

# **Rural Perspectives: Understanding Climate Anxiety, Perceived Risk, and the Willingness to Take Climate Adaptive Measures**

*A case study in Tubbergen, the Netherlands*

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Date: 04-06-2024

Master specialization: Cultural Geography - Climate Adaptation Governance

## **Abstract**

The purpose of this study is to explore how residents of rural areas in the Netherlands perceive climate risks, how this is influenced by the emerging concept of climate anxiety, and assess to which extent this impacts their readiness to engage in climate adaptation initiatives, addressing the gap in the literature concerning the role of residents in climate adaptation action in rural areas, drawing upon the concepts of climate adaptation behavior intention, climate anxiety, and perceived climate risks, which are further embedded in societal and individual characteristics. An exploratory case study approach was employed, utilizing the methods of guided narrative mapping and thematic analysis. The chosen case study was the municipality of Tubbergen in the Netherlands. Eighteen participants were recruited through social media posts, with eligibility criteria open to all citizens of the municipality. Findings indicate that there is concern over climate risks such as flooding, loss of biodiversity, and heat stress, particularly in relation to the agricultural sector, shaped by media portrayal and experiences in foreign countries. Residents perceive to be invulnerable to climate risks, strengthened by the fact that the inconveniences caused by climate change in their day-to-day lives were minimal. Adaptive actions are hindered by a belief in innovation and technological progress, a belief that the government should address climate issues, and a belief that individual actions have little impact given the scale of the problem. This is strengthened by societal and individual characteristics. Participants reported that they did not experience negative emotions directly, yet negative news coverage regarding climate risks did impact their mental state. Financial incentives and knowledge enrichment could facilitate adaptive behavior, as well as strong social networks and attachment to nature. Further research is needed to enhance generalizability of the results, through performing similar case studies in other rural areas and including a broader and more diverse group of participants.

**Keywords:** climate anxiety, perceived climate risks, climate adaptation behavior intention, rural.

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# Chapter 1: Introduction

## 1.1 Background of the research problem and definition

Human-induced climate change will lead to more frequent and extreme events, with widespread adverse impacts and related losses and damage to nature and people (IPCC, 2022). Anthropogenic climate change thus severely and rapidly impacts human societies by rapidly changing the natural systems (Ghanian et al., 2020). Climate change effects show considerable variability across different geographical locations (Michetti & Ghinoi, 2020). Regions with lower levels of industrialization are especially susceptible to the impacts of climate change. Agrawal & Perrin (2009) argue that it is essential to recognize that rural households may bear a disproportionate burden of climate change impacts, naming droughts, famines, floods, variability in rainfall, storms, and coastal inundation as examples.

Adaptation plays a key role in reducing exposure to climate change (IPCC, 2022). Adapting to climate change must occur across various levels, including the national, provincial, and municipal scales. Municipalities need to consider the role of climate adaptation schemes in their area development and water management plans. Besides formulating policies, municipalities need to incite and motivate residents to adapt to the changing climate and strive for climate resilience to meet their goals (VNG, 2021).

Van Valkengoed & Steg (2019) further argue that governmental efforts alone are not sufficient; private individuals and households will also need to take measures to reduce the risk and negative impacts of climate change. As most land is privately owned, Tompkins & Eakin (2012) suggest that private individuals can be crucial providers of ‘adaptation goods’. These goods result from residents taking action themselves (e.g. by using sandbags to minimize home flood damage) and for their communities (e.g. reducing soil sealing on their properties to enhance urban water buffering capacity). To illustrate this within the context of this thesis, in the Netherlands, there are around 6.4 million private gardens, covering a total of 107.000 hectares. Nevertheless, about 46 percent of these gardens are paved. If private individuals took it upon themselves to fill these with trees, plants, and vegetable gardens, it would provide significant benefits and contribute to climate adaptation goals (Stadszaken, 2022).

However, the question remains: what motivates individuals to adopt adaptive measures? Parreira & Mouro (2023) argue that if citizens feel informed and empowered to help control threats, they are willing to work with relevant agencies. Therefore, policymakers need to focus on understanding the factors and motivations that influence how individuals understand related threats and deal with risks. The assessment of threat is influenced by cognitive responses, such as risk perception, and emotions, such as fear and anxiety (Parreira & Mouro, 2023). Fear and anxiety, acknowledged reactions to climate change, have gained prominence in recent years. The term ‘climate anxiety’ has transitioned from being unknown to familiar in the past years (The Guardian, 2023). The perception of risk and climate anxiety can function as a driver for taking adaptive actions. As argued by Ogunbode et al. (2022), negative emotions are key drivers for human action.

