Faculty of Geosciences

M.Sc. Spatial Planning

Master's Thesis

Bridging the Gap Between Healthy Cities and Climate Adaptation Governance

Barriers and Opportunities of Integrated Policymaking in European Municipalities

Luca Gediehn

Student number: 6536425

Email: a.l.gediehn@students.uu.nl

Supervisor: Dr. Patrick Witte

Utrecht, 16 June 2020

Table of Contents

Acknowledgments

As this thesis remarks not only the final piece of my master´s degree, but also the end of my student time, I would like to mention and thank a couple of people that helped me along the way in many different ways.

First of all, thanks to Dr. Patrick Witte for supervising my thesis, for all the patience and valuable feedback during many meetings, face to face and via skype. I always left our meetings with new motivation and ideas – thanks a lot Patrick, it was a massive help! A huge thank you also to my wonderful internship supervisor Dr. Miriam Weber from Gemeente Utrecht for a great internship experience, long and inspiring talks at the coffee bar and especially for sharing your enormous network of people from all over Europe with me – this research for sure wouldn´t have been possible without all those interesting contacts that I got thanks to you! I hope we can keep up our coffee moments that we used to call `weekly chats´, even though they might not be weekly and not at the wonderful Stadskantoor anymore…

Furthermore, thanks to all my interview partners from Utrecht, Cork and Kuopio for taking the time, sharing their insights and enabling me to conduct this international research. Not to miss out, thanks to all my other internship colleagues at Gemeente Utrecht for making me feel very welcome in the team and especially for teaching me Dutch during our lunch breaks which made me leave my internship knowing a new foreign language and even enabled me to conduct an interview for my thesis in Dutch. Moreover, thanks a lot for inspiration, help, feedback and mental support to Nienke Buikema, Georg Linzen and Jenny Göbel!

And finally, a massive thank you to my parents for their trust and continuous support all the way throughout my studies, for supporting me with going abroad and always welcoming me back home – I´m very grateful!

Abbreviations

CARO	Climate Action Regional Office
CPI	Climate policy integration
e.g.	Example given
EPA	Environment Protection Agency
EPI	Environment policy integration
et al.	et alia (lat.): „and others"
HiAP	Health in all policies
ibid	ibidem (lat.): „in the same place"
pers. com.	personal communication
RIVM	Rijksinstituut voor Volksgezondheid en Milieu (National Institut for Public Health and the Environment)
SDGs	Sustainable Developement Goals
UN	United Nations
URGENCHE	Urban Production of Greenhouse Gas Emissions in China and Europe
WHO	World Health Organization

Abstract

The debate about healthy cities is facing new challenges in recent years due to the increasing effects of climate change on public health. This is especially the case in cities where the urban heat island effect is reinforcing heat stress on people. Most cities in Europe are therefore developing policies that aim at adapting to those effects to make sure urban areas remain places of good liveability. As good public health and wellbeing is an important part of the liveability of cities, health experts and the World Health Organization came up with an approach that aims at integrating their needs into local policies of other sectors. The health in all policies approach is important for the development of climate adaptation strategies as it presents a possibility to tackle wicked problems like the health effects of climate change in a broad and holistic approach. While previous research has mostly dealt with climate change and public health separately, integrated policies can make a contribution to a more sustainable way of policymaking. Spatial planners can play an important role in this debate due to their long-standing tradition in interdisciplinary working and finding integrated solutions. The aim of this work is therefore to bridge the gap between the healthy cities debate and urban climate adaptation by looking at integrated policymaking from a planning perspective.

This comparative case study takes a look at the three European cities Cork, Utrecht and Kuopio and their local actions towards integrated policymaking. While focusing on local actions, the wider multilevel governance background that the cities are embedded in will also be considered. Empirical research will be done by applying a framework that consists of five governance dimensions that are of importance for the integration of health issues into local climate adaptation policies. Furthermore, an already existing model by Storm et al. (2014) will be used to measure the maturity of the health in all policies approach. This maturity model can help to identify barriers but also enables to detect opportunities that can be of use for other cities that want to develop integrated policies themselves. An empirical data collection consisting of policy papers and interviews with policymakers will be used for evaluation with the developed conceptual framework.

The findings show that at this point all three cities are at very different points of developing integrated policies. A lack of awareness for the topic, financial issues, unclear distribution of responsibilities and a lack of political support are identified as the most common barriers. On the other hand, a broad definition of health, intersectoral working groups and the use of informal networks can offer some great opportunities for integrated policymaking. This work concludes that more research with an integrated perspective is necessary and furthermore claims for a better knowledge exchange at international level.

1. Introduction

The summers of 2018 and 2019 have given Europe an example of the consequences that climate change can have on people´s life. The average temperature throughout the year was the highest since the beginning of recordings in the late 19th century, massive wildfires occurred even as far north as Sweden, flood events affected several European regions and a shortage of drinking water had an impact on people as well as animals and resulted in harvest failure (Mücke and Straff, 2019, p. 535). Followed by an extremely mild winter 2019/2020 causing floods and high water levels of rivers, this can be expected to be the beginning of a permanent change of weather conditions and climate worldwide. All these consequences have given evidence once again that man-made climate change is not a problem in the distant future anymore and acting on it is very urgent. At this point, we do not only need to reduce and mitigate the effects of climate change, but we also have to adapt to impacts of climate change that are already unavoidable to make our living environment less vulnerable and more resilient. The Intergovernmental Panel on Climate Change (IPCC) defines climate adaptation as

> *"the process of adjustment to actual or expected climate and its effects"* (Kendrovski and Schmoll, 2019, p. 541).

Ebi and Semenza (2008) refer to climate adaptation as

> *"the process of designing, implementing, monitoring and evaluating strategies, policies and measures intended to reduce climate change related impacts and to take advantage of opportunities"* (p. 501).

By actions of adjustment, key-vulnerabilities to climate change can be reduced (Harlan and Ruddell, 2011, p. 128).

As a major part of the European population is based in cities, urban areas deserve special attention because they are particularly exposed to the consequences of climate change. The heating of concrete surfaces and the lack of green space in cities leads to the so called `urban heat island effect´ which is defined by higher average temperatures as opposed to rural areas and tropical nights of 20 degrees and more during the summer period (Helbig, 1999, p. 144). This effect is reinforced by a growing density of cities. As cities are areas not only of high density and diversity of population and buildings, but also host key-functions for larger socio-economic systems, like governments and other administrative functions, important infrastructures and educational institutions, the potential for damage in cities by the consequences of climate change is very high (Birkmann et al., 2010; Harlan and Ruddell, 2011, p. 126). Kendrovski and Schmoll (2019) state, that by the end of the 21st century, two thirds of Europeans could be exposed to weather-related disasters every year, compared with only

5% during the period between 1981 and 2010. While buildings and urban infrastructure are mainly vulnerable to storms and flooding, heat-stress has a considerable impact on people's health, as the human body has limited possibilities to adapt to high temperatures. The World Health Organization (WHO) states that

> *"these health effects range from loss of well-being and productivity to disease and death"* (WHO 2019a, p. 2).

In 2017, the WHO Regional Office for Europe declared that the effects of climate change on health will become one of the most challenging threats populations will face in the upcoming decades and therefore need to be tackled urgently (WHO, 2017, p. 1). In fact, many researchers state that climate change can be seen as the biggest global health challenge of the 21st century (Rudolph et al., 2013, p. 52). The importance and urgency of this topic is also reflected in many international guidelines like the 2030 Agenda for Sustainable Development with its 17 Sustainable Development Goals (SDGs) which has been initiated by the United Nations in 2017. The importance of the topics health and climate change as well as their interplay become clear in this agenda and is represented by SDG 3 (good health and well-being) and SDG 13 (climate action) as demonstrated by figure 1 below. Those two goals have a very close connection as stated by the WHO:

> *"SDG 13 (climate action) has a significant health dimension, as its implementation will ensure that current and future climate change mitigation and adaptation measures, policies and strategies integrate health issues at all levels"* (WHO, 2017, p. 2).

Furthermore, the SDGs highlight the role of the health sector for sustainable development and their function as a key-driver for climate action by taking an active role in awareness-raising, advocacy and strengthening the evidence base on the health impacts of climate change (Kendrovski and Schmoll, 2019, p. 541).
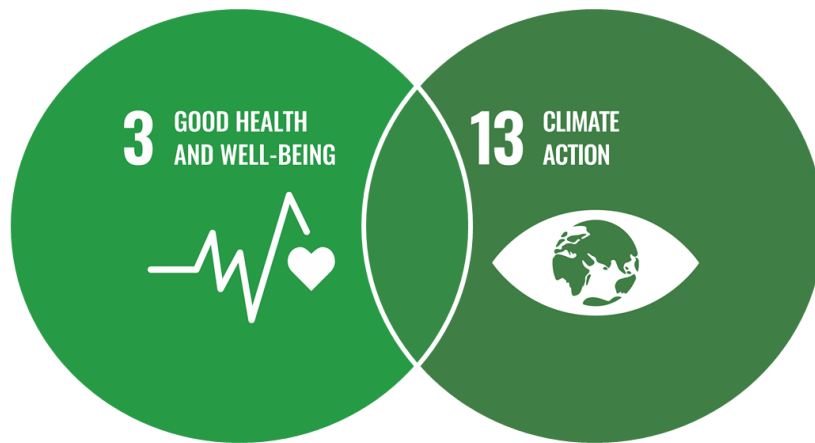
With their main vision of `healthier and happier cities for all´ the WHO Copenhagen Consensus of Mayors, agreed on in 2018, serves as another important international guideline that has an impact on the future development of policies concerned with climate change. It acknowledges the power of cities as important stakeholders and claims that

> *"healthy cities can act as leaders and partners in tackling our global public health challenges, including [...] environmental challenges [...]"* (WHO, 2018, p. 3).

These goals and challenges have a major impact on current and future urban governance. Furthermore, the public health sector gets a new leading role for policymaking in the fields of climate change and adaptation and asks for a collaboration with different stakeholders across all sectors and levels of governance. The concept of integrating issues of health into policies of all sectors gained more and more popularity in recent years and could be one way to bring health more in the focal point of spatial development. From a planning perspective, health experts can be seen as a new important stakeholders that have to be taken into account in urban governance processes like policymaking for climate adaptation. As new stakeholders bring new focal points of interest into the debate, this might lead to new challenges of intersectoral collaborations and priority setting in policymaking as opposed to previous routines. Reflecting on this new role of the health sector in urban governance processes and policymaking and the patterns of integrating their aims into other policies can help planners to identify typical barriers and challenges of integrated policymaking and might help to improve those in the future. Those barriers and challenges as well as opportunities shall therefore be the focal point of this thesis.

1.1 Research gap/ relevance of this research

The introduction showed that the consideration of health issues when dealing with the effects of climate change has become increasingly important in recent years. While there are a lot of publications already that aim to facilitate the 17 individual UN Sustainable Development Goals, many researchers and practitioners (e.g. Nerini et al., 2019) claim that wider and deeper interdisciplinary collaboration is required to maximize the effectiveness of actions in all domains of the SDGs (Nerini et al., 2019, p. 674). In scientific literature as well as in the practice of urban governance, a lack of an integrated perspective has to be acknowledged when dealing with the topic of health and climate change. Integrated policymaking is therefore an approach that has potential to bridge this gap and could be of increasing importance for European municipalities in the upcoming years. Mickwitz et al. (2009) state that spatial planning can be a useful instrument to provide integrated responses at a local level and can help to coordinate and combine sectoral policies more effectively (Mickwitz et al., 2009, p. 58). Therefore, this work aims to have a focus on the governance of the interplay, interdependencies and synergies of the SDGs 3 (health and well-being) and 13 (climate action) and claims for a closer collaboration between them. The following two paragraphs will explain the societal relevance of this study as well as the contribution to the existing scientific literature.

Societal Relevance

Due to the great diversity that Europe has in terms of geographical location, local climate, socioeconomic status, demographic change, national politics, laws and many more, every city is facing different challenges in the context of climate change and every city has a different approach to deal with that. Several cities that are members of the WHO 'Healthy Cities Network' (HCN) have dedicated themselves to specifically address health issues in their climate adaptation strategies. The integrated perspective they are aiming for has often been lacking in urban governance approaches in the past. However, governing the combination of health and climate adaptation in integrated policies is of growing importance and contributes to a closer collaboration of the SDGs 3 and 13. Spatial planners can play an important and supportive role in this transformation process due to their long-lasting tradition of interdisciplinary thinking and developing integrated solutions. However, since the field is relatively new, many European cities have not started or are struggling to develop a climate adaptation strategy that explicitly considers health as a core topic. By analysing the governance of integrating the topics health and climate adaptation in three different case study cities from a spatial planning perspective, this study can make a contribution to help municipalities in Europe to learn from each other by exchanging knowledge and experiences. Hereby, the importance of contextualisation due to the different preconditions of cities has to

be acknowledge. Therefore, contextualisation be considered in this study by choosing three case study examples and looking at the specific preconditions and circumstances they are operating in.

As the three case study cities of this research are currently all at a different stage of developing their policy, analysing processes of the development of integrated policies will be of major interest for this study, rather than solely looking at the outcomes of the policy documents. This approach enables the research to detect barriers, challenges and opportunities at all stages of policy development and can be supportive for those municipalities that do not yet have an integrated policy or are still in the process of developing one.

Scientific Relevance

For a long time, there has not only been a lack of integrated approaches in the practice of policymaking, but also a lack of research that aims at analysing integrated governance approaches. This study contributes to overcome this gap by focussing on the interplay of SDGs and their associated policies and by doing analysis in the field of integrated policymaking. The concept of mainstreaming climate actions by integrating their aims into other policy domains has become a more and more common practice in recent years (e.g. Uittenbroek, 2014). This work takes a different approach by putting a focus on the health perspective to find out how health can be mainstreamed into other policy domains, in particular policies on climate change adaptation. Taking this approach makes use of the powerful position that the health sector has due to a high level of trust and respect that they gain (WHO, 2020b, p. 24). This powerful position enables the health sector to step into other domains by raising awareness and providing evidence of the health impacts of climate change and thereby contribute to a more sustainable way of policymaking. To emphasize the added value of taking an integrated perspective in policymaking, it is useful to measure the level of integration of health issues into climate adaptation policies and thereby make different cities comparable to each other. Maturity models are useful tools to differentiate between different stages of policy integration. Storm et al. (2014) provide a maturity model that specifically aims at measuring the integration of health issues into other policies (see chapter 2.3.5). This research contributes to the existing literature by applying the model of Storm et al. (2014) to the three case study cities and measuring how they have integrated health issues specifically into their climate adaptation policies. Besides making the three case studies more comparable, the level of maturity helps to give an insight which institutional barriers hinder the maturity of policy integration and which opportunities can lead to an improved maturity level of integrated policies.

Furthermore, it can be seen that most guidelines and projects addressing health and climate change adaptation so far are operating mainly at an (inter-) national level of governance. However, as mentioned earlier in this work, as well as declared by the Local Agenda 21 and many other researchers on multilevel- and multi-sectoral governance (e.g. Mickwitz et al., 2009), the role of local authorities is of major importance in this issue. Municipalities can be seen as key-stakeholders due to the more direct influence they have when it comes to the integration of health into climate adaptation policies. Therefore, this thesis aims to bridge that gap by putting its main focus on local actions.

Therefore, this work presents a contribution to existing scientific studies and literature on the topic of governing public health and climate adaptation in integrated policymaking. Furthermore, it serves as a help for European cities to develop their own integrated policies by providing insights into possible barriers and opportunities from other municipalities.

1.2 Research aim and research questions

The purpose of this comparative case study is to identify challenges when integrating health issues into urban climate adaptation policies as well as to explore promising practice examples in the European cities Utrecht, Cork and Kuopio in order to overcome those barriers and act as promising practice examples for other cities.

The main research question this thesis will follow is therefore

"**What barriers are the cities Utrecht, Cork and Kuopio facing when integrating health issues into climate adaptation policies and which opportunities can they offer for other European municipalities?**".

The research will be guided by six sub-questions that are supposed to help answering this main question in a structured and logical way:

- How is the mainstreaming of health issues promoted in the case study cities Utrecht, Cork and Kuopio?

- How are their intersectoral partnerships structured to link health issues and urban climate adaptation?

- How are the local actions embedded within a wider multilevel- governance context?

- What are the main institutional barriers when bridging health and climate adaptation in an integrated policy approach?

- How is the health in all policies approach implemented?

- What opportunities are there to overcome the current barriers and challenges in the future?

1.3 Outline of the thesis

Chapter two of this work will start off with a literature review that contains some general policy background information about specific impacts of climate change on human health and the health in all policies approach. In the end of that chapter, a conceptual framework for the research of this work will be developed by diving deeper into the issues of integrated policymaking: mainstreaming health promotion, intersectoral collaborations, multilevel governance issues, institutional barriers and the measurement of maturity of health in all policies (see chapter 2.3). The research project will be an explorative case study which compares three European cities and their approach to integrate health issues into their climate adaptation strategies. The specific methods for this project, including the research design, case selection, data collection and processing will be explained in chapter three. Chapter four will then present the outcomes and results of the research. Chapter five will discuss the results and answer the research questions before coming to a conclusion in chapter six.

2. Literature review: understanding and evaluating healthy policymaking

In order two answer the research question (and its sub-questions) that have been developed in the previous chapter, it is important to get a deeper understanding of current challenges that climate change causes for the healthy cities debate and the changes that emerge for policymaking in these fields. This will be done by discussing healthy cities in times of climate change based on existing literature (chapter 2.1) before introducing the health in all policies approach (chapter 2.2). Chapter 2.3 and its sub-chapters will dive into the possibilities of measuring the health in all policies approach by developing a conceptual framework that will be used for the evaluation of the empirical research of this study later on. The measurement of health in all policies will mainly be done with the help of an existing maturity model by Storm et al. (2014) and four different urban governance debates that are of importance for the evaluation of integrated policymaking in the fields of public health and urban climate adaptation.

2.1 Healthy Cities in times of climate change

This paragraph will start off with a brief introduction of the (historical) evolvement of the healthy cities debate and its relevance for urban planning. In addition, the increasing challenges healthy cities are facing due to the effects of climate change will be explained.

Healthy cities – the evolution of a field for urban planners

The fields of public health and urban planning share a long history of collaboration. In fact, the initial task of urban planning was to improve the health of the people back in the days when sanitary facilities were rare and a lack of hygiene lead to poor living conditions, diseases and epidemics in cities (Baumeister et al., 2016, p. 34). By restructuring these cities systematically, inventing canalised water systems and other new technologies, planners have improved the living conditions and public health of cities. Since the size and density of cities increased, topics like a growing and ageing population, loneliness, negative mental health, environmental inequality and lack of physical activity have become an issue in urban areas. Those developments have raised the awareness of planners and municipalities have given health issues a higher priority on the agenda of planners in recent years (Barton and Grant, 2006; Flynn, 1996).

The definition of health has changed over time from the sole absence of illness and disease towards a much broader view of health as a

"*state of complete physical, mental and social well-being*" (WHO, 2020a).

This shift in terminology also caused a shift of tasks for urban planners to support the idea of healthy cities. Nowadays `healthy cities´ can be defined by

"*a living environment where the pressure on the environment and health is as low as possible, which is experienced as pleasant and leads to healthy behaviour*" (Rijksinstituut voor Volksgezondheid en Milieu , n.d.).

Slesina (2001) defines a healthy city by its characteristic to

"*continuously improve the physical and social living environment and support community actions*" (Slesina, 2001, p.48 (quote translated from German)).

The aim of a healthy city is not only to reduce negative health impacts, but also to make healthy choices easy in the everyday life of people. Nowadays, planners have the power to influence the land-use, infrastructure, open spaces, public transport and green spaces and thereby improve the health of people and the liveability of urban spaces. This is of fundamental

importance since the effects of climate change have a considerable impact on public health in cities.

Impacts of climate change on healthy cities

Extreme weather events will increase in frequency and intensity in the future and therefore pose growing risks to human health (Kendrovski and Schmoll, 2019, p. 537; Harlan and Rudell, 2011, p. 127). As climate change and its impacts recognise no borders, everybody will be affected. (WHO 2017, p. 1) However, the vulnerability of people depends on the level of exposure and personal characteristics, such as age, education, income and health status as well as on their access to health services (Kendrovski and Schmoll 2019, p. 537). Elderly people, young children, poor people, socially isolated and marginalised communities, ethnic minorities and people with pre-existing illnesses can be defined as especially vulnerable groups of society when exposed to the effects of climate change (Harlan and Ruddell, 2011, p. 128; Watts et al., 2018).

The impact that climate change has on human health can be distinguished into direct and indirect effects. Some of them are particular phenomena of urban areas while others can equally occur in rural areas. Urban populations are at risk of multiple exposures to climate change, from which heat stress and air pollution have the most **direct effects** on health by increasing morbidity and mortality and reinforcing cardiovascular diseases (Harlan and Ruddell, 2011, p. 127; Kendrovski and Schmoll, 2019, p. 538). The heatwave during the summer of 2003 claimed more than 70.000 lives in Europe, mainly in Western European countries (Kendrovski and Schmoll, 2019, p. 538). At the same time, bad air-quality can cause respiratory illnesses, particularly in urban areas, where CO_2 emissions are high and fresh air corridors are lacking (WHO, 2017, p. 2). The largest effects of an aggravated air quality will be experienced in northern mid-latitude cities during high pollution episodes (Harlan and Ruddell, 2011, p. 127). Furthermore, **indirect impacts** on health can be observed by the impacts that climate change has on environmental conditions and social infrastructure. Increasing temperatures have made many plants and animals shift their geographical ranges and seasonal activities. For humans, these shifts can increase the incidence of pollen allergies and vector-borne diseases in Europe (WHO, 2017, p. 2). Infectious diseases that are currently limited by low-temperature boundaries might change their geographical boundaries and expand to northern European regions like Scandinavia (ibid.). Another indirect impact of climate change on health is the effect it has on food security. Mediterranean and eastern European regions are likely to experience significant losses in agricultural food production due to increasing temperatures and droughts (WHO, 2017, p. 3). Reduced crop yields can lead to increased prices of agricultural products and food insecurity, especially for poorer parts of the population (ibid.). Furthermore, it might cause land-use conflicts and migration. For children,

who count as a particularly vulnerable group of society as well, climate related hazards can have an impact on their physiological and cognitive development. In addition, effects of climate change can have a negative influence on the European economy due to a loss of productivity which is rooted in a decrease of overall health and well-being (Kendrovski and Schmoll, 2019, p. 537). Moreover, increasing rates of illness and deaths generate large costs for the public health sector which could be reduced by improving health and well-being from the beginning (Harlan and Ruddell, 2011, p. 127).

All these consequences make it necessary and urgent to take climate-specific action in order to protect the health of people and the planet (WHO, 2017, p. 1). This is particularly necessary in urban areas where the effects usually have an even higher intensity. Figure 5 below by Kendrovski and Schmoll (2019) provides a good overview of the main effects of climate change on public health as well as possible interventions.
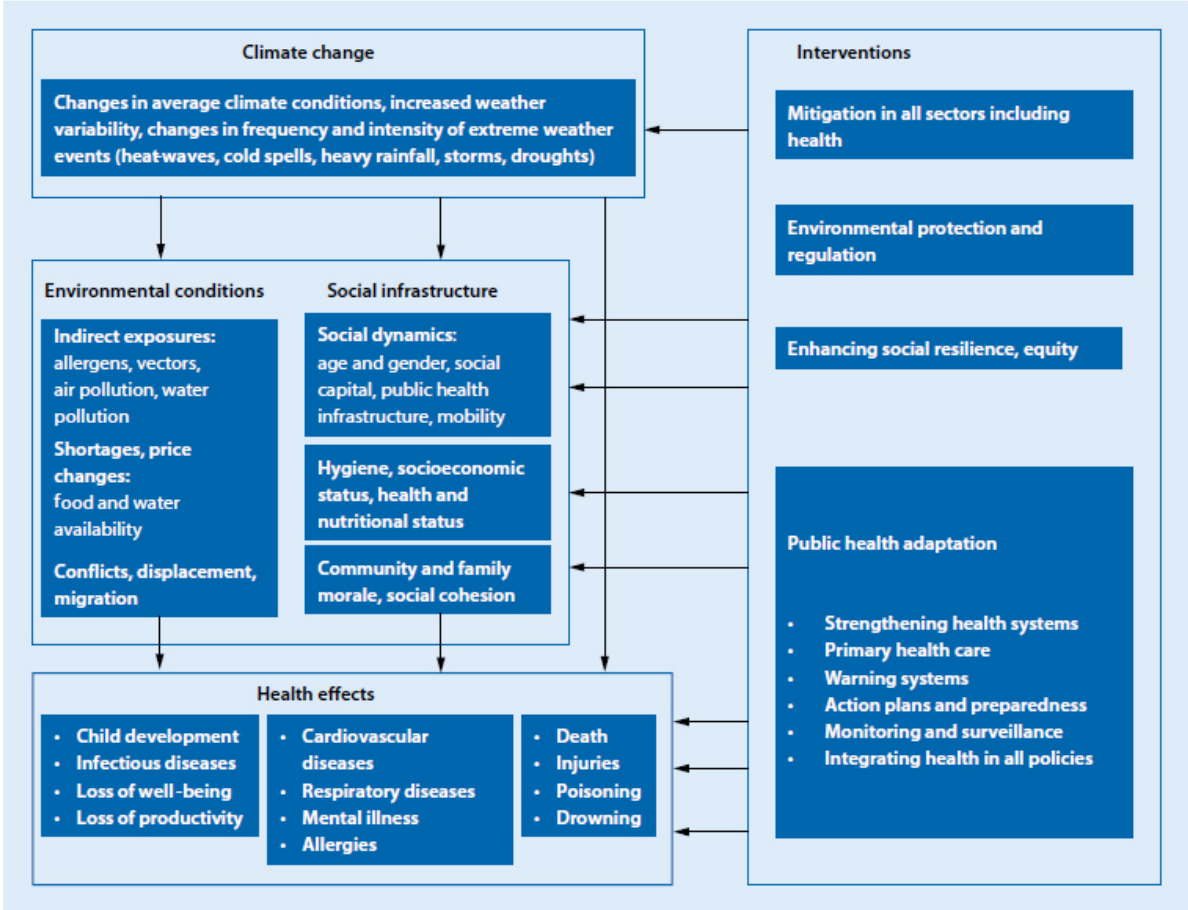
Figure 2: Effects of climate change on public health (Kendrovski and Schmoll, 2019)

The figure shows that public health adaptation to the effects of climate change can be done in many ways. On the one hand by direct action of the public health sector, on the other hand by actions of other sectors addressing climate change that have health co-benefits. This gives prove for the need of a close collaboration between the different sectors. Integrated

policymaking can be a very useful tool for that. A concept that has gained a lot of attention in the last couple of years is the health in all policies approach (HiAP) where health issues are being integrated into policies of other sectors. The following paragraph will provide a more detailed overview of this approach.

2.2 Health in all policies approach

As good health and well-being is influenced by many factors from the social, environmental and economic surroundings, an integrated approach is needed in order to achieve improved health outcomes in the long run (Rudolph et al., 2013, p. 5). Experiences in the past have shown, that the specialization of policies for specific sectors tend to result in a lack of consideration of impacts from other sectors and domains (Runhaar, Driessen and Uittenbroek, 2014, p. 133; Lafferty and Hovden, 2003). Therefore, a collaborative, intersectoral approach is needed, that involves actors and stakeholders from many different sectors and policy areas. On the one hand, such an approach can help to achieve a common goal, like improved health outcomes, by sharing resources and costs between departments in a more efficient way, promote innovation mutually and reduce redundancies (Rudolph et al., 2013, p. 7; Runhaar, Driessen and Uittenbroek, 2014, p. 134; Stead and Meijers, 2009; Brouwer, Rayner and Huitema, 2013). On the other hand, it can create co-benefits for each of the stakeholders involved in the process and help them to advance their own goals at the same time (Rudolph et al., 2013, p. 6).

From policy integration towards health in all policies

The idea of jointly working on a specific topic by integrating its needs into policies across different sectors and different levels of governance is called policy integration (Lafferty and Hovden, 2003, p. 3). In the field of environmental policies, the practice of Environmental Policy Integration (EPI) and Climate Policy Integration (CPI) have been discussed and implemented a lot in recent years. Lately, the topic of improved public health has increasingly been put on the agendas of sectors addressing climate change (Kendrovski and Schmoll, 2019, p. 540). The 2018 WHO Copenhagen Consensus of Mayors states that the health of people and the planet should be prioritised in spatial development by considering health issues in policies of various sectors (WHO, 2018b, p. 3). The Consensus commits to strengthen the **health in all policies** (HiAP) approach which, just as EPI and CPI, wants to institutionalise health and make sure that diverse governmental partners and stakeholders are aware of health issues and collaborate in order to commonly achieve improved health outcomes (WHO, 2018, p. 6; Rudolph et al., 2013, p. 6). Storm et al. (2014) define HiAP by stating that

"an important characteristic is that HiAP is a policy in which the relevant municipal sectors collaborate on the shared aim of promoting and protecting health" (Storm et al, 2014, p. 184).

Whole of government approaches

Approaches of policy integration, like HiAP, EPI or CPI are called whole of government approaches as they build on a trans-disciplinary and intersectoral way of working which includes (in the best case scenario) all governmental departments. Whole of government approaches are especially useful to address wicked problems like climate change or improved public health because their complexity makes it necessary to involve many stakeholders in order to tackle them. While climate change is publicly already quite acknowledged to be one of the wicked problems of the 21st century and EPI is therefore a very common practice, the implementation of the HiAP approach is still in the process of development and has gained relatively little attention in comparison to EPI. However, as the effects of climate change on human health are considerably big, climate adaptation strategies can make a contribution by applying the HIAP approach and considering health issues from the beginning when strategies and policies are being developed. For many people, this new approach of institutionalising health by the practice of integrated policies asks for a shift in mindset and in the way governments function (Rudolph et al., 2013, p. 62). The institutionalisation from an early stage is especially important for the long term impact and to secure stability as it makes health more resilient to changes of leaders, funding sources and political priorities in the future and makes sure health will remain considered as a central topic (ibid.). Hereby, it is important that the health sector takes the initiative in encouraging other sectors and stakeholders to consider health as an important factor in their work. According to Watts et al. (2018) the health sector can and should take a leading role in the development of climate adaptation strategies and efforts of resilience towards climate change.

After this introduction of the health in all policies approach, the following chapter will develop a method to measure the achievement of HiAP. This method will serve ass a conceptual framework which will be used for the evaluation of the empirical case studies of this work later on. It is based on an existing maturity model that has been developed by Storm et al. (2013) which will be explained in more detail in the following chapter.

2.3 Measuring health in all policies: towards a conceptual framework

The following sections will explain five dimensions that have to be taken into account when analysing the integration of health issues into climate action policies from a planning perspective (see figure 6 below). These dimensions are important factors that determine urban

governance and policy development at a local level and have been chosen because they are directly linked to the research questions of this study and can help to answer them.
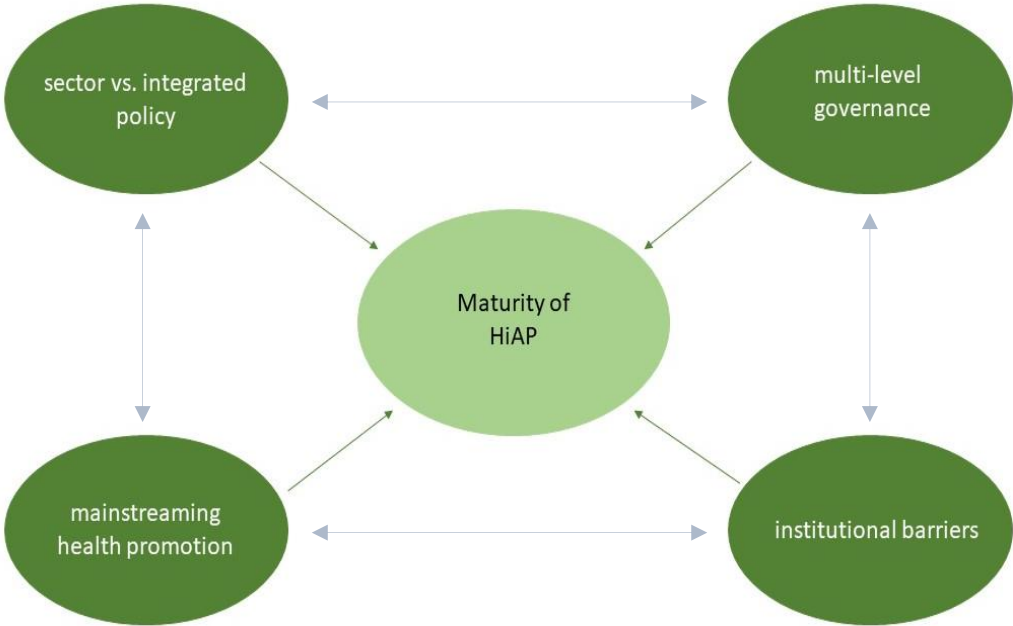
Figure 3: Dimensions of the integration of health issues into climate action policies (own figure)

While the four dimensions in the corners are typical dimensions for research in the field of governance, the fifth dimension in the middle has been added to put a special focus on health actions in the research framework. It measures the maturity of the health in all policies approach. The maturity of HiAP can be seen as an addition to the other four dimensions as it is based on and influenced by them. Besides influencing the maturity of HiAP, the four dimensions in the corners are often closely connected to each other which is demonstrated by the arrows in the figure. Those five dimensions will serve as a framework for the analysis of the local actions in the three case study cities and will be explained in more detail in the following five sub-chapters. At the end of this chapter, this figure will be complemented by the main characteristics of the five dimensions to make the framework more consistent and transparent for the following analysis of the case studies.

2.3.1 Mainstreaming Health Promotion

The academic discourse about mainstreaming climate change into a wide range of policies can be seen as a big step into a new direction of integrated policymaking. However, while negative health outcomes of climate are equally interconnected to other policy domains and the development of integrated policies would be of major importance, the `mainstreaming

of health issues´ into other policy domains has been discussed a lot less. Derham (2017) quotes that the reason why we are trying to tackle climate change is because

"we are not trying to save the planet, we are trying to save ourselves".

Having that in mind, it seems paradox that health issues are rarely integrated into climate adaptation strategies yet, because health is one of the topics people are most concerned about.

As mainstreaming is associated with gaining more attention and priority for certain issues in the development process of policies, the promotion of health issues across sectors can be seen as a crucial pre-step for policymaking. Based on that it is possible to integrate health issues into climate adaptation (and other) policies and to follow the health in all policies approach.

The topic of health promotion came up in academic literature in the last decade and can be described as a *"soft field"* of action as it includes a variety of methods, like participatory approaches, community development strategies, and many more (Jackson, 2011, p. 3). Thereby, health promotion has the potential to contribute to effective solutions of complex problems like climate change, promote intersectoral collaborations and make a step towards a more sustainable development by building healthy public policies. While health promotion is so far mainly taking place through international actions initiated by the WHO or the UN, health promotion is most effective when taking place at a local level where such holistic approaches can have the most direct impact on communities and individuals (Jackson, 2011; Kumar and Preetha, 2012).

Despite many benefits the approach of mainstreaming health promotion can have, there are some challenges and pitfalls that have to be considered. While the diversity of actions and methods of health promotion can be seen as a strength, it can be seen as a liability at the same time. It is a very broad concept which is lacking a clear theoretical base and can therefore include many different methods (Jackson, 2011, p. 3). Mainstreaming health promotion can furthermore carry the risk of weakening organisational capacities of municipalities as there is an extended need for personal and financial resources and it might result in unclear distribution of responsibilities between stakeholders (Jackson, 2011, p. 4).

In order to benefit from the strengths of health promotion it will be of interest to compare the approaches the three different case study cities take to promote health towards other sectors. Looking at their different methods and actions will be helpful to explain how health issues can be brought more into the focus of policy makers dealing with climate adaptation.

2.3.2 sector vs. integrated policy approach/ intersectoral collaborations

> "*The field of climate change adaptation and global health bring with it new challenges which necessitate approaches that consider […] broader elements*" (Bowen et al., 2013, p. 5).

In order to tackle wicked problems and complex issues like climate change, multisectoral systems and cross-scale networks are necessary to link the different actors and organisations involved when developing new policies (Bowen et al., 2013, p. 2). Therefore, a shift from sector-specific policies towards more multisectoral policies and systems has occurred in recent years (Bowen et al., 2013, p. 1).

Usually, policies that are in place for local municipalities used to be solely developed by the departments that are specifically responsible for the particular topic the policy is dealing with. It enables actors to specialise on a certain topic, use their knowledge and expertise to develop a policy that serves the specific needs of a municipality. When the topic of climate change and the need to adapt to its effects came up, literature often assumed that governance of climate adaptation needs its own new policy domain (Uittenbrooek, 2014; Moser and Ekstrom, 2010; Grothmann and Patt, 2005). However, policies dealing with topics like climate change and health are highly dependent on intersectoral collaborations as they contain many factors that lie outside their own range of responsibilities (Bowen et al., 2013).

The concept of policy integration was first mentioned in literature by Underdahl (1980) where he defines it as the

> "*incorporation of aims [of a specific topic] into all stages of policymaking in other sectors*" (p. 19).

Related concepts that are built upon the idea of policy integration, like environmental policy integration (EPI) (e.g. Lafferty and Hovden, 2003) and mainstreaming, not only aim to gain priority for certain issues, but also to gain more attention for new challenges (like negative health outcomes of climate change) in the development of new policies (Uittenbroek, 2014, p. 17). Combining efforts of separate but thematically interwoven topics in integrated policies can increase the effectiveness of policies through shared knowledge and shared financial and human resources, raise potential for new ideas and innovations, facilitate actions, raise capacities of cities, and minimise contradictions between sectoral policies. Investing time and resources into integrated policies can therefore be seen as sustainable investments for municipalities and policy developers from a long-term perspective (Uittenbroek, 2014).

However, the integrated policy approach is still facing some issues and challenges that have to be taken into account when doing analysis. As the actors from different departments often have different goals and interests, promoting engagement with other sectors sometimes becomes difficult (Bowen and Ebi, 2015, p. 83). Furthermore overall political priorities (at local, but also at regional or national level) can be a challenge for integrated policymaking (Witte et al. 2012, p. 59) Besides some institutional barriers (which will be explained in a separate paragraph later on) integrated policies have a risk of being rather general and might lack specific actions. They attempt to serve the needs of all sectors involved rather than fostering actions that have a concrete benefit for just one of the sectors. This vagueness of integrated policies might also lead to an unclear distribution of responsibilities between stakeholders involved and hence lead to inactivity. Having a clear distribution of responsibilities is of great importance for successful integrated policymaking as inactivity of single stakeholders might hinder the actions of all other stakeholders and lead to ineffective policymaking.

Therefore, understanding intersectoral partnerships is important to improve and strengthen them as well as the policies that result from such collaborations (Bowen and Ebi, 2015, p. 80). Bowen and Ebi (2015) claim for further research in the field of understanding and analysing intersectoral networks in order to assist the integration of health into climate adaptation policies and strategies (p. 81). Bowen et al. (2013) define four governance characteristics that are of importance for intersectoral policymaking in the field of health and climate adaptation. These elements are:

- **Social networks**: defined as the capacity of collaborating on a base of trust, exchange, shared goals, norms and working groups

- **Actors beyond the state**: non-state actors have an increasing relevance in influencing environmental governance processes; by involving non-state actors (e.g. citizen initiatives) the relevance of global environmental problems for local needs can be made clear

- **Informal networks**: are important for input and the development of new ideas and the flow of information between policymakers

- **Bridging organisations**: the linkage between groups, networks and organisations across governance levels can create links between issues that are interconnected

Analysing those categories in the three case study cities can help to understand the collaborations between different departments of a municipality and the development process of integrated policies dealing with health and urban climate adaptation. While this approach takes a close look at intersectoral collaborations within a municipality, it is also important to

consider the wider context by looking at other levels of governance that the local actions are embedded in. Therefore, the next paragraph will explain typical issues and phenomena of multilevel governance systems in more detail.

2.3.3 Multilevel governance (issues)

The development of a new (integrated) policy not only involves many actors from different sectors but is also embedded in a very complex system of multiple levels of governance.

First of all, a policy that is operating on a municipal level is dependent on other sectoral local policies and the overall priority areas for action of a municipality and their political leaders. Furthermore, agreements on a provincial or county level might be of relevance for the municipal policy. In the case of climate adaptation, there are usually national strategies at state level that form the legal base and provide guidelines for the development of municipal policies. Those are usually based on the national political priorities as well as on EU laws. If health issues are supposed to be integrated into climate adaptation policies, the health system also plays an important role which is usually regulated on a national level.

And finally, there are international guidelines, networks and agreements that are not all legally binding, but ask for commitment from actors at all levels of governance. Those guidelines are for example the 17 UN Sustainable Development Goals, the WHO Ostrava agreement on environment and health, the WHO Healthy Cities Network and many more.

The different levels of governance can therefore be seen as an additional challenge for the development of integrated policies (Mickwitz et al., 2009). This is especially challenging for policies that wish to contribute to sustainable development as there are a lot of different governance levels, sectors, and actors with different goals involved that make it a very complex system (Howlett et al., 2017).

In their research about mainstreaming climate change into policymaking, Mickwitz et al. (2009) come up with a distinction between vertical and horizontal policy integration (see figure 4 below). Vertical integration refers to the integration of a topic within a specific sector on different levels of governance (local, regional, national, international) while horizontal integration refers to the integration within one level of governance, but across different sectors. However, one can never really operate solely in the vertical or horizontal dimension as they are very much interdependent.
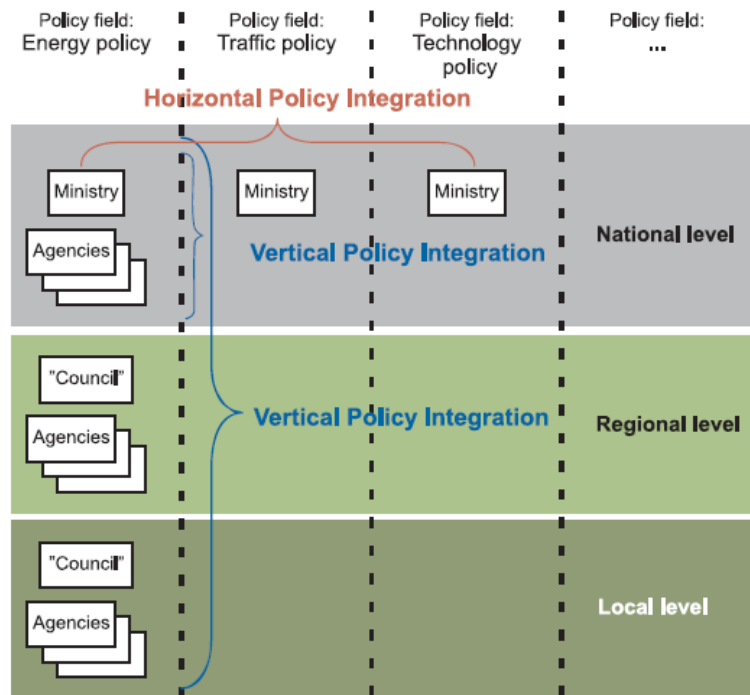
Figure 4: Vertical and horizontal policy integration (Mickwitz et al. 2009)

For the aim of this study the two sectors of health and climate adaptation and their cooperation at a local level of the three case study cities are of central importance. This is according to the principle of subsidiary which claims that action should always be taken at the lowest appropriate level of governance (Mickwitz et al., 2009, p. 25). One of the main advantages of policymaking at a local level is that the local challenges and needs towards the effects of climate change very diverse (Rudolph et al., 2013, p. 41). This applies especially to the variety and intensity of the effects of climate change on cities. Some places, especially in the southern and eastern regions of Europe, are very exposed to heat-stress and drought, while others might be more affected by the rising sea-level (e.g. The Netherlands) and again others are suffering from flooding due to heavy precipitation and the rise of water levels of rivers. Furthermore, every city has a different degree of vulnerability to the different effects of climate change. Therefore, the health outcomes from these effects are very specific to the circumstances of places and appropriate actions depend on local ecologies, economic and social development, available technologies, political capabilities, wealth, the age of the population and many more factors (Harlan and Ruddell, 2011, p. 126). Therefore, local officials have better possibilities and more capacities to adapt to climate change according to their specific needs (Keskitalo, 2010, p. 5; Naess et al. 2005). Municipalities and their planners therefore play a key-role when it comes to policy integration in the fields of health and climate adaptation. The close relationship they have with key-stakeholders and the local community can be seen as a great advantage when designing a strategy, because it enables residents to

get involved and take part in decisions that directly affect their everyday life (Rudolph et al., 2013, p. 41).

