpours.<sup>49</sup>

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<sup>47</sup> <https://vaxer.stockholm/tema/miljo-och-klimat/>

<sup>48</sup> [https://www.solna.se/download/18.5002ae1016ed574744199bd/1596180205909/Klimatstrategi\\_2019.pdf](https://www.solna.se/download/18.5002ae1016ed574744199bd/1596180205909/Klimatstrategi_2019.pdf)

<sup>49</sup>

<https://www.solna.se/om-solna-stad/alla-nyheter/arkiv/2022-12-21-staden-anpassar-for-skyfall-i-frosunda>

### *Danderyd*

Danderyd's climate adaptation plan for 2022–2031 focuses on creating a resilient municipality to face the consequences of climate change, with specific measures in areas such as **increased precipitation, increased temperature, risks of landslides, landslides and erosion as well as rising sea levels**.<sup>50</sup> The climate adaptation plan emphasizes **stormwater management**, risk prevention for **heat waves** and better preparedness for **floods** and **downpour**. The municipality plans to strengthen infrastructure and buildings, as well as collaborate with external actors such as the Swedish Transport Administration to manage climate-related risks in a comprehensive manner. The municipality aims to improve stormwater management due to the risk of flooding from rain and the sea. Danderyd also invests in building climate-adaptive buildings.

Concrete measures to deal with the increasing climate risks are given in Danderyd's climate adaptation strategy for 2022–2031.<sup>51</sup> Examples of measures taken up in the strategy are to improve drainage at municipal buildings to reduce moisture damage and to use rainfall mapping to identify risk areas that require special protective measures against floods. The municipality also plans to strengthen the routines for handling heat waves by improving shaded outdoor environments at schools and nursing homes, as well as developing an emergency water plan to ensure the supply of drinking water in extreme weather conditions.

### *Neck*

Nacka municipality's climate adaptation program (2022–2025) includes strategic measures to manage climate risks that **floods, heat waves, raised sea levels** and **impact on biological diversity**.<sup>52</sup> Among the prioritized measures are improving stormwater systems to prevent flooding, adapting green areas to lower the heat locally, and developing the municipality's infrastructure to reduce vulnerability. The municipality also invests in cooperation with external actors and continuous information to property owners and businesses about climate-related risks. Neck will have to deal with rising sea levels and consequently erosion due to climate change. The municipality mentions that certain groups, especially in densely built-up areas with hard surfaces, may be more exposed to high temperatures.

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<sup>50</sup>

<https://www.danderyd.se/globalassets/globala-filer/bygga-bo-och-miljo/miljo-och-klimat/klimatanpassningsplan-2022-2031.pdf>

<sup>51</sup>

[https://www.danderyd.se/globalassets/globala-filer/bygga-bo-och-miljo/miljo-och-klimat/strategi-for-klimatanpassning-2022-2031\\_rev-.pdf](https://www.danderyd.se/globalassets/globala-filer/bygga-bo-och-miljo/miljo-och-klimat/strategi-for-klimatanpassning-2022-2031_rev-.pdf)

<sup>52</sup>

<https://www.nacka.se/49ea13/globalassets/kommun-politik/dokument/styrdokument/program/program-for-klimatanpassning.pdf>

### *Sundbyberg*

The city of Sundbyberg works with climate adaptation as part of its sustainability program linked to Agenda 2030.<sup>53</sup> The focus is on creating an inclusive city with equal living conditions, a good living environment and a fossil-free city by 2030. Climate adaptation efforts that Sundbyberg prioritizes in its target picture 20230 include managing **extreme weather** such as **heat waves** and **floods**, integrate green areas for ecosystem services and strengthen infrastructure resilience. The municipality invests in multifunctional solutions that can contribute to climate resilience as well as recreational opportunities and public health, as well as reducing **the flood risk** through climate adaptation and development of green areas.<sup>54</sup>

Examples of measures are newly constructed parks and better drainage. In their program for a sustainable Sundbyberg according to Agenda 2030, one of the three main goals is to create "an inclusive city with equal and equal living conditions" by 2030. Gender mainstreaming is used as a method to ensure that women and men, as well as various vulnerable groups, have equal opportunities and rights. Sundbyberg also works with an intersectional approach to deal with several forms of discrimination at the same time, with a clear focus on an inclusive city and equal living conditions