## 1.2 Scientific relevance and connection to theoretical debate(s)

This study aims to further explore how residents of rural areas in the Netherlands perceive climate risks, how this is influenced by the emerging concept of climate anxiety, and assess to which extent this impacts their readiness to engage in climate adaptation initiatives. Consequently, this research elaborates upon the academic debate in the fields of perceived climate risks, climate anxiety, and climate adaptation behavior intention.

There is a lack of research regarding the nature of the role of residents in local climate change adaptation (Hügel & Davies, 2020). In the same vein, Hegger et al. (2017) argue that climate adaptation literature has so far given limited attention to the role of residents. Furthermore, van Valkengoed & Steg (2019) argue that literature on adaptation to climate change and climate change adaptation policies has overwhelmingly focused on the role of governments. Nevertheless, it is illustrated in the previous paragraphs that the role of citizens is vital in addressing instances of non- or maladaptation, as their initiative or consent is often required to implement adaptation measures within or around their homes (Hegger et al., 2017).

Moreover, risk perception and adaptation are specific to culture and place (Weber & Hsee, 1999). Therefore, it is expected that the public perceptions of the threat posed by climate change, and support for adaptation policies, will vary across geographical areas (Taylor et al., 2014). Berenguer et al. (2005) argue that studies about how environmental concern is determined by place of residence have been scarce and inconsistent. However, the geographical area wherein an individual exists plays an important role in shaping their actions (Dang, Li & Bruwer, 2012). Nevertheless, Wagner & Grow (2021) argue that within the scientific disciplines of geography, the focus has primarily been on large cities and metropolitan areas. Furthermore, most studies regarding environmental concerns in rural communities are quantitative and focus on farmers specifically, with the impacts of climate change on the wider rural community considered to a lesser extent (Austin et al., 2020). This research adds to the current body of literature on rural areas, which needs more focus on scientific disciplines within the geography field.

### **1.3 Societal relevance**

This study holds societal relevance in identifying obstacles hindering residents' engagement in adaptation initiatives within rural areas. By understanding these barriers and potential motivations, policymakers can develop effective strategies to further motivate and mobilize residents, thereby enhancing the Netherlands' overall climate resilience.

### **1.4 Objective of the study and research questions**

To further explore how residents of rural areas in the Netherlands perceive climate risks, how this is influenced by the emerging concept of climate anxiety, and assess to which extent this impacts their readiness to engage in climate adaptation initiatives the following research questions are proposed:

**Main research question: How does the perception of climate risk in Dutch rural areas, including the emerging concept of climate anxiety, influence the willingness to participate in climate adaptive actions?**

- **Sub-question 1:** What insights does the existing body of literature provide regarding the concepts of climate anxiety, perceived climate risk, and climate adaptation behavior intention?
- **Sub-question 2:** Which climate risks are recognized by citizens in the rural parts of the Netherlands?
- **Sub-question 3:** To what extent do citizens in the rural parts of the Netherlands experience climate anxiety?
- **Sub-question 4:** What are the barriers and opportunities for citizens of the rural parts of the Netherlands to engage in climate adaptive actions?

## Chapter 2: Theoretical Framework

This research will make use of the concepts of ‘Climate Adaptation Behavior Intention’, ‘Climate Anxiety’, and ‘Perceived Climate Risk’. These concepts are further embedded in societal and individual characteristics. The concepts will be discussed hereafter.