However, when analysing policy integration with the focus on health and climate change, the other sectors and levels of governance always have to be taken into account. At the vertical level, national legislations and the national health system can have a major influence on the possibilities of local policy integration. Furthermore, international guidelines like the Sustainable Development Goals or commitments towards goals of the WHO have an impact on local actions as well as local capacities and responsibilities. At the horizontal level, local policy integration is very much dependent on the collaboration between the different departments within a municipality. The following figure gives an overview of the most important factors and institutions at all levels of governance that have an impact on integrated policymaking at local level:

International level	• SDGs
	• WHO
	• EU legislations
National level	• National legislations
	• Health system
	• Political goals
	• National climate adaptation strategies
Regional level	• Interests of the provinces/ counties
Local level	• Municipalities
	• Local political goals

Figure 5: Factors and institutions that impact policymaking at different governance levels (own figure)

To sum up, multilevel governance gives the opportunity to share responsibilities, benefit from collaboration, save resources and mandate policy response to the most appropriate level (Mickwitz et al., 2009, p. 25). But at the same time, there is a risk of failure when horizontal or vertical dimensions of policy-making are not well integrated and unclear, overlapping responsibilities as well as redundancies and gaps will remain an issue in the process of developing integrated policies (Howlett et al., 2017; Mickwitz et al., 2009).

For the aim of this study, it is therefore important to have a sharp look on the different stakeholders involved in the process of integrating health issues into climate adaptation policies. The different actors within a municipality, but also components from other levels of governance can help to detect hindering factors and opportunities for local policy integration of health and climate adaptation actions.

2.3.4 Institutional barriers

In addition to the multi-sectoral and multilevel governance issues of policy integration, institutional barriers can hinder a successful integration. Barriers can occur at all levels of governance. A typical example of an institutional barrier at local level would be the identification of sources of funding and the clarification of institutional arrangements to bridge the gaps between sectors in a meaningful way (Bowen and Ebi, 2015, p. 80). Furthermore, the increasing importance of non-state stakeholders can be seen as a challenge and requires a shift in the way of collaboration. Other institutional barriers are incompetent leadership, a lack of political support, unclear distributions of responsibilities and the competition of other objectives in the policy process (Uittenbroek, 2014; van den Brink, 2009). And finally, language barriers might hinder local actions in international networks or working groups.

All those institutional barriers should be taken into account for the research of this study, especially when looking at hindering factors of policy integration.

2.3.5 Measuring policy integration: Maturity of HiAP

The last four paragraphs have pointed out different governance factors that have an impact on the success of integrating health into climate adaptation policies. In order to finally analyse this integration, it is important to find a way of measurement that makes different case study cities comparable. As the health in all policies approach (HiAP) is a relatively new concept and every city is having different needs and possibilities and therefore using different strategies and instruments for the implementation of HiAP, developing a suitable measurement is quite complex (Storm et al., 2014, p. 184). The most important characteristic of HiAP is the collaboration of the health-sector with other policymakers. Therefore, research about the commitment of non-health stakeholders can be of great interest and value (ibid.).

Based on different maturity models, Storm et al. (2014) came up with a maturity model that is especially focussed on the integration of health issues into other policies and enables to distinguish between six different stages of HiAP. Identifying different stages of health in all policies can be useful to evaluate which methods of inter-sectoral collaboration offer good opportunities and which ones are rather hindering the process (Storm et al., 2014). The model is using a mixed-method of document analysis and interviews with different stakeholders to identify actors that are involved and their role, the case-specific contexts, co-operation agreements, the structure and form of collaboration and find out about the recognition and

acceptance of HiAP (Storm et al., 2014). By taking several key-characteristics into account, they define the six stages of maturity as follows:

1. **Unrecognized**: no attention for the problem

2. **Recognized**: municipality recognizes the problem and regards HiAP as a solution; possible activities are clear

3. **Considered**: HiAP in local health policy, project-based collaboration between health and other sectors; preparatory actions and activities to integrate health into other policies

4. **Implemented**: structural collaboration with other sectors in several problem areas

5. **Integrated**: quality processes as integrated part of HiAP; broad shared vision of improvement through HiAP; visible milestones

6. **Institutionalized**: systematic improvement of HiAP quality; political and administrative anchoring of HiAP at all levels

As a result of their study, Storm et al. state that a positive political context at a municipal level as well as a broad vision of health are important preconditions to encourage inter-sectoral collaboration and improve the stage of HiAP (Storm et al., 2014, p. 184 and 190). When doing analysis, one has to distinguish between individual factors, such as good experiences with collaboration and good relations between stakeholders, organisational factors, such as shared interests, sufficient resources and adequate timing and political factors, such as a high sense of urgency, sufficient political support and input from municipal councillors (Storm et al., 2014, p. 185).

Having these preconditions in mind, Storms maturity model can be used to analyse and compare the integration of health issues into climate adaptation strategies in different European municipalities. The following figure will provide a summary of the five governance categories that have been explored in this chapter. It complements figure 3 with the most important characteristics.
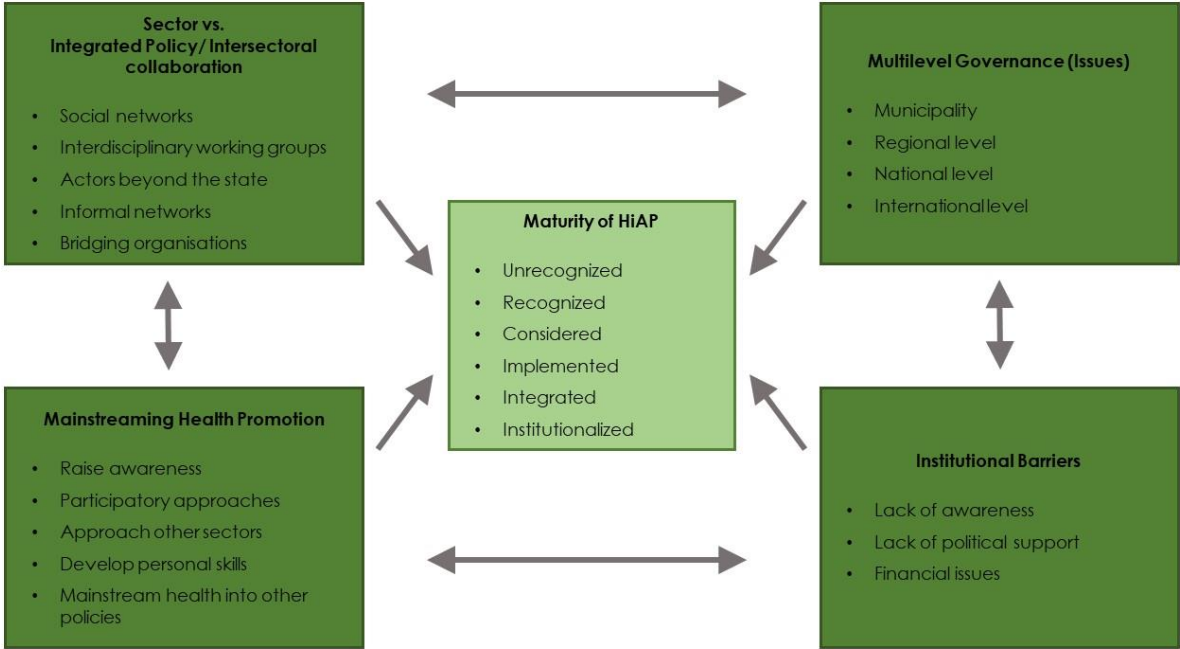
Figure 6: Conceptual framework for policy integration analysis (own figure)

This figure will be taken as the conceptual framework for the empirical research of this study. Just as figure 3 it shows that the four governance categories in the corners are an important base for the maturity of HiAP in the middle. Furthermore, the connecting arrows between the four boxes in the corners show that all these governance categories are interdependent and influencing each other. This conceptual framework serves as a good structure to answer the research questions as each 'box' in the figure is closely connected to one of the research sub-questions. Therefore, the characteristics of each category will be used as a structure for the empirical data collection and the results can be compared and referred back to this conceptual framework.

Having this framework and the theoretical background in mind, the following chapter will give a detailed explanation of the methods that have been used in order to carry out the empirical research.

3. Research Methods

After providing a theoretical background and a literature review about the current state of scientific research in the previous chapters, empirical research has been conducted in order to answer the research question "**What barriers are the cities Utrecht, Cork and Kuopio facing when integrating health issues into climate adaptation policies and which opportunities can they offer for other European municipalities?**" and its sub-questions with the help of the three case study cities. The following chapter will provide a detailed explanation of the design and the methods that have been used to conduct this research.

Research Design

The concept of research design has been defined by Yin (2009) as a plan that aims to guide the steps that are being taken in order to get from the research question to its answer (Yin, 2009, p. 19). Besides the initial research question and its sub-questions this includes the relevant data that are needed to answer the question as well as a description of the exact method that is being used to collect the data and the way of processing and evaluation of the data.

Doing research in the field of policymaking make it useful to collect empirical examples in the form of a comparative case study design that enables the researcher to compare two or more cases by using the same method (Bryman, 2012). Pierre (2005) states that comparative case studies in urban governance are of high relevance for scientific research as comparative approaches can help to uncover issues and relationships among a wide heterogeneity of actors on the urban political scene (Pierre, 2005, p. 450). Policymaking in the field of climate change adaptation is very much dependent on the geographical location due to different weather conditions and the exposure to the effects of climate change. Furthermore, the political and financial conditions can have an impact on the adaptiveness to the effects of climate change. When taking into account the health effects of climate change, the national health system does also have an impact on the opportunities and barriers that cities have to integrate health issues into their climate adaptation strategies. Therefore, a cross-cultural case study design has been used for this study which can be defined by

> *"the examination of particular issues or phenomena in two or more countries comparing their manifestation in different socio-cultural settings using the same instrument to conduct empirical research"* (Hantrais and Mangen, 1996, p. 1).

The aim of choosing case study cities that are situated in different countries is useful to cover a greater variety of challenges for cities that are associated with climate change (e.g. heat stress, droughts, flooding) and explore a greater variety of knowledge and approaches on how

to cope with the effects of climate change. Furthermore, it can show the significance of the national context and it might help to identify the different opportunities and barriers that are caused by political and financial conditions. The selection of the case study cities will be explained in more detail in the following paragraph.

3.1 Case selection

In order to support the validity of the literature review and to contextualize the outcomes of the research questions, empirical data had to be collected. As climate change and its negative health outcomes is a worldwide problem with every city facing different effects of climate change and having a different degree of vulnerability, an international comparison of municipalities is useful. In terms of accessibility search for case study cities has been limited to European cities. Evidence for the power of comparative studies in urban governance can be found in existing scientific literature. Pierre (2005) describes comparative urban governance as a useful instrument for developing a deeper understanding of different political structures, policy objectives and issues at a local level (Pierre, 2005, p. 450-451). Furthermore, this research recognizes the importance of contextualisation and aims to have a look at the local context that each case study city is embedded in.

In order to reach out to European cities and find suitable case study examples, an open call has been sent out via email through the distribution list of the Environment and Health Working Group within the WHO Healthy Cities Network to find out about their local actions and whether they would be willing to contribute to the research of this study. It was assumed that all cities within that working group are active on the topics health and environment and presumably also climate action. Furthermore, the study was introduced during the monthly Webex-meeting of the coordinators of all flagship cities of the WHO Healthy Cities Network. The aim was to find three case study cities with different national backgrounds. This is enough to make a reasonable comparison of local actions, policies and identify barriers of policy integration while still staying within a doable scope for the purpose of a master´s thesis. Within three weeks after the open call, the following cities declared that they are trying to integrate health issues into their adaptation policies and that they would be willing to contribute to the research of this study:

- Frederiksberg (Denmark)

- Cork (Ireland)

- Utrecht (Netherlands)

- Newcastle (United Kingdom)

- Kuopio (Finland)

- Prague (Czech Republic)

- Düsseldorf (Germany)

- Vienna (Austria)

- Pilea (Greece)

While the cities Prague and Pilea seemed active in the field and willing to participate in the study, they did not have any policy or strategy papers available in English language and were therefore not suitable as a case study city for this research. After further consultation with the Healthy City coordinators, but also with their colleagues from the planning department, environmental specialists and people responsible for the local climate adaptation strategy, the three cities **Cork**, **Utrecht** and **Kuopio** have proved as most suitable for the aim of this study.

All three of them have policy documents available in English, as well as actors from the fields of health and climate adaptation that showed their willingness to participate in an interview to share some insights and experiences. Their climate adaptation strategies are all at a different stage of development which makes it possible to identify barriers and opportunities at all points of development. Cork has launched their climate adaptation strategy in September 2019 already while Utrecht is about to finalise their strategy in summer 2020 and Kuopio is still in an early stage. Furthermore, all three cities are situated within a different national context which contributes to the aim of the study to put a focus on the contextualisation of the case study examples. With their local actions, the three cities Cork, Utrecht and Kuopio can be seen as forerunners in the field of integrating health issues into their climate adaptation strategies and might therefore be able to share some opportunities for other European cities that wish to take action in that field in the future.

3.2 Data Collection, Processing and Evaluation

In order to answer the research questions, an extended literature search and review has been done first to collect sufficient theoretical background information and develop a solid conceptual framework. In a second step, empirical data have been collected for the three case study cities in order to apply the conceptual framework. As the focus of this study is not only on the climate adaptation policy documents themselves, but also on their development process and the collaboration of the different stakeholders involved, this study relies on two different kinds of sources: the climate adaptation policy documents and semi-structured interviews that

have been conducted with representatives of the case study cities. The aim was to give both sources equal importance for the evaluation. The climate adaptation strategies have been reviewed of those cities that already have their finalised strategy in place. In two of the cases (Kuopio and Cork) those were publicly available on the homepage of the municipalities. In the case of Utrecht, the final climate adaptation strategy has not been released yet. The policy analysis has been done in relation to the conceptual framework developed in chapter 2.3. A more detailed description of the policy analysis procedure can be found in Annex IV. For the interviews the aim was to talk to one responsible person from the health sector and one responsible person for the development of the climate adaptation strategy of each city. For the cases Cork and Utrecht the aim of talking to one person from each sector succeeded, in the case of Kuopio, only a person from the climate adaptation sector could be made available, resulting in a lack of information from the health perspective in Kuopio. 5 interviews have been conducted in total with an average length of 45 minutes. Interview partners from the public health department have been approached through the WHO Healthy Cities Network while people responsible for the climate adaptation strategies have been found through snowball-sampling. As it was not possible to conduct all interviews face-to-face, some interviews have been conducted via Skype or phone. All interviews have been conducted in English or Dutch language. Two different interview guidelines have been used, one for all interview partners from the public health department and one for the responsible persons of the climate adaptation strategies. They have been developed based on the research sub-questions and conceptual framework in chapter 2.3. In order to be able 'fill out' the five boxes of relevant governance categories (figure 6) with the results of the case studies, the interview questions systematically addressed the characteristics of each governance category. Both complete interview guidelines can be found in Annex I of this work. Using these two different guidelines allowed to make use of the sector-specific expertise of all interview partners while also making the data comparable with those of the different cities.

The following table provides an overview of the three case studies as well as the data that have been collected.

	Cork	**Utrecht**	**Kuopio**
Member of the Healthy Cities Network	Since 2012	Since 2016	Since 2005
Climate adaptation strategy	Cork city council climate change adaptation strategy (Published September 2019)	Not published yet (expected finalisation summer 2020)	Kuopios Climate Policy Programme 2009-2020 (published 2009, no particular strategy for climate adaptation)
Interview public health department	Denise Cahill, Healthy Cities coordinator, Cork City Council	Miriam Weber, Healthy Cities coordinator, Municipality of Utrecht	
Interview climate adaptation/ spatial planning department	Micheál Lyons, climate action unit, Cork City Council	Marit Linckens, senior policy advisor for climate adaptation, municipality of Utrecht	Minna Kuuluvainen, environmental specialist, municipality of Kuopio

Figure 7: Overview of the case studies Cork, Utrecht and Kuopio (own figure)

In order to process and evaluate the data, all interviews have been transcribed (see Annex II) and coded using the computer programme NVivo. The codes were structured into 8 main categories and several sub-categories. Five of them are according to key characteristics of the five governance dimensions in figure 6 of chapter 2.3. They are complemented with three additional categories for complementation: 'current challenges', 'ideas and goals for the future' and 'opportunities/ things to learn for other cities'. A detailed coding diagram can be found in Annex III. The analysis of the policy documents has been done with a content analysis as defined by Holsti (1969)

> *"any technique for making inferences by objectively and systematically identifying specified characteristics of messages"* (Holsti, 1969, p. 14).

A list of the key-words that were searched for in the policy documents can be found in the Annex V. In order to make the results of all three case studies comparable, chapter 4 is mainly structured in the same way for all case studies: First, a short introduction to each city is provided. Then, the concept of mainstreaming health promotion is analysed, followed by a detailed explanation of the intersectoral collaborations of the city. Afterwards, the multilevel governance issues and institutional barriers will be explained before measuring the maturity of the health in all policies approach with the help of the model developed by Storm et al. (2014). The slightly different structure of the case study Kuopio will be explained in more detail later on. Each case study will close off with a short summary and ideas and goals for the future.

Chapter 5 will compare and discuss the results of all case studies in relation to the conceptual framework and theoretical background before coming to a conclusion in chapter 6.

Construction of validity

In order to evaluate the quality of a research study, scientific literature (e.g. Bryman, 2012; Yin, 2009) has established standard categories that need to be tested: construct internal validity, external validity and reliability.

Internal validity refers to the ability of a study to construct a causal relationship between the concepts used (Yin, 2009; Bryman, 2012). The internal validity of this study is mainly created through the extended literature review in chapters 1 and 2 which points out the strong interference of the concepts health and climate change as well as in the conceptual framework which aims to examine the collaboration of policy makers of those two sectors. Expert interviews with policy makers from both sectors, health and climate adaptation, is also strengthening this internal validity as taking their different opinions into account makes sure to reduce a biased point of view. However, internal validity is mainly an issue for causal case studies (Yin, 2009, p. 35) and is therefore a rather minor concern for this research.

External validity refers to the possibility to generalize the findings of a particular case study beyond the chosen cases (Yin, 2009, p. 35). The external validity of this research is established by the research design as a multiple-case study. The research framework allows to compare different cases that are situated in different national contexts and could therefore be used for any other city that aims for an integration of health issues into their climate adaptation strategy. The external validity is furthermore strengthened by counting on different methods: the analysis of climate adaptation strategies as well as expert interviews that all follow the same interview guideline and would enable future research generalize the findings and to use that same guideline for the examination of the same research question in a different case study city.

The last category, **reliability**, refers to the idea of making sure that if the exact same research would be conducted again, it would lead to the same outcomes (Yin, 2009, p. 36). Establishing reliability for this study can be seen as difficult as the topic of integrating health into urban climate change is relatively new and still in the process of development and the issues and barriers that are detected now might (hopefully) be overcome in a couple of years. Therefore, the point in time would be of relevance when trying to replicate the study. However, when using the same conceptual framework and the same interview guidelines, one can replicate the study and even come to a more helpful outcome when comparing the results of both studies as it might give more information about which strategies of integrating health into

climate adaptation strategies work especially good and which barriers are especially hard to overcome.

3.3 Limitations to the Research

While trying to make the conceptual framework and the empirical research as solid as possible, some limitations to the research have to be acknowledged when reading and evaluating this study

First of all, all three case study cities are situated within northwestern Europe where important health outcomes of climate change like heat stress might be less extreme than in southeastern regions of Europe. However, there were no cities in South-Eastern Europe available that met the criteria to serve as a case study. This was mainly due to language barriers, as those countries often do not have an English version of their policy papers available and sometimes lack experts that were willing to give an interview in English. However, the study is still of high relevance as issues like heat-stress affect northwestern Europe as well, especially as this is a topic that these regions are not used to yet and will be of growing relevance in the upcoming years.

Furthermore, it has to be acknowledged that less data could be made available for the case study of Kuopio. Therefore, there is a lack of information from the public health perspective in Kuopio. In addition, Kuopio takes a very different approach for their intersectoral collaborations than the other two cities which makes it hard to compare Kuopio with the other two case study cities. However, Kuopio has still been chosen as a case study example as comparing their actions with those of Cork and Utrecht will provide quite different results and therefore give a different and interesting insight. Even though the results of the Kuopio case will be presented in a less systematic way, this will be interesting because it shows the great variety of actions that there is in Europe and also shows at what different stages European cities are with their local actions.

Another limitation to this research is the fact that the idea of integrating health issues into climate adaptation policies is still relatively new. Therefore, adaptation strategies are still at a different point of development with different foci and different levels of detail which makes an extensive comparison very difficult. Therefore, the search for keywords was used to get a general idea of the role that health issues play in climate adaptation strategies. While the aim of this research was to treat policy papers and interviews as equally important resources, it turned out during the research that the evaluation of the interviews made a bigger contribution to the findings than the policy analysis. However, the topic is of such high relevance and

urgency for the future that this study will be worth looking back at in a couple of years and even worth repeating in the future when cities have further developed and improved their strategies. Furthermore, comparing future research with this study might show how the awareness for negative health outcomes of climate change has grown over time.

4. Results

Based on the conceptual framework that has been developed in chapter 2.3, empirical research has been conducted in the three case study cities Cork (Ireland), Utrecht (Netherlands) and Kuopio (Finland). This chapter will present the results of that research for each of the case study cities separately. In the beginning of each case study, there will be a brief general introduction to the city and the current status of their climate adaptation strategy as well as their actions within the WHO Healthy Cities Network. Afterwards, the structure will be according to the conceptual framework, starting off with the actions of mainstreaming health promotion, followed by the intersectoral collaborations before coming to the institutional barriers and multilevel governance issues and finally measuring the maturity of the health in all policies approach. While the two categories multilevel governance issues and institutional barriers were treated as two separate categories in the conceptual framework, the findings show that they are very closely connected to each other and often overlapping. Therefore, multilevel governance issues and institutional barriers will be presented together in the results of the case studies. Each case study will finish off with a summarizing figure and a brief outlook that contains ideas for improvement and future actions in the field of bridging health and climate adaptation in local policymaking. The comparison of all three case study cities will be done in the discussion in chapter 5.

4.1 Case Study: Cork (Ireland)

This chapter will present the results of the first case study in the city of Cork (Ireland). The empirical research that has been conducted for this case study is based on interviews with Denise Cahill, the healthy city coordinator of Cork as well as with Micheál Lyons who is working for the climate action unit at Cork City Council and who was responsible for the development of Corks climate adaptation strategy. These interviews gave an insight into the development process of the strategy and the interactions of the different stakeholders involved. The entire interviews can be found in Annex II of this work. The climate adaptation strategy itself has also been used as a resource of information, however, for the aim of this research more findings could be gained through the interviews. This chapter will be structured as explained above by following the conceptual framework that has been developed in chapter 2.3.

4.1.1 Introduction to the City of Cork

The City of Cork has a population of around 200.000 inhabitants and is located at the South coast of the Republic of Ireland. After having expanded their municipal boundaries in

June 2019, they are one of two municipalities that together form the County Cork. Irish counties are administrative units comparable to a province or a district. Cork has been a member of the WHO Healthy Cities Network since 2012 and is nowadays part of a national network on healthy cities as well. The effects of climate change will be of high relevance for Cork, not only due to heat stress in the urban area but also due to the geographical location at the coast and the exposure to a rising sea level. Therefore, the new climate adaptation strategy was launched on 30 September 2019. While the city does not have a climate mitigation strategy yet, authorities were obliged to first release a strategy for climate adaptation (Lyons, 2020, pers. com.). The strategy consists of 66 goals with health effects of climate change being one of them. A strategy for climate change mitigation is still in the development process.

4.1.2 Mainstreaming Health Promotion

While the topic of climate change and its effects is being more and more recognised as a serious issue for the future in the city of Cork, the climate adaptation unit of the city council states that there is still a lack of awareness and understanding among the public for new health issues that will arise due to climate change (Lyons, 2020, pers. com.). Therefore, raising awareness and the promotion of health issues across sectors and mainstreaming those into policies is of major importance.

The public health sector sees their role in informing the public, as well as the municipality, local companies, engineers, housing and transport departments about the impact that their sectors and policies can have on public health and about the issues that health services will have to deal with in the upcoming years (Cahill, 2020, pers. com.). Furthermore, their ability to bring a wide range of stakeholders together and their expertise in dealing with people can be regarded as an important strength, especially with regards to a long term development that aims for behavioural and policy change (Cahill, 2020, pers. com.). The national Environmental Protection Agency (EPA) supports that goal by claiming the public health sector to become a leader for behavioural change in climate change (Derham, 2017). To broaden the understanding for climate change related health issues the public health department chose to bring people together at the local level and organise a public seminar in 2019 with discussions and keynote speakers to inform about the connection between public health and climate change. This has been organised using the so called EcCoWell approach (**Ec**ology and economy, **Co**mmunity and culture, **well**being and life-long learning), which is an interactive workshop containing of several short pitch presentations by experts from different departments and research institutes, small workshops and a rotating group work. According to

the public health department, this event has been fully booked and was evaluated very positive by the organisers as well as the participants (Cahill, 2020, pers. com.).

To promote health across sectors and mainstream health issues into policies, the health sector can be referred to as a

"resource that can be used for consultation and can help to feed into a bigger machine"

of urban governance and policy-making (Cahill, 2020, pers. com.). Despite the high ambitions and a growing attention for health issues, the actual mainstreaming into (climate adaptation) policies is still in an early stage. The barriers and reasons for that will be explained in more detail in the following paragraphs.

4.1.3 Sector vs. integrated policy (intersectoral collaboration)

The official climate adaptation unit that was responsible for the development of the strategy of Cork consists of only one person. Therefore, it was the aim to involve a great variety of actors in the development process of the strategy to make sure that it integrates the aims of as many other sectors as possible, including the aims of the public health sector. According to Bowen and Ebi (2015) the understanding of intersectoral relationships and collaboration between all actors involved is of importance when aiming for integrated policymaking. This paragraph will analyse the intersectoral collaboration between the public health department and the climate adaptation unit at Cork City Council. This will be done by taking a close look at the four governance characteristics that Bowen et al. (2013) declare as important for intersectoral collaborations: social networks, actors beyond the state, informal networks and bridging organisations.

Social networks and actors beyond the state

From a health perspective, actors see their membership in the WHO Healthy Cities Network (HCN) and the Copenhagen Consensus of Mayors as a mandate to foster intersectoral collaboration and connect their work on public health issues to the results of climate change (Cahill, 2020, pers. com.). The way that work associated with the HCN is organised is based on a

> "*partnership agreement between the community sector, the local authority and the health service executive in Cork that aims for improved public health at an urban level*" (Cahill, 2020, pers. com.).

They share responsibilities between them but also use a participatory approach to involve actors not only within the municipality, but also actors beyond the state (as defined by Bowen et al., 2015). By using the EcCoWell approach they bring the health sector, the environment sector, the education sector, planners, residents of the city and the private sector together to find out how they can collaborate around new topics like climate change adaptation. The results and suggestions for concrete actions are collected and being passed on to politicians and those who are in charge for implementing actions at policy level (Cahill, 2020, pers. com.). Organisers of those events state that

> *"It's very interesting to bring all of those people together, because they are not used to working together and when they come together it's incredible what emerges and that's where the EcCoWell approach and methodology has been really beneficial"* (Cahill, 2020, pers. com.).

In comparison to that, the climate adaptation unit has been equally active in making use of the knowledge of a variety of actors when developing the actual climate adaptation strategy. After a first draft of the strategy had been made, it was made available to the public for consultation for a certain period before everyone could give their personal feedback via a dedicated email address for that matter (Lyons, 2020, pers. com.). Furthermore, a series of four workshops had been organised, each dedicated to a different target group like businesses, school children or just anyone from the open public to find out about their specific needs and ideas they had for the climate adaptation strategy of Cork. This approach did not only contribute to the content of the final climate adaptation strategy, it also helped to raise awareness and

> *"make [climate adaptation] a little bit more visible, because this is a long term issue"* (Lyons, 2020, pers. com.).

Informal networks

Furthermore, the characteristic of `informal networks´ defined by Bowen et al. (2013), like collaboration through personal connections, is of importance when looking at intersectoral partnerships in Cork. Actors from both departments, health and climate adaptation state that personal interests into a certain topic often plays a major role when setting up new intersectoral collaborations (Lyons, 2020, pers. com.; Cahill, 2020, pers. com.). In the case of Cork it can be seen as an advantage that the city is relatively small where people from authorities and agencies often know each other well which is a great advantage for intersectoral partnerships. The dependency on personal connections and interests make it even more important to have institutionalised agreements for collaboration and embed collaborative work into policies.

Bridging organisations

Bowen et al.´s (2013) category of bridging organisations like politics or other local, national or international networks, can be found in the involvement in the WHO Healthy Cities Network, the Irish umbrella group CARO (Climate Action Regional Office) and guiding principles like the SDGs. Furthermore, there is a growing interest of local politicians in connecting health issues and climate change as there is a growing influence from the political green party in the city council since the last elections.

To sum up, one can see that both departments, public health and the climate adaptation unit have made great efforts recently towards closer intersectoral partnerships and integrated policymaking by collaborating with a large number of different actors. The climate adaptation strategy can be evaluated as an integrated rather than a sectoral policy as it is based on a collaborative work of many different actors. When looking at the specific integration of health issues into the policy however, it must be said that there is still quite some space for improvement, especially when looking at the process of the policy development. Both departments are well aware of each others work and the health department, like everyone else, had the chance to give feedback on the draft of the climate adaptation strategy. However, both departments claim for a closer collaboration as there is currently no systematic partnership yet and due to a number of reasons the health department was not consulted from the beginning on when developing the new climate adaptation strategy (Cahill, 2020, pers. com.; Lyons, 2020, pers. com.). After having a close look at the current actions in Cork in the last two paragraphs, the next paragraph will explain institutional barriers and multilevel governance issues that Cork has been facing so far in their actions towards integrated policymaking in the fields of public health and climate adaptation.

4.1.4 Institutional Barriers and multilevel governance issues

In the process of trying to integrate health issues into climate adaptation policies, the City of Cork is facing a variety of institutional barriers at different levels of governance. This paragraph will have a detailed look at those issues and is structured according to the different governance levels at which they occur. While institutional barriers and multilevel governance issues were treated as two separate categories in the conceptual framework, it turned out during the empirical research of this study that they are very closely entangled. Therefore, they will be treated together in this paragraph.

The first institutional barrier, which is not associated with a particular level of governance, but which however seems to be one of the most significant institutional barriers

is the fact that the field of collaborating on public health and climate adaptation governance is very new with not much research having been done yet and a very uncertain and unforeseeable development in the upcoming years. This means that there will be a constant need to adapt to new situations and challenges and policies might not keep their validity for very long (Cahill, 2020, pers. com.).

Local level

A challenge which is taking place at the local and which has affected the development of the climate adaptation in particular was a very limited time frame. The final strategy had to be launched by the end of September 2019 by legislation which caused a limitation of possibilities to engage with the public and collaborate more closely with actors across sectors. Furthermore, the climate action unit consists of only one person due to financial issues of the municipality, which means that there are reduced personal capacities. Another barrier mentioned by local practitioners is the multilevel issue that the health system as well as the national climate adaptation strategy operate on a national level, while the practical actions take place on a local level where needs and capacities might be different from the rest of the country (Cahill, 2020, pers. com.).

Regional level

An institutional barrier which is affecting the local, but also the regional is the expansion of the City of Cork into the county that happened in 2019. Therefore, a lot of administrational duties had to be reorganised and sorted out between the city and previous municipalities from the whole region that now belong to the city of Cork. This reorganisation caused a lack of personal capacities for the dedication towards other ongoing projects like the development of the climate adaptation strategy (Lyons, 2020, pers. com.).

National level

Issues that are taking place at the national level are often of political nature. Recent elections that caused a bit of instability and uncertainty for the upcoming months. In addition to that, Ireland has been affected by the consequences of Brexit as a neighbouring country of the England and Northern Ireland. Those two recent events are adding up to financial difficulties that have been affecting the Republic of Ireland for the last ten years (Lyons, 2020, pers. com.). The financial crisis which has caused problems in the job and housing market, broadband infrastructure and others has led to a lack of awareness for climate change and its negative health outcomes among the public. This can be seen in the tendency of people voting rather for political parties that are dealing with problems that might appear more `immediate´

like the shortage of housing, while climate change and its effects is still regarded as a problem in the distant future by a considerable number of people (Lyons, 2020, pers. com.).

International level

In the context of the WHO Healthy Cities Network, the most significant barrier is reported to be the physical distance of actors that are spread all over Europe which makes face to face meetings difficult and often slows down the implementation of actions (Cahill, 2020, pers. com.).

4.1.5 Maturity of Health in All Policies

This paragraph will measure the actual integration of health issues into the climate adaptation strategy in Cork by applying the maturity model for measuring the health in all policies approach by Storm et al.(2014).

Looking at the actions of the public health department it can be seen that they have been quite active and engaged in the field of intersectoral collaborations, within the municipality as well as with actors from the university, the residents of Cork and in national and international interdisciplinary working groups. They promote public health issues by using a wide range of approaches towards a wide range of actors. Looking at the particular actions they take in order to integrate their aims into the policy for climate adaptation, one can say that they have done a brave job diving into this newly emerged field (Cahill, 2020, pers. com.). They reviewed the climate adaptation strategy and gave feedback to it before it was launched, however they have not been actively involved or consulted in the development process of the strategy. While both departments are in regular contact, know of each others current actions and collaborate in some particular projects, there are no official agreements that would ensure a continuous partnership or the integration of health issues into the climate adaptation strategy.

Evaluating the maturity of the integration of health issues into the actual climate adaptation policy by using the model of Storm et al. (2014) one could say that the actions in Cork can be associated with the stage called `**implemented**´. This is stage number four on the maturity scale which is defined by structural collaboration with the other sector in several problem areas, but no defined shared vision or goals (Storm et al., 2014).

4.1.6 Summary/ Ideas for the future

This chapter gave an overview over the local actions in the city of Cork, the mainstreaming of health promotion, their intersectoral collaborations, current institutional barriers and multilevel governance issues they are facing before trying to measure the maturity of HiAP in the last paragraph. Looking at future goals in Cork, they report that beside overcoming their current institutional issues, they would like to improve their strategy to put policy goals into action (Cahill, 2020, pers. com.) and to develop an even closer collaboration with stakeholders outside the municipality. The University College Cork was mentioned as one example for such a collaboration (Lyons, 2020, pers. com.).

The following figure will provide a summary of the findings that have been presented in this chapter.

General facts about actions in Cork	• climate adaptation strategy launched in September 2019 (responsible: climate action unit of Cork City Council) • member of the WHO Healthy Cities Network since 2012
Mainstreaming of health promotion	• lack of awareness for climate change related health issues among the public • health sector sees their role in bringing together a wide range of actors to inform about the topic and raise awareness • use of the EcCoWell approach
Intersectoral collaborations	• both departments collaborate with a great variety of actors in interdisciplinary working groups and workshops • public consultation for the climate adaptation strategy • advantage of informal networks due to the small size of the city • no institutionalised collaboration between public health department and climate action unit for policymaking
Institutional barriers and multilevel governance issues	• limited time and personal capacity for the development of a climate adaptation strategy (local level) • gap between local actions and national health system

	- administrational reorganisation due to expansion of the municipality (regional level) - political instability and effects of Brexit (national level) - lack of knowledge exchange at international level due to physical distance
Maturity of HiAP	- acknowledgement of the importance of the topic - great variety of actions and approaches - project-based collaboration between departments - no institutionalised partnership for the development of climate adaptation policymaking - HiAP level four: **implemented**
Ideas and goals for future actions	- Make sure policy goals are put into action - More collaboration with institutions like the university - Hope for better financial support

Figure 8: Summary of the findings about Cork (own figure)

4.2 Case Study: Utrecht (Netherlands)

This chapter will present the results of the second case study city, Utrecht (Netherlands). The empirical research that has been conducted for this case study is based on interviews with Miriam Weber who is the healthy city coordinator of the municipality of Utrecht and chair of the Environment and Health Working Group within the WHO Healthy Cities Network and Marit Linckens, policy advisor for climate adaptation at the municipality of Utrecht. As the climate adaptation strategy of Utrecht has not been finalised and published yet, the findings are mainly based on the interviews with a focus on the development process of the policy rather than on the finalised policy document. Just as in the first case study, the chapter will follow the structure of the conceptual framework that has been developed in chapter 2.3. After a short introduction to the city (4.2.1) the ways of mainstreaming of health issues are promoted in Utrecht will be explained (4.2.2). After a paragraph about intersectoral collaborations within the municipality (4.2.3), a paragraph about institutional barriers and multilevel governance issues (4.2.4) will follow. Just like in the first case study, multilevel governance issues and institutional barriers will again be dealt with together due to their close

interaction. Finally, the maturity of the health in all policies approach will be measured (4.2.5) using the maturity model developed by Storm et al. (2014). The chapter will close with a summary and an outlook to needs and ideas for future actions towards negative health outcomes of climate change.

4.2.1 Introduction to the city of Utrecht

The city of Utrecht has a population of around 340.000 inhabitants and is located in the centre of the Netherlands, being the administrative centre of the Province of Utrecht. There is an ongoing process of a massive growth of the city with an expected population of 455.000 inhabitants by 2040. Since 2015 Utrecht chose 'healthy urban living for everyone' (gezond stedelijk leven voor iedereen) as one of their overarching priorities for the upcoming years. The aim of this holistic and integral approach for the city is to give public health a central role for the development of Utrecht and consider health in all kinds of actions that can support a healthy urban lifestyle (Gemeente Utrecht, 2020). Among many actions that serve the aims of this topic, like partnerships with the province of Utrecht, Utrecht University and the RIVM (National Institute for Public Health and the Environment), Utrecht has become a member of the WHO Healthy Cities Network since 2016 and is chair to the environment and health working group within that network. The climate adaptation strategy of Utrecht is still in the process of development and is expected to be launched in summer 2020.

4.2.2 Mainstreaming health promotion

Climate change brings a lot of challenges to the city of Utrecht, like flooding, heat and drought. However, research showed that heat will be by far the most influential and the biggest challenge for Utrecht that is associated with climate change (Linckens, 2020, pers. com.). Therefore, local heat plan is currently being developed in addition to the general national heat plan in order to adapt better to the specific local needs in Utrecht (Linckens, 2020, pers. com.). As heat is a problem that affects everyone, especially vulnerable groups and in some parts of the city where there is a lack of green space and a lot of concrete surfaces, the awareness for negative health outcomes of climate change is already quite high among the public.

In combination with the local goal of healthy urban living for everyone, the promotion of health issues towards other sectors is quite high on the agenda within the municipality of Utrecht. The public health department sees their role in raising awareness for public health issues in a preventive sense by defining and approaching health in a very broad way. Therefore, other departments can align to it from their perspectives, put it on their agenda and

contribute to the goal of healthy urban living (Weber, 2020, pers. com.). In order to take this approach and mainstream the promotion of health issues, the public health department formed a team for healthy living environment (gezonde leefomgeving). This is an interdisciplinary team with people from different backgrounds and departments with the aim of giving advise on health topics right from the beginning on and throughout the whole process of spatial development projects in Utrecht and make sure that

"health is always at the table in one way or another" (Weber, 2020, pers. com.).

The public health department reports that promoting health among other sectors has not always been easy but starting off with small projects and alliances between departments has helped to build up long term relationships between departments. Furthermore, the political goal of healthy urban living has been highly contributing to the promotion of health issues and interdisciplinary work. When the topic of climate change and adaptation to its effects became more and more important, the municipality could benefit from their already established experiences of interdisciplinary work (Weber, 2020, pers. com.). The framing of the way health is being approached is very important, because

"if you address it in the right way, everything contributes to quality of life and wellbeing and health of the city and people living in the city. No one can be against that! But it´s finding your vocabulary and your shared ambitions and everybody can align to that". Weber (2020)

4.2.3 Sector vs. integrated policymaking (intersectoral collaborations)

This paragraph will describe the intersectoral collaborations between the public health department and the spatial planning department which is responsible for the climate adaptation strategy at the municipality of Utrecht. Understanding these intersectoral relationships is of high importance for successful integrated policymaking as stated by Bowen and Ebi (2015). The paragraph will be structured by first explaining the two perspectives of the public health and the climate adaptation department and then analysing the four characteristics suggested by Bowen et al. (2013): social networks, actors beyond the state, informal networks and bridging organisations.

Health perspective

When collaborating with stakeholders from other departments within or actors outside of the municipality, the public health department mainly regards its task to share their

knowledge about the specific health effects (for example from climate change) in Utrecht and to support and advise on how to act on that, for example through green and blue infrastructure (Weber, 2020, pers. com.). Besides the development of the climate adaptation strategy they are generally often involved in spatial planning projects and the development of new policies and programmes to advise on possible effects these projects on public health, like noise and air pollution (Weber, 2020, pers. com.). Therefore, there is a quite strong link between the public health and the spatial planning department in Utrecht. Furthermore, the before mentioned team of healthy living environment (gezonde leefomgeving) takes an important role for interdisciplinary work and collaboration with other departments (see chapter 5.2.2). The interdisciplinary work from a health perspective has especially been strengthened since the goal of healthy urban living for everyone came up in Utrecht.

Climate adaptation perspective

The topic of climate adaptation is organised by two departments at the municipality of Utrecht: the spatial planning department which has the main responsibility and the team for water which is a sub-group of the department for city operations ('stadsbedrijven'). Their aim is to make sure that all new as well as all renovated buildings are built in a way that makes them resilient towards the expected climate conditions of 2050 to improve the liveability in peoples homes (Linckens, 2020, pers. com.). Furthermore, they aim to make sure that there is enough green in the city, in public spaces as well as in private gardens of residents. All these aims are currently being put together into the climate adaptation strategy of Utrecht which is to be launched in summer 2020 (Linckens, 2020, pers. com.). Coming up with a successful strategy that combines all these aims makes it necessary to collaborate with the public health department as well as with many other departments and experts. Therefore, they set up a project team which consists of experts for water and green space, landscape architects, public health experts and people from the department for communication to which is meeting around every two weeks set up the climate adaptation strategy. Their plan for the future is to have ambassadors for climate change from that team that promote climate change in their sectoral departments. The policy advisor for climate adaptation at the municipality states that

"one of our tasks is to make sure that everyone within our organisation considers climate adaptation" (original quote in Dutch, translated from Linckens, 2020, pers. com.).

In addition to the project team they have a close relationship to the aldermen of the city to raise awareness for climate change adaptation among the politicians.

Social networks

The perspectives of both departments, public health and spatial planning/ climate adaptation show that intersectoral working groups are very established at the municipality of Utrecht. The team of healthy living environment (gezonde leefomgeving) and the project team that is developing the climate adaptation strategy are good examples for that. Before the approach of `healthy urban living for everyone´ and the topic of climate change adaptation came up, collaboration was organised rather project-based and for specific smaller topics while it is a very common practice by now. Actors from the municipality state that

> *"introducing climate change and the impacts […] has the advantage […] that now we already have this kind of experience in interdisciplinary working and finding more holistic approaches, so climate change fits into that"* (Weber, 2020, pers. com.).

Actors beyond the state

Besides the intersectoral collaborations that exist within the municipality, Utrecht has taken an approach of working together with what is defined by Bowen et al. (2013) as `actors beyond the state´ for quite some years. Those actors can be private companies and businesses, citizens, research institutes and the university. One example of a collaboration of the public health department with actors beyond the state would be the Health Hub Utrecht which is a collaboration between the municipality, the province of Utrecht, Utrecht University, the National Institute for Public Health and the Environment (RIVM), several hospitals, health insurance companies and many more (Weber, 2020, pers. com.). Another example of collaboration with actors beyond the state on the topic of health and climate adaptation is the campaign `waterproof 030´ which is a platform that gives advice for residents on how to act on flooding and contribute to a better climate adaptation. Furthermore, the spatial planning department is planning to include a communication plan in the climate adaptation strategy for the particular communication with residents (Linckens, 2020, pers. com.).

Informal networks

Besides the before mentioned working groups and intersectoral collaborations, actors from both, the public health and the spatial planning department state that personal and informal networks are of high relevance for their work (Weber, 2020, pers. com.; Linckens, 2020, pers. com.). They explain that collaboration at the municipality of Utrecht sometimes even happens by coincidence when hearing about new projects of colleagues where the health department has not been involved yet. In those cases they usually try to invite themselves to other working groups to come up with ideas about how they can contribute to the project from a health perspective (Weber, 2020, pers. com.).

Bridging organisations and political support

Looking at Utrechts politics and support from the local aldermen for projects addressing public health and climate adaptation, stakeholders from both departments state that they

"have had, already for quite some years, a very supportive [and] strong local government" (Weber, 2020, pers. com.).

The government has adopted the health in all policies approach for their goal of `healthy urban living for everyone´ and asks for a trans-disciplinary work from an integrated and holistic perspective (Weber, 2020, pers. com.). As the current two aldermen responsible for spatial planning affairs are from the green-left political party, they are very ambitious and supportive for the topic of climate change adaptation (Linckens, 2020, pers. com.).

4.2.4 Institutional barriers and multilevel governance issues

Just as the city of Cork, Utrecht is facing a number of institutional barriers and issues related to multilevel governance challenges. Following the structure of the model of Mickwitz et al. (2009) those issues can occur at the local, regional, national and international level.