### *Järfälla*

Järfälla municipality's climate adaptation plan adopted in 2022 identifies the main climate risks which **floods**, **heat waves**, and **slide/landslide**, and includes measures to manage these risks.<sup>55</sup> The municipality prioritizes strengthening the infrastructure, training personnel, and implementing technical solutions to reduce vulnerabilities, especially for socially critical functions and sensitive groups. Järfälla municipality is also working with climate adaptation as part of its physical development plan for 2050.<sup>56</sup> The focus in the physical development plan is on managing risks linked to climate change such as **floods** and **heat waves**. The municipality plans to strengthen infrastructure, improve stormwater management and create green areas that can mitigate the climate's effects on the urban environment. The adaptation strategy also includes working to reduce climate impact and promote sustainable building methods. To meet climate changes such as floods and heat waves, the municipality also invests in sustainability initiatives.<sup>57</sup>

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<sup>53</sup>

<https://www.sundbyberg.se/download/18.2e6195c8190a64a78d417754/1722416213112/Program%20för%20ett%20hållbart%20Sundbyberg%20-%20lokal%20Agenda%202030%20-%20tillgänglighetsanpassad.pdf>

<sup>54</sup>

<https://www.sundbyberg.se/kommun-och-politik/hallbarhetsarbete-i-kommunen/klimat-och-miljomassig-hallbarhet>

<sup>55</sup>

[https://www.jarfalla.se/download/18.221d1de1862cf99f2c1b45c/1675953485903/klimatanpassningsplan\\_tillgängl.pdf](https://www.jarfalla.se/download/18.221d1de1862cf99f2c1b45c/1675953485903/klimatanpassningsplan_tillgängl.pdf)

<sup>56</sup> <https://www.jarfalla.se/4.20dd2ca2187db9c22d5114b0.html>

<sup>57</sup> <https://www.jarfalla.se/ekonomiochfakturor/arsredovisning2022/artiklar/hallbarutveckling.4.47f4b9311791266dadb44ca9.html>

Järfälla's climate adaptation plan highlights the need for continuous follow-up and to engage various departments and actors to improve Järfälla's resilience to the effects of climate change. Järfälla municipality's climate adaptation plan includes justice aspects by examining how both climate impact and adaptation measures affect different socio-economic groups. The plan proposes that special consideration be given to sensitive and vulnerable groups, such as **barn** and **older**, to ensure that adaptation measures benefit the most and reduce inequalities.

### Lidingö

The city of Lidingö works with climate adaptation as part of its environmental program and aims to adapt the city to both current and future climate changes.<sup>58</sup> The city has updated its map base to identify risk areas for **flood**, **HEAT**, **ras**, **landslide** and **erosion**. This document is used to integrate climate adaptation into the city's general plan, detailed planning work, physical planning and management and operation of the city's land and buildings. The city of Lidingö is currently preparing a new master plan with the goal of creating sustainable development until 2050.<sup>59</sup> As support for the upcoming master plan, Sweco has developed a document that identifies important climate risks and recommended measures to strengthen the city's preparedness for future climate change.<sup>60</sup> To reduce the negative effects, measures such as strengthening physical planning with the help of risk maps and establishing guidelines for construction and land use in areas at risk are recommended. Furthermore, it is proposed that the city of Lidingö prioritizes both preventive and adaptive measures to create a robust and sustainable urban environment by the year 2050.

### Sigtuna

Sigtuna municipality works with climate adaptation by managing climate risks such as **floods**, **heat waves**, and **geotechnical risks**.<sup>61</sup> The municipality uses rainfall mapping and overview plans to identify risk areas, and plans multifunctional surfaces for stormwater management and heat reduction. Adaptation also includes strengthened infrastructure and green solutions to manage climate impacts on socially important functions, such as care and water supply.

Sigtuna's *Sustainability report 2023* mentions climate adaptation in various contexts, with a focus on strategies to promote sustainable societal development and meet the

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<sup>58</sup>

<https://lidingo.se/toppmeny/naturmiljo/klimatochmiljo/strategisktklimatochmiljoarbete.4.3d1e5816979fc250c25fe0.html>

<sup>59</sup>

<https://lidingo.se/toppmeny/byggabo/harplanerarochbyggervi/stadsbyggnadsprocessensagardentill/nyoversiktsplanforlidingo.4.3b3fffd18e3acdadd1691.html>

<sup>60</sup>

<https://lidingo.se/download/18.6429948018ecac981f61c6/1713248352981/Klimatanpassning%20i%200oversiktsplan%20för%20Lidingö%20stad%202022-11-21%20slutversion.pdf>