### 2.1 Climate Adaptation Behavior Intention

There are various models to predict the climate adaptation behavior intention of individuals. One of the decision-making models is the Protection Motivation Theory (PMT). Xue et al. (2021) argue that this model is frequently adopted in pro-environmental behavior research, especially in the fields of environmental risk and disaster response. PMT investigates the factors affecting motivation and individual behavior, but it strongly influences the role of risk perception in motivating an individual to minimize negative impacts (Ghanian et al., 2021). The basic theoretical framework argues that when faced with potential threats (climate change impacts in this case), people will conduct two psychological assessments, namely threat appraisal and coping appraisal (Xue et al., 2021). Individuals assess the probability of potential threats (perceived vulnerability) and potential damage (perceived severity) to value if they do not change their behavior (Xue et al., 2021). To further explain individual behavior and decisions through socio-economic factors Xue et al. (2021) added climate change perception, information, and policy to this framework. The role of information is further stressed by the findings of Ghanaian et al. (2021), who argue that belief in climate change has a negative effect on maladaptation intention towards climate change. Thus, information provision is therefore crucial in shaping a perception of climate change risk and the effectiveness of adaptive measures. However, Xue et al. (2021) study found that whilst the acquisition of information about climate change impacts the risk appraisal of residents, it does not have a significant effect on the resident’s intention to adapt.

With regard to policy, it is found by Ghanaian et al. (2021) that individuals are more likely to be strongly influenced to adapt to the demands of the public sector than by their social network of relatives and friends. In the same vein, Xue et al. (2021) found that policy perception is the most important factor for promoting the formation of residents’ intention to adapt to climate change. This is especially interesting in light of the findings of Hegger et al. (2017), who argue that the role of citizens towards governmental actors in the adaptation domain can be described as a passive one, with governmental actors taking the lead. The main reasons for this are lack of risk awareness and uncertainty regarding residents’ scope of action (Hegger et al., 2017). Therefore, Tompkins & Eakin (2012) argue that to provide ‘adaptation goods’, strong institutional arrangements for delivery should be in place. Mirroring the findings of Tompkins & Eakin (2012), Xue et al. (2021) found that there is an urgent need for reasonable adaptation policies. In the same vein, Bouman & Steg (2022) argue that governments play a key role in turning a spiral of inaction, as they are well-positioned to alleviate barriers for citizens. For illustration, many barriers arise from how society is currently organized, making unsustainable alternatives easier and cheaper (Bouman & Steg, 2022).

Grothmann & Pratt (2005) contextualized these factors of PMT in climate change as climate change risk appraisal, adaptation appraisal, avoidant maladaptation, and adaptation intention. Grothmann & Pratt (2005) further add the factors of social discourse, adaptation incentives, and objective adaptive capacity (power, money, entitlements, knowledge, institutional and social support). Another factor incorporated

by Grothmann & Pratt (2005) is reliance on public adaptation, if people rely on the efficacy of the public or administrative adaptation they will probably take less precautionary action themselves. Similarly, Dang et al. (2014) framed these factors as risk perception of climate change, adaptation assessment (perceived self-efficacy, perceived adaptation efficacy, perceived adaptation costs), maladaptation (decision-making under uncertainty, fatalism, denial, and wishful thinking), and adaptation intention. Dang et al. (2014) further added the factors of belief in climate change, adaptation incentives/disincentives, and subjective norms. With regards to subjective norms, Bouman & Steg (2022) further argue that people often want to be accepted by and belong to others, making them inclined to act in line with what they think others would do and care about. Furthermore, when the impacts of an individual's own climate actions are seen as useless because others do not act, people may be even less likely to believe that the benefits of their climate actions outweigh some (of their) costs (Bouman & Steg, 2022).

Another framework to determine the climate adaptation behavior intention is the Protective Behavior Model (PBM) (Kollmuss & Agyeman, 2002). PBM argues that individual decision to undertake pro-environmental or adaptive behavior occurs through the interaction of internal (environmental knowledge; emotional involvement; values and attitude) and external (social and cultural factors; economic situation; infrastructure; political climate) factors. Choosing a different path, Arya & Kumar (2023) argue that climate adaptation behavior intention can be assessed by using the Theory of Planned Behavior, to which they added eco-anxiety. Other factors included in the Theory of Planned Behavior are attitude, subjective norm, perceived behavioral control, and risk perception. Arya & Kumar (2023) found that a change in attitude, norms, pro-environmental behavior, risk perception, and eco-anxiety leads to a change in climate change adaptation behavior intention.

Understanding the underlying decision processes concerning adaptation measures provides important insights into why some individuals prepare well for climate risks, whilst others do not engage in adaptive behavior. As shown in previous paragraphs, a branch of literature on climate adaptation has examined how the actual implementation of adaptation measures on an individual and household level is grounded in decision theories from psychology, such as the Protection Motivation Theory and the Theory of Planned Behavior (Kesternich et al., 2022). Furthermore, on a societal level social and behavioral scientists have devised a range of conceptual models to describe the factors that influence environmental decision-making using psychological decision theories as the basis (Ghanian et al., 2021).