Local level

The main issue of collaboration on the topic of health and climate adaptation at local level is the complexity of the topic and the coordination of so many different stakeholders. The broad and interdisciplinary approach that is needed here

"means that we have to collaborate and cooperate within the whole city and our municipal building because it´s not a single topic and we are not working silos anymore. So you need all the colleagues from all the departments" (Weber, 2020, pers. com.).

Taking this holistic approach asks for a shift towards a more interdisciplinary way of working. Even though the municipality of Utrecht is structured as an organisation that works very intersectoral already, the transition away from previous, sectoral structures and mechanisms is sometimes still an institutional barrier when trying to develop integrated policies (Weber, 2020, pers. com.). Another challenge that the city of Utrecht is still facing in the process of developing their climate adaptation strategy is to come up with more concrete and specific actions that can be put into practice. While the policy makers try to keep the goals and ambitions in the strategy broad and applicable to a great variety of actors, many project developers and companies are asking for concrete actions that they can take to realise the aims of the strategy (Linckens, 2020, pers. com.). Furthermore, stakeholders report that they

realise the importance of expectation management for collaborative work with different actors. Organisations like municipalities, companies, research institutes and universities have different experiences in working together and also different expectations of the outcomes of collaborative work. Therefore *"expectation management is key"* when taking broad and interdisciplinary approaches (Weber, 2020, pers. com.). Another institutional barrier which occurs in Utrecht with regards to climate change adaptation is the financing of projects. Since climate adaptation is the responsibility of many different departments, the responsibility of financing for new projects is sometimes unclear. While topics like flooding and drought clearly belong to the water department, heat is neither the responsibility of the spatial planning nor the public health department. Therefore, realising new projects like planting new trees to create more green and shady places in the city becomes difficult as the responsibility for financing is unclear (Linckens, 2020, pers. com.). These issues often slow down the processes.

Regional level

As there will be new funding from the government for climate adaptation projects at regional level in 2021, the municipality has recently started to collaborate with a variety of stakeholders within the province of Utrecht. Since October 2019, there is a working group called `platform water en klimaat´ which consists of the province of Utrecht, the water authority (waterschap) and 16 different municipalities with the aim of developing a regional climate adaptation strategy (Linckens, 2020, pers. com.). The reason why this working group was founded is the fact that some climate change related issues (e.g. flooding) are not restricted to municipal boarders but affect an entire region and therefore need regional actions. However, due to different local needs and contexts, some municipalities have their own different needs and issues which make a local strategy more useful than a regional one. Therefore, a regional gap can be found between the need to act on some issues with the whole region while considering the different local needs for each municipality (Linckens, 2020, pers. com.). Coming up with particular and specific actions in a regional strategy is therefore a challenge that still needs to be mastered.

National level

Institutional barriers and multilevel governance issues are mainly of importance for the public health perspective. As in most other countries, the health system in the Netherlands is organised at national level. In extreme situations related to health issues that are caused by climate change, like heatwaves, the main responsibility of advising the public on behavioural changes lies within the tasks of the National Institute of Public Health and the Environment (RIVM) while the public health department of the municipality has rather preventive responsibilities for climate change related health issues.

International level

The spatial planning department and the team responsible for climate adaptation is not very active yet at international level. However, with their membership in the WHO Healthy Cities Network, the public health department is very involved in international projects. With regards to climate change, the healthy cities coordinator of Utrecht states that

"this is a topic which is mainly addressed by the WHO in Bonn and they have not drizzled down to the local level. That goes for several topics of the WHO and we have to bridge that" (Weber, 2020, pers. com.).

4.2.5 Maturity of Health in All Policies

This paragraph aims at measuring the actual integration of health issues into the local climate adaptation strategy by using the maturity model for health in all policies by Storm et al. (2014). As Utrecht has not finalised and launched their climate adaptation strategy, the measurement will in this case focus on the development process of the strategy and the general collaboration between the public health and the spatial planning department.

Public health issues generally have a very high priority at the municipality of Utrecht. This is mainly due to a very broad definition of health which includes physical as well as mental health and considers the liveability of the city and wellbeing of its residents. In order to achieve that goal, the health in all policies approach has been a common practice for the last couple of years and is part of Utrechts vision of `healthy urban living for everyone´ (gezond stedelijk leven voor iedereen). This motto can be seen as what Storm et al. (2014) describe as `a broad shared vision of improvement through health in all policies´.

The problem of climate change related health issues is recognised within the spatial planning department and there is a high level of awareness for the heat problem which already exists in Utrecht and which will increase in the upcoming years. Interdisciplinary working groups like the team of healthy living environment of the public health department and the project team for the development of the climate adaptation strategy are making sure that health issues will be considered in the strategy which is t be launched in summer 2020. A `visible milestone´ as described by Storm et al. (2014) in the collaboration between health experts and climate adaptation experts can be found in the local heat plan which is a policy paper that specifically considers the negative health outcomes that are seen as particular problematic in Utrecht.

Using the maturity model of Storm et al. (2014) the integration of health issues into climate change adaptation affairs can therefore be associated with the stage called `integrated´ (stage 5). This can be seen as a great achievement at the municipality of Utrecht. While there is even a political and administrative anchoring of HiAP at all levels which would be associated with stage 6 (institutionalised), a systematic improvement of the HiAP approach has not been developed yet. However, a further development in that field in the upcoming years could bring the actions of Utrecht even to that last and best stage of Storms maturity model.

4.2.6 Summary and ideas for the future

This chapter has given an overview over the local actions in the city of Utrecht, the mainstreaming of health promotion, their intersectoral collaborations, current institutional barriers and multilevel governance issues they are facing before trying to measure the maturity of HiAP in the last paragraph. It has been shown that there is a very close collaboration between the public health department and the spatial planning department and that the health in all policies approach has a very high priority in Utrecht when approaching new projects of any kind.

With regards to future projects, the spatial planning department aims to raise even more awareness for climate adaptation among companies like engineering businesses and architects as well as among residents to bring climate adaptation even more to their mind when designing and working on their own gardens to expand the amount of green space in the city (Linckens, 2020, pers. com.). From the public health perspective, actors involved claim for a closer collaboration with other cities for a better knowledge exchange and a better support from international networks, like the WHO Healthy Cities Network to focus more on local actions to address climate change related health issues and provide a better exchange between the member cities.

The following figure provides an overview of the findings of this case study:

General facts about actions in Utrecht	• climate adaptation strategy not launched yet (expected in summer 2020) • member of the WHO Healthy Cities Network since 2016
Mainstreaming of health promotion	• healthy urban living for everyone as one of the overarching topics at the municipality of Utrecht

	• raising awareness for health issues by using a broad definition of health
	• team for healthy living environment
Intersectoral collaborations	• climate change actions make benefit from an established culture of interdisciplinary working groups with holistic approaches
	• collaborations with actors beyond the state (e.g. Health Hub Utrecht or waterproof 030 campaign)
	• communication plan within the climate adaptation strategy for collaboration with residents)
	• good political support from the local government
Institutional barriers and multilevel governance issues	• Coordination of the many stakeholders involved
	• Sometimes unclear responsibilities in financing
	• Gap between different local goals within the region
	• Limited capacities for local health actions due to national health system
	• Wish for a better knowledge exchange and support at international level
Maturity of HiAP	• Broad definition of health and holistic approach leads to a high priority of health actions
	• Established interdisciplinary collaborations
	• Local heat plan as policy that explicitly considers climate change related health issues
	• HiAP level five: **integrated**
Ideas and goals for future actions	• Raise more awareness for specific climate adaptive actions that residents can take
	• Aim for better knowledge exchange at international level

Figure 9: Summary of the findings about Utrecht (own figure)

4.3 Case Study: Kuopio (Finland)

The third case study that has been done for the purpose of this research is the city of Kuopio in Finland. The findings of this case study are based on an interview with Minna Kuuluvainen who is an environmental specialist at the municipality of Kuopio and who is involved in actions and policymaking to address climate action. Furthermore, the Kuopios 'Climate Policy Programme 2009-2020' has served as a source of information for this research. Even though a lack of information from the public health perspective in Kuopio has to be acknowledged, the findings of this case study can provide an insight into the local actions and contribute to this research. This is especially due to a very different approach that Kuopio takes which is especially of interest for the spatial planning perspective of this study. Therefore, the case study of Kuopio should not be regarded as a comparison to the other two case studies in Cork and Utrecht, but rather as an add on that gives a different kind of insight which can nevertheless contribute to the response of the research question. This chapter will therefore be structured in a slightly different way than in the other two case studies by putting its focus mainly on the intersectoral collaborations and by pointing out some of the current institutional barriers that Kuopio is facing.

4.3.1 Introduction to the city of Kuopio

The city of Kuopio has around 120.000 inhabitants and is one of the biggest cities in the lake region of Eastern Finland. The University of Kuopio has an international reputation for its research in the fields of public health and wellbeing. Furthermore, the municipality has been member of the WHO Healthy Cities Network since 2005. Local actions addressing climate change are taken care of by the Environment Centre of the municipality. Acting on the effects of climate change is of importance not only for Kuopio city, but also for the whole region as agriculture is an important part of the local economy where droughts can have a massive impact. While the first policy addressing climate change at a local level was developed in 2003 already and will be revised in 2020, the city´s main focus still remains on climate change mitigation rather than on climate adaptation. The current strategy of the city towards climate change is the 'Kuopios Climate Policy Programme 2009-2020'. A policy that is particularly addressing climate change adaptation is not in place yet. However, the city has dedicated itself to be active in the field of climate action with special consideration for health issues, which makes Kuopio relevant for the aim of this study. Their dedication and aims can for example be seen in their active participation in the EU funded project called URGENCHE ('Urban Reduction of Greenhouse Gas Emissions in China and Europe') which is an interdisciplinary

network that aims to address health issues associated with environmental effects. One of their main goals is to become a carbon neutral and waste-free city.

4.3.2 Intersectoral collaborations

According to an environmental specialist at the municipality of Kuopio, the main goal of their climate action policy

"....is that [they] take care of nature and that will bring health and wellbeing to the people" (Kuuluvainen, 2019, pers. com.).

They acknowledge the complexity of climate change and the effects it has on the people and their life and therefore claim for a very close collaboration between different stakeholders within the city.

Social networks

The municipality of Kuopio generally states that they have close collaborations with many different stakeholders, inside and outside the municipality. In their municipal actions, they give a special role to land use planning as they see this field as a platform that can bring together a great variety of actors from different fields (Kuuluvainen, 2019, pers. com.). The planning of new areas in Kuopio is usually done in collaboration with actors from the infrastructure department, the energy efficiency department, water, environment and the public health department. The way they structure their collaborations is usually by organising big meetings or workshops with all stakeholders affected to find out about specific needs, collect ideas and promote the consideration of climate change adaptation towards other departments.

Actors beyond the state

Besides the intersectoral collaborations within the municipality, there is also a great variety of actors that can be defined as `actors beyond the state´ and that the department for climate action is collaborating with. The main actors are the University of Kuopio, the university of applied sciences, student housing companies, construction companies, the local energy agency, the university hospital and the residents of Kuopio. For collaborations with residents, there often meetings and planning workshops or questionnaires to find out about their specific needs and ask for opinions and ides for actions addressing climate change adaptation.

Informal networks and bridging organisations

Besides the formal meetings within the city, actions towards health and climate adaptation in Kuopio make use of informal networks and bridging organisations. In addition to

their membership in the WHO Healthy Cities network, they are part of the Finish national network for healthy cities as well as a national network for actions on climate change. They state that especially the involvement in the national networks has been of good use in recent years for knowledge exchange and sharing good practice examples of other cities in Finland. For future actions in Kuopio they would appreciate an even better cooperation with other cities at international level.

4.3.3 Institutional barriers and multilevel governance issues

As the municipality of Kuopio is (as far as the data that have been conducted for this case study) so far mainly cooperating at local and national level and does not have specific mechanisms for policymaking for climate adaptation yet, institutional barriers mainly occur at a local level of governance. In this case, actors state that their main challenge with intersectoral collaboration is the limitation of financial and human resources and unclear responsibilities between the different departments (Kuuluvainen, 2019, pers. com.). The city has high ambitions for their future sustainable development, but a lack of human and financial resources makes it hard to implement and commit to these goals (Kuuluvainen, 2019, pers. com.). Furthermore, slow decision making processes in municipal administrations have been reported as a hindering factor for intersectoral actions at municipal level.

4.3.4 Maturity of Health in All Policies

The lack of data from the health perspective as well as the non-existing climate adaptation strategy make it more difficult to apply the maturity model by Storm (2013) to measure the actual integration of health issues into climate adaptation actions in Kuopio. However, looking at the six defined steps of maturity of the model make it possible to place Kuopios actions on that scale. As the municipality clearly recognises the importance of public health as a field that needs to be considered for actions in climate adaptation and health issues are also mentioned in the climate change policy, the maturity of HiAP actions in Kuopio can be categorised as `recognised´ which is the second level of maturity in the model of Storm et al. (2014). As there is no project-based collaboration between the public health and the climate adaptation sector yet, the level `considered´ has not been achieved yet.

4.3.5 Summary and ideas for the future

This chapter provided an insight into the local actions in Kuopio towards the bridging of public health issues and climate adaptation policymaking. The following figure provides a summarising overview of the findings in this case study as well ideas and goals for future actions in Kuopio.

General facts about actions in Kuopio	• No policy with a particular focus on climate change adaptation • member of the WHO Healthy Cities Network since 2005 • main focus on climate mitigation rather than on adaptation
Intersectoral collaborations	• central role for the field of land-use planning • workshops and questionnaires to collaborate with a great variety of actors inside and outside of the municipality
Institutional barriers and multilevel governance issues	• lack of financial and human resources • slow decision making processes at municipal level • exchange of experiences mainly at national level • municipal administration processes slow down actions
Maturity of HiAP	• HiAP level two: recognised
Ideas and goals for future actions	• Aim for better knowledge exchange at international level

Figure 10: Summary of the findings about Kuopio (own figure)

5. Discussion

The previous chapter has presented the findings off three case studies that have been conducted for the aim of this research. The outcomes show that some barriers and opportunities differ a lot from case study to case study while others seem to be very similar at all three of them. This chapter will discuss those results by looking at the similarities and differences between the case study cities and referring back to the theoretical background that has been provided in the beginning of this work. This will serve as a base to answer the main

research question "**What barriers are the cities Utrecht, Cork and Kuopio facing when integrating health issues into climate adaptation policies and which opportunities can they offer for other European municipalities?**".

This chapter will start off by providing an overview of the main outcomes of all three case studies (chapter 5.1). In this table the similarities and differences become clear which serves as a good start for the discussion following afterwards. Just as the table, the discussion will be structured according to the five governance categories that served as a framework for the empirical research.
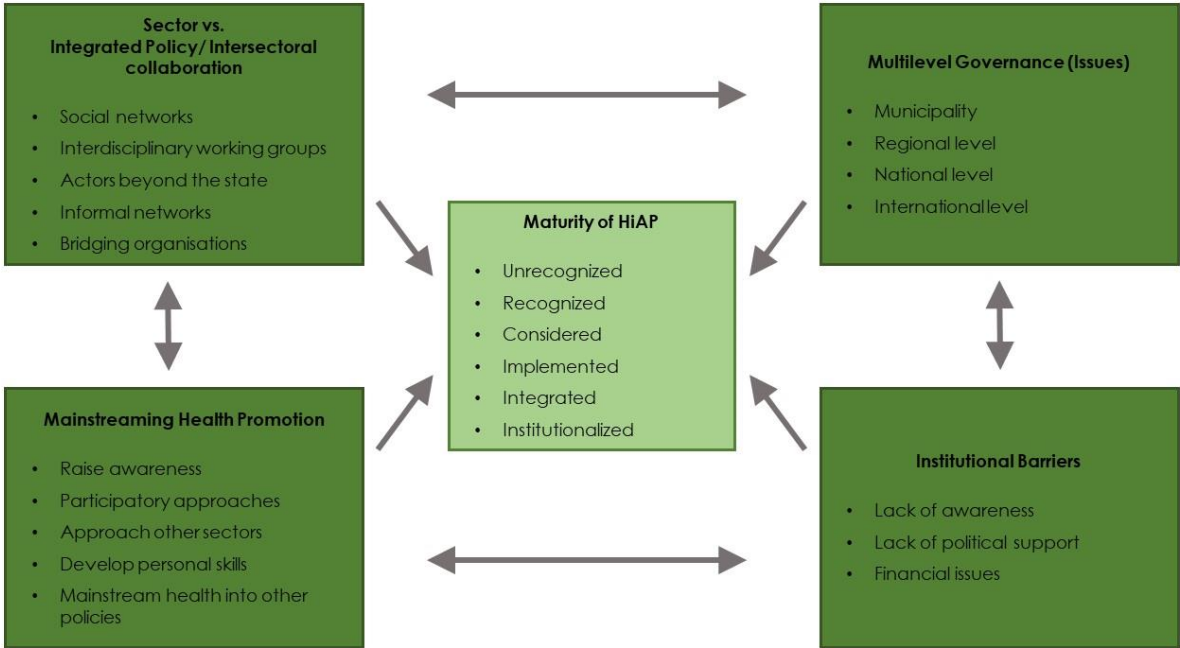
Figure 6: Conceptual framework for policy integration analysis (own figure)

One of the findings of all three case studies is that the two dimensions 'multilevel governance issues' and 'institutional barriers' have an especially close connection and are often overlapping. In fact, many institutional barriers are multilevel governance issues. Therefore, those two dimensions will be discussed together, just as in the results section of the case studies.

Each paragraph of this chapter will enable to answer one of the research sub-questions.

5.1 Comparison of the three case studies

The figure on pages 54-55 provides a summary of all three case studies and serves as a start-off for a more detailed discussion in this chapter. It is designed in a way that makes it

easy to make a direct comparison between the three cities and their actions in the five governance categories that have been researched.

	Cork	*Utrecht*	*Kuopio*
Mainstreaming health promotion	• Lack of awareness for climate change related health issues among the public • Health sector sees their role in bringing together a wide range of actors to inform about the topic and raise awareness • Use of the EcCoWell approach	• Healthy urban living for everyone as one of the overarching topics at the municipality of Utrecht • Raising awareness for health issues by using a broad definition of health • Team for healthy living environment	
Intersectoral collaborations	**Social networks** • Both departments collaborate with a great variety of actors in interdisciplinary working groups and workshops • No institutionalised collaboration between public health department and climate action unit for policy making **Actors beyond the state** • Public consultation for the climate adaptation strategy **Informal networks** • Advantage of informal networks due to the small size of the city **Bridging organisations** • Involvement in interdisciplinary working groups of the WHO HCN	**Social networks** • Climate change actions make benefit from an established culture of interdisciplinary working groups with holistic approaches **Actors beyond the state** • Collaborations with actors beyond the state (e.g. Health Hub Utrecht or waterproof 030 campaign) • Communication plan within the climate adaptation strategy for collaboration with residents **Informal networks** • Big informal network due to established culture of interdisciplinary working **Bridging organisations** • Good political support from the local government • Involvement in interdisciplinary working groups of the WHO HCN	**Social networks** • Central role for the field of land-use planning **Actors beyond the state** • Workshops and questionnaires to collaborate with a great variety of actors inside and outside of the municipality **Informal networks** • Advantage of informal networks due to the small size of the city **Bridging organisations** • Involvement in interdisciplinary working groups of the WHO HCN • Involvement in national networks for knowledge exchange

| Institutional barriers/ multilevel governance issues | Local level

- Limited time and personal capacity for the development of a climate adaptation strategy | Local level

- Coordination of the many stakeholders involved

- Sometimes unclear responsibilities in financing | Local level

- Lack of financial and human resources

- Slow decision making processes

- Municipal administration processes slow down actions |
|---|---|---|---|
| | Regional level

- Administrational reorganisation due to expansion of the municipality | Regional level

- Gap between different local goals within the region | Regional level

- – |
| | National level

- Political instability and effects of Brexit (national level)

- Gap between local actions and national health system | National level

- Limited capacities for local health actions due to national health system | National level

- Gap between local actions and national health system |
| | International level

- Lack of knowledge exchange at international level due to physical distance | International level

- Wish for a better knowledge exchange and support at international level | International level

- Exchange of experiences mainly at national level |
| Maturity of health in all policies | - Acknowledgement of the importance of the topic

- Great variety of actions and approaches

- Project-based collaboration between departments

- No institutionalised partnership for the development of climate adaptation policy making | - Broad definition of health and holistic approach leads to a high priority of health actions

- Established interdisciplinary collaborations

- Local heat plan as policy that explicitly considers climate change related health issues | - – |
| | **HiAP level four: implemented** | **HiAP level five: integrated** | **HiAP level two: recognised** |

Figure 11: Comparison of the case studies Cork, Utrecht and Kuopio (own figure)

56

5.2 Mainstreaming health promotion

This paragraph will answer the first research question `**How is the mainstreaming of health issues promoted in the case study cities Utrecht, Cork and Kuopio?**´ by comparing and discussing the empirical findings about the mainstreaming of health promotion.

As stated by Jackson (2011) mainstreaming health promotion is a broad concept that offers a lot of possibilities but is challenging at the same time as it lacks a consistent theoretical background. All case studies have shown that due to its interdisciplinarity, the public health sector can make use of its connections to other sectors to raise awareness for public health issues that are associated with climate change with a great variety of methods. Additionally, as stated by the WHO by it can indeed be seen that most public health departments have realised that they are in a powerful position due to the high level of trust that they gain and that they make use of this position (WHO, 2020, p. 24). Even though health systems are usually organised at national level, public health departments have a position at local level that enables them to promote preventive actions in particular. Comparing the case study cities, one can see that all three of them promote health in a different way and are at a different stage of promoting the mainstreaming of health.

The city of Cork is currently putting their main focus on bringing together a great variety of different actors from the municipality as well as outside the municipality (e.g. businesses, residents, the local university) to raise awareness for public health issues. In the context of climate change adaptation they used the EcCoWell approach that has proved to be a successful method to bring people together that usually do not collaborate to address this new topic. This is especially important since some of the stakeholders stated that climate change related health issues are still lacking awareness of the wider public. However, Corks proactive actions are still more focussed on promoting health issues in a more general sense rather than actually mainstreaming health issues into the policymaking of other sectors.

The city of Utrecht has a strong focus on mainstreaming public health promotion especially within the municipality. Utrechts general motto of 'healthy urban living for everyone' has put public health issues high on the agenda of all local actions for the last couple of years. This holistic approach requires a broad definition of public health. By now, the awareness for public health issues is quite high at the municipality of Utrecht.

The city of Kuopio has a quite long tradition of prioritising health issues due to the focus of the local university on the field of public health and their long membership in the WHO Healthy Cities Network. However, the particular actions of the municipality to mainstream public health promotion could not be identified in this study.

The main similarities between the three cities can be described as follows:

Similarities	Differences
• Generally high priority for health issues • Role of the public health department as awareness raiser	• Different level of awareness for climate change related health issues • Different target groups for health promotion (residents vs. other departments within the municipality)

Figure 12: Similarities and differences between the case study cities in mainstreaming health promotion (own figure)

To sum up, one can say that making use of a variety of methods offers some great opportunities to mainstream health promotion. The following actions have proved to be especially helpful:

- Taking a broad definition of public health

- Start collaborations based on small projects as a first step

- Building up interdisciplinary teams

- Organising workshops that bring together a variety of different actors (e.g. EcCoWell approach)

- Trying to establish the health in all policies approach

Other cities that aim at a more extensive promotion of health issues might want to consider these key points as a help for their actions.

5.3 Intersectoral collaborations

This paragraph will provide a response to the second research sub-question: `**How are intersectoral partnerships structured to link health issues and urban climate adaptation?**´ While Bowen and Ebi (2015) emphasised the importance of understanding intersectoral collaborations and claimed for further research in this field, this research contributed to that debate by doing a detailed analysis of intersectoral partnerships in the case study cities. This paragraph will discuss these results by following the structure of the four governance characteristics that influence health and climate adaptation and that have been used for the empirical research.

Social networks

At the municipality of Cork, both departments, public health and climate action, have built up a huge network of stakeholders that they work with and share responsibilities. They both choose for participatory approaches and ask for feedback for their own actions, for example by public consultation of their draft climate adaptation strategy. However, while both departments are proactively reaching out to others, there are no particular agreements between those two departments. Stakeholders of the public health department report that they have not been actively involved in the development process of the climate adaptation strategy.

When the topic of developing a climate adaptation strategy came up, the municipality of Utrecht could benefit from their already existing experience of collaboration between the public health and the spatial planning department. The interdisciplinary project team that is responsible for the climate adaptation strategy actively consulted the public health department throughout the whole development of the strategy. Furthermore, the team of healthy living environment plays an important role for the social networks in between departments at the municipality of Utrecht.

The city of Kuopio generally has a culture of close collaboration in between departments with land-use planning as a central field for bringing together intersectoral actors. However, as the city of Kuopio does not have a specific climate adaptation strategy yet, intersectoral collaborations towards that strategy could not be analysed.

Actors beyond the state

By now, all three case studies seem to recognise the importance of actors beyond the state. While Cork and Kuopio are organising events and workshops (like the EcCoWell events) to inform stakeholders outside the municipality about their actions and Cork was setting out their draft climate adaptation strategy for public consultation, the municipality of Utrecht wants to integrate a communication plan into their climate adaptation strategy to make sure that residents of the city and other important stakeholders stay involved in the local actions. Actions like that to involve actors beyond the state are of importance as they are relevant for environmental governance processes (Bowen et al., 2013).

Informal networks

All three case study cities have proved that even nowadays where work structures of municipalities are very formalised and bureaucratic, informal networks are of high importance for intersectoral collaborations. Especially in relatively small cities where possibilities for financing and other capacities might be lacking, informal networks can compensate and play an important role for local actions. Utrecht states that these informal networks are crucial for

their work as they sometimes result in projects and collaborations that evolve by coincidence due to informal networks of particular people who are involved (Weber, 2020, pers. com.)

Bridging organisations

Bowen et al. (2015) define bridging organisations as

"the linkage between groups, networks and organisations across governance levels"

as they can create links between issues that are interconnected. This can be political support by the local government or networks at different levels of governance. While Utrecht states that they have a very supportive local government, the city of Cork is currently going through a period of political instability after elections which causes in a lack of political capacities to support actions towards public health and climate adaptation. This confirms the statement of Witte et al. (2012) and Uittenbroek (2014) that the overall political priorities at a municipality are of importance and can make a significant difference for local actions. However, as all three case study cities are active members of the WHO Healthy Cities Network, they are counting on the benefits of bridging organisations. Furthermore, they are all involved in various networks at regional and national level for their actions. However, most stakeholders state that so far they found actions at regional and national level more beneficial than those taking place at international level. But as they all believe in the benefit of international collaborations like the Healthy Cities Network, they ask for a better communication and institutionalised ways of knowledge exchange at international level.

To sum up, intersectoral collaborations play an important role in the development process integrated policies in all three cases of this study. However, comparing them gives prove that it is crucial for integrated policymaking to communicate across sectors as early as possible. In order to implement the health in all policies approach in climate adaptation policymaking it is therefore important to integrate stakeholders from the beginning on. Intersectoral working or project groups have proved to be beneficial to raise the awareness for health issues and include their interests into policies by intersectoral collaborations. Giving the spatial planning sector and the field of land-use planning a central role, like being done in Kuopio, can be of help as they usually have a big network of partners across sectors. Furthermore, it can be seen that the level of political support from the local government can have an important impact on the actions towards linking public health and climate change adaptation.

The most striking similarities and differences between the three case studies can be described as follows:

Similarities	Differences
• Shared general goals of the stakeholders involved • Reaching out to actors beyond the state • Involvement in various networks/ bridging organisations • Wish for a better knowledge exchange at international level	• Active, regular collaboration between public health and climate adaptation department • Existence of interdisciplinary teams • Level of political support from local government • (Central) role of the spatial planning department

Figure 13: Similarities and differences between the case study cities in intersectoral collaborations (own figure)

5.4 Institutional barriers and multilevel governance issues

This paragraph aims to discuss the multilevel governance context and the institutional barriers that cities are facing when trying to come up with integrated policies that aim to bridge the needs of public health and climate adaptation. While institutional barriers and multilevel governance issues have been treated as two separate categories in the conceptual framework, it turned out during the empirical research that they are in fact so closely interconnected that they can hardly be separated. The two research questions **'How are the local actions embedded within a wider multilevel- governance context?'** and **'What are the main institutional barriers when bridging health and climate adaptation in an integrated policy approach?'** will be answered in this paragraph.

Combining the two dimensions of multilevel governance issues and institutional barriers can be done by providing an overview of the main institutional barriers of all three case study cities at the different governance levels (see figure 12 below).

Local level	• limited time and personal capacity
	• gap between local actions and national health system
	• insufficient political support
	• Coordination of the many stakeholders involved
	• Sometimes unclear responsibilities in financing
Regional level	• Different needs and priorities of municipalities in the region
	• Other administrational units
National level	• Gap between local actions and national health system
	• Political and economic situation in the country
International level	• Insufficient knowledge exchange between cities
	• Not enough focus on local level actions by international bridging organisations (e.g. WHO)

Figure 14: Main institutional barriers of the three case studies at different levels of governance
(own figure)

Looking at all these different barriers gives prove of the statement of Mickwitz et al. (2009) who state that the embeddedness of a municipality in a multilevel governance system brings additional challenges for integrated policymaking. Furthermore, the insufficient knowledge exchange at international level shows that the relationships and collaborations between stakeholders at local level is closer at local like assumed by Rudolph et al. (2013, p. 41). Sources of funding and a lack of political support like suggested by Bowen and Ebi (2015, p. 80) and Uittenbroek (2014) are indeed an institutional barrier and occur mainly at local level.

If cities that do not have a local climate adaptation strategy yet want to develop one and take an approach that specifically considers health issues as a core topic, taking these barriers into consideration is beneficial. It can help cities to avoid methods that have been proved as unsuccessful and make benefit from the experiences and knowledge of other cities.

5.5 Maturity of Health in all policies

This paragraph will answer the last research sub-question **'How is the health in all policies approach implemented?'**. The four governance dimensions that have been discussed before have an impact on the successful implementation of the health in all policies approach. Applying the maturity model by Storm et al. (2014) to the three case study cities and their actions to integrate health issues into climate adaptation policies has been measured.

While all three cities have a strong focus on the field of public health in general, the results showed that they all have to be categorised at a different stage of maturity when using the model by Storm et al. (2014) . At the municipality of Kuopio, climate change related health issues are recognised to be a challenge for the future of the city and there are aims to consider health issues for the development of a local climate adaptation strategy. However, there is no particular climate adaptation strategy for the city yet where health aims could be systematically implemented. Therefore, the maturity of HiAP can be categorised as **recognised** according the maturity model. In comparison to that, the city of Cork already has a finalised climate adaptation strategy since September 2019. The maturity stage of their actions to integrate health issues into the climate adaptation strategy can be categorised as **implemented**. There is structural collaboration between departments in several problem areas and the public health department had a chance to have an impact on the climate adaptation strategy by reviewing the draft and making suggestions for improvement. However, there are no institutionalised structures for collaboration between both departments and health experts have not been consulted for the development of the strategy from the beginning. The municipality of Utrecht does not have a finalised climate adaptation strategy in place yet. However, during the development process of the strategy, it can be seen already that there is a well established collaboration between the public health and the spatial planning department. Interdisciplinary teams and working groups are sharing broad goals towards a healthy city and are working together to use the HiAP approach for integrating health issues and climate change adaptation. A first and very important milestone of the actions in Utrecht is the local heat action plan. Even though the final results of the climate adaptation strategy in Utrecht cannot be evaluated, actions towards HiAP in Utrecht can be categorised as **integrated** on the maturity scale. The actions in Utrecht give prove of the statement of Storm et al. (2014) that a positive political context as well as a broad vision of health are important pre-conditions to strengthen intersectoral collaborations and improve the level of HiAP (Storm et al., 2014, p. 184).

Even though all three case study cities are at a different stage of maturity of their actions with different levels of success, this study chooses not to put them into a kind of ranking that evaluates the quality of their actions. This choice has been made as it has to be recognised that the cities are embedded into very different regional and national contexts, having different

possibilities and capacities. The aim of this categorisation is rather to give an impression of where cities are currently standing with their actions and which steps could be taken in order to achieve improvement for future actions. Concluding this study, one can say that there are a couple of actions and pre-conditions that offer good opportunities to improve the level of HiAP by implementing health issues into climate adaptation policies:

- Close intersectoral collaborations

- Shared interests

- Good expectation management

- Secured financial resources

- Political attention for the topic

- Awareness for the topic

- Sufficient political support

As this paragraph has answered the final research sub-question, the following chapter will provide a conclusion of this study and give an outlook for the needs of future actions.

6. Conclusion

This study has made a contribution to the rising debate about healthy cities by bringing in the topic of climate change adaptation and taking an integrated perspective that aims at bridging the gap between those two topics. This integrated perspective can be seen as a progress to previous studies that mostly looked at both topics separately. Furthermore, it is in line with Rudolph et al. (2013) who claim for strengthening the shift in mindset towards more integrative approaches of policymaking that aim at improved health outcomes. This study gave an insight into local governance actions that aim at bridging that gap by integrated policymaking. With the help of the three cities Cork (Ireland), Utrecht (Netherlands) and Kuopio (Finland) barriers and opportunities in integrated policymaking could be identified at local level. Focussing at local level actions is in line with the Local Agenda 21 and is of importance as cities are hotspots for climate change related health issues. However, while focussing at local level actions this study also considered the wider context by looking at actions at all levels of governance.

As the topic of combining public health issues and climate adaptation actions is relatively new and not much research has been conducted in that field before, this study took a quite explorative approach to get an overview of actions that already exist in European cities. This can help to collect opportunities that might help other European cities for their own actions and policymaking. Even though the results of this study cannot be generalised for all European municipalities, they still give an idea of opportunities and barriers that cities are facing that can, at this stage, be seen as frontrunners in that field in Europe.

For the evaluation of the three case studies, a conceptual framework has been developed that takes into account five dimensions of governance that are of importance for integrated policymaking in the field of public health and climate change adaptation. Measuring the maturity of the HiAP approach was helpful to identify barriers and opportunities of integrated policymaking. The results of the case studies show, that all three cities are currently at a very different point of developing their climate adaptation strategies and embracing the health in all policies approach even though all three cities have been defined as frontrunners in Europe. These differences make clear once again how important the local (and national) context of a city is for its local governance and policymaking. The contextualisation of the case studies was therefore an important element of this work.

The following barriers and opportunities represent the main outcomes of the study and might therefore be of special interest for other cities that want to get active in the field of integrating health issues into climate adaptation policies.

Main barriers

One of the main issues that has occurred is the fact that there is still a lack of awareness for the relevance of climate change related health issues. Raising awareness therefore remains important in the future to foster integrated policymaking. This is in line with the goal of the WHO Copenhagen Consensus of Mayors to strengthen the HiAP approach. All members of the Healthy Cities Network should therefore give their best to contribute to that goal. Another issue that cities seem to face quite often is the coordination of the many stakeholders that are involved in the local actions. This often leads to unclear distributions of tasks and difficulties in sharing financial and human resources as stated by Rudolph et al. (2013). Furthermore, an often detected barrier is that communication between the health and the climate adaptation department takes place too late in the process of policymaking which can hinder or slow down the actions. Therefore, early communication between the different sectors is necessary.

Opportunities

While detecting barriers of policy integration this study was also able to find some opportunities that are worth considering for future actions. A very important precondition for successful policy integration is to take a broad definition of public health and wellbeing. Cities that have done so make it easier for other departments to integrate health into their policies and can therefore strengthen intersectoral collaborations. The actions of the city of Utrecht are worth mentioning as a good example for that. Thereby, municipalities can act as key-stakeholders to make a contribution to the healthy cities debate by recognising and considering environmental challenges. Furthermore, it is important to make sure that collaborations are secured from the beginning to make sure all partners can contribute to a better and more sustainable way of urban governance and policymaking.

Regarding the importance of the topics public health and climate change adaptation which will even increase in the upcoming years, this work aims to finish with a few messages that are of great importance for future actions. The topic of climate change is affecting each and everyone of us and will increasingly do so in the future. Therefore, it is important to overcome competitions between cities and rather aim for a closer collaboration between cities in order to learn from each other as this is a challenge that will be faced by everyone. One of the main outcomes of the study is that at this point there is a need for a better knowledge exchange between cities at international level due to the great variety of actions that exist in Europe. With regards to future actions this study contributes to that need by providing an international comparative case study which points out barriers and opportunities in cities and could therefore be a start off for more comparative research as a base for a better knowledge exchange. The WHO Healthy Cities Network provides a great base for this experience and

66

knowledge exchange and should put more effort into regular exchange possibilities between cities to increase the benefit. While WHO actions so far still have a stronger focus on national actions, actions at local level actions should be even more strengthened in the future. It is worth referring back to Slesina (2001) who quotes that

"Healthy cities should continuously improve the physical and social living environment".

Looking at future actions, this will only be possible by actively taking the health effects of climate change into account.

The final message tries to motivate and empower more cities in Europe (and the world) to not be afraid to dive into the topic and tackle climate change related health issues at local level. The topic is new enough to most stakeholders at municipalities, so there is not much that can go wrong by trying out new actions. This is especially important to know for smaller municipalities that might not have the same financial and human resources as big cities. However, small cities often have the advantage of a closer informal network which is a great advantage to set up new collaborations and can often compensate possible lacks of resources.

Future research about this topic could and should consider an even bigger variety of European cities to compare their actions and facilitate a better knowledge exchange at international level. Observing the actions in the upcoming years and the improvement of the more and more upcoming climate adaptation strategies will be of interest. Making sure that public health and climate adaptation actions keep up and even intensify their close relationship will be crucial in order to contribute to a closer connection of the SDGs. Spatial planners will be important stakeholders in this debate in the upcoming years as they can help to bridge this gap and make European cities healthy and climate adaptive.

References

Adger, N.W., Arnell, N.W. & Tompkins, E.L. (2005). Successful adaptation to climate change across scales. *Global Environmental Change* 15, 77–86.

Barton, H. & Grant, M. (2006). A Health Map for the Local Human Habitat. *Journal of The Royal Society for the Promotion of Health* 126 (6), 252-253.

Baumeister, H., Köckler, H., Rüdiger, A., Claßen, T., Hamilton, J., Rüweler, M., Sahin, C., Baumgart, S. & Hornberg, C. (2016). Leitfaden Gesunde Stadt - Hinweise für Stellungnahmen zur Stadtentwicklung aus dem Öffentlichen Gesundheitsdienst. Bochum: Landeszentrum Gesundheit Nordrhein-Westfalen.

Birkmann, J., Garschagen, M., Kraas, F. & Quang, N. (2010). Adaptive urban governance: new challenges for the second generation of urban adaptation strategies to climate change. *Integrated Research System for Sustainability Science* 5, 185-206.

Bowen, K.J., Ebi, K., Friel, S. & McMichael, A.J. (2013). A multi-layered governance framework for incorporating social science insights into adapting to the health impacts of climate change. *Global Health Action* 6, 21820.

Bowen, K.J. & Ebi K.L. (2015). Governing the health risks of climate change: towards multi-sector responses. *Current Opinion in Environmental Sustainability* 12, 80-85.

Brouwer, S., Rayner, T. & Huitema, D. (2013). Mainstreaming Climate Policy: The Case ofClimate Adaptation and the Implementation of EU Water Policy. *Environment and Planning C: Government and Policy* 31 (1), 134-153.

Bryman, A. (2012). *Social research methods*. Oxford University Press, Oxford.

Derham, J. (2017). Climate Change and Health. [Online] Available at: https://www.youtube.com/watch?v=LS0ty5qHpn8 (Accessed 29 May 2020).

Ebi, K.L. & Semenza, J.C. (2008). Community-Based Adaptation to the Health Impacts of Climate Change. *American Journal of Preventive Medicine* 35 (5), 501-507.

Flynn, B.C. (1996). Healthy Cities: Toward Worldwide Health Promotion. *Annual Review of Public Health* 17, 299-309.

Gemeente Utrecht (2020). Utrecht – stad voor gezond stedelijk leven voor iedereen. Municipality of Utrecht. [Online] Available at https://www.utrecht.nl/bestuur-en-organisatie/utrecht-stad-van-gezond-stedelijk-leven-voor-iedereen/ (Accessed 20 April 2020).

Godsmark, C.N., Irlam, J., van der Merwe, F., New, M. & Rother, H.-A. (2019). Priority focus areas for a sub-national response to climate change and health: A South African provincial case study. *Environment International* 122, 31–51.

Grothmann, T. &. Patt,A. (2005). Adaptaive Capacity and Human Cognition: The Process of Individual Adaptation to Climate Change. *Global Environmental Change* 15, 199-213.

Hantrais, L. & Mangen, S. (ed.) (1996). Cross-National Research Methods in the Social Sciences. Printer, London & New York.

Harlan, S.L. & Ruddell, D.M. (2011). Climate change and health in cities: impacts of heat and air pollution and potential co-benefits from mitigation and adaptation. *Current Opinion in Environmental Sustainability* 3, 126–134.

Helbig, A., Baumüller, J. & Kerschgens, M.J (1999). Stadtklima und Luftreinhaltung. Springer, Berlin, Heidelberg.

Holsti, O. R. (1969). Content Analysis for the Social Sciences and Humanities. Reading, MA: Addison-Wesley.

Howlet, M., Vince, J. & del Rio, P. (2017). Policy integration and multi-level governance: dealing with the vertical dimension of policy mix designs. *Politics and Governance* 5 (2), 69-78.

Jackson, S.F. (2011). Mainstreaming Health Promotion. *Global Health Promotion* 18 (2), 3–4.

Kendrovski, V. & Schmoll, O. (2019). Priorities for Protecting Health from Climate Change in the WHO European Region: Recent Activities. *Bundesgesundheitsblatt* 62, 537-545.

Keskitalo, E.C.H. (2010): Developing Adaptation Policy and Practice in Europe: Multi-level Governance of Climate Change. Springer Netherlands, Dordrecht.

Kumar, S. & Preetha, G.S. (2012). Health Promotion: An Effective Tool for Global Health. *Indian Journal of Community Medicine* 37 (1), 5–12.

Lafferty, W. & Hovden, E. (2003). Environmental Policy Integration: Towards an Analytical Framework. *Environmental Politics* 12 (3), 1-22.

Mickwitz, P., Aix, F., Beck, S., Carss, D., Ferrand, N., Görg, C., Jensen, A., Kivimaa, P.,Kuhlicke, C., Kuindersma, W., Máñez, M., Melanen, M., Monni, S., Pedersen, A.B.,Reinert, H. & van Bommel, S. (2009). Climate Policy Integration, Coherence and Governance. *PEER Report No 2. Helsinki: Partnership for European Environmental Research.*

Moser, S.C. & Ekstrom, J.A. (2010). A framework to diagnose barriers to climate change adaptation. *National Academy of Sciences* 107 (51), 22026-22036.

Mücke, H-G., Straff, W. (2019). Zunehmende Wetterextreme sind Gründe, die gesundheitliche Anpassung an den Klimawandel ernst zu nehmen. *Bundesgesundheitsblatt* 62**,** 535–536.

Naess, L.O., Bang,G., Eriksen,S. & Vevatne, J. (2005). Institutional adaptation to climate change: Flood responses at the municipal level in Norway. *Global Environmental Chance* 15 (2), 125-138.

Nerini, F.F. et al. (2019). Connecting climate action with other Sustainable Development Goals. *Nature Sustainability* 2, 674-680.

Pierre, J. (2005). Comparative Urban Governance - Uncovering Complex Causalities. *Urban Affairs Review* 4, 446-462.

Rijksinstituut voor Volksgezondheid en Milieu (n.d.). Over Healthy Urban Living. [Online] Available at: http://www.strategischprogrammarivm.nl/RIVM_brede_themas/ Healthy_Urban_Living/Intro (Accessed 01 November 2019).

Rudolph, L., Caplan, J., Ben-Moshe, K., & Dillon, L. (2013). Health in All Policies: A Guide for State and Local Governments. Washington, DC and Oakland, CA: American Public Health Association and Public Health Institute.

Runhaar, H., Driessen, P. & Uittenbroek, C. (2014). Towards a Systematic Framework for the Analysis of Environmental Policy Integration. *Environmental Policy and Governance* 24, 233-246.

Slesina, W. (2001). Gesundheit und Stadtentwicklung. *Gesundheitswesen* 63 (1), 48-51.

Stead, D. & Meijers, E. (2009). Spatial Planning and Policy Integration: Concepts, Facilitators and Inhibitors. *Planning Theory and Practice* 10 (3), 317-332.

Storm, I. et al. (2014). Measuring stages of health in all policies on a local level: The applicability of a maturity model. *Health Policy* 114, 183-191.