<sup>61</sup>

<https://www.sigtuna.se/bygga-bo-och-miljo/oversiktsplan-och-detaljplaner/oversiktsplan/oversiktsplan-2022/mark--och-vattenanvandning/klimatanpassning-halsa-och-sakerhet/anpassning-till-forandrat-klimat.html>

Agenda 2030 goals.<sup>62</sup> In the sustainability report, the importance of justice and inclusive societies is emphasized and is not directly linked to climate adaptation measures. The municipality emphasizes that in order to create long-term sustainability, all residents, regardless of background, gender, age or socio-economic status, have equal opportunities to participate and benefit from the municipality's resources and services. Justice and inclusion are seen as central factors in promoting equality, and the municipality works to ensure that everyone can influence decisions and benefit from the progress made in sustainability work.

### *Norrtälje*

Even Norrtälje, due to its geographical location, will deal with risks related to rising sea levels. Therefore, the municipality has already invested in protective dikes and the expansion of green areas because "Climate planning and green infrastructure are the key to managing coastal risks."<sup>63</sup> Norrtälje municipality's master plan includes climate adaptation to manage **floods, landslides and erosion** and **heat waves**. The city has carried out downpour mapping and identified risk areas, especially low points near waterways and the coast. Proposed measures include green areas for temperature regulation, local solutions for stormwater management and specific level requirements for new construction near the coast and lakes to reduce the risk of damage in the event of torrential rain and high water levels.<sup>64</sup>

### *Täby*

Climate adaptation in Täby is about adapting society to the climate changes that are already being felt today and those that are expected to affect us in the near future, such as extreme weather. In order to prevent flooding during heavy rains, the municipality has produced a rainfall mapping which forms the basis for the management and diversion of rainwater. Täby also works to reduce the risks of heat waves, including by planting trees and developing parks and green areas.<sup>65</sup> Täby's master plan assesses that the management of climate-related risks does not give rise to negative consequences. The plan takes into account the effects of climate change and integrates land use that takes risks into account **downpour** and **floods**, for example by identifying areas that can be used to handle large amounts of rainwater. Also **heat islands** and **water supply in case of prolonged drought** has been taken into account. Although the specific vulnerability of certain activities is not analyzed in detail, Täby municipality says in the overview plan that these aspects are

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<sup>62</sup>

<https://www.sigtuna.se/download/18.136730ee18f0f89467d609a/1714118810285/H%C3%A5llbarhetsredovisning%202023%202.0.pdf>

<sup>63</sup>

[https://www.norrtalje.se/globalassets/dokument/dokument-bygga-bo--miljo/dokument-norrtalje-vaxer/dokument-samhallsplanering/dokument-oversiktsplanering/dokument-oversiktsplan-2050/miljo--och-klimatstrategi\\_ny.pdf](https://www.norrtalje.se/globalassets/dokument/dokument-bygga-bo--miljo/dokument-norrtalje-vaxer/dokument-samhallsplanering/dokument-oversiktsplanering/dokument-oversiktsplan-2050/miljo--och-klimatstrategi_ny.pdf)

<sup>64</sup>

<https://www.norrtalje.se/info/bygga-bo-miljo/norrtalje-vaxer/samhallsplanering/oversiktsplanering/fordjupning-av-oversiktsplanen-for-norrtalje-stad/allmanna-intressen/klimat/klimatanpassning/>

<sup>65</sup> <https://www.taby.se/bygga-bo-miljo/miljo-och-hallbarhet/klimat/>

to be included in future climate adaptation work and in strategies to reduce risks for existing buildings.<sup>66</sup>

### *Heat death*

Värmdö municipality's master plan includes comprehensive guidelines for climate adaptation, especially with a focus on managing risks related to **flood, sea level rise, landslide, erosion** and **heat waves**. The plan emphasizes that development should take place in a way that does not increase flood risks, and stipulates that low points and trapped areas should be avoided in new construction. Hardened surfaces are to be limited, while natural catchment areas such as wetlands and ditches are maintained to reduce runoff. Furthermore, protective measures are recommended for socially important infrastructure, especially in the event of a 100-year rain. For areas on the Baltic Sea coast, waterways and lakes, the county administrative board's guidelines for minimum foundation level must be followed to minimize the risk from high sea water levels. When developing on land with landslide and landslide risks, geotechnical investigations are required to evaluate the long-term stability of the land in a changing climate. To deal with heat waves and droughts, the plan emphasizes the importance of creating cooling green areas and water surfaces, as well as using climate-smart building materials and green solutions such as green roofs and facades. These guidelines aim to both cool built-up areas and improve the sustainability of socially important activities such as elderly care and healthcare.<sup>67</sup>

### *Tyresö*

Tyresö municipality's master plan does not contain specific guidelines for climate adaptation, it says that the municipality will develop an addendum to the master plan that will deal with climate-related risks.<sup>68</sup> A search on the website tireso.se does not find anything about climate adaptation, neither via Google nor through the municipality's own search box.