## **2.2 Climate Anxiety**

One of the factors that influence the intention to adopt is anxiety about climate change or the ecological state of the world (Arya & Kumar, 2023). Climate change can be perceived as negative, neutral, or even positive. However, its impacts are predominantly negative, as most perceptions of it. Hickman et al. (2021) argue that terms such as climate anxiety and eco-anxiety are gaining attention worldwide as people become increasingly aware of the current and future global threats associated with a warming planet. Climate anxiety and related terms such as climate distress and climate change anxiety define human negative emotions and states toward a global climate crisis and its threats (Larionow et al., 2022). Perceptions considered negative concerning climate change, for example, increased anxiety, feelings, or threats (Leite et al., 2023). Climate anxiety can be connected to many affective symptoms, including worry, fear, anger, grief, despair, guilt, and shame, as well as hope (Hickman et al., 2021). Climate anxiety has been defined as heightened emotional and mental distress in response to dangerous changes in

the climate system which can result in behavioral symptoms such as panic attacks, loss of appetite, and sleeplessness (Dodds, 2021; Ogunbode et al., 2022).

Nevertheless, Hickman et al. (2021) argue that climate anxiety is known to be a practical anxiety because it has the beneficial effect of leading people to reassess their behavior to respond appropriately. People reported to experience climate anxiety are twice as likely to say they are motivated to change their behavior to reduce their contribution to climate change (Leite et al., 2023). Abunyewah et al. (2023) study in Ghana shows that climate anxiety, experience, and knowledge influence the level of adaptation against climate change. Moreover, negative emotions are key drivers of human action (Ogunbode et al., 2022). Ogunbode et al. (2022) further found that climate anxiety is related to the nature of information people receive through the media, namely the content of the information and the amount of attention people pay to it.

Whitmarsh et al. (2022) argue that demographic factors, experiential factors, mental health, and environmental values impact climate anxiety. Similarly, Crandon et al. (2022) emphasize the importance of considering both the individual and contextual factors in understanding climate anxiety, taking into account the interplay between personal experiences, societal influences, and environmental factors through the social-ecological framework in shaping the emotional responses to climate change of individuals. In the same vein, Ogunbode et al. (2022) argue that perceived descriptive norms about emotional responses to climate change also appear to have a role in determining how people experience climate anxiety. Clayton (2021) further adds that it can be triggered by the loss of place, activities, and traditions due to climate change or the fear of the potential scope and impact of dangerous climate change. Wullenkord et al. (2021) argue that climate anxiety relates to climate denial, ideological beliefs, needs and aspirations, and pro-environmentalism.

There are various frameworks for measuring climate anxiety, one of which is the Climate Anxiety Scale (CAS) is a tool designed to measure climate anxiety as a psychological response to challenges posed by climate change (Larionow et al., 2022). Nevertheless, it should be noted that there have been few validation studies conducted on the Climate Anxiety Scale as climate anxiety itself is a relatively novel concept (Larionow et al., 2022). However, certain patterns have been identified from the available studies.

Clayton & Karazsia (2020) found that people with environmental concerns were found to be actively involved in environmentally friendly actions. Moreover, it was found that climate anxiety was influenced by personal experiences related to climate change (Clayton & Karazsia, 2020). Furthermore, those who identify strongly with nature are more likely to feel a stronger response to climate change (Clayton & Karazsia, 2020). Wullenkord et al. (2021) found that those with higher levels of climate anxiety are more likely to have general anxiety and depressiveness. Moreover, people with higher climate anxiety expressed less climate denial and stronger pro-environmental intentions as well as pro-environmental behaviors (Wullenkord et al., 2021). Younger individuals and women experience higher rates of climate anxiety (Larionow et al., 2022). In the same vein, Hickman et al. (2021) argue that climate anxiety and dissatisfaction with government responses are widespread in young people (16-25 years) in countries worldwide, impacting their daily functioning. Moreover, Kollmuss & Agyeman (2002) found that women and younger individuals revealed significantly higher levels of climate anxiety.



Ultimately, climate anxiety is the negative emotions and states caused by the global threats associated with the warming of the globe. It triggers a broad range of negative emotions such as fear, worry, anger, and so on. Furthermore, the existence of climate anxiety is further shaped by societal and individual characteristics.