Suprayoga, G.B., Witte, P.A. & Spit, T.J.M. (2020). Identifying Barriers to Implementing a Sustainability Assessment Tool for Road Project Planning: An Institutional Perspective from Practitioners in Indonesia. *Journal of Environmental Planning and Management* 37 (4), 1-22.

Uittenbroek, C. (2014). How Mainstream is Mainstreaming? The Integration of Climate Adaptation into Urban Policy. [Online] Available at: https://dspace.library.uu.nl/bitstream/handle/1874/301676/uittenbroek.pdf?sequence =1 (Accessed 24 June 2019).

Underdahl, A. (1980). Integrated marine policy; What? why? how? *Marine Policy* 4 (3), 159-69.

van den Brink, M. (2009). Rijkswaterstaat on the horns of a dilemma. PhD dissertation. Radboud University, Nijmegen.

Vogel, B. and D. Hennstra (2015). Studying local climate adaptation: A heuristic research framework for comparative policy analysis. *Global Environmental Change* 31, 110-120.

Watts, N. et al. (2018). The Lancet Countdown on Health and Climate Change from 25 Years of Inaction to a Global Transformation for Public Health. *Review* 391, 581-630.

Witte, P.A., Wiegmans, B.W., van Oort, F.G. & Spit, T.J.M. (2012). Chokepoints in corridors: Perspectives on bottlenecks in the European transport network. *Research in Transportation Business & Management* 5, 57-66.

WHO (2009). Protecting Health from Climate Change. Global research priorities. [Online] Available at: https://www.who.int/globalchange/publications/9789241598187/en/ (Accessed 20 May 2020).

WHO (2015). Implementing the European Regional Framework for Action to protect health from climate change. A status report. [Online] Available at: http://www.euro.who.int/__data/assets/pdf_file/0006/276117/Implementing-Euro-Framework-Action-protect-health-climate-change-en.pdf?ua=1 (Accessed 11 April 2019).

WHO (2017). Fact Sheet 3 - Climate Change and Health. Strengthening adaptive capacity and resilience and supporting measures to mitigate climate change. [Online] Available at: http://www.euro.who.int/__data/assets/pdf_file/0012/341130/Fact-Sheet-3-Climate-Change-and-Health.pdf?ua=1 (Accessed 16 April 2019).

WHO (2018a). Climate Change and Health. Fact sheets on sustainable development goals: health targets. [Online] Available at: http://www.euro.who.int/__data/assets/pdf_file/0007/347983/13-Fact-sheet-SDG-Climate-change-FINAL-25-10-2017.pdf?ua=1 (Accessed 26 March 2019).

WHO (2018b). Copenhagen Consensus of Mayors: Healthier and Happier Cities for all - A transformative approach for safe, inclusive, sustainable and resilient societies. [Online] Available at: http://www.euro.who.int/__data/assets/pdf_file/0003/361434/consensus-eng.pdf?ua=1 (Accessed 16 April 2019).

WHO (2018c). Public Health and Climate Change Adaption Policies in the European Union. Final report. [Online] Available at: https://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/publications/2018/public-health-and-climate-change-adaptation-policies-in-the-european-union-2018 (Accessed 20 May 2020).

WHO (2019a). Health, environment and climate action: Policy Brief. [Online] Available at: https://www.euro.who.int/__data/assets/pdf_file/0009/397791/SDG-13-policy-brief.pdf (Accessed 25 May 2020).

WHO (2019b). Health, einvironment and climate change. [Online] Available at: https://www.who.int/phe/publications/global-strategy/en/ (Accessed 20 May 2020).

WHO (2020a). Constitution. [Online] Available at: https://www.who.int/about/who-we-are/constitution (Accessed 20 February 2020).

WHO (2020b). Seventh Meeting of the Working Group on Health in Climate Change (HIC) of the European Environment and Health Task Force – Meeting Report. [Online] Available at: https://www.euro.who.int/__data/assets/pdf_file/0004/440338/7th-meeting-Health-in-Climate-Change-HIC.pdf (Accessed 20 May 2020).

Yin, R. (2009). *Case Study Research*. Thousand Oaks: SAGE.

List of Figures

Images on titlepage:

Annex

I Interview Guidelines

Guideline 1: Health Experts

1.) Can you briefly introduce yourself and tell me what exactly your function is at the municipality of [*Utrecht/ Cork/ Kuopio*]?

2.) What are currently your biggest health challenges and what actions do you take to address negative health outcomes of climate change?

3.) How do you promote health and the Health in all policies approach?

4.) Why do you think health is not so much in the discussion yet when talking about climate change? What makes it so hard to come up with actions for it?

5.) Have health experts or people of your department been involved in the development process of the climate adaptation policy?

6.) How do you collaborate with other departments within the municipality to integrate health issues into the local climate adaptation strategies?
   - Explicit projects?
   - Who is in the lead? Do you approach them or the other way round?
   - Are there explicit agreements with them that you work upon?

7.) Are you getting sufficient political support?

8.) Do you collaborate with other stakeholders apart from people working for the municipality when addressing health and climate change? (University? Private companies? Other municipalities? Residents?)

9.) What are the biggest challenges when collaborating with so many different stakeholders on that topic? Can you tell me about your positive or negative experiences?

10.) How do you profit from the HCN (or other networks) for health and climate adaptation?

11.) Is there something about the health actions (towards climate adaptation) in [*Utrecht/ Cork/ Kuopio*] that other cities (in Europe) can learn from?

12.) What would you like to improve for actions towards health and climate change in [*Utrecht/ Cork/ Kuopio*] in the future?

13.) Is there anything you would like to add or ask?

Guideline 2: Policymakers from the Spatial Planning/ Climate Adaptation Department

1.) Could you briefly introduce yourself and tell me what exactly your function is at the municipality of [*Utrecht/ Cork/ Kuopio*]?

2.) What are currently the biggest challenges for climate adaptation in [Utrecht/ Cork/ Kuopio]? (What role does health play in that?)

3.) What are the key priorities in your climate adaptation strategy? What´s the position of health issues in that strategy?

4.) Who was involved in the development process of [*Utrechts/ Corks/ Kuopios*] climate adaptation policy and how do you organise the collaboration of stakeholders?

5.) Were there stakeholders involved apart from people working for the municipality? (University? Private companies? Other municipalities? Residents?)

6.) What were the biggest challenges of collaboration in the development process of the policy? Can you tell me about your positive or negative experiences?

7.) Do you benefit from any (inter-)national networks on that topic?

8.) Is there something about climate adaptation in [*Utrecht/ Cork/ Kuopio*] that other cities (in Europe) can learn from?

9.) What would you like to improve for the climate adaptation in [Utrecht/ Cork/ Kuopio] in the future?

10.) Is there anything else you would like to add or to ask?

Interviewee: Denise Cahill
Position: Healthy City Coordinator, Cork City Council
Date: 05 February 2020
Interviewer: Luca Gediehn
Interview conducted via Skype

Luca Gediehn: It's really great that you take the time, that´s really nice. Can you briefly first tell me what exactly the Health Department does in Cork and what your function is?

Denise Cahill: Okay so Cork has been a Healthy City since 2012, a designated WHO Healthy City. In Cork our municipality works different to the rest of the European cities in that our local authority does not have a remit to manage the health services. So we have a national health service which is managed at local level but separate to our municipality or local authority. So Healthy Cities in Cork is an interagency collaboration between the community sector, the local authority and the health service executive. So it's basically a partnership of agreement to work together to obviously become a Healthy City to strive towards health at an urban level. So I've been the coordinator since 2012 and I'm employed by the health service but I mostly work side of the health service which the agencies around the table and which the local authority, predominantly Cork City Council in terms of health and promotion in the city. Is that a sufficient explanation?

LG: Yes, it is, thank you! You already told me that actions and the topic of health and climate action are still in the process of development, so can you tell me what are currently your actions towards negative health outcomes of climate change?

DC: In terms of climate change in public health?

LG: Yes.

DC: Okay, so as you're probably aware at the moment the WHO designation requires that we plan to six P´s and one of those P´s under the (terms) of the Healthy Cities is `planet´. So we embarked last year to do some work around this particular area because it is an area we hadn't developed in the past. So we organized a number of events. The first thing we did was a public seminar which specialized in this area speaking to the public about the connection between public health and climate change and the direct impacts, but also how we manage and adapt to climate change to public health measures and that was fully attended, fully booked out actually and in the city centre. Then the next day we brought some discussion from that event, we had a keynote speaker who had attended the public event and she spoke at a seminar the

75

next day, releasing what has been said and what kind of questions emerged from the public, but also talking from her expertise. Her name is Dr. Chrisie Goodsmark and she is based in University College Cork in the school of public health and her area of expertise is public health and climate change. She spoke also of the bigger picture in terms of health. Her speech is on the Cork Healthy City's website, if you want to look at it at any stage yourself. And she set the tone for what we call an EcCoWell Workshop for the morning. So EcCoWell is an approach that we take in Cork of interagency collaboration across health […] the environmental (green) agenda and the private sector. So in the methodology of it she reviews to bring this four areas of work together to see how we can collaborate to coproduce such a work together around particular issues. So we thought that the climate change is the perfect theme for an EcCoWell event and it actually emerged that it was. The approach that we take is the open space technology which is somebody speaks for three minutes on a topic and then members of the larger audience choose which topic they want to follow or which they think they want to learn more from or contribute ideas to and you can rotate that four times. Now four speakers spoke in the first session and they spoke to their topic and then after the four people had spoken the large group followed them around and they created ideas around what we can do in Cork to enhance that. So we had experts from the university and from people in practice around these topics. So the first person spoke about transport, the next person spoke about air quality, the next person spoke about energy and the fourth person in that group spoke about the food system. So in every workshop we had facilitators. After they spoke, they only spoke for three minutes, that's a very unique method but I assure you it works really well. After they spoke four minutes the group was divided into four groups and then after half an hour they were invited to move to whatever group they wanted to and then we rotated a third time. So we asked the facilitators to generate concrete ideas of what we can do in Cork. So what has emerged from the ideas is a lot of opinions and a lot of ideas. Some of them would be policy level ideas and some of them are grassroot-type-of action ideas underground. And what we have done, because each of those groups was facilitated by an expert on the topic that allowed for any misinformation to be read out, that was our methodology. So the speaker who is an expert, say on transport, made sure that some of the suggestions that they made that weren't realistic were rooted out of the discussion and they talked that through. Then we had a break and then we had another four and the next four was water, biodiversity and green infrastructure, emergency response to extreme weather events and health as a leader for climate action which is kind of what you are studying yourself. So again, experts to each of those areas work that works to that area or is researching or studying that area, led or spoke to those topics and then led the discussion in the groups and helped to facilitate the actions that emerged. So what has been agreed from that is that the actions that are actions on the ground. The Cork Healthy Cities Action plan under the Ps will adapt and adopt those actions for delivering for the next

ten years and the policy level suggestions, from which there are many, for example in transport there is a big discussions around how we need to prioritize active means of transport, we to reduce current space, this type of policy level suggestions. Those suggestions will be going to the climate action committee which is a political committee in Cork City Council and they are going to take that feedback and try to deliver on it at a policy level. So out of the two days of events and the work that went into it in advance in terms of the expertise, has emerged a series of actions that we're currently working through to turn into concrete smart actions for our Healthy Cities Action Plan and also policy level actions that we got through the climate policy group in Cork City. We also at the same time, actually the night of the public event, the climate adaptation strategy for Cork City Council was launched and there were various of actions in that, that includes, from a Healthy Cities perspective, they see our role, now I'm hoping that this will evolve, but they see our role very much as engaging with the public. Building public understanding, building public awareness of climate adaptation and what the public basically can do to adapt. They are currently in the process of developing their mitigation strategy. They were legally obliged to produce the adaptation strategy first and now they are doing a mitigation strategy as well. So those four key documents are what we are hoping will drive us forward. That happened in October, in November then we had an intergenerational climate discussion. I am very sure you are aware of the Fridays for Future movement across the world, in Cork City we have a Friday for Future striker who is in Cork City Council every Friday morning, Saoi O'Connor. So I co-chaired a conference on that and what we had was multiple discussion groups again, around issues that were pertinent to the intergenerational, for young people and older people, around climate. We had an equal footing in terms of young people speaking and older people, will say experienced and researchers in the workplace as well as older adults, speaking to topics. Then we asked the young people, with the intergenerations at their tables, to develop what they [11:20] as a new system of how we can go forward, how we can build a new system. That feedback is going into a national level, the environmental protection agency in Ireland which is seeking input on a national climate strategy and that will set be in there. So both, I suppose, from Cork I suppose we have taken a start, we are not afraid to go into it and what I am finding from other cities when I talk to other cities is there is a fear of going into this space because either the people working in Healthy Cities don't feel that confident to go there or the people in the space of environment and climate change are not aware that Healthy Cities exist or that health promotion has skills that can actually support that interagency approach. So in summary what I would say is the EcCoWell approach that we adopted to the seminar in October was hugely successful. It's a fantastic way of engaging the private sector or the economic sector, the health sector, the education sector, the cultural sector and the green and environmental sector and getting them together to kind of, I suppose, really look at issues that

are of impact or not and that worked really well. So it's a methodology that I would definitely promote and I suggest in terms of other cities looking at it from that perspective.

LG: Great! You said that the climate adaptation policy was basically launched around the same time when you had your workshop?

DC: It was very interesting. The night of our public event, which was the 31st of September, that was the date that the climate adaptation strategy went through for approval by the councellor in Cork City Council. So some of the councellors came from signing of the adaptaion strategy over to the public event across the road. It was by chance but that happened but is was timely. Then the director of the environment who is charged with leading out on that adaptation strategy, he came to the EcCoWell event the next morning and spoke about the ambition they have for that adaptation strategy to the room full of experts on each of this topics and the people, I suppose the stakeholders from the five different sectors around, how he'd hope to be able to work with them to implement the adaptation strategy. So it was a very successful approach, I suppose the success through the day was brilliant in that the methodology really worked and I really recommend it and I think it has to be seen to kind of understand it but we have an expression here in Ireland: The proof isn't the pudding. In that the proof will be how we implement these actions. And that's in my experience in terms of not just climate change, not just this area. We are very good at engage and ask people what actions they want but it's the follow-through and the delivery of those actions that really is the key and difficult part. And that's the stage we are at now in Cork and we try to bring these actions very much into our action plan and I am delighted to have the team of planners in our action plan because we didn't have that before I guess. As much we did of course put reference to it in previous stages of Healthy Cities but it's very much to the four and very equal now to the other areas of public health and Healthy Cities under the Copenhagen consensus. So personally I'm delighted with that and I suppose the other thing that I learned is it's an area of interest to me personally. So I was not afraid to take it on. I'm not afraid to go there because I have a basic understanding of the climate change crisis and I wasn't afraid to kind of facilitate and I went into it with the attitude 'I don't need to be the expert, I have all the answers' but what we need to do is create a space to create the answers.

LG: Have health experts or people of your department also be involved when the climate adaptation policy was developed?

DC: That's an interesting task now, because I suppose the climate adaptation strategy took a very different approach and it's not an area that I'm working in. It's the Cork City Council's approach and I suppose they have a different way of engaging than I would. Now I was working hard to build relationships for that department, there's only one or two people in it at the

moment. I'm really keen to build that relationship because I want them to see us as a resource for helping them to engage with people in a real way. So I don't want to be critical of the approach that they have undertaken but it wouldn't have been the approach I would have taken. To engage with the public, they put this strategy up on the website and they invited people to submit. Now Healthy Cities and the Cork Food Policy Council and Green Spaces for Health made submissions to that strategy but they weren't big supporters unfortunately.

LG: So you would say when collaborating with them or people who developed the strategies, rather they have experts to take the initiative to approach them to collaborate than the other way around?

DC: Unfortunately, yes. I think what happened with the climate adaptation strategy was there was a deadline on the 31st of September so there was a limit to time. They were legally obliged to produce it so they had to do it really fast and they didn't get the chance to engage with the public the way they way they probably would have liked to. So when we were organizing this event they were delighted but it was too late for adaptions. Their strategy was being launched on the night we were starting this process but they have out in their adaptation strategy that it is a document which will evolve, it's not set, it will be added to, it will evolve as time goes on and there's a learning involved and I think you have to take that approach because this area is so new, you can't have a set number of actions for the next ten years because in two years time we will have greater knowledge and expertise around particular areas and we are going to realise that's actually that´s not the way to go. That's an area of interest for Christie Goodsmark who is from UCC and she talks very much about being careful about the actions that we take that they don't cause more damage. There is this kind of famous anecdote here in Ireland in that, you know, when the green party were in government they brought in a reduction on diesel cars, thinking that it was a good climate move and now it's emerged that actually the particular diesel in cities is not good at all for the environment. So I suppose we are still learning in this space so we have to be open to adapting and evolving and changing and growing our action plans in accordance with the knowledge that we gather as we go forward but being very careful not to cause more damage with what we are trying to do. Electric vehicles would be another example. Instead of reducing the number of people actually driving, focusing on electric vehicles, which tends to happen here as well from a political perspective, that's causing more harm to the environment as such.

LG: Interesting, because I have talked to a couple of people now and everyone tells me that it's usually the health department who takes the initiative to raise awareness for health issues or negative health outcomes of climate change. Everyone is talking about climate change and how to adapt to it, how to mitigate it but everyone is usually concerned about how to protect the environment but not that many people take health as a major issue in that, it feels like.

DC: And that was the focus of our public event about how it does impact on our health and what the environmental protection agency in Ireland has[…] They led the discussion on how health is a leader for behaviour change in climate change because they realised that now[…] My opinion on why maybe health has been leading on this because in health we´re used to be dealing with people. In this space of climate adaptation in local authorities it's generally engineers, it's generally planners, it's generally transport people. They are used to dealing with infrastructure. As a result they are only thinking about that, they haven't got the skills or the experience of engaging with people around behaviour change. In the health service, in the health arena and in the health promotion in particular that's our bread and butter, that's how we work. We work with people all the time, it's always about the impact on people and how people can leave a thing. So it's very interesting in terms of people's perspective and approaches to this whole area and that's where the value of bringing somebody with an engineering thinking together with people who work on the frontline, in flood areas or in an emergency response, in ambulances, together with people in the private sector who are taking profit and how do we survive through this recession, you know, profit, profit, profit. It's very interesting to bring all of those people together, because they are not used to working together and when they come together it's incredible what emerges and that's where the EcCoWell approach and methodology has been really beneficial, I feel. It's because of the history using that approach in Cork that these sectors coming together isn't hugely unusual and we also have a very small city. We just expanded the city boundary, it's now 200,000 people, it's used to be 120,000. So it's a small city where agencies know each other, people know each other, they are used to engaging and I suppose we have to engage to get thing done, really. So there's a history of collaboration and working together and I think that helped as well. But it's very early days and as I said we are only starting the discussion. The real hard work of the actions is yet to come, you know.

LG: Do you get political support from local authorities to improve that collaboration?

DC: Yeah, so in Cork City election, which was just last year, we got a major input of green councellors. We got more green councellors than we ever had, now, it's only five or six I think but we never had that many. As a result they are very active and proactive and they have set up an interparty, crossparty, a climate action committee. They are charged with driving the climate adaptation strategy but I met with them and I presented to them on what we were planning to do, we hadn't this done yet, and they said they wanted the feedback, they need actions, they are looking for actions because they are a new group. So they wanted the outcomes of this workshop so be sent back to them so they can attempt to deliver on the policy level suggestions that the group came up with. That´s where the political support is coming from. Then you have obviously individual councellors with an interest in this area or maybe an

expertise or background in this area that are keen to drive it on. But it's troubling because they are individuals and you do need a bit of consensus, you need a mandate, you need a reason. So it's difficult for them and I acknowledge that. So while you have champions within the political structure, it's that structure really to make things happen in this climate action committee because they have a mandate. A mandate or permission to do work in this area.

LG: That's good because otherwise it also feels like it often happens from personal interest and people that are in charge are interested in an certain area but there are not really agreements that you work upon, right?!

DC: It is fascinating because if you just got a group of people into a room and say 'What are the answers in terms of climate change?', things will emerge. But it's good to have experts in there. Not for controlling the discussion because sometimes academic experts don't have a knowledge of what goes on in the round. They may know about the theory but not the practice and not understand how things work. But when you mix those people all together that's when you get really good quality suggestions, I feel. In theory that's what should emerge. You have to mix those people. Planners on the ground, transport engineers, health professions, public health, nurses, teachers, community workers on the ground, mixing with people who are fully combined with the Copenhagen consensus. That's like our mandate to do this work. To explore actions in this area, that's why they've given us the permission to actually connect our work to climate change. That's huge from our perspective.

LG: So that was the initiative?

DC: That's the reason to initiate this work, exactly. That's number one. Number two then, the environment subgroup, the environmental health subgroup that Miriam Weber is overseeing. Again, we are a member of that. It's not very active, it's difficult to cover all so dispersed on the continent. But again, this gives us a mandate, a permission to try to explore things and for me to say, look, we are a member of this subgroup. We have to try something. It just gives me a reason to pick up the phone to somebody and say, you know, we are part of this European network, we need to progress. So again this gives me another mandate. And then I guess the network gives us the opportunity to explore. Our telly conferences, our annual business meetings, there has been presentations on different elements of climate change, the fact that it's connected with the SDGs and the UN is obviously another beneficial element to the network and to us doing this kind of work. So you just see like your work isn't being done in isolation in a tiny room in Cork City, it's actually feeding into a bigger machine and is actually impacting your learning and you are contributing to a bigger machine of movement and change. So the network has been hugely beneficial from that perspective but not in a practical sense. I'd love more, you know, I'd love more from capacity building workshops or there hasn't been anything

like that. It's challenging, so I understand why, it's because we are all over Europe but I'd love at the annual business meetings to be attending workshops on tools for engaging around the environment but what tends to happen at our annual business meetings is we talk and talk and talk about what we'd like but we never seem to deliver it. Put into action, exactly.

LG: That's pretty much the same things Miriam is also struggling with, that she would like to improve. Are you active in the national network of Healthy Cities in Ireland?

DC: We have a national network. Our national network is very much aligned with our national health policy which is Healthy Ireland. Less so with the WHO. Now we are a member of the WHO network so Cork is different to the other cities and counties in Ireland in that we are a WHO designated and we have remained also designated separately as a city to the WHO network so we are very active on that. Our political rep is a member of the national network as he represents the political establishment in that network and then I'm one of two coordinator reps on that national network as well. But our national network is very much focused on Irish health policy which I think is a little bit too limited from our perspective. We have been a part of WHO for ten years. I see that as the way forward because national health policy changes here. Healthy Ireland is very much embedded in our policy, in our health services. But it is very lifestyle-focused and that would be my big concern about that.

LG: I see. Is there anything what you think other cities in Europe could learn from Cork? For example you said that Cork has the advantage of being a small city so coordination is easier. Could bigger cities learn anything from that or rather other cities in general?

DC: I think about the methodology and the mandate. So if you have the mandate and you bring a good methodology I think what Healthy Cities have to offer in this domain is a platform for discussion and action. I think our role is to A) inform about the impact on health and make sure that that's understood in terms of that municipalities and engineers and environmental departments and housing departments and transport departments understand the climate change impact on health. So they need to understand that the health service is going to be dealing with these issues for the next decades, whether it's infectious diseases, our flood risk, our emergency extreme weather events, they are the ones dealing with it and unless there is an understanding of that, that's where I would start. Then our role is to bring all of the stakeholders together. It's a platform for action and it's a platform and mandate to do something and I think that's where we add value to this whole area. We can bring people together and we can look at driving actions through our action plans and I suppose we can do that at an interagency and multi-stakeholder level. That's the value we add to this and then obviously we oversee the delivery of those actions where we work in partnership to make sure this actions take place. That's where I see our role. So you asked about Cork, that's what I would be saying.

It's about having a bit of courage to try and do something about it and explore it. It's not an area where you have all the answers. It's about an openness to hearing solutions when we come together rather than standing up and saying 'We have to do this.'. Now there are certain things of course have to do in terms of putting things in place around reducing carbon emissions and all of that. That's the policy level. But when it comes to action on the ground I think we have got the scope to bring those stakeholders together and the expertise to bring them together and try and find those solutions at a local level because every single city has different issues. Every city has to look at their own action plan. I think Healthy Cities fives that platform for it so I suppose that's what we have learned to the process and if there is mutual respect and there is parity of esteem where everybody is seen as equal and their knowledge and information is valuable then that can really bring really good actions. But if there's the hierarchy of 'No you are wrong' and there can be that with climate, that can be like 'No that's wrong, this is wrong', whatever. I think you just have to go into it, gently, and try out the solutions together and be patient with it. That's what we have learned so far but as I said we are on the first step of a very long stairs of action. We are only starting the discussion and that's what I would be suggesting to cities, especially the larger cities. Start the discussion in your cities, start doing it. Just having the conversation is a huge step towards action.

LG: Would you have an idea of how to better integrate health also really in the policies of climate change?

DC: You see, in Ireland it's about national policy change so for me it's about educating politicians. I think it's about educting them because at the moment we are going through a national election process here. The election is on Saturday and even on Monday there was a national discussion or a program with politicians on climate change and they haven't a clue. It's very depressing. So the policy stuff needs to come from a national level but the action happens at local level so for policy for me it's about the national informing, informing the politicians that they can do that to their local political structure. But unless they understand it and get it, it's very difficult. Now we also in Ireland had a citizens assembly around climate change and it was excellent. It was a weekend-long event and what the citizen assembly suggested was absolutely fantastic. All of the actions were bang on. My personal approach and our approach here is to say to the politicians whether you are going to enact the actions of the citizens assembly and keep saying that because those actions are the answer in terms of Ireland and it's carbon emissions. Agriculture is a big problem for carbon emissions in Ireland so it's about looking at alternative forms of agriculture, of beef production. But there is no sign of our politicians going down that route. So for policy it's about education for politicians and then at local level it's about those climate action committees and special political committees. There is an environment SPC here in Cork as well. It's about getting in there, talking to them,

talking about linking health and climate change and just broadening understanding as a first step.

LG: So strengthening the local level as well.

DC: Definitely. Because that's where the action happens. But for policy change, it's a bit like… In Ireland they are always in this climate change/public health agenda. In Ireland we brought in the smoking ban in workplaces. So it was our politician at national level who had a particular passion and interest in it and led that whole policy shift and brought it in over the series of two years to public education and discussion and simple messaging that smoking kills, smoking causes cancer, brought in that whole change and behaviour basically. We have gone from 30 % smoking rate down to 15 % smoking rate, that's a massive population shift in 16 years. And that was because one politician had the vision and wanted to drive it, made it happen on policy level. But the change happened on local level, it was the workplaces on the ground that needed support and needed to make all the changes to happen. I think it's the same with climate change. If there is a champion for it in government with a good vision… Now it's that simple, smoking is a simpler issue. Climate change is very complex and there are loads of things we have to do but if you have a champion for it with a good vision, that's how change happens. At policy level.

LG: So motivate the national politicians so they improve the policies and local level actions can happen. That's very interesting because everyone has such a different approach.

DC: I think it would be fantastic if everybody who is giving this a go could get together to talk about what they have done. You could do it in a PechaKucha presentation. Like 20 slides, 20 seconds per slide, this is what we did, this is what we learned. I think you could have massive learning out of that. Not just within the Healthy Cities Network, probably for environmental agencies and, you know, across the board. The recommendation I'd make is about bringing people who are giving this a go together to learn what worked well, what didn't worked so well. So that we are not constantly reinventing the wheel.

LG: Totally...Let's see what future action brings.

DC: Exactly.

LG: I guess that's it for now. Do you have any other questions or anything else you would like to add?

DC: No, not really, but I will send you a few links and contacts now that you could have a look at.

LG: Oh great, thanks a lot. Well, thanks again for taking the time to answer my questions and share your experiences!

DC: You´re welcome and good luck for your research!

Interviewee: Micheál Lyons

Position: Senior Executive Engineer, Climate Action Unit, Strategic and Economic Development Directorate, Cork City Council

Date: 14 February 2020

Interviewer: Luca Gediehn

Interview conducted via phone

Luca Gediehn: Could you briefly introduce yourself and tell me what exactly your function is in the municipality of Cork?

Micheál Lyons: Yes sure, my name is Micheál, that´s the Irish version of Michael and I´ve been working for the Cork City Council for the last 19 years. I came in here in the year 2000 and I was appointed as the manager of the Cork City energy agency. It was an energy agency many local authorities of which there are 41 in the Republic of Ireland. About 10 of us had set up local energy agencies to try and improve energy efficiency, energy use, save costs, save carbon and generally work in the sort of sustainability area. So that´s where I came from. And then I moved around the orgnisation for a while and now I have ended up in a planning department where I am basically the climate action unit, you can see that on the bottom of my signature of my emails. I wanted to call this a climate action team, but I was reminded that to have a team you need more than one person.

LG: So you are basically your own team?

ML: I am, yes. I can´t call myself a team, but I can call myself a unit. So that´s kind of where I am from. So what I was kind of doing at this last sort of evolution of my carreer happened last June where we coincided with the boundary extention. We are a local authority for the city which is surrounded by a local authority in the county. Do you understand the concept of counties in Ireland?

LG: Yes, I do, it´s like a district or a province.

ML: Yes, it´s like administrative districts. The island has 42 counties and 6 of them are in what we call Northern Ireland and they are run by the UK government and then there is 26 in the republic. While there is one county of Cork it´s big enough to have two municipalities, two local authorities. One for the city called Cork City Council and funny enough the other one is called Cork County Council. So what we did in June is, we expanded into the county, so we almost

86

doubled our population from about 110.000 to about 220.000 people. And we increased the amound of land in our area by about 5 times the amount of land. So as we did that we had an internal reorganisation in the local authority and I moved into the planning directorate because I was writing at that time the Cork City climate change adaptation strategy. So that´s the brief story of how I ended up here and where we are. So I have been working in the environmental space for a good while and my function I suppose in this organisation really is to encourage other other people in other departments to carry out the actions from our strategy. And I guess you read our climate change adaptation strategy, right?!

LG: Yes, I have.

ML: Okay, so I basically drew that up.

LG: I see. So my second question would be: what are currently the biggest challenges for climate adaptation in Cork?

ML: The biggest challenge is our money! Adaptaion means preparing ourselved for mitigating the risks due to current and for future climate change. So that includes things like flood defences and organising ourselves in such a way that we plan for climate change and also as we draw up further development plans and strategies that we built climate action into it. Or climate mitigation or adaptation. We used to do things in a certain way once upon a time, but now have you thought about what´s going to happen in the next five years in terms of wheather, in terms of rain, drought, cars, no cars, different cars, different transport modes, increasing population in the city, more industry in the city and regulations from the EU, national regulations, stuff fromthe IPCC and things like that. So the biggest challenge is actually finding the money to do the stuff that we need to do.

LG: And that is because there is not enough political support or why is that?

ML: Well I would imagine it goes all the way back to there is not enough money in the country for a start. This country went through a very extreme time about ten years ago and we as a country owe the banks about 200 billion Euros. Servicing that takes about three or four billion Euros a year just to pay interest on it. I could do a lot with that three or four billion Euros and so could the country. And we have crisees, that´s crisis plural, in our housing, that´s very apparent at the moment, there are not enough houses for the population. We are unusual in Europe because our population is actually growing. We also have major problems with sort of broad band infrastructure, trying to develop that and we have problems with the health system

in a sense that it takes an awful lot of money and a lot of people are still not happy with the service that we provide. So there is a lot of competing interests in this country. We just had a general election last weekend and we have a very strange set of politics happening at the moment here, so there is a large period of uncertainty in the country as to who will lead the country going forward, what the politics will be, will they be looking at climate, will they be looking at other things. There is certainly going to be three or four months of instability in the country. And even if the government is formed it may (Interview Micheal Cork, Pos. 11-13) not last very long and maybe we will have another election very shortly, I mean that´s my oppinion.

LG: So you would say political instability is basically the biggest challenge for climate adaptation also?

ML: I don´t know if it´s the biggest, but it´s certainly a major factor and competing inches for the bit of money that we have in the country. Because you know and I know that if you are homeless that is an immediate problem. Thinking about higher sea levels and rainfall and droughts and wind and storms and their frequencis, that´s something kind of into the future. It´s a different way of thinking, but if you need a house right now, thats your most important thing, so if you have the money you get the house and likewise the politicians know what the people want. Or they think they know what the people want. So that would be the biggest challenge I would imagine. And when you say health and what role does health play in that, what I was talking about initially was the health system which is just the ordinary health system in the country whether it will be physical health or mental health or whateve, but in terms of new or different health issues because of climate change I don´t think a lot of people have a good understanding of that.

LG: So do you think there is not that much awareness yet?

ML: I don´t think there is. I wouldn´t pretend to be an expert on this at all, but I do understand the problems with heat. And we´re living in a city where you have a heat island effect, I mean we´re not New York and we´re not Singapore, you know, so maybe it does not effect us as much, but certainly the incidence of various diseases and spreading because of climate conditions, temperature changes, humidity changes, the idea that the Malaria bounds in the world are going north and south, some of these diseases we associate with tropical Africa or southern Europe, may in the next 10 or 15 years actually become a real problem in Ireland. But I would say that there is not a great understanding of the dangers that we face should some of the climate predictions come true. People like Denise is doing her best to spread that message, to spread the gospel on that, but it´s a slow one I would suggest.

LG: Okay. And what are the key priorities in your climate adaptation strategy? What´s the position of health issues in that strategy?

ML: The key priorities in the adaptation strategy, well as you can see by looking through the documents, if you look at the actions which start on page 36/ 37/38, those are the 66 priority actions. And the key actions, I would say, flood defences are key to the city, the underlying ground conditions, the major river that comes through it, the major effect we have from the sea and the tides, the frequencies of the storms and what they do to an increased flooding risk, rising sea levels as we know, that could be a (Interview Micheal Cork, Pos. 13-19) 4 millimetres a year or a decade, but that could be a step change with melting of ice sheets and things like that. So I think that is a key priority in terms of us adapting tothe current and future climate. And with regards to the positions of health issues in that strategy, I must admit that as I wrote this document it was like, who will do this? Micheal will this this, he knows something about energy, you know?! But Denise would have helped me out a good bit in terms of putting in issues or actions into the strategy which where directly related to health. And that leads to your question of who was involved of the development process of the policy and how did you organise the collaboration of stakeholders. This was given to us, we were told by the government that every local authority had to produce an adaptation strategy before September 2019. And what I did was, first of all I started informing people inside of our organisation that this had to be done and drawing together ideas from people. Then, using a template which the government circulated in terms of looking at the various teams, looking at the built environment, looking at nature based solutions, looking at land-use and these things. I imagine if you look at a lot of these strategies in Ireland, they´re based on common teams and that´s not a bad idea. It´s a good idea, kind of replicated. So really we started looking at thart and then developing the teams, breaking them down into objectives and then breaking the objectives down into actions. In our case we happened to have 66 actions. I know that another local authority has 120. Another local authority I know of has 40. But I could look at my actions and see that one action has about 6 or 7 sub-actions in it. So they could almost be looked at as individual actions, so it is what it is and what we had to do once I wrote this with whatever help I could get from inside my organisation and talking to other local authorities, we had to then send this draft out to what we call public consultation. So we had to advertise that in the local media, put in on our website and give people a period of time, something like 6 or 8 weeks in which they could look at the draft, they could comment at the draft, so they could say this is a whole lot of rubbish that barnished or they could say well, this is all good, but have you thought about this or we don´t agree with this ans we want ever they wanted to say.

LG: So basically everyone could have a say in that? Also the residents and everyone?

ML: Anybody! Residents, business, industry, academia, the people in the local authority, the NGO´s, charities, it didn´t matter. And we advertised it as good as we could with the resources we had and then we ran a series of workshops and what we call open days. So what we had was a big hall, a big space in our offices here in the city hall and we would have invited a lot of people, like people from the MET-Office, the meteorological office, they would come down and would have experts there and information and signs and things to explain where they are coming from. I would have invited people from the EPA, the environment protection agency which is a government agency. We would have had some NGO´s, there is one called the Cork Environmental Forum which has been going on for about 20 years, the Cork Nature Network, various departments in Cork City Council who do work in the climate space, like in our transport, in our housing, people from a government agency called Sustainable Energy Authority of Ireland, they came down and people who are involved in flood defences, they came, so we had those people there to talk to the public. And then we ran a series of 4 workshops where we invited experts to run workshops asking people what they thought of the strategy, what we could add to the strategy, what they wanted taken out of the strategy. The first of those workshops concentrated on the business organisations and another organisation called the public participation network, PPN, they where set up to help local government contacts and to work with the community in a better way. The public participation network has several areas or several sub-committees and one of them is the environmental sub-committee. So they together with the business leaders were in one workshop where it was explained about climate change. And then about what the strategy was trying to do was to consult their advise. And then there were two other workshops for school children generally around the age of 17. A few children from each school came along and so we had about 30 people at the first workshop with the PPN and the business, then we had an average about 30 students from local schools at each of our workshops 2 and 3 and then we had a workshop open to the public. I think 40 people turned up to that. So between that, engaging their reaction and taking down their suggestions and suggestions that came through from a consultation portal, people could log on to the website and comment on that way and I must admitt most of our comments came by email. We had a special email address. In terms of real comments I think we got something like 73 submissions. And some of those submissions could be very simple as somebody saying "we need to plant more trees" to somebody from the local department of the university sending in an extremely four-page critique on the strategy and explaining what they do better. So once we got all the comments back we drew up a report, so all the comments about planting more trees we highlighted, all the comments about electric vehicles we highlighted, all the ones about health we highlighted, all the ones about flood defences we highlighted, so you will see

the way we have done that. And then, you can see it in the document, where we as a city council say this was a good idea, we are now going to put this into the final strategy. So you can see an evolution there.

LG: So basically you drafted the strategy and then you got a lot of comments from tons of people and then you basically worked that into the strategy and improved it.

ML: We did. So we worked some of it into the strategy, some of it we looked at and said this is not suitable (Interview Micheal Cork, Pos. 19-23) for the strategy, this is more a mitigation issue, this is more a sort of parks issue, this is not feasable, this is already included, you just didn´t see it, whatever. So we didn´t put in everything what people said. We thought about it and we put in an we explained why we put things in in a reasonable way, because otherwise, you know, we are the decision makers. Whether that´s good or bad, we are the local government and somebody has to make the decision. Thank you for all your input, but here is our decision.

LG: Looking at it now, do you think it was a useful way to do it like that or would it have been more useful to first have all the workshops about the topic and collect all the ideas of people and then draft the strategy?

ML: Well, the thing is, this is the way we did it and we were told to do it and if I had an unlimited amount of stuff, unlimited time and an unlimited budget, I probably would have done it differently. I probably would have gone out and set up a series of more smaller meeting with the public and with various local interest groups, be they businesses or academia or whatever and get their reaction and build up a better relationship with them and all that sort of stuff, so I could explain to them why this could be done but that couldn´t be done. What we did what we had to do by legislation, but we didn´t really have to run the workshops, we didn´t really have to have the open days, but we did that because we thought it was good from a number of points of view. First of all, we would get engagement from a certain amount of people, we would get comments that would help us for the final draft. We would also be seen to be doing something, we would also make ourselves a little bit more visible, because this is a long term issue and it won´t go away just because it is written. It would be great that if somebody told me tomorrow that all the caravans have been gone to Mars and we get no problems anymore, then I´d go back to housing or parks or something like that. But you and I know that that´s not going to happen. So there is work on this for another couple of years first. So would I do something different in the future? Yeah, I could if I had more resources I could have done it better, but it would have been along the same line, it would have been along here is a basic

plan, this is what we, the supposedly professionals, think of it and you can have a look at it, you can kick it around, you can comment, understand that you cannot have everything you want, that it has to be sensible and that if you really want this that´s going to cost four billion Euros and you need to talk to your politicians about that. We have a green party here in this country and we have 160 parliamentarians, we call them TD´s (??), in England that´s a member of parliament. And of the 160 I think 12 of them are from the green party. Of course they are very concerned about the climate and saving whales and polar bears and things like that, but it just gives you an indication of where we as a public see green issues. When the other parties say we are going to build 100 houses for affordable homes, that´s where they get the votes. (Interview Micheal Cork, Pos. 23-25) So to recap, we did it this way because this is the way we normally do stuff, this is the propper way of consultation and that´s how we did it. And I guess you know about Brexit, Brexit obviously has effected this country in many ways. One of the ways that people don´t think about is that while that was going on, we put so much of our energy, pour politicians, our institutions, our banks, everybody was doing work on Brexit. Everybody in the European Parliament was doing work on Brexit. And when that happened other things got neglected. I would suggest that the climate agenda has been neglected certainly in a big way with this. I wouldn´t say that the Croatians have been involved as much in Brexit as the Irish people have for very good reasons. Croatia is not next door to England or Wales or Northern Ireland or Scotland. So I think we as a country are all under a bit of pressure there and we as a local authority were under a double pressure. We had a boundary extention to do at the same time and an internal reorganisation. That´s where the time was lost and the focus and the energy and the thinking.

LG: When you collaborate with so many people, what were the biggest challenges of collaboration in the development process of the policy? Any positive or negative experiences?

ML: Positive and negative experiences...yeah, the people who understand the problems want it fixed immediately and sometimes they don´t understand that we´re not like China in ways that they build a hospital in eight days because of the Corona virus. We can´t build a hospital in eight days because we´re not as big as they are and we don´t have the central organisation that they have. Meanwhile we had to carry out environmental impact assessments and we had to carry out all these things to make sure that it didn´t effect other bits in the nature and the harbour and all sorts of things. And maybe that´s why sometimes things are slowed down because of that as well. That would be one of the issues here that we are very regulated and we cannot move very quickly sometimes.

LG: Do you benefit from any international or national networks on the topic of climate adaptation?

ML: What exactly do you mean by that question?

LG: Like for example when I talked to Denise, they are involved in the European Healthy Cities Network from the WHO, so they also collaborate with other cities in Europe, so they have a network to work on that topic. Do you have something like that for climate change adaptation?

ML: We do in a way. Well first of all we work through, well back in the days when I joined here I was manager of the Cork City energy agency. Of the 31 local authorities maybe 12 of them had local energy agencies, so there was a network there. It was called the association of Irish energy agencies, so AIEA. That was a network. And then two years ago, the government provided (Interview Micheal Cork, Pos. 27-33) a small bit of funding to set up an umbrella group called the CARO and that stands for Climate Action Regional Office. So four of those were set up to cover the 26 counties in the Republic of Ireland. And I happened to be with our authority in the Southern Atlantic CARO. If you look at the map of Ireland you will see that the counties of Cork, Kerry, Limmerick and Clare are members of that. Then there is a Northern Atlantic CARO, that´s the second area. Then the third area is simply Dublin. Dublin is comprised of four local authorities and they have one CARO to help them. And then whatever is left, that´s about 15 counties left, from the Northern Ireland border down to the south-east coast and they are in the midlands CARO. So that was set up as a network and I´m one of five local authorities in my area and we help each other. For example recently we have set up a climate action team within the local authority here, drafting up some documentation on the governance of that and the structure of it and what we call in English a terms of reference document. So basically it´s kind of for the members of this climate action team as in welcome to the team, it´s great honour to be in the team, this is not just about having free lunches, this is about work. And the work you´re expected to do is as follows: you´re expect not to go to the press, you´re expected to do as you´re told, blablabla, so I would have done one of those and I would have sent it to my colleagues in the other local authorities and they would set meetings up, so there is a network there. Then the Sustainable Energy Authority of Ireland which is a national sort of agency, they organise lots of meetings and seminars and training courses and visits and study visits and all that sort of stuff. So that could be looked upon as a sort of loose network. And within Europe we´ve been involved in a number of European funded projects and the last ones that I was semi-involved in were smarter cities and one called smart resilience. And we´re involved in other ones as well. A lot of them would have an energy or climate or waste or circular economy or CO_2 focus. So you have your sort of networks there from your partners, Eruopean partners,

whether it would be, for example we get on with Cologne quite well, mainly because we have a relationship anyway because we are twin-cities. We are also twinned with Rennes in France and sometimes some of those projects come about from the twinning. So there is sort of loose networks and they are very important as you´re doing the project, but sometimes they live on after the project. And mainly due to the personal relations between the people. If I get on well with you and you get on well with Sebastian and Sebastian gets on well with Mary in England, you know, it´s that sort of thing and as long as people stay in the same organisation those networks can be very powerful. And we are also officially members of ECLEI, they are based somewhere in the south of Germany, it is a network of local authorities in Europe. They are very involved in some European funding programmes and we´re member of that. And what I am trying to set up here is a good relationship with the two universities in our city. We´ve recently always worked closely together but I wanted to work closer together because the way I look at it is that we as a city council have the authority to do things but don´t necessarily have the people to do it. We don´t physically have enough people to do it, that´s why my unit is one person. The universities, from what I can see, having been to university and having dealt with people in universities is that they have a lot of students who have a lot of projects. Even a final year student will have to do a final year project, if you´re doing a master´s degree it is a dissertation, if you´re doing a phd it´s a thesis, if you have your phd and you´re doing a post-doc research fellowship you need projects, you need work. And what sort of work do you need? You need the ability to look at buildings, to look at data, to look at structures, to look at roads, to find out who does this and who does that. So what I´m trying to do is to try and get both of us to work more closely together to say these are the things we want to do, but we don´t have the people to do it and you´re looking for things to do, we can give you things to do. You are happy, your students will produce something, you as a supervisor/ professor/ lecturer will have your students doing something and we at the local authority will get something out of it as well. So I´m working on that at the moment as we speak and on a more formal arrangement to the extend that I have send that as adaptation strategy to a contact in a part of our local university called the environmental research institute, ERI. I´ve sent it to one of the doctors there and there is a phd doctor and a medical doctor and I have said right, look at these 66 actions independently and see for which ones of these you think could collaborate with us on. I did that myself and now we have swapped over ideas. We tried to do it as independently as we could, do one person would not influence the other person. And what we´re doing now is we´re looking at the ones that match up. Where both of us think okay, we don´t have to choose all 66, but if we could get just five good ones to start of and we can formally agree to work on that and even get your president of the college and the chief executive of the city council to even get a photograph taken, shaking hands, signing a memorandom of understanding - now we

have something we can work on. So that´s another network, if you wish to call it like that, that I´m working on at the moment.