### *Vaxholm*

Vaxholm municipality has a climate adaptation plan that identifies several climate-related risks, primarily **floods, rising sea levels, erosion, heat waves** and effects of **strong winds**. The biggest risk is flooding from torrential rain, which can cause water to accumulate in low points and damage infrastructure. Rising sea levels are also expected to affect the municipality in the long term, especially after 2050 when land elevation no longer compensates for rising sea levels, which requires consideration in all planning of new developments. The risk of landslides

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<sup>66</sup>

<https://www.taby.se/globalassets/3.-dokument-per-dokumenttyp/detaljplaner-och-programhandlingar-taby-vaxer/oversiktsplan-2050/2050/ny/oversiktsplan-taby-2050--staden-pa-landet.pdf>

<sup>67</sup>

<https://www.varmdo.se/download/18.2ce8cc8e1817fd56d97bca2/1655973530469/Antagandehandling%20uppdaterad%20översiktsplan.pdf>

<sup>68</sup>

<https://www.tyreso.se/download/18.256bad0d189c49422672b902/1691412505325/Tyresö%202035%20Översiktsplan%20med%20redaktionella%20ändringar.pdf>

and landslides is considered to be low, but may increase in areas with unstable soils, especially along beaches and watersheds. Long heat waves pose health risks, affect the indoor temperature of buildings and increase the energy demand for cooling, especially on archipelago islands with limited water supply. High winds, although not a climate factor in themselves, can amplify the effects of high water levels and affect coastal structures such as piers and buildings.

In order to face climate change and prevent risks, Vaxholm municipality focuses on knowledge-raising efforts, preparedness measures and technical solutions. The municipality underlines the importance of both companies, communities, property owners and residents taking in the knowledge of a changing climate and adapting their plans and measures accordingly. The municipality's responsibility includes disseminating information about climate adaptation, especially during extreme weather events, and ensuring that activities are conducted in a safe manner and that support is given to vulnerable groups. The municipality further states that green areas must be preserved and developed to improve shade, water retention and rainwater infiltration. For private properties, risk mitigation measures such as installing check valves in floor drains, diverting rainwater and reinforcing shorelines can protect against flooding. In road maintenance, which is handled by the Swedish Transport Administration, the municipality, communities and individual road owners, the municipality emphasizes simpler measures such as cleaning ditches, upsizing road drums and stormwater facilities effective to reduce the risk of damage to the roads.

### *Penitential church*

Botkyrka municipality's climate and vulnerability analysis identifies that the most serious consequences for Botkyrka are primarily linked to **floods**, which is caused by heavy rainfall and high water levels in lakes and streams.<sup>69</sup> In addition to flooding, the analysis has also highlighted serious risks associated with **heat waves**, **high temperatures** and **rising water temperaturer**, all of which can have a significant impact on the municipality and its residents.

In its master plan, Botkyrka municipality takes into account increased climate-related risks such as floods, high water levels, landslides and landslides. To minimize these risks, the municipality specifies safety distances for new buildings: at least 3 meters above the mean water level of the Baltic Sea, 2 meters above the mean water level of Lake Mälaren for general buildings and at least 3 meters for important social functions at Lake Mälaren. Furthermore, technical protection solutions, such as the construction of dikes, are planned in places where this is economically justifiable. The municipality has also identified areas with soil stability problems that require detailed investigations in the event of a possible change in land use. Climate adaptation also includes energy efficiency and climate-smart building techniques. Botkyrka encourages construction with environmentally friendly materials and

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<https://www.botkyrka.se/download/18.155401b818b654f51eba6f6/1698401483748/Risk-%20och%20s%C3%A4kerhetsanalys%20Botkyrka%20kommun%202023-2026.pdf>

integrates the need for shading, especially for facades with large windows, to reduce heat load and improve living comfort in a warmer climate.<sup>70</sup>