### **2.3 Perceived climate risks**

Risk perception is assessing the likelihood and magnitude of a threat (Gilbert & Lachlan, 2023), in this case, climate change. While climate change is a complex global hazard, the extent to which it is publicly viewed as a risk that requires urgent attention varies (van der Linden, 2014). Van der Linden (2014) argues that climate change risk perceptions can be conceptualized along two key dimensions, namely: personal and societal risk judgments.

On a societal level, Müller-Mahn et al. (2018) propose the concept of risk scapes to link the material dimension of potential physical threats, the discursive dimension of how people perceive, communicate, and envision risk and agency, how people produce risks and manage to live with them. It is further argued that risks emerge out of shared risk perceptions, communication, and collective actions of a society or social groups (Müller-Mahn et al., 2018). Müller-Mahn et al. (2018) argue that risk scapes have four dimensions: spatiality, subjectivities and social groups, practice, and plurality.

- Spatiality: Risks are produced through specific spatial dynamics, but at the same time they also contribute to the production and transformation of spaces (Müller-Mahn et al. 2018). For example, the effects of global climate change are spatially differentiated (Müller-Mahn et al., 2018).
- Practices: Understanding human activity is key to any deeper knowledge of events and states (Müller-Mahn et al., 2018).
- Subjectivities and social groups: Many different subjectivities and communities of practice exist, all of which produce their own risk scapes (Müller-Mahn et al., 2018).
- Plurality: From the multiple nature of practices, subjectivities, and communities of practice follow a fundamental plurality of risk scape (Müller-Mahn et al., 2018).

White and Lawrence (2020) argue that riskscape offer the potential to highlight how different actors and social groups develop their particular visions of risk and translate them into spatial settings. The perception of the individual is embedded in this riskscape.

On an individual level, Lemée et al. (2019) argue that the perception of risk can be evaluated by using the psychometric paradigm of risk. The psychometric paradigm seeks to account for the individual's objective opinions on risk (Lemée et al., 2019). Three main factors influence risk perception on an individual level, namely: fear, knowledge, and risk exposure (Lemée et al., 2019). Similar to Müller-Mahn et al. (2018), Lemée et al. (2019) argue that risk perception is intertwined with psychological, social, cultural, and political determinants. According to van der Linden (2014), experimental and sociocultural factors explain significantly more variance in risk perception than either cognitive or socio-demographic characteristics. Moreover, cognitive, experiential, socio-cultural, and socio-demographic factors all significantly explain and predict holistic risk perceptions of climate change. Gilbert & Lachlan (2023) found that women, younger participants, those with more than a high school degree, and those who considered themselves left-leaning had higher climate change risk perceptions. Moreover, those with

more knowledge about potential responses to climate change had higher levels of risk perception (Gilbert & Lachlan, 2023).

Furthermore, Michetti & Ghinoi (2020) found in their study that whilst a certain consciousness about risk is found, however, the lacking effect of adaptive capacity and experiential knowledge seems to characterize the perception of climate-related hazards. Michetti & Ghinoi (2020) stress the importance of knowledge, arguing that risk perception is positively related to climate-related knowledge.

## **2.4 Societal and individual characteristics**

To get a comprehensive overview of factors influencing adaptive behavior, the models mentioned above are further embedded in the broader social, political, and economic system(s) in which the assessed individuals operate. This is further stressed by Geiger et al. (2019) who argue that pro-environmental behavior is influenced by a combination of individual factors and contextual factors.

Societal and individual characteristics are part of the frameworks mentioned above in various manners. For example, Xue et al. (2021) add socio-economic factors and policy to their framework to contextualize their study. Another example is van der Linden (2014) who stresses the importance of sociocultural and socio-demographic factors in their study.

## **2.5 The connection between Climate Anxiety, Perceived climate risk, Climate Adaptation Behavior Intention, and Societal and individual characteristics**

In the aforementioned paragraphs the definitions and operationalizations of ‘Climate Adaptation Behavior Intention’, ‘Climate Anxiety’, and ‘Perceived Climate Risk’ are discussed. In this paragraph, the relations between the concepts will be defined, resulting in a conceptual framework. The model is a guide to analyzing the discussed concepts in the context of the municipality of Tubbergen.