LG: Is there something about climate adaptation in Cork that other cities (in Europe) can learn from?

ML: There is. Maybe the fact that I´d say, look, on a hierarchy of cities you´re going to have some great cities like Stockholm for example, they will be great at energy efficiency. There are exemplar cities in Europe where everybody could learn from. I would suggest that Cork is, let´s say if you look at the table of the Bundesliga, you have Bayern Munich at the top and you have Stuttgart at the bottom or whoever it is nowadays, Stockholm would see themselves as up there, as a green city and do a lot of projects. And I don´t know who is at the bottom, maybe some poor city in Poland or Romania, I would see Cork somewhere in the middle or just below the middle, I don´t know.

LG: But specifically about the climate adaptation actions, is there anything where you think okay, this worked particularly good when we set up the strategy or something? Because there are a lot of cities that don´t have a climate adaptation strategy yet and they are still developing it. Is there anything that other people or other cities could learn from?

ML: I think they could learn from looking at our process. They may decide that the process is too complicated, it´s not rigurous enough or it´s too rigurous, it´s whatever, it takes too long, there is not enough people involved, but just to actually look at the process. And then perhaps look at the way we intend to take this forward as in you have the full council, we have people who are elected members of the council, politicians together we our senior management team and then we have another special team of councillors called the climate action committee and below that is a climate action team, which is professionals and then you have me, the climate action unit and then you have focus teams below that carrying out the actions. maybe by looking at the structure that we are setting up, it hasn´t been fully set up yet, we´re having the first official meeting of our climate action team next month. One good thing is that I have encouraged our chief executers, the manager, to be the chair person of this group. Because much in all is I think people listen to me, but they´re going to listen to her a lot more. So I think that might be useful for people, but I don´t know where we sit on the table of greatness of work, but I know there are a lot of people ahead of us and I know that there are some people behind us, but some of our stuff could certainly help.

LG: Yes, that´s what I mean. And how would you like to improve the climate adaptation of Cork in the future?

ML: More money. Give me more money and I´ll do lots of things with it. I mean money is not the answer to everything, but it helps a lot.

LG: Okay, that was a short answer. Is there anything else you would like to add or to tell me about your actions in Cork?

ML: No, I think we´ve had quite a good chat at this state, what if you have any more questions or if I´ve confused you in any way with the structure, put it down in an email and we can have another phone call and bit by bit you´ll get it all. I know that it´s hard over the phone, sometimes it´s a lot easier obviously if you´re sitting across the table from me, but we´ll do the best over the phone. I´ll send you on a few more documents, but feel free to come back with more questions and we can have more conversations until you´re fed up with me, is that alright Luca?!

LG: Oh yes, sounds great! Well thanks a lot then for your help and for taking the time!

ML: No problem, you´re very welcome, I´m delighted to have somebody interested in my work. The more people we have working in this area, the more we will get done.

LG: Alright great, thanks a lot then and have a good weekend!

ML: Have a good weekend too, bye bye!

LG: Bye!

Interviewee: Miriam Weber
Position: Healthy City Coordinator, Gemeente Utrecht
Date: 04 March 2020
Interviewer: Luca Gediehn
Interview conducted via phone

Luca Gediehn: What are currently your actions, or Utrechts actions towards negative health outcomes of climate change?

Miriam Weber: Well, I think from the health perspective of course we are mainly involved in spatial planning projects. During those urban planning/ spatial planning initiatives we address health among other environmental health stresses like noise and air pollution, so in that sense there is always a link to water, so to the blue and the green perspective. And in addition to that we are frequently advised in new policies and policy programmes. So in relation to the climate change project which Marit is leading on, the question is more, okay what are the specific Utrecht health effects of climate change and how can we support and advise on that? And I think it´s mainly, of course we are always careful in heat stress, but for that we have a very strong national perspective and support by the RIVM and the GGD, so there is hardly a task for us in the situations that we have heatwaves that we advise, because we don´t advise in those occasions. It´s more in the preventive sense. I think the strongest links are mainly in urban planning/ spatial planning, the planning of public spaces and to see how we can address heat, extreme rainfall etc. in relation to health through the green and blue infrastructures.

LG: I see. And how do you collaborate with the planning department for example to promote health and also to implement the health in all policies approach?

MW: Well for one part it´s because our colleagues from the team of healthy living environment, gezonde leefomgeving, they take part in the gebiedsteams, the interdisciplinary teams that work in urban planning/ spatial planning from the smaller up to the larger spatial development plans in advising right from the beginning on health topics. So giving their advise for the design in the whole process, even in the tendering procedures to establish a healthy urban environment. So that´s one of the roles and that's a constant role and a constant way of working together because we have these interdisciplinary teams, specifically for urban planning. On the other hand, as we recently, during the last two years towards what we call 'opgavengericht' so identifying the main challenges we have as a city, these complex and wicked problems we have, this means that we have to collaborate and to cooperate within the whole city and our municipal building because its not a single topic and working in silos anymore. So you need

all the colleagues from all the departments and that's the health in all policies approach! Therefore, health is always at the table in one way or another. Whether it would be in very strategic discussions about the challenges up to the small decisions of road construction or revitalising of public space or something like that.

LG: And do you feel like it´s hard to promote health when talking to other departments, the planning department for example? Because when dealing with climate change, it feels like everyone is always talking about protecting the environment and that kind of stuff. But it feels like health is not always on top of the discussion, so do you feel like it´s hard to raise awareness for the health issues of climate change?

MW: I think what we learned, because we started addressing health issues already ten years ago almost. And of course in the beginning it was a bit difficult for health just in general and in spatial planning it´s often the environmental health perspective. So in the beginning it was difficult of course, but we had politicians that want us to address health. And what I heard from the other colleagues that were involved from the beginning is that they searched for lines with colleagues from for example the noise perspective or air quality. Because then they could collaborate and just form small bonds and these topics are very important. It´s not only about noise exposure, it´s about health impacts due to noise exposure. So they had their alliances and that made it more easy to address health. And of course you have to search for what are your joint ambitions, where do we want to go to? And this healthy urban living, this is kind of a mantra where everybody can sort of align to from a different perspective. So it´s not always putting health as a priority, but it´s more putting health in this broader sense of...yeah, just raising awareness. And I think now introducing climate change and the impacts, the advantage is that now we already have this kind of experience in interdisciplinary working and finding more holistic approaches, so climate fits into that. Of course we had the real experience ourselves of what climate change means in a city with problems like flooding, drought, new species coming in, like, what is it, the `eikenprocessierups´. So from a biodiversity and ecosystem thinking, I think as these are all topics that can be framed as kind of a quality, because if you address in in the right way, everything contributes to quality and wellbeing and health of the city and people living in the city. No one can be against that! But it´s finding your vocabulary and your shared ambitions and everybody can align to that. And of course there are situations where you have to lobby for it more hard than in other situations where some economic limits or boundaries are set or something is really difficult to be realised because of the geographical area where something is planned. And then of course you have to find and fight for the second best option. But I think climate change benefits from discussions we had before that.

LG: I see. And who is leading that awareness raising for health debate? I mean, are you approaching the other departments that you work together with or are they consulting you or asking hey, we need your opinion or your advise on that or is it usually the health department approaching others? Can you say that?

Miriam: I think it´s both. I depends upon structures and persons. Sometimes you have the organisational structure that sort of forces you to sit together, being it politicians that want to have a broad and holistic advise or that it´s organised in these kind of `opgaven´ so the challenges and we have the managers being responsible for that, so then you are part of these organisational or institutional contacts. And sometimes, when that is not the key driver, you have to either invite yourself to a specific table or you have to be invited and then it depends upon people. Are people aware of what you are doing and are you aware of what others are doing? And sometimes that´s just a coincidence. Just hearing something like `oh, he or she is working on this´ and then you think `oh, was someone from health been involved´ or can we contribute? So sometimes that´s practice as well. So it´s depending and this is what you see in organisations that are in transition, so when you have to change and move towards a more holistic and interdisciplinary organisations and ways of working, then you have this kind of intermediate period. Sometimes you have to force it through organisational structures and sometimes it´s more the softer mechanisms and that´s all about the added value of people being more generalistic or being more in a networking perspective or whatever. And sometimes it´s a driver from outside and you get the question from someone like a private company or a research institute or citizens and then you think okay, that´s something I need others to reflect upon as well because I don´t know everything and life is not always organised in the sectors and departments we are.

LG: Exactly, that would have also been my next question: do you collaborate with other stakeholders than just people from the municipality? How do you work together with for example the university, the residents, other municipalities?

MW: In general we have to work together with all these stakeholders. Be it citizens or organised citizens or the SME´s or other private companies, research institutes and the university. Because we even have these kinds of protocols of participation or participation 2.0 or I don´t know how they call it now. But it has been a perspective of working already for quite some years that we need to consult, co-create, co-design, cooperate, everything with a "co" with everybody. Otherwise it´s not going to be accepted. What I see within the public health department is that we even work in the lines, it´s kind of In the matrix of the different roles that you can have as a local authority. Sometimes you have a role that is really set by legislation

that we have to do that and on the other hand you sometimes see that you have to do something, to implement something or to act on something. But others are acting and taking their responsibilities in a way that they are addressing the problem themselves and we as a municipality don´t have to take a role or just a limited role, being just a part of it or see in which way we can support or facilitate it a bit. So you have those two extremes. We are always looking to what´s the task and what´s the challenge and who is involved and who needs to be involved and from which perspective and from which task or role? Therefore, of course we have a lot of different ways of working together. We have the health HUB addressing quite some key health issues from the health services up to healthy living environment and health education and health workforce and that´s a collaboration of municipalities, of the province, hospitals, universities, the health insurance company and many many more. Another example is that we have this close collaboration with the university and the university of applied sciences, even for the occasional education, involving students and applying for European or Dutch research funds. So there is a collaboration as well. And for example for the health pact which has been initiated last year, we even say tat we are just facilitating and providing a platform for all the great work that is done in the city by different groups. And they are all addressing health in whatever sense.

LG: What are the biggest challenges when collaborating with so many people on that topic?

MW: I think one of the challenges is that you always have to be very clear about the expectations and your roles and what you expect from the others, so expectation management is key. What we currently see is that quite a lot of parties call us, especially when you talk about academia, they are asking us to be involved in whatever project or initiative or research. That is not always in the way we would like to approach and apply because we really want to have it applicable and useable and develop it together, so co-creation and co-design are key. But not everybody is already capable or experienced to work in that way. So it´s about expectation management being capable to act from your own roles and your own responsibilities in a co-design/ co-creation process. We all still have to learn a little bit in that.

LG: And do you get enough political support? How are your links to local politics?

MW: The advantage we have with the government that we have now is that they fully adopted this health in all policies approach. And that they even decided to design the portfolios in most of the cases in a ways that when you need a political decision, more than one vice-mayor is involved. So they want to work trans-disciplinary, from an integrated and holistic perspective themselves. And of course it is all a question of what are we doing, is it adding to the health

topics and the concept of healthy urban living and the challenges, but I think we have a had, already for quite some years, a very supportive, a very strong local government. So I think the support from a political level is extremely well. When I compare that to others, every time when I tell how our situation is, everybody is saying oooohhh that´s great, how are you doing that?! So yeah, I think we have been lucky for quite some years with our politicians and local governments.

LG: And how do you profit from the Healthy Cities Network or other networks for the topic of health and climate change or climate adaptation?

MW: Not enough I think. What I see from health and climate change and climate adaptation, this is a topic which is mainly addressed by the WHO in Bonn and they have not yet drizzled down to the local level. That goes for several topics of the WHO and we have to bridge that. As there is not really a functioning system of exchange yet in the Healthy Cities, we´re not benefitting enough from experiences from other cities. That´s one of the topics we would have to look for to improve that. It´s more that we need people like you doing research on a specific topic and then being aware of cities that have interesting examples. It´s almost by coincidence that you hear about something or a person, a professional and you could act upon that. That´s a pity. Within EuroCities I must say it´s not specifically climate change and climate adaptation with regards to health, but EuroCities has working groups as well. They have working groups on noise and air quality, air pollution, sustainable energy etc. and biodiversity. So climate change and climate adaptation are topics, but they are not really addressed from a health perspective. That could be a step forward in those networks to have more the health in all policies perspectives in their working groups and in their work. But EuroCities is of course a network that is established around certain topics that are at the EU agenda, so that´s mainly legislation and new policies and programmes from more the classic themes and introducing new topics like climate change and sustainable mobility etc. But health has never been a topic there and from WHO you see that health has always been the main driver and is the core of all the topics that are addressed. But WHO has a focus on national governance, not local governance, so a lot of thematic knowledge that is being developed within WHO is developed at a more general national level and not at local level. So we are missing some crucial links. Because in the Healthy Cities Network, the knowledge mainly is developed within the individual cities and we are hardly able to share that between the cities and we are looking for the mechanisms to link to the thematic perspective from the WHO itself. You know about the environment and health working group and how difficult it is - it´s horrible! One of the thinks I´ve been discussing with Monika is that its´s not working in this way. And she told me that there are two ways: it´s either working groups chaired or organised by the cities themselves

and there is something called a task force and that´s led by WHO. There will probably be a new task force for road safety which is a quite broad perspective and which could even link to the environment and health perspective. There was this place working group with John from Scotland, but they are probably going to make that a task force to be led by WHO. We did not touch upon that in detail, but I think as Monika mentioned before that they want the place standard tool as a kind of WHO tool. This is probably the reason they are now trying to find a way to have this as a task force and then have more WHO credit and influence on it. But that´s my vote. So for that reason I´ve been briefly touching upon working groups and the environment and health working group and these challenges with Monika. She sees that these are the challenges, but she has a lack of staff. I learned that they published a book with a description of all the member states health systems. So how are tasks and responsibilities devised over the various government levels in all the member states. It probably needs to be updated. They have had a collection of good examples on specific topics, I now have that report. But I was not aware of it. Of course they are still preparing the phase 6 evaluation report, which should comprise of various examples from the cities. But phase 6 ended by the end of 2019, we still don´t have this report. And that´s all due to limited stuff and bureaucracy. So there is a desperate need for organising sharing experience and knowledge.

LG: And is there something about the health actions towards climate adaptation or just in general in Utrecht where you think other cities in Europe could learn from your experience or the way you work or something?

MW: Well, I am always a bit hesitant and careful in this, because at some point it turns out that we are always the good example. We are front runner in everything we are doing. Okay, we are in several ways, but on the other hand there are a lot of topics we could learn from others as well. In a general sense, when you tell your story, everybody is impressed and they say `wow, it´s wonderful what you do´. And the same goes for me. When I hear other stories I think `wow, that´s interesting, I´d love to learn more of that´. But the next step is never taking place. And sometimes it´s like, because we are so advanced we can´t learn from anyone else or the system, whatever system, in that place or that city or that country is completely different from ours, so we can´t use it. And I don´t agree with that. When you dive deeper, you will always find things you can learn from others. But this is my personal quest, sort of.

LG: So generally a claim for more collaboration and learning from each other and stuff.

MW: Yes! The European Union has a call for peer to peer learning for cities. Monika is now trying to connect persons of interest or cities to see whether we can find some EU funding to do so.

LG: On what topic?

MW: Various topics! It´s on health resilience innovations. But you can find the right wording to any topic within the health perspective. But again: you need more information on what is going on in the specific cities in order to be able to just learn and see what and how you could learn. I´m hoping that they can bring this forward from the WHO that we might have some budget to have the opportunity to have this peer to peer meetings or something like that. So I will see. But they offered to prepare it, so they are just now collecting ideas. So we just sent in a few ideas we had. The difficulty is when I ask colleagues, is there something within your topic you would think of that you could learn from someone else internationally, where they see this is a relevant topic, but I don´t know which city or which organisation is interesting enough, I don´t know who is into that topic or front runner. I just thinking of what could be helpful is for example to go into EU projects and see which cities have been involved, like the inherit-project that was done by RIVM and **Euro Health Net** as well. So then finding case studies that might be of interest.

LG: Okay...so the last question I have: what would you like to improve for the future actions towards health and climate change in Utrecht?

MW: For Utrecht specifically?

LG: Yes!

MW: Ohm...wow, that´s a difficult one! I don´t know. But I´d love to know more and maybe then act more on issues from climate adaptation or climate change in relation to health from different perspectives than just urban planning. But I don´t have any idea of what kind of programmes or initiatives or interventions...I would love to explore that in a broader sense than way of how is our built environment contributing to it.

LG: For example?

MW: Well, I expected that question and I don´t have an answer yet. I don´t know, but just be innovative! Think of the things that have not been thought of! Because in my oppinion, I think there must be other ways that are of interest as well, maybe more in the softer perspectives. I

don´t have any clues or ideas on that, but ... it was really funny. You know that we have the new public health policy plan. We have a lot of `speerpunten´ - main priorities and somewhere in the policy plan has been written down that we would like to look into culture, arts and their relation with health. So a very small group, I think three of the colleagues from the public health department have thought: okay, lets start a discussion on that. lets see what we could do with the topic without having it as one of the huge topics because it´s not one of the priorities, but just see how the energy goes. So they just sat together, they made a kind of flipchart, hang that near the toilets and asking people just to respond to that, just to write and stick ideas to it. When I saw that, that was in the same week that I had a webex for the Healthy City coordinators, but I don´t know where and how it come, but there was a brief message I think about WHO just recently published a report on culture, arts and health. And then I thought, that´s interesting! So I addressed the three colleagues working on that, that was in November. We had now, in a broader team, involving Erlijn from literature, because we are UNESCO city of literature, we had David from the Euro perspective and colleagues from the culture department, we are now preparing a meeting with loads of stakeholders from the city in April, just to share and discuss and see what are we doing? And what are we talking about when we are talking about culture and health in a very broad sense and what would we like to continue on and what does it mean for everybody´s involvement or participation or whatever. In that way it´s really interesting! Who would have ever thought about using culture and arts as a perspective to address health?! It is very logic and there is a lot of evidence on it and there is even a WHO report on it. And I think this way of out of the box, weird thinking, that would be nice. I would love to do that! When I was in Bonn, talking about biodiversity, some people only address biodiversity in the sense of biotics and I don´t know what, we as people who eat and have our own stomach in balance as a contributor to health. So I think there are so many perspectives, so many ways to address a specific topic. Just by getting weird people together I think! The not usual suspects. So that would be my idea.

LG: Nice! Yeah, I guess that was it about my questions. So thanks a lot for taking the time and sharing experiences and ideas with me, it was very interesting!

MW: You´re welcome!

Luca Gediehn: "Kan je misschien een beetje iets vertellen over wat is eigenlijk precies jouw functie bij de Gemeente Utrecht, waar hou je jezelf mee bezig?"

Marit Linckens: "Dat kan ik wel doen. Nou, officieel ben ik senior beleidsadviseur klimaatadaptatie en eigenlijk hebben we binnen de gemeente klimaatadaptatie in twee organisatieonderdelen ondergebracht: een is ruimte, daar zit ik bij en de andere is stadsbedrijven en daar valt water onder. Vanuit ruimte zijn we eigenlijk de trekker en door de opgave gezond leefklimaat is klimaatadaptatie in gekomen en eigenlijk is aan mij gevraagd als senior van wil jij een strategie gaan maken en wil jij een team gaan bouwen zodat klimaatadaptatie bij ruimte echt een plek gaat krijgen. Daar ben ik nu mee bezig en druk ben ik eigenlijk met het schrijven van een strategie nu. We wilden hem eigenlijk in begin eind 2019 laten vaststellen, dat is niet gelukt, dan zou het eerst Q1 worden in 2020 maar nu wordt het Q2. Dus we hopen voor de zomervakantie een vastgesteld plan door de raad te krijgen. Ik werk dus voornamelijk aan de strategie en eigenlijk willen we bij ruimte zorgen dat alle nieuwbouw herinrichtingen klimaatbestendig gaan worden. Dat die al nu zo worden ingericht dat ze het weer van 2050 aan kunnen, dus eigenlijk die extreme die in 2050 gaan optreden. We hebben het voornamelijk nu te maken met openbare ruimte en daarnaast kijken we voor de strategie dat we iets met de tuinen doen en de gebouwen. Het is ook zorgen dat de mensen een aangenamer klimaat hebben in hun woning en dat ze ook een goede nachtrust hebben. En daar zie je wel, daar wordt gezondheid ook geraakt. Ik heb zelf het gevoel dat gezondheid echt iets is waar mensen het mee te maken hebben. Ik denk iets minder met droogte en wateroverlast, dat is toch meer een inrichtings-iets van de gemeente en bij hitte, dat is iets waar heel veel mensen last van hebben, vooral kwetsbare groepen. En vanuit de strategie proberen we vanuit ruimte dus dat alle herinrichtingen, dat wil ik in het programma, dat die standaard klimaatbestendig gaan worden en daarnaast willen we vanuit ruimte onderzoek doen, waar we nu vooral met bezig zijn is gezondheid heeft het lokaal hitteplan omarmt. Ik denk dat dat een heel mooi voorbeeld is dat samen met gezondheid werkt. Wij moeten als grote stad gewoon een lokaal hitteplan hebben, want het nationaal hitteplan is niet toereikend denk ik en we hebben hier echt een hitteprobleem in Utrecht.

LG: "Ja ik weet nog wel, 38 graden afgelopen zomer, dat was heel warm..."

ML: "Ja! Ik zie zelf voor gezondheid naast klimaatadaptatie is natuurlijk heel veel water, groen, de bomen zijn een oplossing, maar daarnaast vind ik dat gezondheid ook eigenaarschap heeft. Door klimaatadaptatie lopen heel veel opgaven heen, dat merk ik zelf ook dat het overal zijn uitlopers heeft.

LG: "En wat zijn op dit moment de grootste uitdagingen voor de klimaatadaptatie in Utrecht?"

ML: "Nou, uit onze stresstesten komt dus dat, overstroming en droogte lijkt nog mee te vallen, maar hitte, dat gaat het probleem worden! En dat wordt alleen maar erger. Het is ook een hele uitdaging om te zorgen dat ze ook in nieuwbouwlocaties daar rekening mee houden. We hebben laatst onderzoek laten doen en in de data zie je dat er heel veel verharding is, en weinig groen...is gewoon hitte. Je hebt in Utrecht echt een paar groen-arme wijken en die zijn eigenlijk ook niet helemaal klaar voor als de extreme bui komt, dan gaan toch wat mensen natte voeten gaan krijgen Dus daar hebben we een paar urgente locaties. Voornamelijk zie ik het probleem op hitte te ontstaan. Zeker omdat dat minder bekend is bij mensen. Mensen denken heerlijk, ik vind hitte heerlijk, maar als je de hele tijd hittegolf heeft, dan heeft iedereen heeft er last van. En de bomen, die gaan ook last krijgen van de hitte en de droogte, dus daar moeten we ook voor zorgen. In Utrecht zeggen we eigenlijk hebben we de principes groen tenzij en onverhard tenzij, dus je moet minder verharding hebben en er moeten meer bomen geplant worden, dat is denk ik een oplossing.

LG: Je hebt net verteld dat er heel veel mensen betrokken zijn bij de ontwikkeling van zo´n strategie. Hoe werk je dan samen met zo veel mensen? Ga je dan een heel grote bijeenkomst hebben of hoe doe je dat?

ML: Ik heb de risico dialogen gevoerd, die zijn wat groter gevoerd, binnen de organisatie hebben we mensen die daarmee te maken hebben uitgenodigd, maar daarnaast werk ik met een projectteam en dat is samen met de club van water van stadsbedrijven, maar in mijn team zitten dus water mensen, ik heb groen mensen, groenadviseurs, ik heb landschapsarchitecten erin zitten, communicatie doet mee, nou we hebben een lijntje naar gezondheid, met Jaap en Rita van Meulen. We hebben eigenlijk een klein basisgroepje en we proberen overal, en daar ben ik nog wel mee bezig, te zorgen dat er overal ambassadeurs komen. Bijvoorbeeld bij stadsingenieurs, dat is iets minder aangehaakt, maar daar willen we eigenlijk dat ontwerp, hoe moeten we dat nou op zien te nemen zodat omdat iedereen tussen de oren krijgt, vooral we moeten anders gaan inrichten en we moeten anders gaan denken en het moet gewoon

normaal worden. Dus dat is een beetje de manier waarop we het nu doen (Interview Marit, Pos. 8-9) Wat wij ook doen zien, wij zijn natuurlijk ook bezig om te zorgen dat de wethouders het ook tussen de oren krijgen en daar lijkt het ook aardig te landen, maar dat is dan een van de opdrachten te zorgen dat binnen de organisatie iedereen klimaatadaptatie omarmt. Maar we doen voornamelijk uit het projectteam waar ik een keer in de twee weken/ een keer in de maand met samen zit een dan bespreken we dat.

LG: En krijg je ook veel ondersteuning van de politiek, of te wethouders?

ML: Nou, de wethouder, ja we hebben laatst weer drie huur met de wethouder drie huur gezeten, ik zat gisteren nog met twee wethouders, ik ga morgen weer met hun zitten. Dus zij willen graag, de twee wethouders die wij hebben zijn groen-links en die hebben gewoon een ambitie, dus in dat geval hebben we de wind mee zou ik maar zeggen. En daarnaast hebben we ook mee dat die hete zomer, ja iedereen ziet het, dus dat maakt het wel makkelijker. En de wethouders willen wel, maar daar zitten we nu nog om het heel concreet te maken. Dus meer van de uitvoering, wat voor een eisen gaan we opleggen, hoe strak gaan we het regelen. Die projectontwikkelaars die vragen gewoon van: geef me maar een lijstje, wat moet ik daarvoor doen? Die willen echt kaders. En wat je nog wel merkt, we zijn nog zoekende van, we zitten nog te kijken of we kunnen samen werken met schaduwwerking in de straat, maar hoe veel schaduwwerking heb je, 50% of 60% hoe haart leg je die eisen neer. En daar zijn we nu echt aan het zoeken van: wat kunnen we neerleggen en wat is werkbaar? En een worsteling is ook nog, vanuit water hebben ze op zich vanuit rioolheffing geld om maatregelen te nemen op water en droogte. Alleen hitte is niet echt gerelateerd aan water en daar zie je gewoon, daar is groen veel de oplossing en groen heeft zelf een probleem om te zorgen dat ze genoeg geld hebben om bomen te planten. En daar zien wij nog echt een opgave om te zien hoe we het samen moeten optrekken met groen, want zij willen bomen planten, is ook oplossing. Hoe gaan we zorgen dat er genoeg geld komt zodat we ook die bomen kunnen planten.

LG: Oh ja, heel veel dingen om te regelen!

ML: Heel veel dingen en ook wel complex, hoor! En de wethouders die willen het ook zo breed mogelijk, die willen duurzaam, we hebben in Utrecht gezond stedelijk leven, dus zij willen alles samenhangen, maar daar wordt het ook complex om het integraler te maken.

LG: Zijn er ook mensen betrokken buiten de gemeente? Bijvoorbeeld van en andere gemeente, of de provincie of de inwoners van Utrecht?

ML: In de strategie komt wel een communicatieplan voor de inwoners van Utrecht, maar dat is eigenlijk een soort van fase twee, die moeten we nog verder gaan uitwerken. Daarnaast hebben we voor de inwoners wel de campagne waterproof 030, daar worden voor water al wat meer dingen gedaan en verder werken we samen met de provincie, ook met het waterschap dat we hebben in Utrecht en in dan plan zijn we ook in de regio verbonden. Daar zitten dan den provincie in en 16 andere omliggende gemeentes. Sinds oktober heet het nu platform water en klimaat en daar gaan we dus naast onze eigen strategie gaan we ook een regionale adaptatie strategie maken. Maar die wordt wel iets anders, want heel veel dinge zullen wij lokaal gaan oplossen, maar dinge zoals overstroming, dat zijn dinge die soms buiten de gemeentegrens gaan. En die zullen we dus regionaal gaan oppakken en we pakken het ook regionaal op omdat er vanuit het rijk vanaf 2021 weer geld gaat komen en daar maak je als regio kans op, dus dan moet je ook wel gaan samen werken.

LG: Dus dat gaat dan samen met de provincie?

ML: Ja de provincie zit erin, dan het waterschap en 16 gemeenten. En wat je wel merkt in de regio is dat iedereen naar Utrecht kijkt. Want wij zijn de grootste stad. Volgens mij Nieuwegein en Zeist komen vervolgens naar Utrecht met 60.000 inwoners. Maar het is wel interessant, want Nieuwegein is al best veer maar ze zeggen van, wat leggen jullie op, want als ze kijken wat gaat Utrecht doen dan kunnen ze ook makkelijker in hun gemeente die eisen neer leggen van Utrecht gaat dit doen, dus daar doen we ook mee. Ja, het is echt ook alweer wat druk bij ons!

LG: Heb je daar bijzondere positieve of negatieve ervaringen met de samenwerking van zo veel verschillende mensen?

ML: Ja ik heb op zich alleen maar positieve ervaringen, maar wat je wel ziet is ze zouden in de regionale strategie heel graag concrete doelen willen maken, maar als je dat bestuurlijk wil aftikken dat wordt wel heel moeilijk want je gaat je committeren aan iets wat met de regio te doen heeft, maar hitte en droogte zijn toch lokale eisen gaat opleggen en toen zijn wij daar ambitieuzer in. In de regio hebben we de Utrechtse heuvelrug, die hebben hele andere problemen, wij hebben het stedelijk gebied in Utrecht en daarnaast hebben we het veenweiden gebied en het rivierengebied, dus we hebben ook verschillende problemen als gemeentes en daar een samenhang in te zoeken is soms best lastig. Wij hebben als Utrecht niets met bodemdaling, terwijl Woerden die heeft daar wel heel erg mee te maken. Voor hun is het een heel belangrijk ding en voor ons is het leuk, maar wij hoeven er niets mee. Dus daar zie je wel van: hoe concreet ga je worden, want ik denk dat onze bestuurders zeggen van, ja wij zijn

ambitieus en we doen ons eigen ding, dus om het regionaal vast te leggen wordt nog wel even lastig.

LG: En werk je ook samen met andere steden buiten Nederland bijvoorbeeld? Of krijg je inspiratie van andere steden in Europa?

ML: Ik ben niet Europees bezig, ik zit wel met middelgrote steden in Nederland, dus met Amersfoort, Den Bosch, Leiden en Eindhoven werken we samen in een soort verband en dat is meer een verband van, we lopen tegen dezelfde problemen aan en we bespreken dat en kijken naar elkaar voor oplossingen. In het Europees verband zijn we nog niet bezig, ik denk dat als onze strategie er is en we er tijd voor krijgen dat we ons ook meer Europees gaan richten. Dat doen we wel met de regio voor overstroming met de aanpak van Life IP, dat is een Europese aanvraag, daar doen we met heel veel verschillende gemeentes uit Nederland onderzoeken daaraan mee, daar zit flink veel subsidie op. Dat heet Life ID en dat moet dit jaar toegekend worden.

LG: En is er iets van de Utrechtse aanpak waar je denkt, ja dit is echt een bijzonder kenmerk van Utrecht, dat werkt heel goed, daar kunnen andere steden misschien ook gebruik van maken? Steden in Nederland of steden in Europa?

ML: Ik denk wel dat wij als een van de eerste steden in Nederland zijn die een lokaal hitteplan gaan laten vast leggen. Ik heb het idee dat de rest dat nog niet doet, dus ik ben heel blij dat Jaap dat heeft omarmt en dat dit jaar wil vaststellen en ik dat is wel iets waar we onderscheidend zijn van wij hebben dat. En daarnaast wil ik eigenlijk dit jaar, dat heeft Amersfoort al, maar eigenlijk wil ik voor de bewustzijn campagne dat de mensen in hun tuin zelf gaan meten en in hun huis en dat wij alle die data krijgen, dus wat doet hitte nou, en hoe ervaren ze dat en klopt het ook wat wij in de modellen zien? Dat is het project hitte meet die stad, dat doen ze al in Amersfoort en dat gaan we dit jaar ook in Utrecht starten en ik denk dat dat ook een hele mooie... ja Den Haag doet dat ook al, dus we zijn er niet heel erg onderscheidend. Ik denk dat het lokaal hitteplan het meest vernieuwende is op dit moment.

LG: En wat wil je zelf voor de toekomst nog verbeteren voor de klimaatadaptatie in Utrecht?

ML: Ik heb eigenlijk echt als doel dat iedereen namelijk binnen Utrecht, dan is het de eerste gemeente vanaf deze schaal, als ik iets ga doen dan moet dat klimaatadaptief zijn! Dat is echt de stip op de horizon. En ook dat inwoners gaan denken van ik moet mijn tuin vergroenen, ik moet niet alles tegelen, daar heb ik zo´n hekel aan, ik zie het ook in mijn omgeving, voortuintjes

worden alleen maar meer verhardt en dan denk ik waarom, waarom?? Ik vind het heel jammer, ik snap ook wel als je een klein tuintje hebt dat je niet een boom kan planten en zo, maar er zijn zo veel andere oplossingen, allen maar niet verharden.

LG: Ja, klopt! Okay, dat was het eigenlijk. Heb jij nog vragen?

ML: Nee, ik heb geen vragen, maar ik ben wel benieuwd als je het af hebt, dan wil ik heel graag een scriptie van je zien, dat vind ik altijd wel leuk!

LG: Ja zeker, heel graag! Okay, nou heel erg bedankt!

ML: Als je nog iets nodig hebt dan moet je het laten weten, dan kan ik het nog door geven als je denkt, ik mis daar nog een antwoord of zo dan moet je het gaan laten weten, dan help ik je graag!

LG: Leuk! Heel erg bedankt voor je tijd en dan wens ik je nog een hele fijne dag!

ML: Doei!

Interviewee: Minna Kuuluvainen

Position: Project Coordinator and Environmental Specialist, Municipality of Kuopio

Date: 14 September 2019

Interviewer: Luca Gediehn

Interview conducted via phone

Luca Gediehn: "Thanks for taking the time, it is really nice that I can talk to you! And as I already sent you in my questions beforehand, can you maybe describe a little bit what your function is and what your main tasks are in Kuopio?"

Minna Kuuluvainen: Yes, I work as an environmental specialist and in environmental services. That includes increasing the energy efficiency, renewable energy and circular economy and the city is also dedicated to becoming carbon neutral and waste-free and such things. So my task is to help the city implement the resource wisdom target, to achieve the goals and to communicate between the different units of the city organization and also other stakeholders, such as the city's own companies, housing companies, management companies and such things. My task is mainly to cooperate with all the departments and help those units to implement the targets. And besides this my job is to work on projects concerning circular economy, resource wisdom and climate actions. For example I prepare an applied funding for our new projects and I coordinate them. And the different campaigns, for example at the moment I work with schools to minimize the food loss, so there are different campaigns and happenings and projects going on, but the main target is that for the goals we are committed that we achieve the results to be carbon neutral and a waste-free city, so I also work with the decision making boards to build up actions to achieve those goals

LG: Okay, interesting. And what would you think are currently the biggest environmental challenges of Kuopio?

MK: Well, if we think about the CO2 emissions, energy production and traffic, those are all challenging areas. And also the water causes, because we have so much agriculture here. We are a wide city that has…well, we are the biggest producers of milk Finland, so we have quite a lot of agriculture and that discharges into the environment, so water causes is the main challenge.

LG: I can imagine. Does health play a particular role in current challenges that you are facing?

MK: Health? Well, of course environment and health impacts. They are taken into account very widely in traffic planning and energy production because they have a major role in local air quality and noise levels, so yes, health is playing a role in that of course. Especially in land-use planning. We have to plan the environment also very carefully by thinking of all those aspects like air pollution and climate change mitigation and adaptation.

LG: So you just mentioned climate mitigation and adaptation. I read the policy that you sent me beforehand and I figured that it has quite a strong focus on climate change mitigation. Do you also have some specific goals or targets for climate adaptation?

MK: Yes we do… first I have to say that this year the climate policy of Kuopio city and its targets will be revised. Maybe this year or at the latest in January next year and this means for the reduction of greenhouse gas emissions and also for serving the large local carbon....in the rural areas. And we see that the local climate policy is a crucial part for the implementation of the city strategy. The concrete actions focus mainly on energy saving and energy efficiency, of course promotion of circular economy activities and also environmental friendly local level traffic and taking into account climate environmental aspects in land-use planning. But also we have some core operations on infrastructure, water supply, clean water, reduction of thermal energy need, the availability of electricity under all conditions. Also increased cooling demand, of course structural durability of buildings. We have challenges due to the temperature and humidity and the air quality management. Those are the core operations and actions which we are focusing on.

LG: Okay. One quote that I read in the climate policy was that Kuopio wants to "improve the wellbeing of the residents while also improving the environment". So it seems like it has a focus on both, the environment and the health of people. How do you approach that? How do you want to reach that goal?

MK: I would say that, like I said before, the traffic planning and land-use planning and energy production have a major role. And air quality and noise and also health, so how people are doing here. And we have some goals concerning the city's wellbeing and there is another programme for that also: "wellbeing Kuopio". I think it works hand in hand here, we cooperate so much when doing the actions and goals and plans with different departments, such as specialists in wellbeing, land-use planning and environmental specialists. We have specific meetings for example before planning a new area and some projects in the city centre, so we always talk to each other with specialists. Maybe that's it, the cooperation.

LG: Nice, so are there specific agreements between the different departments that you work upon or is it just the habit and the way you do things?

MK: It's the way of doing things. We have had some projects before, I'm not sure if we have any at the moment, but maybe you have heard of the project called URGHENCE, there were lots of specialists to plan the urban areas concerning health. But as I said, it's maybe the way of doing things, we are quite used to do things together in any new project or in any area-planning, we are used to that we should always plan things together and to see what the different specialists have to say. In our resource wisdom programme there is a part about wellbeing in Kuopio. The main goal is that we take care of nature and that will bring good health and wellbeing for the people. But there are different goals, but that part of the programme is made with a lot of different stakeholders here in Kuopio.

LG: So you pointed out that you are collaborating a lot with the wellbeing and land-use planning department. Are there other specific departments that you collaborate with or that you work with a lot when you develop your policies?

MK: Well the land-use planning department was quite essential, then of course the […], schools, technical services, property services. Those are the ones within the city organisation, but of course we have different stakeholders such as the university of Kuopio, the university of applied sciences and student housing companies that are owned by the city and the Kuopio

energy company, some construction companies and Kuopio university hospital that is a big organisation. We also made some trials and projects with those stakeholders also.

LG: And do you sometimes also work together with the residents of Kuopio? Do you involve them?

MK: Yes, especially in land-use planning there are a lot of meetings and planning workshops with citizens and also some questionnaires. Because our city is quite wide and large there are some rural areas where the citizens have their own board that we cooperate with, but also with the citizens.

LG: Do you think it's difficult to make sure that both partners always profit from the collaboration or how do you manage that the collaboration is always beneficial for all partners?

MK: Yes, that is a good question. We always discuss how every stakeholder or unit or department can do their part and what is their benefit. And also, after all these goals and commitments that the city has made, there are things that we have to do and we cannot to that alone. For example climate change. To prevent climate change, the city cannot work on its own. Maybe different stakeholders and departments understand that they have to do their own part and they have their own role in that. And maybe it has more benefit if we think about these actions together.

LG: Okay, interesting. Are there any particular challenges that you noticed while collaborating with others? Or do you have any specific positive or negative experiences when collaborating with other departments or stakeholders?

MK: Mainly the reactions and the collaborations are positive, but when organisations or departments have limited resources, financial or human resources, it might be challenging to implement and commit to the goals. For example when investing in new technologies, for example building a new, sustainable school, that's a big investment and it is sometimes hard to make decision makers understand that in the long term it will be more cost-efficient to consider the life-cycle. Maybe it's just communication and marketing of those things so they become more familiar to the people. And also in the municipal sector the decision-making is quite slow sometimes, that's hard, but mainly the cooperation is very positive.

LG: Okay, that's good! And do you profit from any international or national networks in your work?

MK: Yes, the city of Kuopio is part of quite a lot of national networks and we hear and learn from different good practices from other cities from those networks and of course bring them to our city. From time to time we also have some projects and joint-ventures together, that's quite a good benefit for the city as well. We are in some international networks as well. Again, it's the cooperation and also the good practices that we can share in those networks.

LG: What would you think that other cities in Europe could learn from Kuopio regarding your actions on climate change and climate adaptation? Is there anything where you would say this could serve as a good example for other cities?

MK: Well, maybe this is nothing new, but the cooperation is quite a key and important factor at every stage and between every department, horizontal and vertical in the city organisation and also the different stakeholders and cities as well. The cooperation is quite important and I don't know if that is so clear for every city in Europe. Also land-use planning, that is like a platform for companies and cities. And cities can create that platform by land-use planning. It's about the traffic and how the houses are built, are they using renewable energy or not. From the city there will be some regulations or guides how they build buildings and so on, so cities must also be an example as actors in the cities.

LG: That was mainly the questions I had I guess. Is there anything else that you would like to add or anything where you think: people have to know that about Kuopio when thinking about this topic?

MK: Well…let me think. As every city we will make a new policy this year about climate change because of the international report and the upcoming IPCC and so on, so it's mainly, there is a competition between cities, but we have to share those practices. We are all facing this challenge together, so cooperation once again, that's my message!

LG: Yeah, that's really interesting for my research that you focus on that so much, that's really good. Thanks a lot again for this interview, it's been really interesting talking to you!

MK: You are welcome, thanks for your interest.

Category 1: Current challenges

- Heat stress
- Drought
- Flooding
- CO2 emissions
- Air quality
- Energy production
- Water supply
- Humidity

Category 2: Promotion of mainstreaming health

- Raising awareness
- Health promotion
- Participatory approaches
- Approaching other policy sectors
- Develop personal skills
- Mainstream health issues into other policies
- Public events
- Health department as a resource for information
- Bringing stakeholders together

Category 3: Structure of intersectoral relationships

- Social networks
  - Share knowledge
  - Share financial resources
  - Distribute responsibilities
  - Interdisciplinary working groups
- Actors beyond the state
  - Residents
  - Local companies
  - Research institutes/ universities
- Informal networks
  - Personal connections
- Bridging organisations
  - WHO
  - Local politicians

Category 4: Multilevel governance (issues)

- Local level
  - Personal capacities

- Financial issues
- Local priorities
- Regional level
  - Different needs in different municipalities
- National level
  - Legislation
  - Health system
  - Political goals
  - National climate adaptation strategies
  - Financial situation of the country
- International level
  - EU binding guidelines
  - SDGs
  - Mandate of WHO (HCN) goals
  - Language barriers

Category 5: Institutional barriers

- Lack of awareness
- Funding issues
- Lack of political support
- Other priorities
- Lack of capacities for collaborations
- Language barriers
- Being afraid/ overwhelmed by the complexity of the topic
- Hesitation to dive into a new topic
- Limited time
- Personal lack of interest of responsible people
- Geographical distance

Category 6: Implementation of health in all policies

- No attention to the problem
- Recognition of the problem
- Project-based collaborations
- Collaboration in many areas
- Improvement of HiAP
- Political and administrational anchoring of HiAP at all levels

Category 7: Ideas, goals and wishes for the future

- turning goals into practice has to be improved
- better capacity building
- more knowledge and experience exchange at international level
- reduce concrete surfaces in the city

- encourage residents more to take action
- more collaboration with non-state actors (e.g. engineers and housing companies)
- even more awareness raising
- better funding
- closer collaboration with universities
- improved expectation management for collaborations
- try out more innovative approaches

Category 8: Opportunities/ Things to learn for other cities

- don´t be afraid to dive into it/ be open for new topics
- use of methods that approach other sectors
- bring stakeholders together that are not used to working together
- local heat plan as a practical instrument for collaboration at local level
- close collaboration from the beginning
- try to find joint ambitions

While the main focus of this work is on the development process of integrated policymaking rather than on the outcomes of the policy papers, the analysis of the policy documents has to be seen as an additional source while the main findings have been gained through the interviews with policymakers in the three case study cities. Furthermore, it has to be acknowledged that a systematic review of the climate adaptation policies for this case study is very difficult due to the great differences in length and detail.