### *Ekerö*

Ekerö municipality writes in its overview plan about the importance of stormwater for the built-up and water environment, as well as the risk of **flood** which is reinforced by climate change, through an upcoming stormwater strategy. The municipality wants to delay stormwater to enable purification before it is released into larger watercourses. On the property owners' land, they are asked to manage stormwater through local infiltration on the property. Primarily, open stormwater solutions are recommended to reduce vulnerability to climate change.<sup>71</sup> Ekerö municipality further notes in its planning strategy that the existing master plan needs to be supplemented with new guidelines to ensure environmental quality standards for water, protect water resources, and manage sewage and stormwater in accordance with the recently adopted water service plan.<sup>72</sup>

### *Sollentuna*

Sollentuna Municipality writes in its Overview Plan *Sollentuna 2040* (adopted in 2022) that a large part of the existing buildings and infrastructure is already exposed to **flood risk at downpour**, and that climate change will increase this risk. The municipality also highlights the risks with **landslides and landslides**.<sup>73</sup> Intense, short-lived rains overload the mains, especially in densely built-up areas, leading to flooding, while longer, less intense rains are generally better managed. In order to manage the risks of new construction, it must be ensured that the flood risk neither upstream nor downstream increases as a result of exploitation, and existing risk areas can be remedied in connection with the exploitation. Measures must be prioritized in areas with a lot of hardened ground and where the risk of flooding is high.

Sollentuna municipality identifies a potential increase in the risk of landslides in areas with already unsatisfactory stability, as a result of climate change. To be able to determine the extent, however, more detailed investigations are required. There are comprehensive stability maps that point out areas of caution, where further assessments may be needed. The municipality has also, within its ecosystem service mapping, made a general assessment of erosion problems linked to watercourses.

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<https://www.botkyrka.se/download/18.6460a04e16e59225b3d5e169/1574938051878/%C3%B6versiktplan.pdf>

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<https://www.ekero.se/download/18.d9ec095172e6db9637c8626/1600154669156/%C3%96versiktsplan%20Eker%C3%B6%20del%202%20markanv%C3%A4ndning.pdf>

<sup>72</sup>

<https://www.ekero.se/download/18.67e5706b19108351b4bc7c4e/1723788596875/Planeringsstrategi%20Eker%C3%B6%202024.pdf>

<sup>73</sup>

<https://www.sollentuna.se/globalassets/bygga-bo-och-miljo/oversiktsplan/oversiktsplan-for-sollentuna-med-sikte-pa-2040.pdf>



The master plan also provides guidelines for climate adaptation that emphasize the importance of taking climate change into account when planning and developing land and water. Flood risks from rising sea levels, increased flows in waterways and lakes, as well as intense downpours must be managed, and buildings and infrastructure must be adapted to potential increases in water levels and rainfall caused by climate change. In areas where evacuation is difficult in the event of flooding, the accessibility of emergency services and other blue light operators must be prioritized to ensure safety and security.

### *Huddinge*

Huddinge municipality describes on its web pages about the Overview plan measures to reduce climate risks through both planning and specific adaptation efforts. The focus is on ensuring that new buildings are placed in a way that minimizes the risk of **flood, landslides and landslides**. The municipality also emphasizes the importance of preserving green areas and creating more places with natural drainage to deal with increasing amounts of rainfall. The climate adaptation strategy also includes preparedness for **heat waves** by ensuring access to shade and cool environments in urban areas. The municipality works to integrate climate adaptation in its long-term planning and has specific goals to ensure sustainable water resources and protect sensitive ecosystems.

Huddinge municipality's climate and vulnerability analysis maps climate risks such as floods, torrential rains, landslides, landslides and heat waves. The analysis identifies specific areas of risk and suggests measures for buildings, infrastructure, communication and health. The biggest risk is flooding from heavy rains and rising flows in waterways, especially in densely built-up areas where hard surfaces worsen runoff. The municipality's rainfall mapping helps to identify areas that are threatened by, for example, a 100-year rain, where solutions such as parks and green areas can be used as flood areas.

To deal with heat waves, the municipality has carried out a heat mapping which shows that vegetation such as trees and bushes can reduce temperatures in urban areas, which counteracts local heat islands. This is particularly important to protect residents at high temperatures. In the case of new construction, even in areas at risk of flooding, it is central to plan to manage these risks. The municipality highlights the need for in-depth studies to understand flood and torrential risks and to ensure that vital functions such as schools, transport and healthcare are protected. The municipality also writes that coordination with neighboring municipalities is necessary to manage flood risks that extend across municipal borders.