The way people perceive the risk of climate change affects how likely they are to take action to adapt to it. Factors such as the degree to which they fear or worry about climate hazards play a role in this (Ghanian et al., 2021; Dang et al., 2014). Similarly, Parreira & Mouro (2023) argue that the intention to adapt is influenced by various factors, including cognitive responses like risk perception and emotional reactions like fear and anxiety.

The concept of climate adaptation behavior intention is closely interrelated with the notion of climate anxiety, as articulated by various authors. Climate anxiety is a practical kind of anxiety that leads to reassessment of behavior, prompting a more adaptive behavior (Hickman et al., 2021; Ogunbode et al., 2022; Abunyewah et al., 2023). Arya & Kumar (2023) further assert that emotional distress due to the effects of climate change is one of the main factors in influencing climate adaptation behavior intention.

Climate anxiety is linked to perceived climate risk, as emphasized by Whitmarsh et al. (2022) and Asgarizadeh et al. (2023), who argue that individuals’ perception of climate risk plays a significant role in the development of climate anxiety. The interplay between these factors is further explored by Lemée et al. (2019) who argue that climate anxiety can influence the assessment of risks associated with climate

change. Moreover, people who have more concerns about the environment are more likely to have higher rates of climate anxiety (Clayton & Karazsia, 2020).

A common denominator in the aforementioned phenomena is that to get a comprehensive overview of factors influencing adaptive behavior, climate anxiety, and perceived climate risks these models are further embedded in the broader social, political, and economic system(s) in which the assessed individuals operate, or: the societal and individual context wherein the individuals operate.

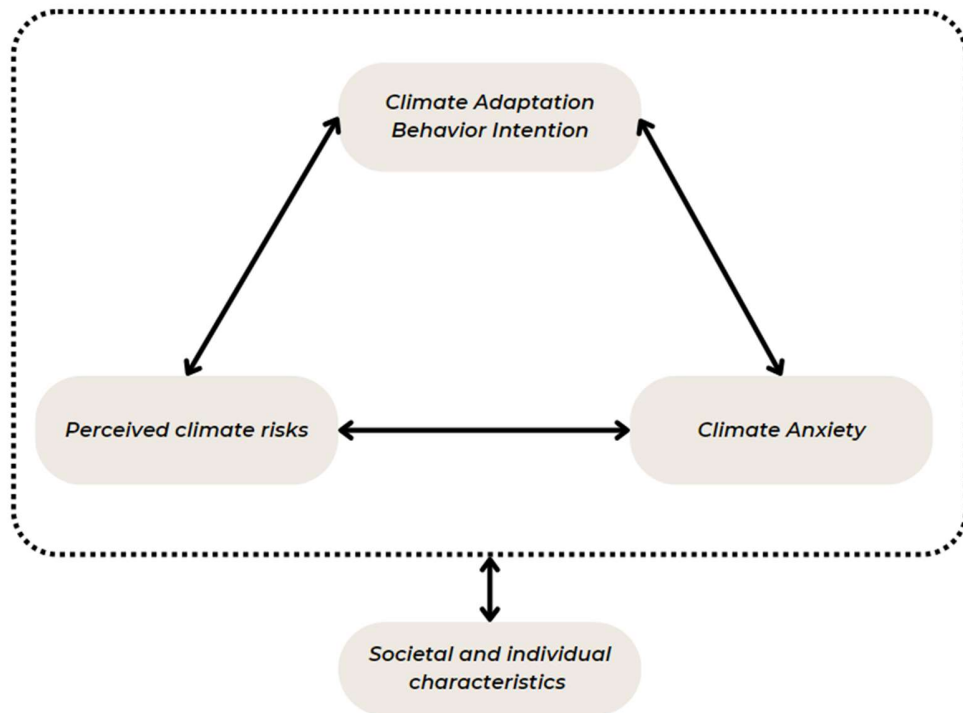


Figure 1 - Conceptual model (Source: author, 2024)

## Chapter 3: Methodology

### 3.1 Research design

This research consists of a qualitative case study research approach. The reason that qualitative case study research was chosen is because a case study allows the researchers to closely examine a contemporary phenomenon within a specific context (Ebneyamini et al., 2018). Yin (1993) identifies three types of case studies: exploratory, explanatory, and descriptive. This thesis is an exploratory case study, which is used to obtain an empirically based understanding to the structure, dynamics, and context of the subject of interest (Chopard & Przybylski, 2021). The case study is an empirical exploration of perceived climate risks, climate anxiety, and participation in climate adaptive actions within the administrative context of the municipality of Tubbergen.