However, the method of doing a content analysis seemed like a promising technique here to get an overview of the actual integration of health issues into local climate adaptation policies. A content analysis has been defined by Holsti (1969) as *"any technique for making inferences by objectively and systematically identifying specified characteristics of messages"*. (Holsti, 1969, p. 14). It is used analyse the theme of a text and examine specific keywords in a document (Bryman, 2012, p. 295).

For the aim of this research, the policy documents of the case study cities have ben scanned through for the following keywords:

- Health
- Wellbeing
- Heat stress
- Extreme weather events
- Vulnerable groups
- WHO
- Healthy City
- Health integration
- Cardiovascular diseases
- Citizen safety

Document 1: Cork City Council – Climate Change Adaptation Strategy 2019-2024

Document 2: Kuopio City Council – Kuopio's Climate Policy Programme 2009–2020
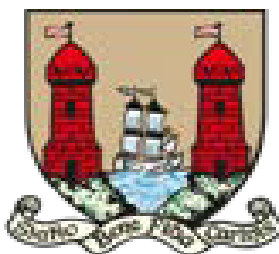
Climate Change Adaptation Strategy 2019-2024

September 2019

We are Cork.

Contents

Abbreviations

CARO: Climate Action Regional Office

CAT: Climate Action Team

CCiC: Cork City Council

CCEA: Cork City Energy Agency

CCET: Cork City Energy Team

CCMA: County and City Management Association

CDP: City/County Development Plan

CFRAMS: Catchment Flood Risk Assessment and Management Study

CODEMA: City of Dublin Energy Management Agency

COM: Covenant of Mayors

CSO: Central Statistics Office

DCCAE: Department of Communications, Climate Action and Environment

DEHLG: Department of the Environment, Heritage and Local Government

DTTAS: Department of Transport, Tourism and Sport

EPA: Environmental Protection Agency

ESB: Electricity Supply Board

FEWS: Flood Early Warning System

GDP: Gross Domestic Product

HSE: Health Services Executive

IPPC: Intergovernmental Panel on Climate Change

KPIs: Key performance Indicators

LAP: Local Area Plan

LGMA: Local Government Management Agency

LLFRS: Lower Lee Flood Relief Scheme

MaREI: Marine and Renewable Energy Ireland

NAF: National Adaptation Framework

NASA: National Aeronautics and Space Administration

NCCAF: National Climate Change Adaptation Framework

NEEAP: National Energy Efficiency Action Plan

NMP: National Mitigation Plan

NOAA: National Oceanic and Atmospheric Administration

NRA: National Roads Authority

OPW: Office of Public Works

OSI: Ordnance Survey Ireland

SEAI: Sustainable Energy Authority of Ireland

SECAP: Sustainable Energy and Climate Action Plan

SMT: Senior Management Team

SPCs: Strategic Policy Committees

SuDS: Sustainable Drainage Systems

TII: Transport Infrastructure Ireland

WERLA: Waste Enforcement Regional Lead Authorities

WMO: World Meteorological Organization

EXECUTIVE SUMMARY

This Cork City Climate Change Adaptation Strategy 2019-2024 is a response to the impact that climate change is already causing and will continue to cause into the foreseeable future on the citizens and infrastructure of Cork City should no mitigation efforts be undertaken. Cork City Council is committed to leading the way in dealing with this recognised global issue at the local level. The two main goals of this strategy are:

- To make Cork city as climate-resilient as possible, reducing the impacts of current and future climate change-related conditions and events; and
- To pro-actively engage with all citizens on the subject of climate action, such as climate change, climate change adaptation and climate change mitigation.

This strategy sets out adaptation action items, grouped into appropriate objective areas, across the following seven key thematic areas that are of equal priority:
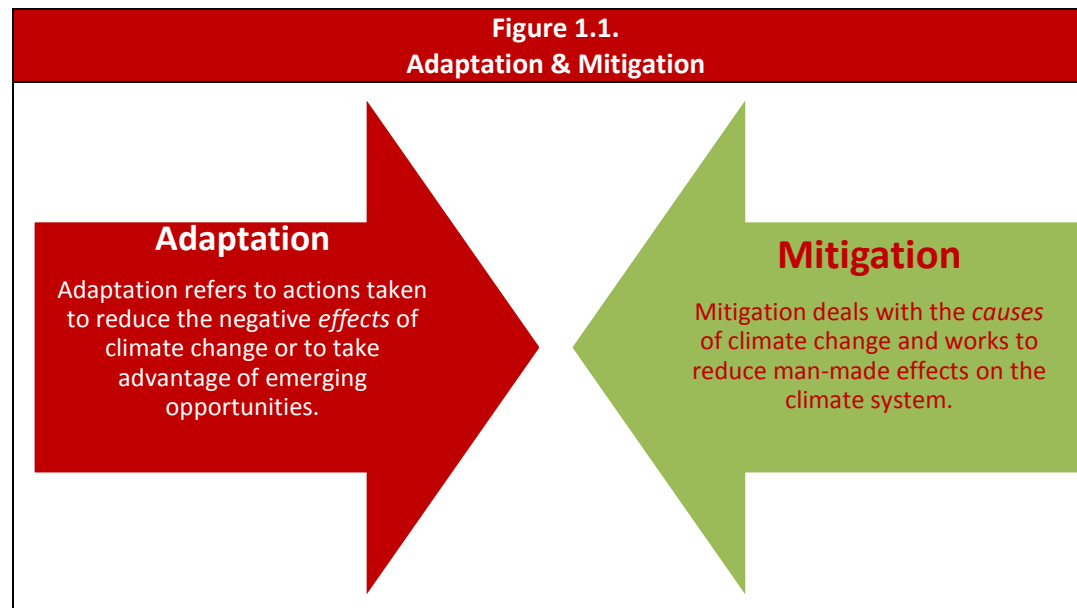
1. Local Adaptation Governance and Business Operations;
2. Infrastructure and Built Environment;
3. Land Use and Development;
4. Drainage, Water and Flood Management;
5. Nature, Natural Resources and Cultural Infrastructure;
6. Citizen Safety, Health and Wellbeing; and
7. Partnerships with other Sectors and Agencies.

These adaptation actions are Cork City Council's template for the future development of climate change resilience, improving our understanding of climate disruption and allowing us to respond appropriately. Cork City Council will build on past and current climate change mitigation actions and progress and enhance early stage adaptation measures. This draft climate change adaptation strategy will assist in the development of future City Development and Local Area Plans. It is proposed to set up appropriate oversight structures involving the elected representatives of Cork City Council, the Council's management team and project teams to implement specific initiatives as appropriate. Key performance indicators will be established and used to monitor progress and evaluate the effectiveness of the adaptation actions, with the realisation that climate change is a dynamic process. Cork City Council will use all available communication platforms to build awareness of the challenges faced from climate disruption, and involve all relevant stakeholders in encouraging greater participation and behavioural change to tackle what has been described as one of the greatest environmental and societal challenges to our current way of life on planet Earth.

1. INTRODUCTION

INTRODUCTION

1.1.   This draft Climate Change Adaptation Strategy 2019 – 2024 represents the first such strategy prepared for Cork City. That stated, as presented later, it builds on significant work conducted by Cork City Council in both adapting and mitigating for climate change. The strategy sets out the risks that climate change will pose to Cork City along with key goals, and actions that the City Council seeks to implement for Cork City to adapt to climate change. **As presented later, this climate change adaptation strategy will inform a _separate_ climate change mitigation strategy which will be prepared by Cork City Council in due course.** Adaptation seeks to address the resilience of the city against the impacts of climate change, while the mitigation strategy will seek to reduce Cork City's impact on the climate.

Figure 1.1.
Adaptation & Mitigation

Adaptation

Adaptation refers to actions taken to reduce the negative _effects_ of climate change or to take advantage of emerging opportunities.

Mitigation

Mitigation deals with the _causes_ of climate change and works to reduce man-made effects on the climate system.

1.2.   Cork City should be agile in its response to climate change. To that extent, this is a _dynamic Climate Change Adaptation Strategy and will be subject to constant review and updating as conditions change_.

1.3.   This adaptation strategy has been prepared through a public consultation process, over a 6-week period. All submissions were evaluated before the final strategy document was finalised, in advance of the Elected Members of Cork City Council meeting to consider its adoption by 30th September 2019.

BACKGROUND

1.4.   Climate change refers to changes in climate patterns that have been apparent from the mid to late 20th century onwards. This is largely attributed to the increased levels of atmospheric carbon dioxide (CO_2) produced by the use of fossil fuels, resulting in numerous global climatic shifts. There is broad scientific consensus that human activities, notably the burning of fossil fuels for energy, has led to the rapid build-up in atmospheric greenhouse gases, causing average global temperatures to rise.

1.5.   Impacts from this warming have already been observed and include increases in global average air and ocean temperatures, accelerated melting of snow and sea ice, widespread retreat of glaciers, rising global average sea level, and extensive changes in weather patterns, including changes in precipitation levels and increased storm intensity. Climate change is one of the greatest environmental and societal threats confronting the world and is impacting on the lives of hundreds of millions of people globally as illustrated in Figure 1.2.

Figure 1.2.
Impacts of Climate Change

Source: World Metrological Organisation
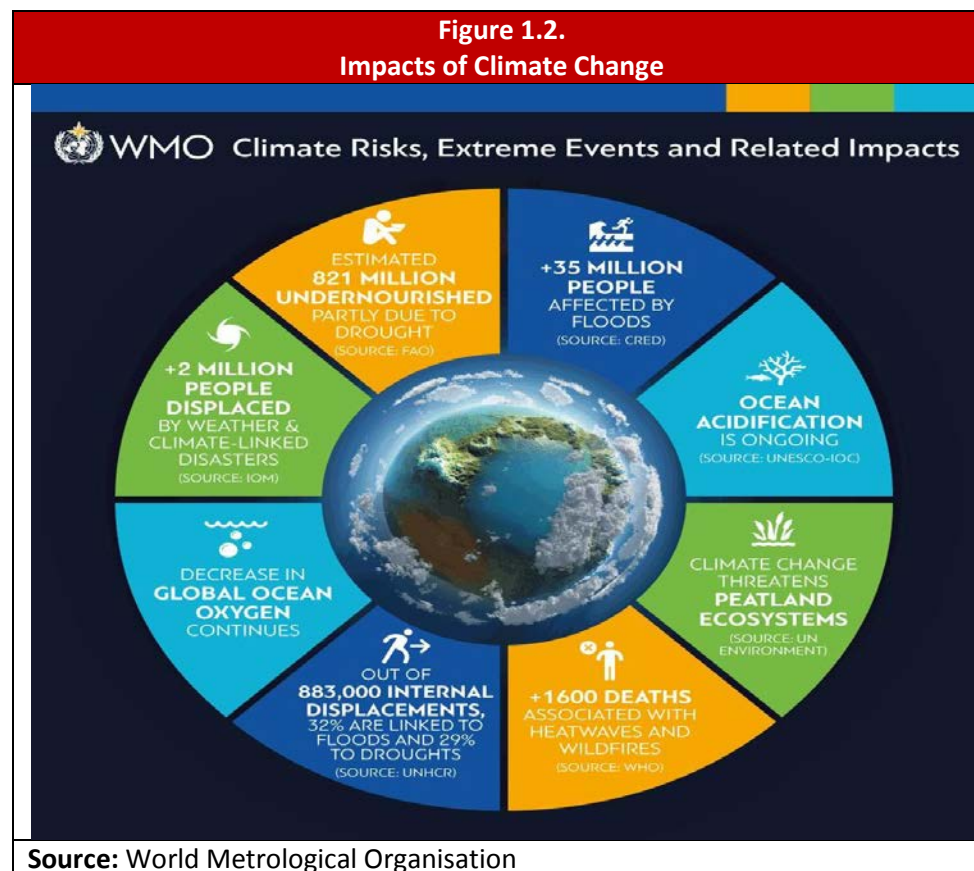
1.6. Observations show that Ireland's climate is also changing and projected physical climate changes include:

- increase in average temperature (surface air temperature, sea surface temperature);
- increased frequency of heatwaves;
- changes in precipitation patterns;
- ongoing mean sea level rise; and
- changes in the character of weather extremes such as storms, flooding, sea surges and flash floods.

1.7. As illustrated later, these impacts are evident in Cork City.

EXISTING CORK CITY COUNCIL CLIMATE ACTIONS

1.8. This draft strategy was not prepared on a blank canvass. Cork City Council has put in place a number of actions aimed at adapting to and mitigating climate change.

1.9. Cork City Council signed up to the **Covenant of Mayors for Climate and Energy** in 2016, joining the mainstream European movement by local & regional authorities in addressing climate change. As the vast majority of energy is consumed in city territories, Cork city has a key burden-sharing role to play in meeting the voluntary commitment of signatories to reduce CO_2 emissions within their territories by at least 40% by 2030. As part of the Covenant of Mayors (COM) commitment, Cork City Council prepared and submitted the Sustainable Energy and Climate Action Plan (SECAP) in 2018 and has also committed to reporting every 2 years on the implementation of the mitigation and adaptation actions in the plan. The Covenant of Mayors commitment will play a key enabling role towards the long-term commitment of Cork City Council to transition to a low carbon society and economy.

1.10. In 2009, Ireland developed The National Energy Efficiency Action Plan 2009-2020 (NEEAP). This NEEAP set an overall national goal of 20% improvement in energy efficiency by 2020, within which the public sector is committed to a 33% improvement in energy efficiency by 2020. By the end of 2018 Cork City Council achieved a 31.5% energy reduction and is on target to reach this 2020 target. Figure 1.3. shows the City Council's progress towards reaching this target. Much of this success is a result of Cork City Council's directorates carrying out energy efficient mitigation projects.

Figure 1.3.
Cork City Council Energy Consumption
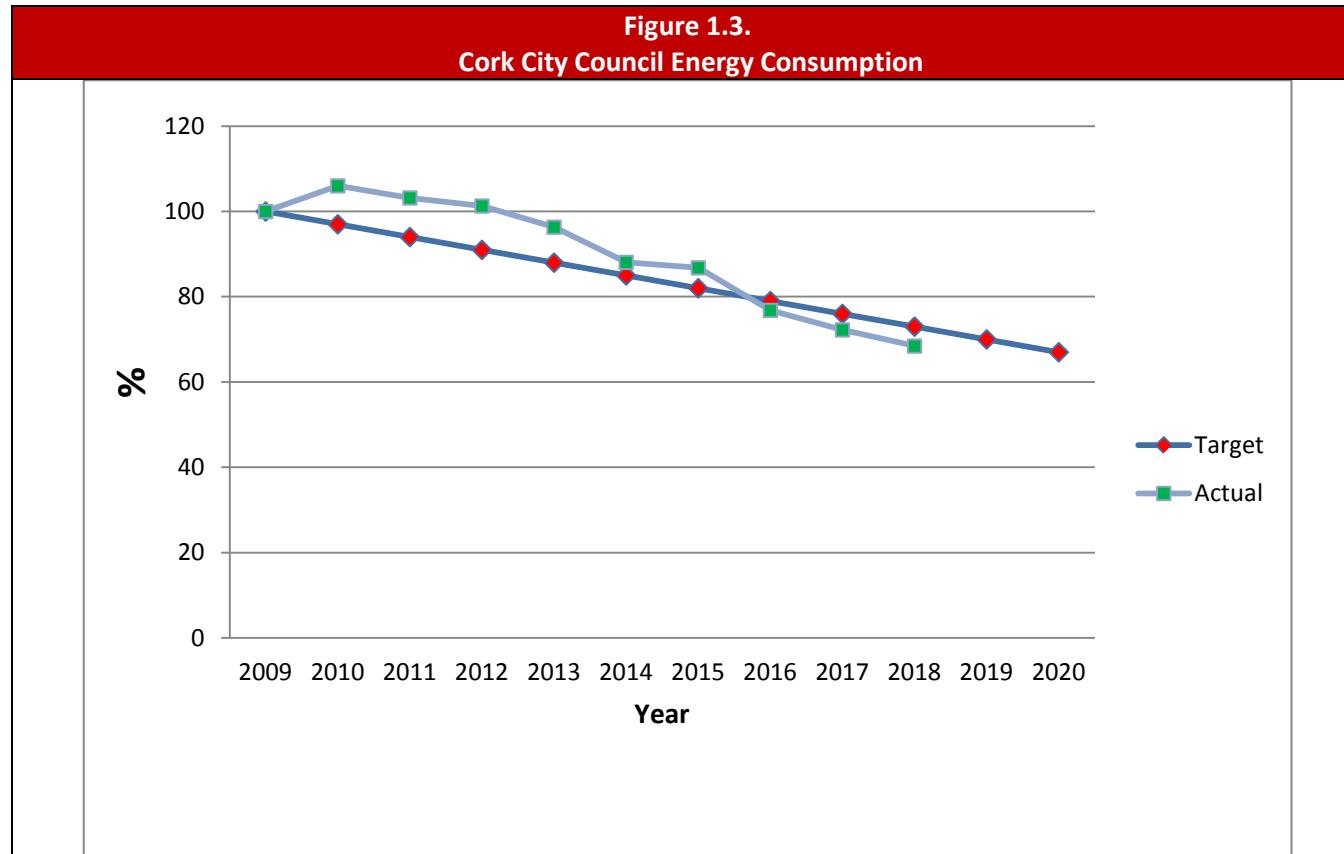
1.11. The Cork City Energy Agency (CCEA), with the Cork City Energy Team (CCET), is committed to achieving ISO 50001 (the international standard for establishing, implementing, maintaining and improving an energy management system) accreditation for Cork City Council by 2020.

1.12. Adaptation measures that have been already implemented by Cork City Council are presented in Table 1.1.

Table 1.1. Climate Change Adaptation Measures Put In Place by Cork City Council	
Category	**Measures**
Support existing initiatives.	Major Emergency Plan and Severe Weather Plans in place. A number of early warning systems are in place, for example: • a new electronic river Lee level gauge provided at Parnell Bridge; • a Flood Early Warning System (FEWS) is currently being progressed for the Lee and it's major tributaries; • existing river Lee levels and flow data available from the Lee Road water treatment plant; • OPW Coastal Surge warning protocol for Cork and Bantry Harbours; • ESB protocol for water discharge from Lee Valley dams; and • IceCast Road Weather Information System for National Roads. Cork City Council continues to work with the OPW in relation to the flood defences throughout the City.
Investigate, review and prepare guidance.	Sustainable Drainage Systems (SuDS) being reviewed to determine its suitability for Cork city. CODEMA to publish guidance on CO_2 Inventory compilation.

Table 1.1. (Continued) Climate Change Adaptation Measures Put In Place by Cork City Council	
Category	**Measures**
Prepare inventories and undertake vulnerability assessments of **assets.**	Property Interest Register has details of Council-owned properties. Roads database holds records of road classifications and condition. Eirspan bridge data base has records of Regional and Local road bridges, including rated condition and damage type.
Identify opportunities.	The Cork City Council Local Enterprise Office (LEO) has expertise in project/product development with business and industry.
Raise awareness.	Cork City Council has built up experience of climate change. Existing mainstream and social media channels widely used by Communications Unit.
Further develop relationships.	Important relationships include: • stakeholders such as Irish Water, SEAI, EPA, ESB; and • 3rd level institutions with research specialisations in climate change.

12

PURPOSE OF THIS STRATEGY

1.13. This adaptation strategy forms part of the National Adaptation Framework (NAF), published in response to the provisions of the Climate Action and Low Carbon Development Act 2015. As the level of Government closest to local communities and enterprise, and as first responders in many emergencies, Cork City Council is uniquely placed to effect real positive change with respect to delivery of the national objective to transition to a low carbon and a climate resilient future. This adaptation strategy takes on the role as the primary instrument at local level to:

- Ensure a proper comprehension of the key risks and vulnerabilities of climate change;

- Bring forward the implementation of climate resilient actions in a planned and proactive manner; and

- Ensure that climate adaptation considerations are mainstreamed into all plans and policies and integrated into all operations and functions of council.

ADAPTATION POLICY CONTEXT

1.14. This strategy is set within a policy framework at international and national levels, as illustrated below.

International Context and the United Nations (UN) Sustainable Development Goals (SDGs)

1.15. Climate change has been on the international political and policy agenda for a number of decades. In 1992 the United Nations agreed a framework on climate change. The Kyoto Protocol, which was agreed in 1997, is based on the principle of common responsibilities to address climate change. By 2013 the EU published a white paper on a climate change adaptation strategy which seeks to contribute to a more climate resilient Europe. Specific targets were set in the 2015 Paris Agreement to limit global temperature rise to well below 2 degrees Celsius above pre-industrial levels and strives to limit the temperature increase to below 1.5 degrees Celsius.   In addition, 9000 cities and local governments, including Cork City Council, are signatories to the Global Covenant of Mayors for Climate Change.

1.16. In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs). The SDGs are a blueprint to achieve a better and more sustainable future. They address global challenges related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The Goals interconnect and are interdependent. Goal No. 13 addresses Climate Action with an objective to: *Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy.* This recognises Climate Change as a global challenge that does not respect national borders and requires solutions that need to be coordinated at the international level to help developing countries move toward a low-carbon economy.

Irish Policy Context

1.17. The 2012 National Climate Change Adaptation Framework (NCCAF) was Ireland's first step in developing a national policy on adaptation actions to combat the impacts of climate change. The 2014 National Policy Position on Climate Action and Low Carbon Development restated the policy position of the NCCAF. The Climate Action and Low Carbon Development Act 2015 provides the statutory basis for the national transition objective laid out in the National Policy Position. Further to this, it made provision for and gave statutory authority to both the National Mitigation Plan (NMP), published in 2017 and the National Adaptation Framework (NAF) published in 2018. The NAF has also identified twelve sectors across seven government departments/agencies which are required to develop specific climate adaptation strategies, which will include actions to be implemented at a local level. See **Appendix B** for a table of the sectors and their parent departments. As previously stated, this draft Climate Change Adaptation Strategy represents Cork City Council's part of the National Adaptation Framework (NAF). In June, 2019 the Government published the **'Climate Action Plan 2019 – to Tackle Climate Breakdown'** which presents a suite of actions designed to address climate change (see below).

1.18. This adaptation strategy is set within the context of a national framework for adaptation planning which is prescribed in the Climate Action and Low Carbon Development Act 2015 and elaborated upon in the National Adaptation Framework (NAF).

1.19. This adaptation strategy commits to aligning with national commitments on climate change adaptation. It must be noted that the process of making 12 sectoral adaptation strategies (identified in the NAF) is running concurrently with the making of local authority strategies. Once published, however, any relevant recommendations or actions will be incorporated into this strategy. For both the preparation of this strategy and the implementation of actions, opportunities will be advanced to align with and collaborate with Cork County Council as the adjoining local authority.

National Adaptation Planning & Climate Services

- Climate Action and Low Carbon Development Act 2015
- National Adaptation Framework
- Sectoral Adaptation Plans
- Local Authority Adaptation Strategies

- Climate Change Advisory Council
- Climate Ireland
- Met Éireann
- Research agencies and 3rd Level Institutions
- Citizens Assembly, National Dialogue
- Climate Action Regional Offices
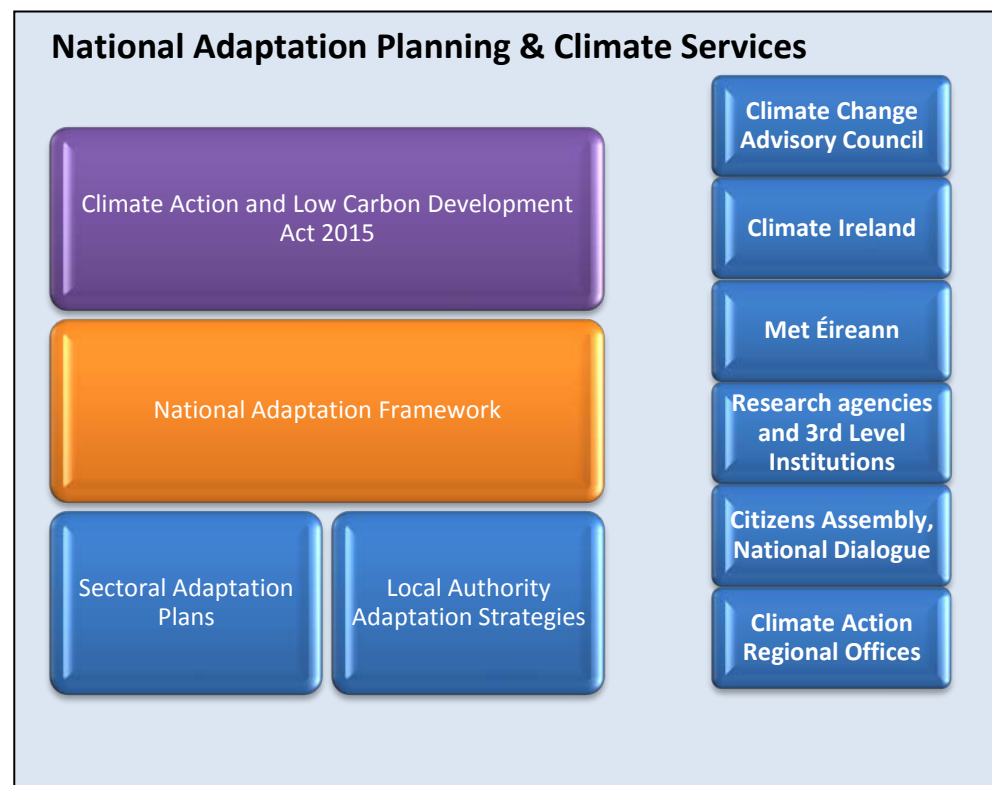
Climate Action Plan 2019 – to Tackle Climate Breakdown

1.20. The all of government Climate Action Plan 2019 - *To Tackle Climate Breakdown* was published on Monday 17th June 2019. The plan sets out 183 individual actions over 12 sectors and charts an ambitious course towards decarbonisation. The Public Sector is identified as having a significant role in the '*Leading by Example*' section, to not only just reduce their own emissions but to inspire climate action across communities and society. Local Government in particular is recognized for its pivotal role in stimulating climate action at community level. The Plan speaks also to the role of the Climate Action Regional Offices (CARO) in assisting local authorities in building capacity to engage effectively with climate change. There are a range of actions that are specific to and/or relate to local authorities as well as the CAROs. Local authorities will be required to undertake an annual programme with <u>measurable impact</u> particularly with actions to focus on, *inter alia;*

- Reducing emissions by 30% and improve energy efficiency of local authority buildings by 50% under the guidance of a new Public Sector Decarbonisation Strategy;

- Setting a target to demonstrate leadership in the adoption of low emission transport options;

- Developing and implementing a Climate Action Charter;

- Public buildings (all) to reach BER 'B' Rating;

- Building capacity through upskilling and knowledge dissemination;

- Supporting and delivering projects that include strong ambition on climate action through funding resources from Project Ireland 2040;

- Developing robust community engagement on climate action by linking to existing and new networks and clustering initiatives using the National Dialogue on Climate Action and local authority structures;

- Working with communities to expand Sustainable Energy Communities; and

- Continue to implement Adaptation Planning with emphasis on building Climate Resilience and delivering the objectives of the NAF.

The Climate Action Plan is notably focused on mitigation measures to achieve emission targets to 2030 and local authorities will need to expand their role to take on actions and measures from the Climate Action Plan to respond to and meet obligations set out.

The level of ambition within Cork City Council over-and-beyond adaptation measures is all- embracing of the mitigation measures prescribed by the Government of Ireland's 'Climate Action Plan' and this is reflected in the Councils resolution in its commitment to the Covenant of Mayors.

Regional Context

1.21. The Southern Regional Assembly is currently preparing a Regional Spatial and Economic Strategy (RSES) for the Southern Region, for the period 2019-2031. The RSES will provide a long-term regional level strategic planning and economic framework, which will support the implementation of the National Planning Framework for the future physical, economic and social developments for the Southern Region. The following key themes of the draft RSES are directly related to Cork City's Climate Change Adaptation Strategy:

- Adaptation transition to a low carbon and climate resilient society; and

- Sustainable management of water and other environmental resources.

Climate Action Regional Offices (CAROs)

1.22. To assist local authorities prepare and implement climate change adaptation plans Climate Action Regional Offices (CAROs) have been established for four regional areas: Atlantic Seaboard North, Dublin Metropolitan, Eastern and Midlands, and Atlantic Seaboard South. Cork County Council was appointed as the lead local authority to manage the CARO for the Atlantic Seaboard South region and the five constituent local authorities in the Atlantic Seaboard South region are Cork City Council, Limerick City and County Council, Cork County Council, Kerry County Council and Clare County Council. The role of the CARO is to assist and coordinate the preparation of all local authority climate change adaptation strategies in its region.

Cork City Context

1.23. Cork City Council is responsible for developing, communicating and delivering this Cork City Council Climate Change Adaptation Strategy. Following the boundary extension that came into effect on 31st May 2019, the population of Cork is 211,000. The geographic area has expanded almost five-fold as illustrated in Figure 1.4. below. The red-hatched area in Figure 1.4 below shows Cork City Council's jurisdiction pre-31st May 2019. The Draft Regional Spatial Strategy population projections are forecasting a population increase to between 274,000 and 286,000 by 2031 and the National Planning Framework (NPF) sets a population target for Cork City in the region of 350,000 people by 2040.

Figure 1.4.
Cork City Boundary Extension, May 2019
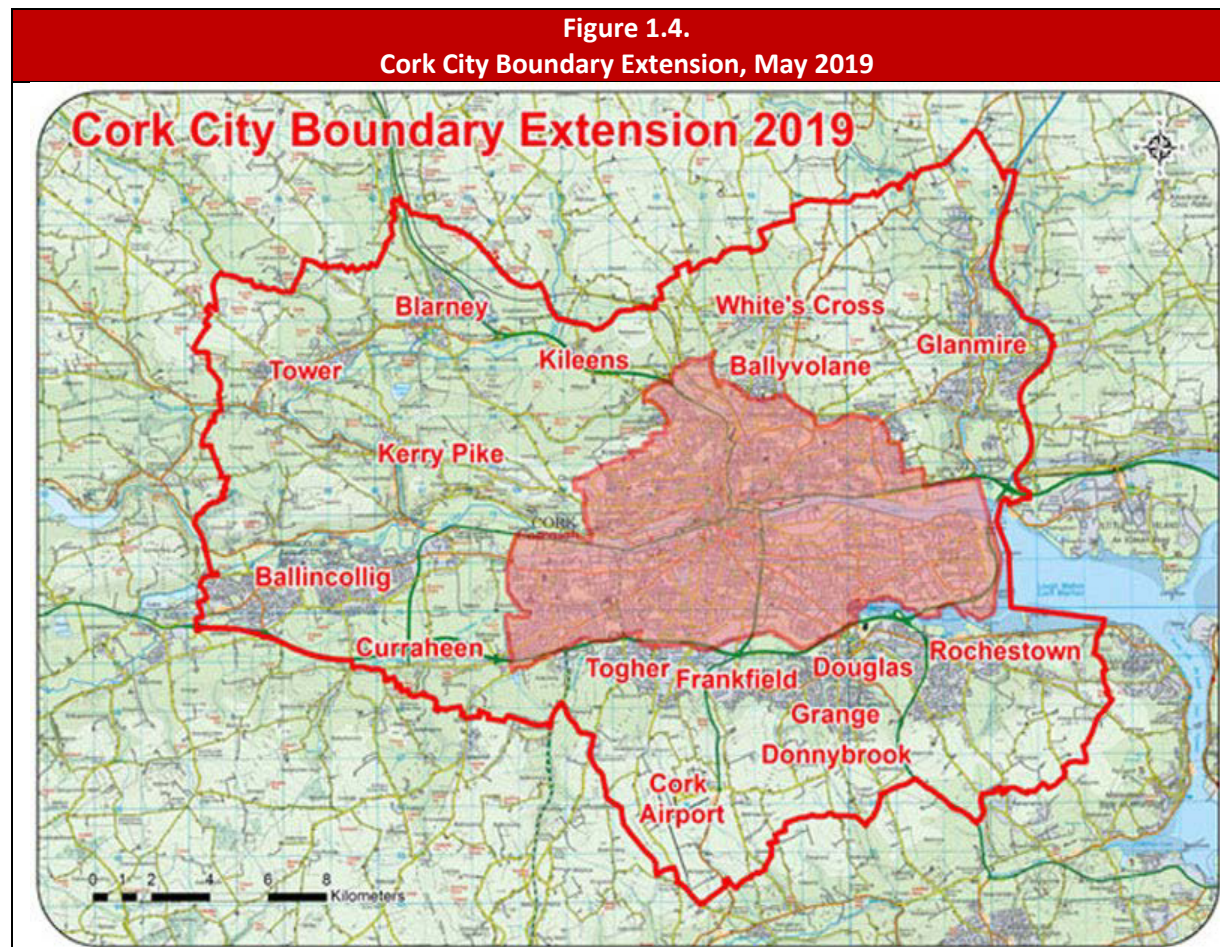
Declaring a Climate and Biodiversity Emergency

1.24   During June 2019, the elected members of Cork City Council declared a *'climate and biodiversity emergency'*. The members, in doing so, showed their commitment to taking action on climate change, including reducing the risks of climate change impacts on council operations and services, promoting and ensuring biodiversity throughout the county, as well as militating against the causes of climate change. This follows the decision by the Irish government and opposition parties to declare a climate and biodiversity emergency, becoming only the second country in the world to do so.

ENVIRONMENTAL ASSESSMENT

1.25   Cork City Council conducted the following screening of the draft Climate Change Adaptation Strategy:

- **Screening Strategic Environmental Assessment (SEA):** Under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435 of 2004 as amended by S.I. 200 of 2011), all plans which are likely to have a significant effect on the environment must undergo screening to determine whether a Strategic Environmental Assessment (SEA) is required. This strategy has been screened for SEA and this screening determined that a full SEA is not required.

- **Screening for Appropriate Assessment (AA):** Screening of this strategy has been undertaken in accordance with the requirements of Article 6(3) of the EU Habitats Directive (directive 92/43/EEC) and the screening has determined that the Climate Change Adaptation Strategy is not likely to significantly affect Natura 2000 sites (i.e. Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) within or surrounding the plan area.

These are presented in detail in Appendix E and Appendix F respectively.

Co-benefits and Cumulative/in-combination environmental effects

1.26   In implementing the actions of this strategy, Cork City Council will seek to ensure that any potential environmental impacts are minimized. Actions will be examined in the context of potential co-benefits including measures such as human health, biodiversity enhancement and protection, improvement in water quality, management of areas at risk of flooding and sustainable landuse zoning and development practices. It would be important that actions yielding multiple environmental and societal benefits are prioritised.

Likewise, consideration of potential adverse cumulative and in-combination environmental effects must be accounted for in selecting and implementing specific actions. For example, consideration of environmental sensitivities under the Habitats Directive and Water Framework Directive are important in the context of potential adverse cumulative or in-combination effects. For the purposes of monitoring and reporting on progress, mal-adaptation will be identified and approaches to counter this will be explored thoroughly and put in place.
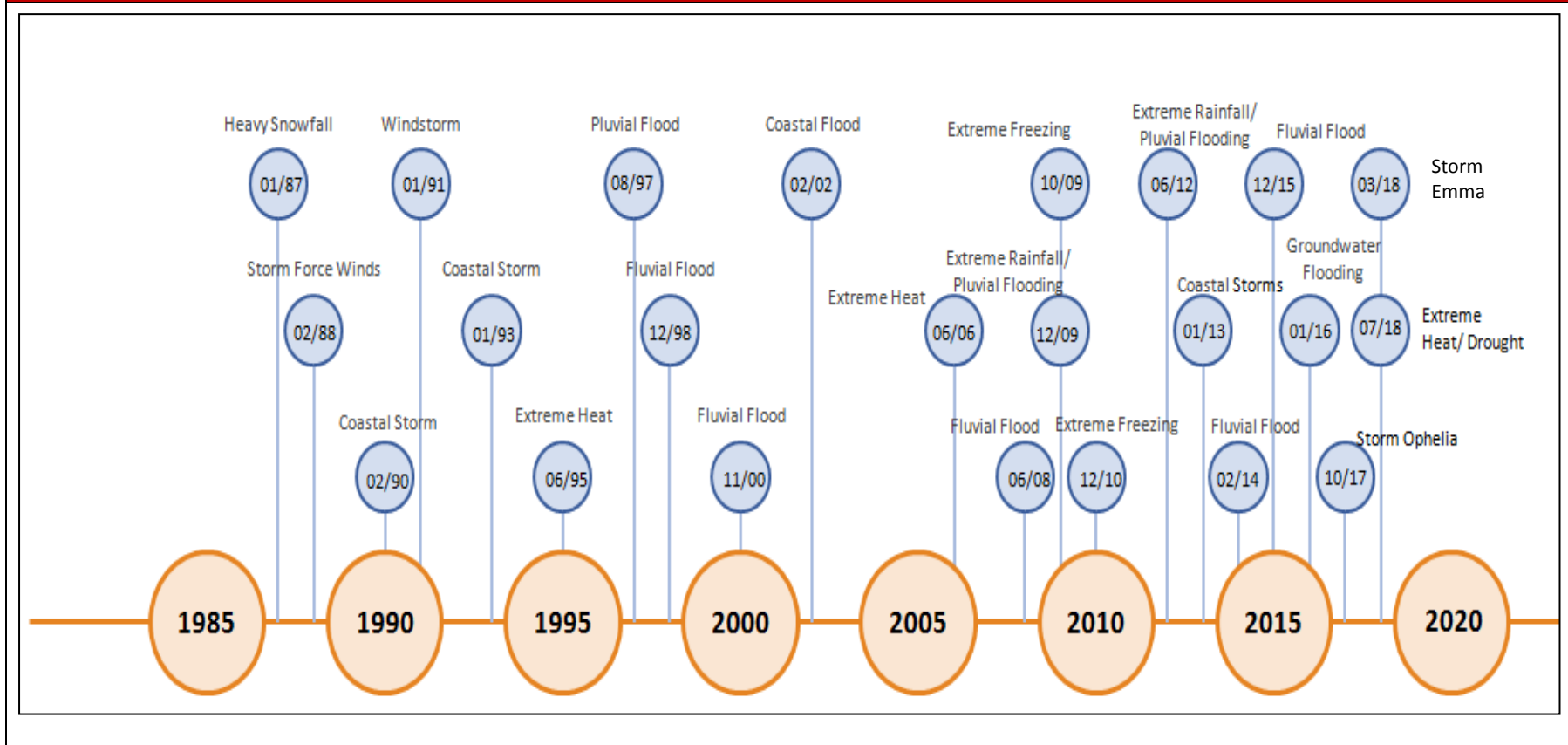
2. CLIMATE CHANGE IN CORK

2.1. A review of extreme weather events in the strategy area over the period 1987 to 2018 has been undertaken using published Met Éireann data and has been categorised under the following headings for the Cork in Table 2.1 and shown graphically in Figure 2.1.

Table 2.1. Climate Change in Cork	
Extreme Weather Events	**Description**
Coastal flooding	• February 2002: Cork city flooding
Coastal storms	• January 1993: severe gusts and heavy rainfall • February 1990: severe gusts and heavy rainfall
Extreme heat and drought	• Summer 2018: warmest weather since 2006 • Summer 2006: warmest weather since 1995 • Summer 1995: warmest weather since 1955
Extreme rainfall	• June 2012: 58mm 1-day total recorded in Bandon • November 2009: 55mm 1-day total recorded in Ballyvourney
Fluvial flooding	• December 2015: River Bandon • February 2014: River Lee • November 2009: River Lee; major flooding in Cork city • August 2008: River Blackwater • November 2000: River Lee
Freezing conditions	• April 2019: Cork airport recorded - 8.6 degrees (coldest ground temperature on record) • December 2010: Cork recorded -7.2 degrees

Table 2.1. Continued Climate Change in Cork	
Extreme Weather Events	**Description**
Groundwater flooding	• January 2016: N25 flooded between Killeagh and Castlemartyr
Heavy snowfall	• February/March 2018: Storm Emma • January 1987: 12cm of snow at Roche's Point •
Pluvial flooding	• June 2012: Douglas • August 1997: Freemount •
Storm force winds/ windstorms	• October 2017: Storm Ophelia, with gusts up to 84 knots recorded at Roche's point • January 1991: gusts in excess of 68 knots recorded at Roche's point • February 1988: gusts in excess of 84 knots recorded at Cork airport •

2.2. It is evident that the main category of extreme weather events reported has been flooding (coastal, fluvial and pluvial). This is followed by windstorms and coastal storms and there is a general similarity in the numbers of the remaining event types. As illustrated in Figure 2.1. there is an acceleration of extreme weather events over recent years.

2.3. Cork City Council has a comprehensive Major Emergency Plan in place to ensure that staff at all levels are aware of their responsibilities and that appropriate actions are initiated in a timely and effective manner to deal with major emergencies. The Major Emergency Plan, which describes actions required in the event of severe weather events, has come into operation on a number of occasions, with the most recent activations being Storm Ophelia in October 2017 and Storm Emma in February / March 2018.

Figure 2.1.
Extreme Weather Events in Cork 1985 - 2019

3.   CLIMATE RISK IDENTIFICATION

INTRODUCTION

3.1.   This section presents the risks that climate change may have on Cork City based on trends of the climate variables that are changing.

CLIMATE VARIABLES

3.2.   The tables below provide an overview of the seven climate variables that have been investigated in preparation of this strategy.

	Hydrology
Observed	The analysis of river flows is complex and subject to large variability, so it is difficult to identify impacts of climate change. During the period 1954 to 2008, summer mean flows were dominated by decreasing flows while for winter there is a tendency for increases in mean flows. Annual and winter high flows are also dominated by increasing trends. Drier summers could have effects on summer base-flows of rivers in Cork and the recharge of underlying aquifers. This ultimately has implications for the provision of drinking water, as was evident in many areas during the prolonged drought period of summer 2018.
Summary of Change	Increasing seasonality in hydrological regimes can be expected with likely decreased summer and increased winter flows. Flood risk will increase due to a combination of higher river-flows and increases in extreme precipitation events. These events are likely to play a greater role in climatic events in the future. An example would be high tides coupled with fluvial and pluvial events, especially in the lower reaches of the River Lee and Cork Harbour.
Climate risks for Cork city	Groundwater flooding, which is the emergence of groundwater at the surface away from river channels and watercourses, under conditions where the 'normal' ranges of groundwater level and flow are exceeded. Pluvial, or surface-water flooding, which results from rainfall-generated overland flow that may occur during or immediately after intense rainfall events and before the runoff enters Cork city's watercourse or drainage system. Fluvial or river flooding, which occurs when excessive rainfall causes the River Lee to exceed its capacity.

	Rainfall
Observed	Throughout Ireland, annual average rainfall amounts have increased by roughly 5% relative to the 1961-1990 baseline period, with this increase observed across all seasons. However, spatially, rainfall intensity and amounts vary with no clear direction of change yet apparent.
Summary of Change	Increasing seasonality in precipitation can be expected with drier summers likely. An increase in the occurrence and magnitude of extreme rainfall events is also likely.
Climate risks for Cork city	Groundwater flooding. Pluvial flooding. Fluvial flooding.

	Sea Level
Observed	Satellite observations indicate that sea level around Ireland has risen by approximately 0.04m to 0.06m since the early 1990s.
Summary of Change	Sea levels are expected to increase for all Irish coastal areas.
Climate risks for Cork city	Coastal flooding, which occurs when normally dry, low-lying land is flooded by seawater. Coastal erosion, which is the process of wearing away material from the coast line due to imbalance in the supply and export of material from a certain section.

	Sea Temperature
Observed	The seas around Ireland have been warming at a rate 0.6^0 C per decade since 1994, which is unprecedented in the 150 year observational record. The greatest warming has been observed over the Irish Sea.
Summary of Change	In line with global trends, the seas around Ireland are expected to continue warming. Warm seawater has a greater volume than cold seawater. As ocean temperatures increase, so will the total ocean volume. Any increased volume will cause the level of the water in the oceans to rise.
Climate risks for Cork city	Coastal flooding. Coastal erosion.

	Surface Air Temperature
Observed	Observations indicate an increase in the surface temperature for Ireland of 0.8°C since 1900. In addition, the number of warm days has increased while the number of frost days has decreased.
Summary of Change	Surface air temperatures are expected to increase everywhere compared to the present. An increase in the frequency, intensity and duration of heat waves is expected.
Climate risks for Cork city	Heat waves may lead to the urban heat island effect, severe drought and violent thunderstorms which impact upon human health, physical infrastructure, river water levels and fires. Fewer frost days and milder night-time temperatures are expected.

	Waves and Surges
Observed	Analysis of satellite data for the period 1988 to 2002 shows a general increase in wave height in the northeast Atlantic.
Summary of Change	The magnitude and intensity of storm wave heights are expected to increase for spring and winter.
Climate risks for Cork city	Coastal flooding. Coastal erosion.