The research uses the method of Guided Narrative Mapping. Guided Narrative Mapping is a form of Narrative Mapping, a research method in which visual storytelling is used to provide a concrete representation of the individual's complex abstract feelings and understandings (Thompson, 2017). The motivation for selecting Guided Narrative Mapping is that the usage of visual mapping techniques can offer a conceptual grasp and a comprehensive overview of the to-be-studied phenomenon (Butler-Kisber, 2010), this aligns with the exploratory nature of this study. Going beyond textual representations, maps, and visual representations adds an additional layer of analysis, aiding the researcher in delving deeper into a particular phenomenon. A further exploration of the process of Guided Narrative Mapping is discussed in paragraph 3.3.

To answer the sub-questions, a literature review was performed alongside qualitative empirical research consisting of thematic analysis of the outputs of the Guided Narrative Mapping approach (table 1).

Table 1- Sub-question and research methods

Nr.	Sub-question	Method
1	What insights does the existing body of literature provide regarding the concepts of climate anxiety, perceived climate risk, and climate adaptation behavior intention?	Literature review
2	Which climate risks are recognized by citizens in rural parts of the Netherlands?	Thematic analysis and Guided Narrative Mapping
3	To what extent do citizens in rural parts of the Netherlands experience climate anxiety?	Thematic analysis and Guided Narrative Mapping
4	What are the barriers and opportunities for citizens of the rural parts of the Netherlands to engage in climate adaptive actions?	Thematic analysis and Guided Narrative Mapping

### 3.2 Case selection and description

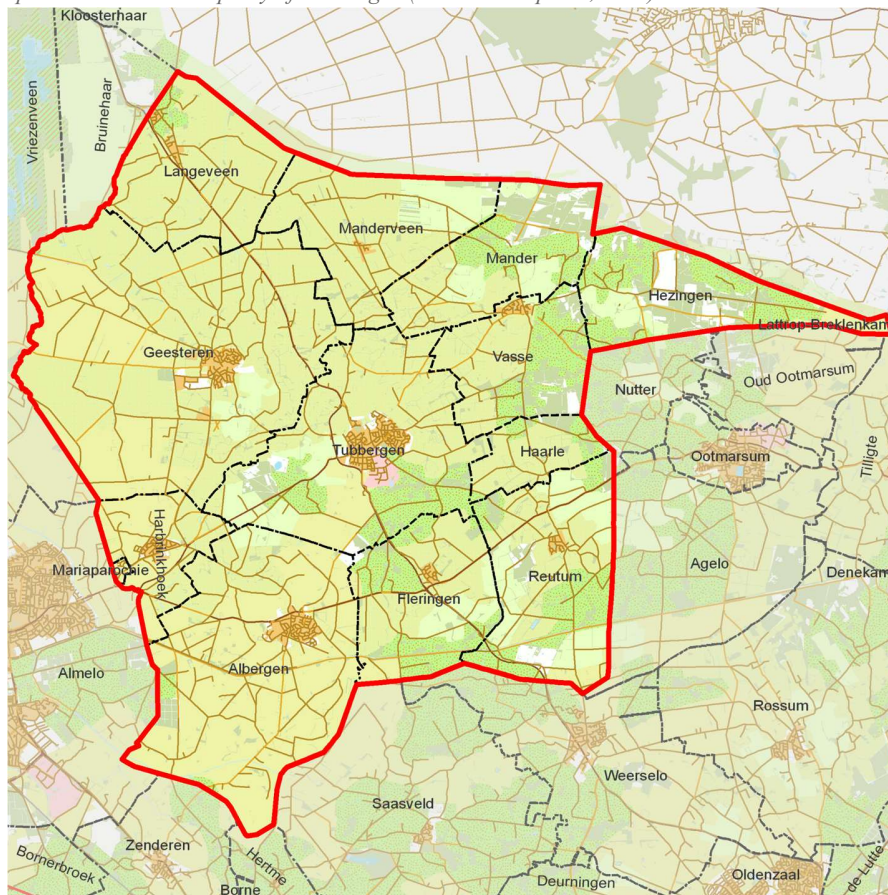
According to Flyvbjerg (2011), a crucial aspect of conducting a case study is to carefully select the subject of study. A case study should be comprehensive and thorough, encompassing a relevant timeframe (Flyvbjerg, 2011). It is imperative to contextualize the case within its environment. The table below provides additional clarification on how the criteria outlined by Flyvbjerg (2011) are applied in this research.