	Wind Speed and Storms
Observed	For Ireland, observations indicate a high degree of yearly variability in wind speeds and, due to a lack of correlation in the available data, analysis of long term trends cannot yet be determined with confidence.
Summary of change	Projections indicate a decrease in wind speeds for summer and increases for winter. An increase in the intensity of extreme wind storms is expected.
Climate risks for Cork city	Wind storms or high winds, that are defined as a having a wind speed greater than 50 km/h which equates to a Force 7 (28–33 knots) on the Beaufort wind force scale.

FLOODING RISKS IN CORK CITY

3.3.   There is a long history of flooding in Cork city and the River Lee valley. There were some 292 floods reported over the period 1841–1988. A number of severe floods have affected the city, most recently in November 2009, February 2014 and Winter 2015/16. The November 2009 event was exceptionally severe, with major damage caused to commercial and residential buildings in Cork city. It has been estimated by the OPW that the damages caused in the 2009 river flood and 2014 tidal flood amounted to €90m and €40m respectively. The National Planning Framework identified that flood management must be addressed as part of any future growth strategy for Cork. Thus, the plans for the development of Cork City, including Cork Docklands, must consider the impact of flooding.

3.4.   Climate Change is expected to increase flood risk. It could lead to more frequent flooding andincrease the depth and extent of flooding. Due to the uncertainty surrounding the potential effects of climate change, a precautionary approach is always advised with respect to landuse planning and development, building flood alleviation measures and ensuring longer term resilience of critical infrastructure. It is important to consider that the increase in the frequency and/or severity of flood events may impact the delivery of services of the council, and in particular may necessitate more frequent and resource intensive emergency responses.

3.5.   The Lee Catchment Flood Risk Assessment and Management Study (Lee CFRAMS) was carried out by the OPW between 2006 and 2013. These studies have been developed to meet the requirements of the EU Directive on the assessment and management of flood risks (the Floods Directive). The CFRAM Studies have produced Flood Risk Management Plans (FRMP) to manage flood risk within river catchments. Flood maps are one of the main outputs of the studies. The maps indicate modelled flood extents for flood events of a range of annual exceedance probabilities (AEP). The flood event maps and future scenario maps are a crucially important mechanism that will support and assist in planning appropriate adaptation strategies and measures for local authorities.

3.6.   In the case of the Lee catchment, these studies identified a preferred scheme to manage flood risk including a combination of a flood forecasting and warning system, revised ESB dam operating procedures and waterside defences. Following on from this, the Lower Lee Flood Relief Scheme (LLFRS) has been developed, which is a modified version of the measures proposed in the Lee CFRAMS together with a flow control structure on the south channel to rebalance flows between the north and south channels. This scheme is designed to protect over 2,100 properties, including 900 homes and 1,200 businesses against tidal and river flooding.

3.7.   Cork City Council will work in conjunction with the OPW to deliver flood alleviation schemes that are deemed appropriate.

INFRASTRUCTURE

3.8. It will be necessary to conduct a detailed vulnerability assessment due to climate change of the 930km of roads and 190 bridges in Cork City.

RISKS TO BIODIVERSITY

3.9. In the case of the natural environment, the National Biodiversity Action Plan for 2017-2021 states that here is evidence that climate change is negatively impacting Irish habitats and is driving ocean acidification. Expected increases in temperature, changes in precipitation patterns, weather extremes (storms and flooding, sea surges, flash floods) and sea-level rise will affect the abundance and distribution of Irish species and possibly encourage the spread of alien invasive species.

Agriculture/Forestry/Soil Management

3.10. Tree planting/management, soil erosion, nutrient management, grazing management of sensitive soils, farming intensity within river catchments and many more issues will all influence adaptation/mitigation programmes within the local authority functional area, particularly having regard to the recently extended boundary. The Council is committed to working with relevant landowners in protecting natural and key cultural assets and developing a more sustainable green economy and resource management.

3.11. It is recognised that a well-planned and managed planting programme can help to improve water quality and to buffer and slow water flows. Cork City Council can benefit from tree planting supports for native woodland and amenity areas. The NeighbourWood scheme in the DAFM Forestry Programme is an example of a scheme which could provide localised climate benefits to Cork City.

REGIONAL AND NATIONAL CONSEQUENCES OF ADVERSE CLIMATE CHANGE IN CORK CITY

3.12. With a population of 211,000, Cork is Ireland's second largest city and a key driver of the regional and national economy. The negative impacts of climate change pose a significant risk to citizens, the economy, the environment and the delivery of local government services. This is especially relevant considering the risks from pluvial, fluvial and tidal flooding in Cork city and its environs. Cork City Council is directly responsible for over 10,000 public housing units. The Council also owns many municipal buildings and other facilities whose functions encompass the full range of local government activity and vary from area offices and libraries to civic amenity sites, parks, cemeteries and leisure centres. Cork City Council manages the major water treatment plant at the Lee Road on behalf of Irish Water.

3.13.   The Cork metropolitan area has many natural and developed advantages, which make it an attractive area to live, to visit and to carry out business in. These include:

- One of the largest natural harbours in the world;
- A significant power generation station and an oil refinery;
- A Tier 1 seaport and an international airport, plus important rail and road links/hubs;
- Well developed digital infrastructure;
- A critical mass of excellent educational institutions;
- Major hospital and medical/health sector facilities;
- A vibrant cultural, sporting and recreational scene;
- A strong economic sector (over 150 Foreign Direct Investment (FDI) companies); and
- Significant commercial and retail facilities.

3.14   However, when viewed through the lens of risk assessment, climate change could make a significant impact on the economy and society of Cork and the Southern region. For example, the likelihood of a major flood event multiplied by the consequences of such an event in terms of danger and damage to citizens and infrastructure is greater in Cork city than many other cities. Having such a critical mass of infrastructure in the second largest city in Ireland means that when current and future climate change-related conditions and events become either the norm or occur at greater frequency and severity, many people, businesses and organisations will be negatively affected unless measures are put in place to adapt to climate change.

4 ADAPTATION AND IMPLEMENTATION

INTRODUCTION – GUIDING PRINCIPLES

4.1 A total of 66 actions under 7 high level themes have been identified to support Cork city's adaption to climate change and address the risks presented in Section 3. The 7 high level themes, together with their objectives and actions, have been developed with the following four guiding principles, to ensure an understanding of the role of adaptation and that a coherent approach to the impacts of climate change is considered in the service delivery of Cork City Council.

- **Mainstream Adaptation:** That climate change adaptation is a core consideration and is mainstreamed in all Cork City Council services and activities. Additionally, it aims to ensure that Cork City Council is well positioned to benefit from economic development opportunities that may emerge due to a commitment to a proactive climate change adaptation and community resilience.

- **Informed Decision Making:** That effective and informed decision making within Cork City Council is based on reliable and robust information having regard to key impacts, risks and vulnerabilities of the county. This will support long term financial planning, effective management of risks and help to prioritise actions.

- **Building Resilience:** That improved awareness and appreciation of climate change will encourage communities to adapt to the anticipated impacts and promote a sustainable and robust action response and that the needs of vulnerable communities are prioritised and addressed.

- **Capitalising on Opportunities:** Predicted climate change can sometimes result in additional opportunities for the local authority. A register of opportunities will enable Cork City Council to encourage communities, stakeholders and interested parties to collaborate on the potential opportunities arising from climate change.

THEMES & ACTIONS

4.2   The 7 high level themes, which are of equal priority, are listed below.

1)   **Local Adaptation Governance and Business Operations:** To support implementations of adaptation planning in all Council activities and operations and to build resilience within Cork City Council to support service delivery.

2)   **Infrastructure and Built Environment:** To increase resilience of roads and transport infrastructure and of Council owed assets, including municipal buildings, depots and the public housing stock.

3)   **Land Use and Development:** To integrate climate action considerations into land-use planning.

4)   **Drainage, Water and Flood Management:** To adapt to the increased risk and impact of flooding and to liaise and work with other bodies responsible for management of water resources.

5)   **Nature, Natural Resources and Cultural Infrastructure:** To develop approaches to protect the natural and key cultural assets in Cork City Council.

6)   **Citizen Safety, Health and Wellbeing:** To build capacity & resilience within communities in regard to climate adaptation.

7)   **Partnerships with other Sectors and Agencies**: To collaborate with other Sectors and Agencies in programs relating to climate action and adaptation planning.

4.3   The seven high level themes are presented in detail in the next section of the document, with proposed adaptation objectives and corresponding adaptation actions for the five year duration of this strategy.

4.4   The adaptation actions included in this strategy involve a mixture of "grey" engineered measures to reduce climate hazards, "green" ecosystem or nature-based adaption measures or "soft" adaptations that aim to alter the behaviour of the public. Actions have been identified for all the functional/operational areas of the council which have a role in their implementation and delivery. These response approaches can be adopted in isolation or can be co-ordinated to complement each other, depending on circumstances.

4.5　The action framework as set out over the 7 high level themes provides for the implementation of actions within the timeframes of short, medium and long.

For clarity, these timeframes have been determined as:

Timeframe	Categorisation
Short	1st Half of Strategy
Medium	2nd Half of Strategy
Long	During & After Lifetime of Strategy

Given their nature, some actions may be commenced within the lifetime of this strategy and continue beyond it.

4.6　The actions proposed in the published draft Cork City Council Climate Change Adaptation Strategy were amended following submissions during the public consultation process. While some actions can be implemented as proposed, others will need further preparatory work prior to implementation. The proposed actions may also be modified to take account of actions proposed in other sectoral adaptation strategies and from other recent and future key publications such as the 'All of Government ' Climate Action Plan 2019 – *to tackle climate breakdown*.

IMPLEMENTATION

4.7 Cork City Council will establish suitable structures to oversee the implementation of this Climate Change Adaptation Strategy as illustrated in Figure 4.1. below. This governance is proposed until such time as the Strategic Policy Committees of Cork City Council are established, at which stage it is recommended that the members of Cork City Council review the governance structure for this strategy.

- **Cork City Council:** The elected members of Cork City Council are responsible for adoption of the Climate Change Adaptation Strategy. The City Council will approve any amendments to the strategy.

- **Climate Action Committee:** One of the first actions of the newly elected City Council was to establish a Climate Action Committee. This committee will have oversight of the implementation of this strategy and make recommendations to Cork City Council in relation to any amendments to the plan.

- **Senior Management Team:** The Senior Management Team will be responsible for the day –to-day delivery of the Climate Change Adaptation Strategy.

- **Climate Action Team:** This internal, multi-disciplinary, cross-directorate team will be responsible for the establishment, resourcing and management of specific Project Teams to implement the adaptation actions. The secretariat will be provided by the Strategic and Economic Development Directorate.

- **Project Teams:** Project Teams will be established, where appropriate to implement the actions of the strategy. These teams may include members from directorates and other stakeholder organisations as outlined in the actions below.

Figure 4.1.
Oversight of Climate Change Adaptation Plan

Cork City Council

Senior Management Team

Climate Action Committee

Climate Action Team

Project Team 1

Project Team 2

Project Team 3
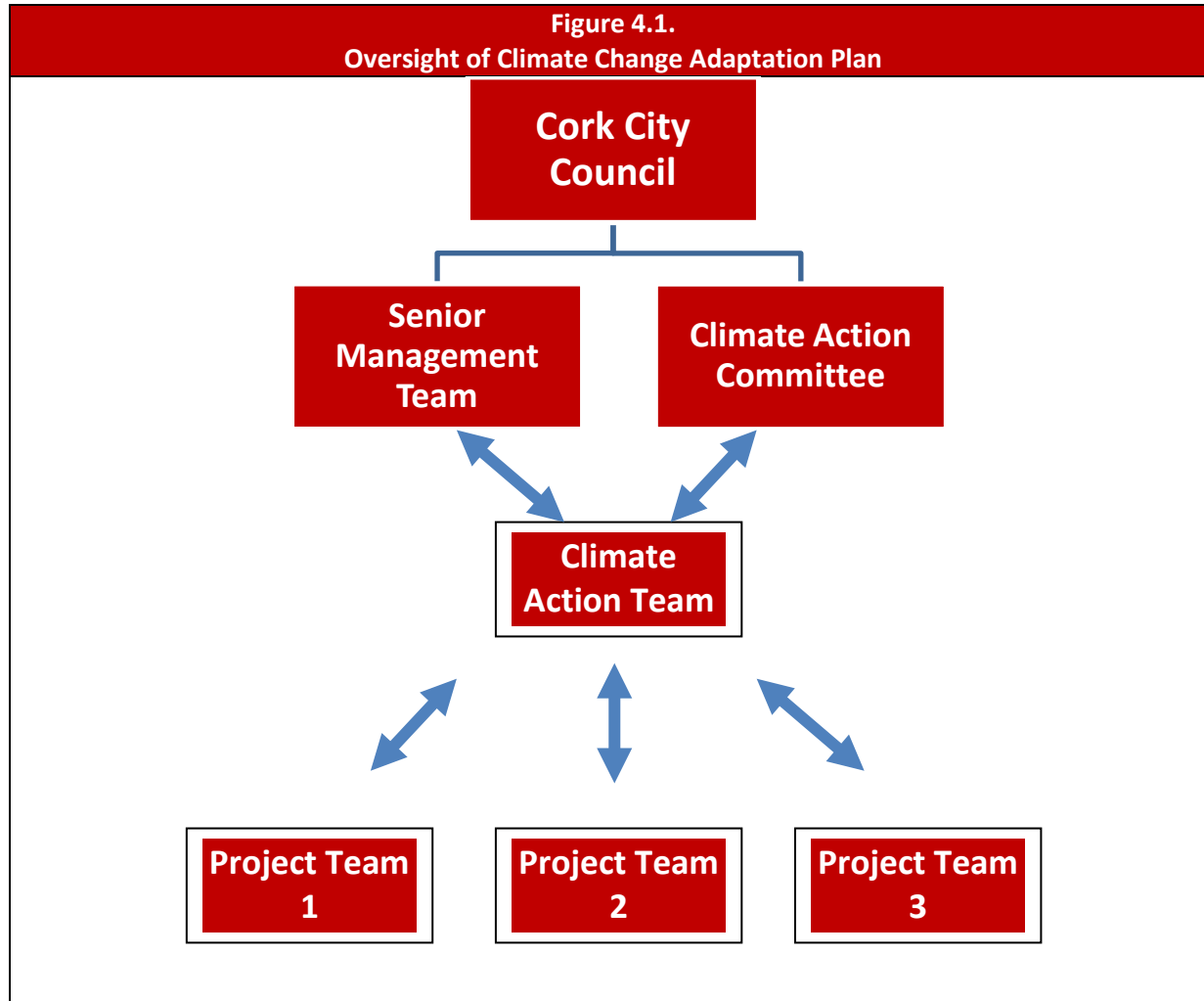
MONITORING

4.8   This adaptation strategy will be monitored by the elected members and senior management of Cork City Council to keep a record of progress made in implementing specific adaptation actions. Monitoring will be undertaken using key performance indicators (KPIs), which may evolve over time as the adaptation process matures and is mainstreamed. These indicators will be used to:

- Monitor the implementation of adaptation policies, measures and actions;

- Target, justify and monitor funding for adaptation programmes;

- Mainstream adaptation through links between sectors and related indicators;

- Communicate adaptation to policy and decision-makers and other stakeholders;

- Update climate change legislation, policy and research information;

- Compare adaptation achievements across sectors, regions and countries; and

- Inform and report climate change adaptation progress to Government.

The requirements of the SEA and habitats directives, where relevant and appropriate, will be considered during the implementation of the actions contained in this climate change adaptation strategy.

EVALUATION

4.9   Evaluation of the adaptation strategy will be a systematic and objective process to determine the effectiveness of adaptation actions. Given the complexity and long-term nature of climate change, it is essential that adaptation is designed as a continuous and flexible process, and subjected to periodic review, both in terms of the validity of the underlying scientific assumptions and the appropriateness of projects, policies and programmes. Lessons learned and good practices identified during the monitoring and evaluation of ongoing and completed projects, policies and programmes should inform future actions, creating an iterative and evolutionary adaptation process. This means that adaptation actions will be informed by latest climate change data and projections. As a result, monitoring, and evaluation can help improve the efficiency and effectiveness of adaptation efforts within Cork City Council. Part of the monitoring will also involve documenting climate events themselves, which will inform future adaptation and mitigation policies.

COMMUNICATION

4.10 Public communication and outreach are essential to inform and educate residents of Cork to climate change mitigation and adaptation measures. Cork City Council will build awareness on the challenges of climate change, keep the public informed on the implementation of this strategy and improve information flows during extreme weather events. A specific Communications Plan to support the implementation of the climate adaptation strategy will be developed to disseminate outcomes and updates to the various stakeholders. This will assist in the development of community forums to engage with the public so as to encourage greater participation and behavioural change in all aspects of climate adaptation and mitigation.

CORK CITY COUNCIL ADAPTATION ACTIONS

Local Adaptation Governance and Business Operations

Objective 1: To support the successful and practical implementation of climate adaptation planning.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
1.1	Establish a Climate Action Team with representatives from all the key functions of Cork City Council, to oversee the implementation of the actions of this climate change adaptation strategy. This Team will implement actions, report and review the progress of the strategy and will encourage local innovation.	Strategic and Economic Development	Climate Action Team	CARO	Short	In Progress
1.2	Integrate climate action into Cork City Council Service Delivery Programmes and provide for its translation into Team Development Plans and Personal Development Plans, to enable actions to be directly pursued by all relevant business units.	Senior Management Team	All Directorates Climate Action Team		Short	Yes
1.3	Ensure that climate action is a regular standing item on the agenda of Senior Management Team (SMT) meetings and relevant Strategic Policy Committees (SPCs), with bi-annual progress reports submitted to the Climate Action Team, as required.	Senior Management Team	All Directorates Climate Action Committee Strategic Policy Committees		Short	Yes
1.4	Liaise with the Climate Action Regional Office (CARO) and provide appropriate progress reports. Assist the local CARO in its development as a 'Centre of Excellence' for the region.	Strategic and Economic Development	Climate Action Team	CARO	Short - Medium	Yes

1.5	Ensure that climate action is a key consideration in the assessment of all planning applications and provide guidance on climate action to developers in Cork City.	Strategic and Economic Development	Climate Action Team Community, Culture and Placemaking	Southern Regional Assembly	Short	In Progress
1.6	Ensure that climate action is referenced to and aligned with the UN Sustainable Development Goals (SDGs), especially SDG 13: Climate Action.	Strategic and Economic Development	Climate Action Team Community, Culture and Placemaking	CARO Southern Regional Assembly	Short	In Progress
1.7	Building on adaptation planning actions set out in this strategy, support and compliment the practical implementation of actions arising from the National Climate Action Plan – to Tackle Climate Breakdown (as revised and updated annually), across the broad range of functions of the local authority to achieve the national climate ambition i.e. decarbonisation targets to 2030 and objectives to 2050.	Strategic and Economic Development	Climate Action Team Community, Culture and Placemaking	CARO	Short	In Progress
1.8	Explore with the relevant Government Department(s) the necessity of appointing a Climate Action Officer and strengthening other staff resources within the existing Climate Action Unit. This Officer and Unit will have responsibility for co-ordinating and delivering climate action-related activity within Cork City Council's Administrative area.	Strategic and Economic Development	Climate Action Team Community, Culture and Placemaking	CARO	Short	In Progress

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
	Objective 2: To ensure that climate adaptation is mainstreamed into all relevant activities and operations of Cork City Council.					
2.1	The Climate Action Team will be tasked with managing and overseeing the effective mainstreaming of climate adaptation measures into all plans, projects, programmes, strategies and policies of Cork City Council: (a) build and strengthen partnerships and promote inter-departmental communications and co-operation; (b) compile a list of all plans, projects, strategies and policies, including expected review/update timelines and ensure that climate action considerations are integrated into all reviews. (c) provide a framework for climate action projects to be included into future service delivery programmes; (d) report to SMT on progress; and (e) include climate adaptation within the following: • City Development Plan and Corporate Plan • Biodiversity Plan • Heritage Plan • Severe Weather Plan • Winter Maintenance Plan • Roads Programme • Housing Strategy • Local Economic and Community Plan • Tourism Strategy • Health & Safety Plan • Energy Management Plan and Sustainable Energy and Climate Action Plan (SECAP). • Cork Metropolitan Area Draft Transport Strategy 2040 – CMATS • Cork City Cycling Strategy and Cork Cycle Network Plan	Strategic and Economic Development Climate Action Team	Senior Management Team All Directorates	CARO	Short - Medium	In Progress
2.2	Ensure through the delivery of all services, functions and activities that there is more effective implementation of relevant regulations, policies, plans and strategies with a role in climate adaptation and environmental protection.	Climate Action Team	Senior Management Team	CARO	Short - Medium	In Progress

Objective 3: To develop and maintain a resource and risk model for Cork City Council.						
No.	**Action**	**Responsible Lead Council Directorate / Team**	**Council Teams**	**External Partners**	**Action Timeframe**	**Resourced**
3.1	Evaluate Cork City Council's activities that may be affected by climate change. The risk assessments will include: • collection and collation of historic weather event data for the Cork City Council region; • collection and evaluation of international and national data on projected climate patterns and the potential risks to Cork city; and • compile a list of Cork City Council's assets that are vulnerable to climate change. Examine the current Sustainable Energy and Climate Action Plan (SECAP) for existing data.	Strategic and Economic Development	All Directorates Climate Action Team	CARO UCC (ERI)	Short - Medium	In Progress
3.2	Develop a system to document, monitor and analyse data on the impact of extreme weather events on Cork City Council. This will identify the actions required to adapt quickly and effectively to extreme weather events and to restore public services, taking into account the following baselines: • nature and extent of extreme weather events and its impact on public service delivery; • impact of extreme weather events on Cork City Council's assets; • staff resources required (and any deficits identified) to deal in a resilient way with all aspects of the impact of extreme weather events; • financial implications of extreme weather events; • number of days of closure of Cork City Council buildings and facilities; • staff working-days lost, including lost activities due to reassignment or loss of resources; • number of activations of Severe Weather Assessment Team; • number of emergency road closures; • number of emergency call-outs, plus representations and calls for assistance from elected representatives, customers, other sectors and members of the public; • number (and dates) of call-outs to deal with wild fires; • number of Health and Safety incidents; • number of kilometres of road treated in freezing and high temperature conditions; • the nature, extent and cost of service provided to or obtained from other sectors; and • the proportion of the impacts that is deemed to derive from climate change.	Roads and Environmental Operations	Climate Action Team Customer Services Unit Flood and Severe Weather Assessment Teams Major Emergency Management Team	CARO UCC (ERI)	Short	In Progress

Objective 4: To build resilience within Cork City Council to support service delivery.						
No.	**Action**	**Responsible Lead Council Directorate / Team**	**Council Teams**	**External Partners**	**Action Timeframe**	**Resourced**
4.1	Develop Business Continuity Plans to identify and address specifically the impacts associated with extreme weather events on all functions/services of Cork City Council and to explore potential opportunities to increase resilience. This will involve: • preparation for and minimisation of the impacts of service disruption; • assessment of Cork City Council's back-up systems infrastructure (including power outage back-up procedures) to ensure resilience; • assessment of the impact of climate events on outdoor working/ site visits and any impacts on deadlines and levels of service provision; • assessment of staff working environments during extreme weather events, and a review of potential ways to maintain safe working conditions and the provision of alternative working locations; and • development of plans for staff deployment and availability due to travel restrictions.	Roads and Environmental Operations	Plant and Machinery ICT Services Severe Weather Assessment Team Corporate Affairs and International Relations	CARO	Short - Medium	Not yet Identified
4.2	Develop a Communications Contingency Plan to identify essential key staff to be able to access all essential council systems remotely, so as to reduce or eliminate impacts on statutory deadlines and backlog. This will include: • maintaining the internal communication protocol for extreme weather events to increase staff awareness of potential risk to safety, and to ensure all staff travel only in safe conditions; • development of internal back-up communication systems to ensure communication for emergency responders is maintained in the event of disruption to the main communication system(s); and • development of external back-up communication systems to ensure effective communication with external partners during severe weather events.	ICT Services	Severe Weather Assessment Team Fire Services Corporate Affairs and International Relations	Gardaí Defence Forces Port of Cork OPW Irish Water Health Services Executive	Short - Medium	Not yet Identified

Objective 5: To build capacity within Cork City Council to respond effectively to extreme weather events.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
5.1	Develop a climate change training programme to educate staff and elected members on the implications of climate change and how to effectively address the effects of climate change on Council operations and services and to build capacity within Cork City Council.	Training Department	All Directorates	CARO	Short - Medium	In Progress
5.2	(a) Assist in building resilience and capacity within local businesses and communities to enhance the overall response to extreme weather events taking into consideration climate equality and justice. (b) Develop an education/awareness programme for business and community organisations to equip them with understanding of risks and how to build longer term resilience.	Community, Culture and Placemaking	Climate Action Team	CARO Cork Chamber Cork Business Association	Short - Long	Not yet Identified
5.3	Support existing extreme weather event response arrangements and investigate further deployment of early warning systems (e.g. Flood Early Warning System (FEWS)), along with reviewing and collating information on existing early warning systems.	Roads and Environmental Operations	ICT Services Severe Weather Assessment Team	Met Éireann Office of Public Works ESB Transport Infrastructure Ireland	Short - Long	In Progress
5.4	Investigate the potential for technology-based solutions for the coordination of responses to climate events in the areas of ICT and GIS.	ICT Services	Fire Service Severe Weather Assessment Team	CARO	Short	Not yet Identified

41

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
Objective 6: To identify and support opportunities that may arise from pursuing adaptation efforts through the functions of Cork City Council						
6.1	Identify, source and leverage funding streams for the implementation of climate change actions (including both adaptation and mitigation).	Strategic and Economic Development	All Directorates Climate Action Team	CARO Southern Regional Assembly Energy Cork	Short - Long	In Progress
6.2.	Support, encourage and develop the move to digital services and exploit new ideas which seek to capture opportunities associated with the environmental and technological advances that support climate actions. An example would be leveraging the progress achieved during the Smart Cities project.	Strategic and Economic Development	All Directorates ICT Services Cork City Energy Agency	CARO Public Participation Network Cork Environment Forum	Short - Long	In Progress

| 6.3 | Collaborate and work with businesses in seeking new ideas to reduce the impact of climate change on Cork city. | Strategic and Economic Development | Climate Action Team

Cork City Energy Agency | CARO

Local Community Development Committee

Public Participation Network

Cork Environment Forum

Energy Cork

Tidy Towns

Environment Protection Agency

Local Enterprise Office

Cork Chamber

Cork Business Association

Cork Healthy Cities | Short - Long | To be Assessed |

Infrastructure and Built Environment

Objective 7: To increase the resilience of roads and transport infrastructure.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
7.1	Develop a system to document, monitor and analyse roads and transport infrastructure vulnerable to the impacts of climate change / extreme weather events including roads, bridges, walking and cycling facilities, rail and bus networks, the airport and the seaport, by the following actions: • review information available from past events and existing asset management systems; • compile a vulnerable infrastructure inventory to aid works prioritisation and inform route prioritisation plans; • establish a procedure for structural integrity assessments of infrastructure after extreme weather events; • communicate with external stakeholders on assets that would be required during an extreme weather event e.g. snow ploughs, grit and salt, mobile emergency signage and lighting, back-up electricity generators, mobile flood barriers, pumps etc. ; • integrate climate considerations into the design, planning and construction of all transport infrastructures; • develop a transport plan for a severe weather event and distribute to relevant external stakeholders; and • integrate climate change adaptation (and mitigation) measures into the design, planning and construction of all roads and transport infrastructure, with a priority given to nature-based solutions e.g. Sustainable Drainage Systems (SuDS). • Home or hub or remote working should be promoted and instituted by relevant organisations and firms. This will help to reduce congestion and carbon emissions associate with using commuting to work, as well as a reduction in particulate matter impacting negatively on air quality. • Better promotion of the 'Public Transport Tax Initiative' scheme. • Support the increased take-up of school children and students using public transport.	Roads and Environment Operations	Major Emergency Management Team Flood Assessment Team Planning Policy Team Local Enterprise Office Smart Cities Healthy Cities Learning Cities	Cork County Council, Civil Defence, Cork Airport, Port of Cork, Bus Éireann, Irish Rail, National Transport Authority, Transport Infrastructure Ireland, Cork Chamber, Cork Business Association, Public Participation Network, Irish Water, Eirgrid, Gas Networks Ireland. UCC (ERI)	Short	To be Assessed

Objective 8: To increase the resilience of Cork City Council buildings, housing stock, parks and cemeteries and other capital assets.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
8.1	Develop a system, in the context of climate vulnerabilities, for the management of capital assets, including buildings, housing stock, fleet, recreation areas and public amenities: • review information available from existing asset management systems; • analyse information from past events and the impacts of climate change for future events; • compile a vulnerable infrastructure inventory to aid works prioritisation; • establish a procedure for structural integrity assessments of assets after extreme weather events; • integrate climate change (adaptation and mitigation) measures into the design, planning and construction of all capital projects, with priority given to nature-based solutions; and • analyse the suitability of the Council's fleet to operate during extreme weather events.	Roads and Environment Operations	Infrastructure Development (Capital Delivery Office) Climate Action Team Plant and Machinery	CARO UCC (ERI)	Short - Medium	To be Assessed
8.2	Identify, resource and install new technologies (or update existing) in council buildings/housing assets to reduce the impacts of climate change on staff, customers, the general public and residents.	Housing Corporate Affairs and International Relations	Roads and Environment Operations Building Control City Architect	CARO	Long	To be Assessed
8.3	Review the Social Housing Tenant's Handbook to increase awareness of extreme weather events and provide climate change resilience information to the tenants.	Housing	Community, Culture and Placemaking	CARO	Short	To be Assessed

8.4	Support the rollout of electric vehicles and electric vehicle-charging infrastructure and the rollout of compressed natural gas (GNG) usage and corresponding infrastructure in Cork City, beginning with Cork City Council's fleet.	Roads and Environment Operations	Plant and Machinery Energy Team	SEAI Energy Cork Transport Infrastructure Ireland Gas Networks Ireland	Short	To be Assessed
8.5	Examine ways to reduce/avoid unnecessary staff travel and promote initiatives to promote more sustainable forms of transport for all Cork City Council staff. Examine the findings of the 'Smarter Travel Workplace' 2019 Staff Travel Survey (currently on-going) to deliver positive action amongst staff.	Community, Culture and Placemaking	Climate Action Team	SEAI Energy Cork Transport Infrastructure Ireland	Short - Long	In Progress
8.6	Promote cycling and walking to support a greater uptake of active travel in Cork city, thus reducing carbon emissions and improving air quality. Promote the modal shift away from private cars through landuse planning policy, development management and local initiatives and promotions. Continue to support Mobility Management Initiatives and other initiatives which support greater use of walking, cycling and public transport including Bike Week, European Mobility Week and other related promotions. Use the 'Cork City Cycling Strategy' and the 'Cork Cycle Network Plan' to help deliver this action.	Community, Culture and Placemaking	Climate Action Team	SEAI Energy Cork Transport Infrastructure Ireland	Short - Long	In Progress

Land Use and Development

Objective 9: To integrate climate action considerations into land use planning policy and influence positive behaviour.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
9.1	Identify, integrate and implement climate change actions into the Development Plan and Local Area Plans. Integrate climate action as a guiding principle and strategic objective, thus tailoring planning policies to reduce the vulnerability of Cork city to the impacts of climate change, by: • enhancing the role of the natural environment to promote climate adaptation by promoting nature-based solutions e.g. green infrastructure; • continuing to take a minimised risk-based approach to development in areas at risk of flooding (coastal, tidal, fluvial, pluvial and groundwater); • promoting climate resilient designs and materials; and • promoting energy efficiency and renewable energy solutions and water conservation measures in new developments and promote green roofs, walls and courtyards.	Strategic and Economic Development	All Directorates Climate Action Team	CARO	Short	In Progress
9.2	Engage with energy and service providers to ensure that energy infrastructure and services are resilient to the impacts of climate change.	Roads and Environment Operations	Climate Action Team	Eirgrid, ESB, Bord Gais, Gas Networks Ireland	Short	To be Assessed
9.3	(a) Ensure that climate change is a key consideration in selecting locations for future developments and that this is reflected in land use zoning policy. (b) In the development of policy and the planning and provision of green infrastructure, ensure appropriate buffer zones are maintained and protected to avoid potential impacts on designated habitats or protected species and habitats, and to protect and enhance wider biodiversity.	Strategic and Economic Development	Community, Culture and Placemaking	CARO	Short - Medium	Yes

Drainage, Water and Flood Management

Objective 10: To adapt to the increased risk and impact of flooding due to climate change.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
10.1	Develop a flood risk management system for council assets and services: • analyse information from past events and the impacts of flooding for future events; • compile an inventory of vulnerable assets and services; and • review current flood maps of areas vulnerable to flooding and indicate flooding levels for a range of future scenarios.	Roads and Environment Operations	Climate Action Team Flood Assessment Team	CARO OPW ESB Port of Cork	Short - Medium	To be Assessed
10.2	Work with the Office of Public Works (OPW) and other organisations to share information in relation to flood risk and in the development of major and minor flood protection and flood proofing schemes throughout Cork city.	Roads and Environment Operations	Climate Action Team Flood Assessment Team	OPW Flood Early Warning System (FEWS) ESB Port of Cork	Short	Yes
10.3	Ensure that flood event emergency response plans are reviewed on a regular basis to reflect the degree of flood risk.	Roads and Environment Operations	Flood Assessment Team Fire Service	OPW Flood Early Warning System (FEWS) ESB	Short	Yes

48

10.4	(a) Identify natural floodplains in Cork city and incorporate nature-based solutions in any enhancement works where possible. (b) Consider and explore the use of natural water retention measures in certain suitable areas as a method of managing flood risk, improve water quality, enhance biodiversity, management of soil and sediment and to provide for the creation of new or additional amenity areas. Liaise and collaborate with the OPW and other stakeholders engaged in research and pilot projects to develop knowledge and capacity on such measures.	Roads and Environment Operations	Flood Assessment Team	OPW Flood Early Warning System (FEWS)	Medium – Long	To be Assessed
10.5	Identify areas susceptible to isolation as a consequence of flooding and establish measures to address this issue. Use future scenario flood maps to assist in the identification of potentially vulnerable communities and assets.	Infrastructure Development (Capital Delivery Office)	Flood Assessment Team Roads and Environment Operations Fire Service	OPW Flood Early Warning System (FEWS) Civil Defence Defence Forces HSE	Short	To be Assessed
10.6	Review the current drainage systems for which Cork City Council is responsible for, by: • compiling an inventory of existing drainage districts; • identify areas that are susceptible to surface water flooding; and • adapting existing maintenance plans, taking into account impacts from climate change such as increased siltation and plant growth, and increased rainfall.	Roads and Environment Operations	Infrastructure Development (Capital Delivery Office)	Irish Water	Short	In Progress
10.7	Develop a system for the upgrade of drainage networks, including the separation of sewer and surface water to increase resilience capacity.	Infrastructure Development (Capital Delivery Office)	Flood Assessment Team	Irish Water	Medium	In Progress
10.8	Investigate the use of smart monitoring in the management of the drainage systems for which Cork City Council is responsible for.	Roads and Environment Operations	ICT Services	Irish Water	Short	To be Assessed
10.9	Continually review flood risk data and take into account increased flood extents and depths in the design, planning and build/delivery of new infrastructure by the council to avoid potential/future flood prone areas and ensure that new infrastructure is resilient to climate change risks.	Infrastructure Development (Capital Delivery Office) Roads and Environment Operations	Flood Assessment Team	Irish Water OPW	Short	In Progress

Objective 11: To provide adequate drinking water supply and waste water treatment during extreme weather events.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
11.1	Support Irish Water in the provision of treated water from major water treatment plants during extreme weather events.	Roads and Environment Operations	Major Emergency Management Team	Irish Water	Short - Long	To be Assessed
11.2	Ensure the emergency services have access to water during extreme weather events (snow, frost, ice and drought).	Roads and Environment Operations	Major Emergency Management Team, Fire Service	Irish Water	Short - Long	In Progress
11.3	Pilot a public drinking water fountain at an appropriate location in a public park area and/or public realm area to provide quality water supply and contribute to a reduction in plastic waste. Explore the feasibility of expanding to a network if successful and liaise and collaborate with Irish Water as appropriate.	Roads and Environment Operations	Community, Culture and Placemaking	Irish Water	Short - Long	To be Assessed

Objective 12: To liaise and work with other bodies and agencies responsible for the management of water sources.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
12.1	Support Irish Water where possible in identifying public drinking water sources vulnerable to climate change. Support the implementation of source protection and or the identification of alternative sources, in order to maintain water quantity and quality levels.	Roads and Environment Operations	Climate Action Team	Irish Water UCC (ERI)	Short - Long	To be Assessed

12.2	Support Irish Water where possible to identify the impacts of power outages of varying durations on specific water and wastewater scheme operations. Support the identification of critical and vulnerable receptors.	Roads and Environment Operations	Climate Action Team	Irish Water UCC (ERI)	Short	To be Assessed
12.3	Liaise, support and work with Irish Water in the development, conservation and upgrade of the water supply systems so as to ensure Cork city has an adequate supply of water to address climate change demands.	Roads and Environment Operations	Climate Action Team	Irish Water UCC (ERI)	Short	To be Assessed
12.4	Liaise, collaborate and support agencies responsible for the management of watercourses in their employment of River Restoration Techniques and Floodplain Restoration Techniques aimed at improving ecological status of waterbodies.	Roads and Environment Operations	Climate Action Team	OPW River Basin Management LAWPRO Waterways Ireland Irish Water Irish Farmers Association Inland Fisheries Ireland	Short - Long	In Progress
12.5	Further develop collaboration with State bodies, and other relevant Bodies responsible for the management of water courses including (but not limited to): • OPW; • River Basin Management LAWPRO; • Waterways Ireland; • Irish Water; • Irish Farmers Association; • Inland Fisheries Ireland; • ESB; and • Others as appropriate.	Roads and Environment Operations	Climate Action Team	OPW River Basin Management LAWPRO Waterways Ireland Irish Water Irish Farmers Association Inland Fisheries Ireland ESB	Short - Long	In Progress

Nature, Natural Resources and Cultural Infrastructure

Objective 13: To protect, enhance and restore the natural environment and promote biodiversity.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
13.1	Support and enhance a native shrub and tree planting programme for Cork City in conjunction with an awareness campaign in the context of climate adaptation. The tree planting programme will include the protection of existing trees, increasing tree cover, identifying new sites for additional tree planting for the enhancement of the natural environment and biodiversity and the protection of trees on private land. Support the planting of native species.	Roads and Environment Operations	Community, Culture and Placemaking	Cork Environment Forum

Coillte | Short – Medium | In Progress |
| 13.2 | Review roadside hedge maintenance programmes in conjunction with landowners with cognisance of the need to maintain ecological corridors and linkages forming part of the green infrastructure within the city. | Roads and Environment Operations | Community, Culture and Placemaking | Landowners | Short - Long | To be Assessed |
| 13.3 | Support and enhance a programme for monitoring and controlling the spread of alien invasive species. Alien invasives may become more of a problem due to climate change, thus increasing threats to native species, in addition to causing structural damage to infrastructure. | Roads and Environment Operations | Community, Culture and Placemaking | Landowners

National Parks and Wildlife Service | Short - Long | To be Assessed |
| 13.4 | (a) Support and promote areas that contribute positively towards enhanced biodiversity and implement the National Pollinator Plan, paying attention to the threats from climate change e.g. seasonal disruption, increased severe weather events.

(b) Explore ways to increase the range of plant species with the aim of increasing food sources and habitats for pollinators. Examine ways to reduce the impact of a longer growing season on lifecycles of bees and other pollinators in terms of food availability and life cycles mismatch. | Roads and Environment Operations | Community, Culture and Placemaking | Landowners

National Parks and Wildlife Service

Cork Environment Forum | Short - Long | To be Assessed |

	(c) In collaboration with communities, and as part of the Green Schools campaign and in conjunction with Lifetime Lab, identify suitable new sites for the implementation of the Pollinator Plan and to ensure continued maintenance and upkeep.					
13.5	Identify potential ecological corridors and connectivity issues between areas. Identify the potential to open up culverted rivers and incorporate softer engineering solutions. Identify locations to create new habitats for native flora and fauna e.g. urban orchards, allotments, green roofs and walls, which will assist in negating the 'heat island effect'. Protect existing wetlands and identify new ones which may arise as a result of climate change. With the inventory of Cork City Council-owned lands, identify the capacity to contribute to quality green infrastructure and enhance biodiversity.	Strategic and Economic Development	Community, Culture and Placemaking Roads and Environment Operations	Landowners National Parks and Wildlife Service Cork Environment Forum	Short - Long	To be Assessed
13.6	Protect natural resources through waste prevention and recycling. Support national and regional initiatives e.g. the policy actions of the Regional Waste Management Plan, the EPA's Local Authority Prevention Network and Local Agenda 21. Promote behavioural change in relation to the use of natural resources through initiatives as the 'Waste prevention grant scheme'. Work with communities to enable them to develop an appreciation of natural resource protection, thus highlighting the link with climate change e.g. Green Spaces for Health and Community Gardens. CCC will seek Department/Government support to employ one permanent full-time biodiversity officer in each LA, with additional biodiversity staff support being provided to LAs depending on their population/jurisdictional area.	Roads and Environment Operations	Community, Culture and Placemaking	Waste Enforcement Regional Lead Authorities (WERLA) OPW Cork Healthy Cities Cork Environment Forum	Short - Long	In Progress
13.7	Adopt 'Green Public Procurement', moving from 'most economically advantageous' to a 'life-cycle costing model'.	Finance	Climate Action Team	CARO Office of Government Procurement	Short - Long	To be Assessed

	Objective 14: To review, manage and protect biodiversity and natural heritage within the natural environment.					
No.	**Action**	**Responsible Lead Council Directorate / Team**	**Council Teams**	**External Partners**	**Action Timeframe**	**Resourced**
14.1	Collaborate with the National Parks and Wildlife Service (NPWS) and research organisations (UCC, CIT, Marine Institute) in the review of biodiversity plans and habitat conservation strategies, and projects to identify risks from adverse climate change impacts. Work with communities and schools to create and implement local Biodiversity Action Plans.	Strategic and Economic Development	Roads and Environment Operations	National Parks and Wildlife Service UCC CIT Marine Institute	Short - Long	To be Assessed
14.2	Given the wider environmental benefits of green infrastructure, such as microclimate benefits including providing shade to alleviate heat stress, supporting for urban biodiversity, water retention, and flood alleviation etc, develop a green infrastructure strategy and associated action plan, including: • the research and mapping of areas considered beneficial for use as local carbon offsets through carbon sequestration in conjunction with the relevant agencies; and • the integration of nature-based solutions in all City Council development / works (roads, housing, architecture, parks and water infrastructure).	Strategic and Economic Development	Roads and Environment Operations Architects	Landowners National Parks and Wildlife Service Coillte Tidy Towns Cork Environment Forum Cork Food Policy Council	Short - Long	To be Assessed

Objective 15: To support and enhance built heritage and cultural infrastructure.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
15.1	Develop a system to document, monitor and deliver actions on reducing the impacts of climate change on Cork City Council's natural and built heritage and cultural assets, including the following: • gather baseline data in order to monitor change e.g. map existing green areas, carry out habitat surveys; • create a risk register for the natural and built heritage and cultural assets; and • introduce 'natural capital accounting' which gives natural heritage a monetary value due to its association with tourism and overall health and wellbeing.	Strategic and Economic Development	Climate Action Team	CARO	Short - Long	To be Assessed
15.2	Raise awareness and support positive behavioural change among staff, schools, community, homeowners and developers. Actions to include: • training and workshops; • information materials (brochures, educational packs, information boards); and • increased use of social media and attendance at events and festivals.	Strategic and Economic Development	Climate Action Team	CARO	Short - Long	To be Assessed

Citizen Safety, Health and Wellbeing

Objective 16: To consult, identify actions and build capacity and resilience within local communities.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
16.1	Develop public awareness campaigns to increase knowledge of and encourage behavioural change around climate change and extreme weather events. Activities to include: • training and workshops; • information materials (brochures, educational packs, information boards); • increased use of social media; and • attendance at events and festivals. .	Strategic and Economic Development	Corporate Affairs and International Relations Community, Culture and Placemaking Climate Action Team	CARO MET Éireann	Short	To be Assessed
16.2	Develop and implement a programme to enhance the capacity of citizens, businesses and communities to respond to and recover from extreme weather events with specific aims to: • provide assistance where possible to vulnerable communities to develop a stronger facilitating role for mitigating risks; • provide advice on the risk of extreme events affecting their locality; • devise adaptation actions to enhance preparedness and reduce dependency on local authority emergency responses; • provide support to develop appropriate resilience arrangements to enable response and recovery; and • integrate key considerations around climate equality and justice.	Roads and Environment Operations	Corporate Affairs and International Relations Climate Action Team Fire Services Local Enterprise Office	Civil Defence Gardaí HSE Health and Safety Authority	Short - Medium	To be Assessed

16.3	Raise awareness of the impacts of climate change and the ways for citizens, businesses and communities to respond appropriately and to increase resilience to these impacts. This should include: • develop and implement a behavioural change plan for citizens, businesses and communities to change behaviours, understand and better deal with climate change and extreme weather events; • provide and promote information on extreme weather event preparedness, including property security and safety; • highlight health issues related to extreme weather events; • raise public safety awareness; • raise water safety awareness for unsupervised watercourses in local areas; • promote local resources to adapt to extreme weather events e.g. road salting; • use of flood mapping outputs, National Catchment Flood Risk Assessment and Management (CFRAM) programmes and other such climate related programmes in any public awareness campaigns; and • work to provide for climate change adaptation co-benefits (opportunities) that provide benefits for the environment through decreasing greenhouse gas emissions or reducing pressures on resources, and promote benefits for communities.	Community, Culture and Placemaking	Fire Service Climate Action Team Healthy Cities Local Enterprise Office	Public Participation Network Civil Defence, Gardaí, HSE, Health and Safety Authority OPW Irish Water Port of Cork Cork Airport Irish Rail Waterways Ireland, Transport Infrastructure Ireland Cork Chamber	Short	To be Assessed
16.4	Explore ways Cork City Council can help older, vulnerable and isolated people/communities to become more climate resilient.	Community, Culture and Placemaking	Strategic and Economic Development Climate Action Team Healthy Cities	Public Participation Network, Age Action, Local Community Groups	Short - Medium	To be Assessed
16.5	Collaborate with third level and other research facilities to investigate the potential of climate action technologies and their application in Cork city, in conjunction with innovation and research funding at national and EU level.	Strategic and Economic Development	Climate Action Team	UCC / CIT National and International Research Centres. Cork Chamber	Medium - Long	To be Assessed

Partnerships with other Sectors and Agencies

Objective 17: To collaborate with other sectors and agencies in programs relating to climate change.

No.	Action	Responsible Lead Council Directorate / Team	Council Teams	External Partners	Action Timeframe	Resourced
17.1	Liaise, collaborate and work in relevant partnership with the sectors in the delivery of the sectoral adaptation actions, as approved by Government, where they are relevant to the functions and activities of Cork City Council.	Strategic and Economic Development	All Directorates Climate Action Team	CARO Departments of: Agriculture, Food and the Marine, Culture, Heritage and the Gaeltacht, Transport, Tourism and Sport Communications, Climate Action and Environment Housing, Planning and Local Government Health	Short - Long	To be Assessed
17.2	Liaise, collaborate and support local organisations and agencies in the pursuit of initiatives and efforts to reduce carbon emissions, build social cohesion and community resilience against the local impacts of climate change and in working towards climate justice	Strategic and Economic Development	Climate Action Team	CARO Relevant Others	Short - Long	To be Assessed

Appendix A: The Science behind Climate Change

An Intergovernmental Panel on Climate Change (IPPC) Special Report in 2018 states that human activities are estimated to have caused approximately 1.0 degree Celsius of global warming with a *likely* range of 0.8 degrees Celsius to 1.2 degrees Celsius. Global warming is *likely* to reach 1.5 degree Celsius between 2030 and 2052 if it continues to increase at the current rate (high confidence).

This coincided with an increase in the average global temperature of 0.74°Celsius between 1906 and 2005. In 2013, the U.S. National Oceanic and Atmospheric Administration announced that CO_2 levels had reached 400ppm. The World Meteorological Organization (WMO) Greenhouse Gas Bulletin (No.14/22 Nov 2018) showed that globally averaged concentrations of carbon dioxide (CO_2) reached 405.5 parts per million (ppm) in 2017, up from 403.3 ppm in 2016 and 400.1 ppm in 2015.

As far back as 2013, the IPCC concluded that *"human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes.... it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century"*. The IPPC Climate Change 2014 Synthesis Report summed up observed changes in the climate system as follows: 'Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished and sea level has risen. In 2019, a research paper in the journal 'Advances in Atmospheric Sciences' states that 2018 has set a new record of ocean heating, surpassing 2017, which was the previous warmest year ever recorded. The vast majority of global warming heat ends up deposited in the world's oceans, and ocean heat content change is one of the best – if not the best – metric for climate change. While the World Meteorological Organization (WMO) released its analysis in 2013 that shows that the decade spanning 2001-2010 was the warmest ever recorded in all continents of the globe, a February 2019 newsletter from the Climate Central organisation uses NASA and NOAA data to declare that 2018 was the fourth-hottest year on record globally, with the five warmest years on record happening during the past five years – and the 20 warmest occurring over the past 22 years.

Appendix B: Adaptation Policy Contexts

International Context

The Paris Agreement 2015 (set within the context of the United Nations Framework Convention on Climate Change (UNFCCC)), was ratified by Ireland on 4th Nov 2016, and it is aimed at:

- limiting global warming to less than 2.0 degrees Celsius above pre-industrial level and pursue efforts to limit the temperature increase to 1.5 degrees Celsius; and
- building resilience and increasing the ability to mitigate the impacts of climate change.

The agreement requires all the parties to formulate and implement National Adaption Plans (NAPs).

One of the 17 United Nations Sustainable Development Goals (SDG No. 13) calls on countries to *'take urgent actions to combat climate change and its impacts' and to integrate effective Climate Action measures into national policies'*.

European Context

The 2013 EU Strategy on Adaptation to Climate Change encouraged all Member States to adopt comprehensive adaptation strategies. It sought for better informed decision making through the identification and addressing of gaps in knowledge about adaptation. The European Climate Adaptation Platform, Climate-ADAPT, was developed as a resource mechanism to help users access and share information on adaptation.

The Global Covenant of Mayors for Climate and Energy is a voluntary, bottom up, approach for cities and local governments to combat Climate Change and move towards a low emission, resilient society. The Global Covenant of Mayors for Climate and Energy brought the Compact of Mayors and the EU Covenant of Mayors under one international body in January 2017 incorporating over 9,000 cities and local governments. Cork City Council is a signature party to the Covenant of Mayors.

Sectoral Context

Twelve sectors across seven government departments/agencies which will be developing individual climate adaptation strategies.

Sector	Parent Department
Seafood	Department of Agriculture, Food and the Marine
Agriculture	Department of Agriculture, Food and the Marine
Forestry	Department of Agriculture, Food and the Marine
Biodiversity	Department of Culture, Heritage and the Gaeltacht
Built and archaeological heritage	Department of Culture, Heritage and the Gaeltacht
Transport infrastructure	Department of Transport, Tourism and Sport
Electricity and gas networks	Department of Communications, Climate Action and Environment
Communications networks	Department of Communications, Climate Action and Environment
Flood risk management	Office of Public Works
Water quality	Department of Housing, Planning and Local Government
Water services infrastructure	Department of Housing, Planning and Local Government
Health	Department of Health

Under the non-statutory 2012 Framework, four Government departments prepared draft sectoral plans covering 5 sectors. These plans are:

- Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017); and
- Adaptation Plan for the Electricity and Gas Networks Sector (DCCAE, 2017).

Government departments must develop statutory sectoral adaptation plans in accordance with the National Adaptation Framework (NAF) and the six-step adaptation planning process described in the May 2018 Sectoral Planning Guidelines for Climate Change Adaptation. These guidelines aim to ensure that a coherent and consistent approach to adaptation planning will be adopted by the key sectors in Ireland.

Actions in completed plans could include those actions that:

- mainstream (integrate) adaptation into key sectoral plans and policies;
- identify and understand the key vulnerabilities, risks and opportunities facing their sectors. This should include major cross cutting risks;
- ensure that plans related to emergencies assigned to a sectoral department as lead Government department under the Strategic Emergency Planning Guidelines are climate-proofed;
- identify and collect information on the costs and benefits of adaptation within their sectors;
- build capacity within their sectors to cope with climate change;
- identify and address key research gaps within their sectors;
- improve co-ordination with the local government sector; and
- develop appropriate monitoring and verification systems within their sectors.

Appendix C: References

1. Southern Regional Assembly, 2019. *Draft Regional Spatial and Economic Strategy for the Southern Region.* p.306. Online: Available at: https://www.southernassembly.ie/regional-planning/regional-spatial-and-economic-strategy Accessed: 27 Feb 2019.

2. Government of Ireland. *Climate Action and Low carbon Development Act 2015.* Dublin: Stationery Office. 2015.

3. Government of Ireland. *Local Authority Adaptation Strategy Development Guidelines.* Dublin: Stationery Office. Department of Communications, Climate Action & Environment. December 2018.

4. Met Éireann. *Major Weather Events.* Online: Available at: https://www.met.ie/climate/major-weather-events   Accessed: 03 April 2019.

5. DEHLG, 2006. *A Framework for Major Emergency Management.* Dublin: Department of the Environment, Heritage & Local Government. Online: Available at: http://mem.ie/wp-content/uploads/2015/05/A-Framework-For-Major-Emergency-Management.pdf Accessed: 03 April 2019.

6. Dwyer, N. & C.Murphy, 2012. *River Discharge. The status of Ireland's Climate 2012.* N. Dwyer. Wexford, Ireland. Environmental Protection Agency. pp 124-126.

7. Steele-Dunne, S., Lynch, P., McGrath, R., Semmler, T., Wang, S., Hanafin, J., & Nolan P., 2014. *The Impacts of Climate Change on Hydrology in Ireland*. Journal of Hydrology. 356. 28-45.

8. Walsh, S. & N. Dwyer, 2012. Rainfall. *The Status of Ireland's Climate 2012*. N. Dwyer. Wexford, Ireland. Environmental Protection Agency. pp.14-16.

9. McGrath, R., Nishimura, E., Nolan, P., Semmler, T., Sweeney, C. & S. Wang, 2005. *Climate Change: Regional Climate Model Predictions for Ireland.* Wexford, Ireland. Environmental Protection Agency.

10. Sweeney, J., Albanito, F., Brereton, A., Caffarra, A., Charlton, R., Donnelly, A., Fealy, R., Fitzgerald, J., Holden, N., Jones, M. & C. Murphy, 2008. *Climate Change - Refining the Impacts for Ireland.* J.Sweeney. Wexford, Ireland. Environmental Protection Agency.

11. Nolan, P., McGrath, R., Gleeson, E. & C. Sweeney, 2013. *Impacts of climate change on Irish Precipitation. Ireland's Climate: The Road Ahead.* Gleeson, E., McGrath, R. & M. Traenor. Dublin. Met Éireann. pp.57-63.

12. Nolan, P., 2015. *Ensemble of regional climate model projections for Ireland.* Report No. 159. Wexford, Ireland. Environmental Protection Agency.

13. Dwyer, N. & R. Devoy, 2012. Sea Level. *The Status of Ireland's Climate 2012*. N. Dwyer. Wexford, Ireland. Environmental Protection Agency. pp.73-76.

14. EEA, 2012. *Climate Change, Impacts and Vulnerabilities in Europe.* European Environment Agency. Copenhagen.

15. Nolan, N. & N. Dwyer, 2012. Ocean Surface and Sub-surface Temperature. *The Status of Ireland's Climate 2012.* N. Dwyer. Wexford, Ireland. Environmental Protection Agency. pp.58-61.

16. Olbert, A.I., Dabrowski, T., Nash, S., & M. Hartnett, 2012. *Regional Modelling of the 21st Century Climate Changes in the Irish Sea.* Continental Shelf Research. 41. pp.28-60.

17. Walsh, S. & N. Dwyer, 2012. Surface Air Temperature. *The Status of Ireland's Climate 2012*. N. Dwyer. Wexford, Ireland. Environmental Protection Agency. pp.10-13.

18. Met Office, 2016. *Heatwave.* Online: Available at: <https://www.metoffice.gov.uk/learning/learn- about-the-weather/weather-phenomena/heatwave>. Accessed: 03 April 2019.

19. Nolan, G., Dwyer, N. & J. Gault, 2012. Sea State. *The Status of Ireland's Climate 2012*. N. Dwyer. Wexford, Ireland. Environmental Protection Agency. pp.68-70.

20. Wang, S., McGrath, R., Hanafin, J., Lynch, P., Semmler, T., & Nolan, P., 2008. *The Impact of Climate Change on Storm Surge over Irish Waters.* Ocean Modelling. 25. 83-94.

21. Walsh, S. & N. Dwyer, 2012. Surface Wind. *The Status of Ireland's Climate 2012.* N. Dwyer. Wexford, Ireland. Environmental Protection Agency. pp.19-21.

22. Nolan, P., Lynch, P., McGrath, R., Semmler, T. & Wang, S, 2011. *Simulating climate change and its effects on the wind energy resource of Ireland.* Wind Energy. 2011.

23. Desmond, M., 2015. *Local Authority Climate Change Adaptation Guidelines. Climate Change Adaptation in Action:* Science, Policy and Practice Seminar. November 4th - DECLG, Custom House, Dublin.

24. Gray, S., 2016. *Local Authority Adaptation Strategy Development Guidelines.* Wexford, Ireland. Environmental Protection Agency.

25. Tyrrell JG, Hickey KJ. 1991. *A flood chronology for Cork City and its climatological background*. Irish Geogr**.** 24, 81–90. (doi:10.1080/00750779109555764)

26. Office of Public Works, 2017. Lower Lee (Cork City) Drainage Scheme Exhibition Report. Online: Available at: https://www.lowerleefrs.ie/project-info-public-engagement/ Accessed: 01 March 2019.

27. Department of Housing Planning and Local Government, 2018. Project Ireland 2040 National Planning Framework. Online: Available at: http://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf Accessed: 13 March 2019.

28. TII, 2016. *National Road Lengths 2015.* Dublin: Transport Infrastructure Ireland.

29. DTTS, 2014. *Investing In Our Transport Future: A Strategic Framework for Investment in Land Transport Background - Paper Thirteen - Analysis of Steady State Cost of Transport in Ireland.* Dublin: Department of Transport, Tourism and Sport.

30. Department of Culture, Heritage and the Gaeltacht. *National Biodiversity Action Plan 2017- 2021.* Dublin: Stationery Office. 2017.

31. Intergovernmental Panel on Climate Change (IPPC), 2018: Summary for Policymakers. In*: Global warming of 1.5 degrees C. An IPPC Special Report on the impacts of global warming of 1.5 degrees C above pre-industrial levels and related global greenhouse gas pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [V. Masson-Delmotte et al]. World Meteorological Organisation, Geneva, Switzerland, 32 pp.

32. National Oceanic and Atmospheric Administration, 2015. *Greenhouse gas benchmark reached.* Online: Available at: <http://research.noaa.gov/News/NewsArchive/LatestNews/TabId/684/ArtMID/1768/ArticleID/1 1153/Greenhouse-gas-benchmark-reached-.aspx>. Accessed: 19 Feb 2019.

33. World Meteorological Organization, 2018. WMO Greenhouse Gas Bulletin. *The State of Greenhouse Gases in the Atmosphere based on Global Observations through 2017.* No. 14/22 November 2018. Online: Available at: https://library.wmo.int/doc_num.php?explnum_id=5455 Accessed: 19 Feb 2019.

34. Intergovernmental Panel on Climate Change, 2013. *Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the IPCC.* Cambridge University Press, Cambridge, UK. p.17.

35. Intergovernmental Panel on Climate Change (IPPC), 2014: *Climate Change 2014; Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)[IPPC, Geneva, Switzerland, 151 pp.

36. Cheng, L J., and Co-authors, 2019: 2018 continues record global ocean warming. Adv. Atmos. Science., 36(3), 249-252, https://doi.org/10.1007/s00376-019-8276-x

37. World Meteorological Organization, 2013. *The Global Climate 2001–2010 A Decade of Climate Extremes*. Geneva, Switzerland. p.3.

38. Climate Central, 2019: *The 10 Hottest Global Years on Record*. Online: Available at: https://www.climatecentral.org/gallery/graphics/the-10-hottest-global-years-on-record Accessed: 19 Feb 2019.

39. Government of Ireland. *Sectoral Planning Guidelines for Climate Change Adaptation.* Dublin: Stationery Office. Department of Communications, Climate Action & Environment. May 2018.

Appendix D: Further Reading

- Cork City Council, 2015. Cork City Development Plan 2015-2021 Volume One: Written Statement, Chapter 13: City Centre and Docklands, p 183-209. Online: Available at: http://www.corkcitydevelopmentplan.ie/index.php/documents/volume-1   Accessed: 01 March 2019.

- Cork County Council and Cork City Council, 2017. *Cork 2050: Realising the Full Potential*, p.23: Online: Available at: https://www.corkcity.ie/en/media-folder/planning/170322_npf-submission-main-report-reduced.pdf. Accessed: 01 April 2019.

- Government of Ireland. *National Adaptation Framework – Planning for a Climate Resilient Ireland.* Dublin: Stationery Office. Department of Communications, Climate Action & Environment. January 2018.

- Houses of the Oireachtas. 2019. *Report of the Joint Committee on Climate Action. Climate Change: A Cross-Party Consensus for Action.* March 2019.

- ESB. 2017. *Generation Asset Map.* Online: Available at: https://www.esb.ie/our-businesses/generation-energy-trading-new/generation-asset-map Accessed: 27 Feb 2019.

- Local Government Management Agency. Minister Naughton publishes first National Adaptation Framework. 2018. Dublin: CCMA. Online: Available at: https://www.lgma.ie/en/news/national%20adaption%20framework.html Accessed: 04 April 2019.

- Barnett, J. & O'Neill, S. 2010. *Maladaptation.* Global Environmental Change. 20. 211-213. Online: Available at: https://d3n8a8pro7vhmx.cloudfront.net/nowaterdeal/pages/31/attachments/origin al/1363981240/Maladaptation_Editorial.pdf?1363981240 Accessed: 04 April 2019.

- Coll, J. & Sweeney, J. 2013. *Current and future vulnerabilities to climate change in Ireland*. Climate Change Research Programme (CCRP) 2007-2013.Report Series No. 29. Wexford, Ireland. Environmental Protection Agency. p.29.

- Desmond, M., O'Brien, P. and McGovern, F., 2018. *A summary of the State of Knowledge on Climate Change Impacts for Ireland.* EPA Research Report No. 223. Wexford, Ireland. Environmental Protection Agency,

- Desmond, M., 2018. *National Preparedness to Adapt to Climate Change: Analysis of State of Play.* EPA Research Report No. 256. Wexford, Ireland. Environmental Protection Agency.

- Moss, A & Martin, S. 2012. *Flexible Adaptation Pathways*. ClimateXChange, Edinburgh. p.3.

- Murphy, C. & R. Charlton, 2007. Climate Change and Water Resources. *Climate Change: Refining the Impacts for Ireland.* J. Sweeney. Wexford, Ireland. Environmental Protection Agency. pp.39 -81.

- O' Dwyer. B., et al.2017. *Local Authority Adaptation Planning Workshop Report.* March 2017. www.climateireland.ie.

- Shine, T., 2018. Climate Resilient Ireland. EPA Research Report No. 252. Wexford, Ireland. Environmental Protection Agency,

- Torney, D., 2018.*Enabling Decarbonisation: A Study of Energy Sector Governance in Ireland.* EPA Research Report No. 246. Wexford, Ireland.

Notes

KUOPIO'S
CLIMATE POLICY PROGRAMME
2009–2020

Abridged version

Contents:

Pictures: Kuopion Energia, Jätekukko, Kuopion kaupunki, Jouko Räsänen

KUOPIO'S
CLIMATE POLICY PROGRAMME
2009–2020

Abridged version

The programme has been accepted
by the City Council 6th of April, 2009.

KUOPIO

1. Kuopio's commitments and plans

In 1997, Kuopio joined the Climate Campaign for Municipalities, which includes the setting of local emissions targets and the preparation and implementation of a climate protection programme. The City signed an Energy Savings Agreement (ESA) in 2001 and a new Energy Efficiency Agreement (EEA) in 2007. The City of Kuopio's Action Plan for Energy Efficiency for the period 2008–2016 is part of the Climate Policy Programme. The City is committed to reducing its own energy consumption by 9% by 2016 (with 2005 as the base year). Because the savings target takes into account measures already implemented in Kuopio, the plan aims for about half the stated 9% improvement in energy efficiency. The EEA is likely to be extended beyond 2016.

A commitment to maintaining a good living and working environment and the need to adapt to environmental changes were written into the Mission Statement of Kuopio's City Strategy, approved in 2005. Climate change and preparation for it are fundamental to the strategy. In the City's Environmental Strategy of 2006, combating and preparing for climate change forms a separate section.

2. Climate-friendly measures taken in Kuopio

In recent decades, significant measures and decisions have been taken in Kuopio that have had a positive impact on mitigating climate change and reducing greenhouse gas (GHG) emissions. In 2003–2004, supported by the national Climate Change Communications Programme, a communications project introducing the previous Climate Strategy was implemented. In 2004–2007, through collaboration between the City and Motiva Ltd, several energy-saving projects were carried out, such as training in energy conservation for City of Kuopio staff.

With regard to climate change mitigation, the following decisions and actions have had a particularly positive impact:

- the initiation of combined district heating and electricity production in 1963
- the high rate of connections to the district heating grid (over 90%)
- a compact city structure and low car use, reducing traffic emissions
- Island Road (Saaristokatu), which reduces emissions generated by vehicles travelling to and from the suburb of Saaristokaupunki by 50%
- separation of biowaste
- utilisation of landfill gas from the Heinälam- minrinne and Silmäsuo landfill sites for heat generation
- utilisation of biogas from the Lehtoniemi wastewater treatment plant for electricity and heat generation
- energy-saving investments implemented at Savisaari Garden and Rauhalahti Spa using the ESCO concept
- energy savings agreements signed by companies
- joining the Climate Campaign for Municipalities in 1997
- the City's ESA in 2001 and new EEA in 2007

3. Implementation of the first Climate Strategy

Kuopio's first Climate Strategy was a national pilot project that involved developing local approaches to reducing GHG emissions. The setting of local numerical targets for emissions proved extremely difficult, and therefore the content of the Climate Strategy ranges from detailed measures to very broad principles of action.

The implementation of the Climate Strategy has not been systematically monitored. The Environment Centre has estimated that about half of the objectives and measures have been or are being implemented. About a fifth of them

have not been implemented at all, and the extent to which the other objectives and measures have been implemented is unclear. Assessment of the implementation and impact of the measures would require comprehensive and reliable numerical monitoring of the energy/material consumption and emissions, which has not been done in Kuopio.

Examples of achieved or ongoing objectives:
- Kuopio Energy's new power plant has been designed to enable the use of biofuels
- the rate of connections to the district heating grid is over 90%
- progress has been made on bringing medium-sized industrial enterprises within the scope of energy savings agreements
- building in accordance with the "finger plan" has integrated and consolidated the city's urban structure
- biogas recovery systems have been introduced at the Silmäsuo and Heinä- lamminrinne landfill sites
- separate collection and treatment of biowaste has been implemented
- GHG emissions from domestic animals have decreased with more effective manure management

Examples of unachieved objectives:
- forms of cooperation with the Regional Energy Agency of Eastern Finland (abolished on 31 March 2007)
- the creation of a network to continue the work of the cooperation network for the Climate Strategy and the ESA
- limiting the increase in heating emissions from buildings
- increasing awareness of the use of the ESCO concept in energy-saving investments
- promoting the use of biofuels in transport

Another objective of the Climate Strategy was to stimulate discussion on reducing GHG emissions and mitigating climate change. The achievement of this goal has been affected by the attention given to the effects and risks of climate change by politicians, scientists and the media.

4. Greenhouse gas emissions and energy consumption in Kuopio

4.1 The current situation

In the 1990s, total GHG emissions were a little over one million tonnes of carbon dioxide equivalent ($MtCO_2e$) (Figure 1). GHG emissions were calculated using the KASVENER program, which calculates both consumption- and production-based GHG emissions. Variations in emission levels are caused in particular by changes in heating energy and electricity needs. Changes in industrial energy consumption and the availability of different fuels also affect emission levels. The general rise in emissions results from increased energy consumption, particularly electricity. Continuous traffic growth has increased the level of road transport emissions. The contribution of the City's own operations to Kuopio's total GHG emissions in 2006 was about 8%, or some 0.09 $MtCO_2e$
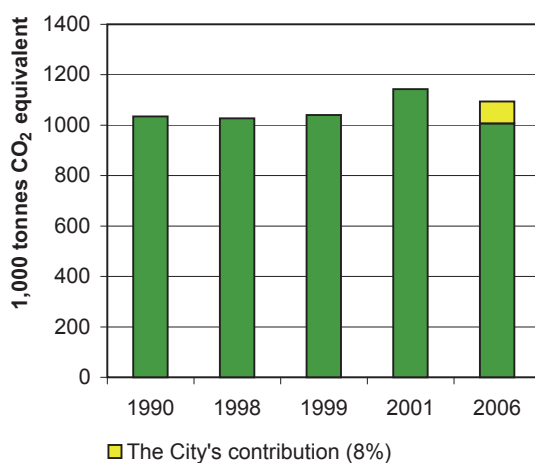

Figure 1. Greenhouse Gas Emissions in Kuopio, 1990–2006.

Annual per capita emissions in Kuopio have varied from a little under 12 tonnes of carbon dioxide equivalent (tCO_2e) to a little over 13 tCO_2e. This variation is explained by, for example, changes in emission levels and the population increase resulting from a municipal merger. Compared with towns of similar size, Kuopio's per capita GHG emissions in the early 2000s (13.1 tCO_2e) were somewhat lower than in Kotka, Lappeenranta and Oulu, for example. Compared with Mikkeli, Kuopio's emissions were almost twice as high. In Helsinki, the equivalent figure was 6 tCO_2e.

In the 2000s, total GHG emissions in Kuopio were about the same as in Kotka and Lappeenranta (Figure 2). Mikkeli's GHG emissions were significantly lower, while Oulu's emissions were about twice as high. The high level of Oulu's GHG emissions is due to the energy-intensive industry in the region. Siilinjärvi's emissions are lower than Kuopio's owing to the lack of large energy-intensive industry, although the process emissions from Yara Finland Ltd's fertiliser plant are high.

electricity use (households, services and public consumption) have also risen significantly since 1990. Households account for about a third of other electricity use. By contrast, emissions caused by the separate heating of buildings, waste management and agriculture have fallen. Emissions from industrial energy production and machinery (other fuel use) have also fallen noticeably since 1990, primarily due to structural changes in the wood products industry and other changes in industrial production in Kuopio.
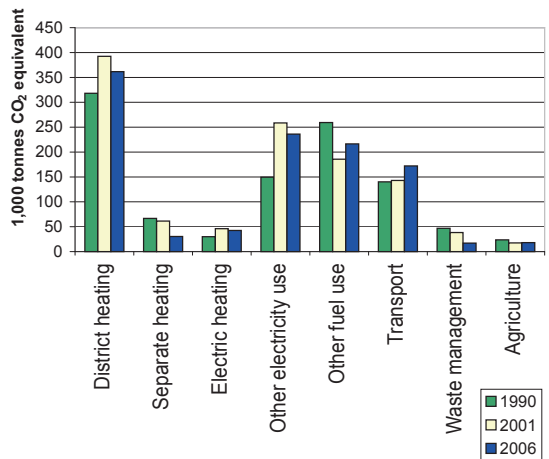
Figure 3. Greenhouse Gas Emissions in Kuopio in 1990, 2001 and 2006. Separate heating comprises forms of heating (e.g. wood and oil) other than district and electric heating. Other electricity use refers to electricity consumption by households, services etc. Other fuel use covers fuels used in industrial energy production and machinery. Agriculture consists of agricultural land and livestock manure emissions. Waste management encompasses landfill, composting and waste water treatment emissions.
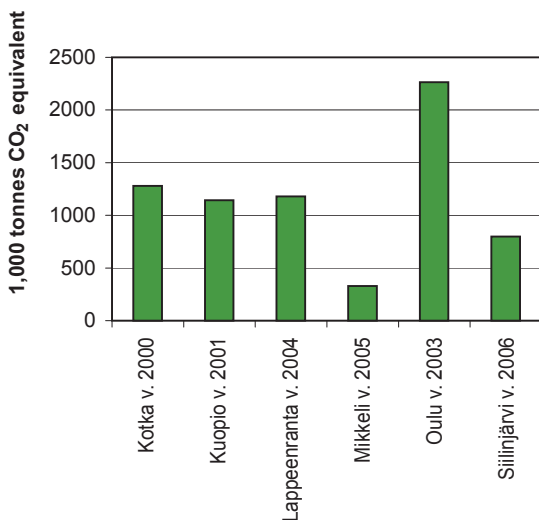

Figure 2. Comparison between Municipalities in GHG Emissions in the 2000s.

Examination of the development of greenhouse gas emissions in the period 1990–2006 (Figure 3) shows a rise in district heating, electric heating and transport emissions. Emissions from other

About 47% of all the energy generated in Kuopio in 2006 was produced from peat (Figure 4). In 2006, peat accounted for about 87% of Kuopio Energy Ltd's power generation. The proportion of peat varied slightly in the 1990s and 2000s. At its highest, at the beginning of the 2000s, peat accounted for about 52% of all the fuel used. In

recent years, the proportion of peat has decreased as a consequence of Savon Sellu Ltd moving over to alternative fuels. The proportion of renewable energy sources has fallen slightly since the 1990s because of the closure, in the 1990s and 2000s, of wood products industry plants, which utilised wood waste for energy.
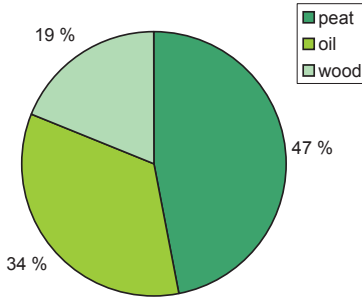

Figure 4. Percentage distribution of fuels used in energy production in Kuopio in 2006.

Most of the fossil fuel carbon dioxide emissions from power and industrial plants in the period 1990–2007 were caused by the power generation of Kuopio Energy Ltd and Savon Sellu Ltd (Figure 5). Emission variations are caused by changes in heating energy and electricity needs, industrial energy consumption and the availability of different fuels.

In the period 1990–2006, households consumed about a third of the electricity produced, while services and industry each consumed about a fifth (Figure 6). Electricity consumption by households and services has risen, whereas electricity consumption by industry has fallen.
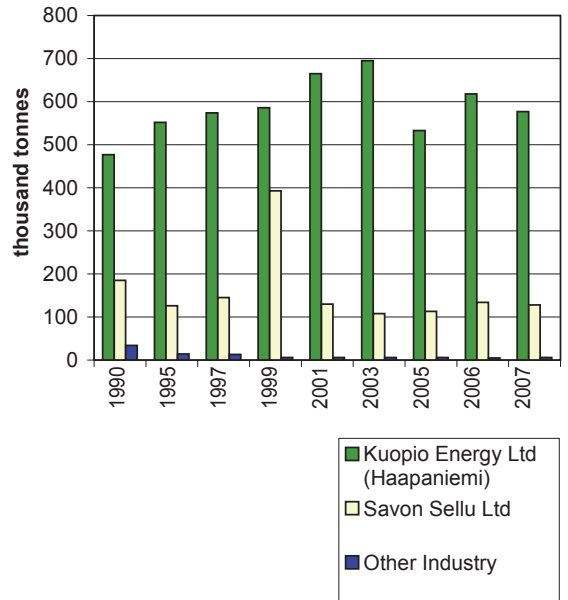

Figure 5. Fossil Fuel Carbon Dioxide Emissions from Power and Industrial Plants, 1990–2007. Other industry comprises the following industrial plants: Atria Plc, Karelia-Upofloor Ltd, Kuopion Saha Ltd, Lemminkäinen Plc, Sasmo Levy Ltd, Sasmox Ltd, Oy Scantarp Ab, Skanska Asfaltti Ltd and UPM-Kymmene Wood Ltd.
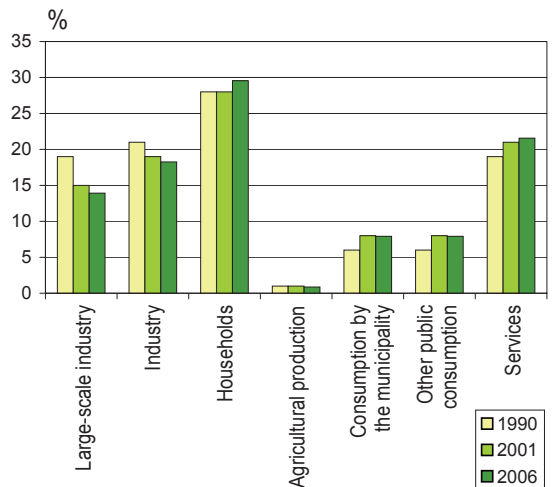

Figure 6. Sectoral distribution of electricity consumption in Kuopio in 1990, 2001 and 2006.

4.2 Projected trends in greenhouse gas emissions

GHG emission trends in Kuopio were estimated in 1999 according to two different scenarios. Projections were made for 2010 and 2020. They were based on the market scenario, on the one hand, and the environment scenario, on the other hand, which provides stronger environmental policy guidance. The calculation criteria for these scenarios contain many uncertainties and, consequently, the figures and the projections based on them (Figure 7) are only approximate.

In the market scenario, the factors affecting emissions evolve according to the market, and there is no attempt to influence the process through (specific) local measures. For example, Kuopio's traffic levels are assumed to increase in line with national trends, in which case road traffic volume/inhabitant will increase significantly. In the environment scenario, road traffic volume/inhabitant will not increase, and in other respects, too, the scenario projects a slowdown in economic growth associated with various structural factors. Moreover, it estimates, for example, that wood will account for 17% of the fuel used in energy generation.

According to the market scenario (Figure 7), GHG emissions will rise by about 8% by 2010 and 10% by 2020, whereas the environment scenario projects a fall in emissions of 3% by 2010 and 9% by 2020. A key role in emission trends is played by energy production, particularly the choice of fuels. The most significant impact on lowering emissions would be made by reducing the proportion of peat and increasing the use of wood/biofuels in energy production, as well as limiting the emissions caused by transport. Even by the environment scenario, neither the City Council's target of cutting emissions by 40% nor the European Council's target of a 20% reduction by 2020 will be met. Achieving these targets will require very significant changes both in the City's operations and the behaviour of citizens.
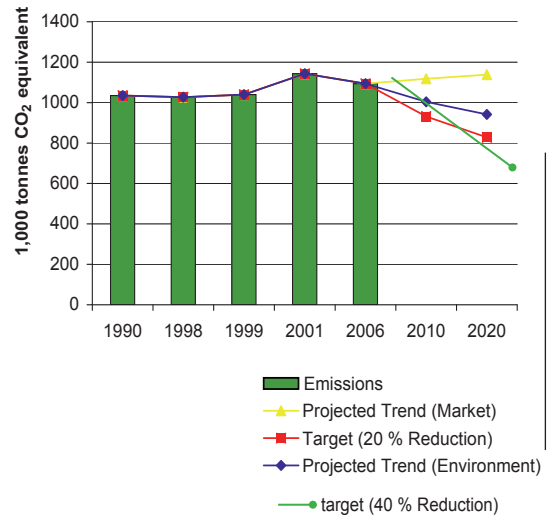

Figure 7. Projected Trends in GHG Emissions (Market and Environment) and Notional 20% and 40% Emission Reduction Targets.

4.3 Summary of the background to the Climate Policy Programme

GHG emissions in Kuopio have risen since the 1990s. The emission levels are equivalent to those of similar-sized cities. The main sources of greenhouse gases are district heating (principally for the heating of buildings), other electricity use, other fuel use (industrial energy production and machinery) and transport. GHG emissions will rise unless active measures are taken to curb transport emissions, improve the efficiency of energy use and increase the use of renewable energy sources.

At the EU level, the target is to cut GHG emissions by at least 20% of 1990 levels by 2020. In the same period, the share of renewable energy should be raised to 20%, with a 10% share of biofuels in transport. At the local level, a major impact is made by the energy efficiency agreements that, in addition to the City of Kuopio, have been signed by companies in different sectors and by other actors, such as housing companies and farms. The EEA signed by the City of Kuopio requires a reduction in energy consumption of 9% by 2016 (with 2005 as the base year).

The GHG emissions caused by the City's own operations are only about 8% of total emissions. But the whole City organisation, including Kuopio Energy Ltd, is responsible for a significant proportion of Kuopio's GHG emissions. The City can influence the emissions from its own operations and those from transport through land use and transport planning. The City can contribute to an increase in energy efficiency in households and buildings by providing information and advice. Through its ownership policy, the City can also influence the operations and emissions of the whole organisation.

5. Kuopio's Climate Policy Programme for the period 2009–2020

5.1 Vision and goals

The City of Kuopio's climate policy vision for 2020 is:

> Everyone in Kuopio will have contributed to reducing greenhouse gas emissions and prepared for climate change.

This vision will be achieved through the following goals:

- Reduce greenhouse gas emissions in Kuopio by at least 40% of the 1990 level by 2020.
- Reduce energy use in the City's own operations by at least 9% by 2016, compared with the 2005 level.
- Reduce greenhouse gas emissions from transport and travel. Promote walking, cycling and public transport.
- Increase the share of renewables in energy roduction.
- Recognise and prepare for the effects of climate change on the City of Kuopio's operations.
- Make everyone aware of the effects of his/her choices and actions on energy consumption and greenhouse gas emissions.

5.2 Objectives

In order to achieve the vision and goals, the Climate Policy Programme contains more detailed objectives and measures for each of the goals, and allocates responsibility for their implementation. Measures relating to the City of Kuopio organisation are contained in the Action Plan for Energy Efficiency for the period 2008–2016.

1. Reduce greenhouse gas emissions in Kuopio by at least 40% of the 1990 level by 2020.

Objective	Responsibility
To promote energy efficiency by integrating and consolidating the city's urban structure.	Technical Services
To determine at the planning stage the energy efficiency and impact on GHG emissions of projects and decisions concerning community structure and services, as well as other major projects and decisions.	All departments Centre for Administration and Development Technical Services
In implementing municipal mergers, to seek to keep basic services generating high levels of car traffic tied to the municipal centre. To seek also to keep decentralised service delivery in old residential areas.	All departments Centre for Administration and Development Technical Services
To systematically monitor the nature and levels of GHG emissions and to actively use the emission data..	Environment Centre

The achievement of the objectives will be monitored using the following indicators:
- the total number of impact assessments (annually)
- GHG emissions (total and per capita emissions/yr CO2e, every 5 years)

2. Reduce energy use in the City's own operations by at least 9% by 2016, compared with the 2005 level.

Objective	Responsibility
To implement the measures set out in the City of Kuopio's Action Plan for Energy Efficiency.	All departments Property Services
To systematically monitor energy consumption (electricity, heating, water) using the latest technology and to actively use the monitoring data in improving energy efficiency.	All departments Property Services Kuopion Opiskelija-asunnot Oy Niiralan Kulma Oy Kuopio Tourist Service Ltd
Vanhojen rakennusten energiatehokkuutta parannetaan peruskorjausten ja remonttien yhteydessä, ja uudisrakentamisessa edistetään matalaenergia-ratkaisujen käyttöä.	Property Services Building Inspection Office Kuopion Opiskelija-asunnot Oy Niiralan Kulma Oy

The achievement of the objectives will be monitored using the following indicators:
- implementation of the measures contained in the Action Plan (annually)
- the specific energy consumption (kWh/m3/yr) of buildings owned by the City and Niiralan Kulma Oy (rental housing company), Kuopion Opiskelija-asunnot Oy (student housing company) and Kuopio Tourist Service Ltd

3. Reduce greenhouse gas emissions from transport and travel. Promote walking, cycling and public transport.

Objective	Responsibility
To improve conditions for pedestrians, cyclists and public transport users and the level of service and traffic flow.	Technical Services
To reduce transport emissions caused by the City's own operations.	All departments
To reduce freight transport emissions by developing the regional transport system.	All departments Regional Procurement Services
To promote the use of low-emission vehicles both in the City's own operations and with regard to service providers.	All departments Regional Procurement Services

The achievement of the objectives will be monitored using the following indicators:
- GHG emissions from transport (proportion of total emissions and per capita emissions/yr CO2e, levery 5 years)
- car use (passenger cars/1,000 inhabitants, every 2 years)
- good bus accessibility (number and proportion of people living within 250 metres of a bus stop, every 2 years)
- the number of journeys by local transport (journeys/inhabitant/day, annually)
- the length of the footway/cycleway network (metres/inhabitant, annually)
- the fuel consumption of the vehicles owned or used by the City (litres/year, annually)

4. Increase the share of renewables in energy production.

Objective	Responsibility
To increase the proportion of biofuels in Kuopio's energy production.	Kuopio Energy Ltd Property Services
To promote the introduction of renewable energy sources in all the City's activities.	Property Services Kuopion Opiskelija-asunnot Oy Niiralan Kulma Oy Kuopio Tourist Service Ltd Building Inspection Office Technical Services Rural Services
To begin investigating the possibility of building a waste incineration plant in Eastern Finland.	City of Kuopio

The achievement of the objectives will be monitored using the following indicators:
- the share of renewable energy (energy balance, every 5 years)
- recovered biogas at the Lehtoniemi wastewater treatment plant as a proportion of the total energy used by Kuopio Water (%, annually)
- the number of on-farm energy investments (annually)

5. Recognise and prepare for the effects of climate change on the City of Kuopio's operations.

Objective	Responsibility
To make use of the expertise of regional scientific and research communities in preparing for climate change.	All departments
In land use planning, to identify the risks caused by climate change and to take them into account in the planning process.	Technical Services
To prepare for extreme weather, such as torrential rain, in the construction and maintenance of transport infrastructure.	Technical Services
To safeguard the water supply in the event of extreme weather conditions.	Kuopio Water
To prepare for changes in the thermal control of buildings and for moisture damage prevention.	Property Services Kuopion Opiskelija-asunnot Oy Niiralan Kulma Oy Kuopio Tourist Service Ltd
To take account of the effects of extreme weather conditions in the City's contingency plans and risk analyses.	Centre for Administration and Development All administrative units
To recognise the health risks posed by climate change and to prepare for them.	Social and Health Care Centre Kallaveden Työterveys
To take account of the effects of climate change in the City's Forestry Plan and in the planning of parks.	Technical Services Surveying Department
To take account of extreme weather conditions in the development of tourism and the planning of leisure activities.	Kuopio Tourist Service Ltd Recreational Services Centre

The achievement of the objectives is shown by the indicators for the other goals.

6. Make everyone aware of the effects of his/her choices and actions on energy consumption and greenhouse gas emissions.

Objective	Responsibility
To take greenhouse gas emission reduction into account in the governance of City-owned companies.	Senior elected and appointed management Members of the company boards
To increase interaction between the major companies and stakeholders with regard to climate change.	All administrative units Centre for Administration and Development
To provide advice and guidance to City staff and citizens on sensible and efficient energy use and climate change mitigation.	Property Services Computing Centre Environment Centre Agricultural Services Recreational Services Centre
To incorporate climate change and its mitigation and energy efficiency in teaching at all levels as part of environmental education.	Education Services Centre Environment Centre

The achievement of the objectives will be monitored using the following indicators:
- the number of Green Flag schools and day care centres (annually)
- a questionnaire on the environmental attitudes of City staff (every 4 years)
- the number of energy efficiency agreements signed by companies operating in Kuopio (statistics provided by Motiva Ltd, every 4 years)
- the achievement of the environmental objectives set by companies and organisations (every 4 years)

6.1 Implementation and monitoring

The City Council has ordered all administrative units to actively adopt the Climate Policy Programme in all preparatory work. From the beginning of October 2009, all the decisions of the boards of city-owned corporations and companies, committees, the City Board and the City Council must record the opinion of the presenting official as to whether the matter in question is:
   a) in accordance with the objectives of the Climate Policy Programme;
   b) neutral;
   c) contrary to the objectives of the Climate Policy Programme.

The implementation of the Climate Policy Programme is coordinated and monitored by the City's Environment Centre. The achievement of the objectives is assessed together with the responsible party, in addition to which data relating to the indicators selected for each goal are collected. The monitoring results are collected in the City's environmental report, prepared every four years. In conjunction with the annual environmental balance sheet, the key indicator data are provided and reported to the City Board. Monitoring of the Climate Policy Programme is performed concurrently with monitoring of the Action Plan for Energy Efficiency.

6.2 The impact of the Climate Policy Programme

The implementation of the Climate Policy Programme requires the carrying out of both cost-incurring and cost-saving measures. Energy conservation and increased energy efficiency bring cost savings, and various technical innovations related to GHG emission reductions may create more jobs. Investments related to energy production, on the other hand, incur short-term costs. However, combating climate change is both globally and locally considerably less expensive than adapting to climate change and repairing the resulting damage.

A reduction in Kuopio's GHG emissions of 40% from the 1990 level means a cut of 0.47 million tonnes CO2e from the current level of 1.09 million tonnes. That is about 43% of the 2006 level, because GHG emissions have risen since 1990. The target level for 2020 is about 0.62 MtCO2e. If the emission reduction target were directed solely at the fossil fuel GHG emissions from the power plants of Kuopio Energy Ltd, they would have to be cut by about 80%. Even the total elimination of all GHG emissions from transport and industry would not be enough to achieve the emission reduction target. Eliminating these emissions would meet about 80% of the target.