Table 2 - Flyvbjerg (2011) Characteristics of case studies

<b>Case</b>	Perceived climate risk, including the emerging concept of climate anxiety, and participation in climate adaptive actions in rural areas of the Netherlands.
<b>Period</b>	2015-onwards. There was progress in the integration of climate adaptation made through the Paris Agreement, namely through the first global adaptation goal and agreement (Climate Change & Comité 21, 2019). This was followed by countries writing up National Adaptation Strategies, programs, and other policy documents, to actively work on climate adaptation.
<b>Environment</b>	The municipality of Tubbergen.

The municipality of Tubbergen is located in the eastern part of the Netherlands and is classified by the Central Bureau of Statistics (CBS) as ‘not urban’, which means there is a residential address density of fewer than 500 addresses per km<sup>2</sup> (CBS, 2024). The geographical context of the municipality is portrayed with red lining in Figure 2. The municipality consists of the villages of Tubbergen, Geesteren, Albergen, Fleringen, Mariaparochie, Reutem, Haarle, Vasse, Hezingen, Mander, Habrinkhoek en Langeveen.

Figure 2 - Geographical context municipality of Tubbergen (Source: Wikipedia, 2012)



Like all other municipalities in the Netherlands, Tubbergen is mandated to implement the objectives outlined in the national policy document ‘DeltaPlan Ruimtelijke Adaptatie’ (DRPA) concerning climate adaptation. To operationalize these measures aimed at enhancing climate adaptation goals, the

municipality of Tubbergen formulated the policy document ‘Uitvoeringsprogramma Klimaatadaptatie Tubbergen 2021-2025’. The primary areas of concern in terms of climate change impacts encompass extreme rainfall, drought, and heat stress (Municipality of Tubbergen, 2021). Nevertheless, as mentioned in the introduction, the municipality needs its residents to meet the climate adaptation goals. Hence, the municipality of Tubbergen, being a rural area in the Netherlands, has to adapt to climate change and relies on the active involvement of its residents in this process. Consequently, it serves as a fitting site for a case study for the proposed main research question.

### 3.3 Data collection

The process began with narrative interviews with citizens from the municipality of Tubbergen using open-ended questions in a semi/unstructured interview protocol. An interview guide was developed based on the theoretical framework. The interview guide can be found in Appendix I. The goal was to create a diverse pool of citizens. The participants applied via a social media post posted on the LinkedIn, Instagram, and Facebook pages of the researcher. The interviews provided insight into the perceived climate risks, the extent of climate anxiety, and to which degree this impacted their readiness to engage in climate adaptation initiatives. To make sure that participants understood the concepts discussed in the research, they were introduced to them before the guided narrative mapping exercise.

It is important to allow as much of the story to emerge in the process of the interview so that once participants begin mapping, any thoughts, feelings, or memories that might not have surfaced in the interview setting might find space on their map (Thompson, 2017; Carmack & LeFebvre, 2023). Therefore, the mapping only began after the participant and researcher felt complete with the interview. To start mapping, participants were provided with paper (which had a map of their living environment on it) and markers. The participants drew the perceived climate risks in their living environment. The created maps can be found in Appendix V. Two interviewees (I1 and I6) were unable to participate in the mapping exercise due to their exclusive online availability.

When participants were finished drawing their map they were invited to present their results. The researcher and participant engaged in a participant-led discussion of the map, where the researcher served as an engaged listener. Thereafter, the researcher asked further questions, identifying other connections, and speaking to what may have been previously unspoken or unrecognized during the initial interview (Thompson, 2017; Carmack & LeFebvre, 2023).

In the table below the participants, gender, age, place of residence, and occupation can be found. Interviews were recorded with the approval of the participants. The interviews were transcribed via Amberscript. Hereafter, the researcher carefully reviewed the transcriptions for accuracy. Lastly, the researcher uploaded the transcriptions into Atlas.TI. The transcription can be found in Appendix IV.

*Table 3 - Table of respondents*

<b>Respondent</b>	<b>Gender</b>	<b>Age</b>	<b>Place of residence</b>	<b>Occupation</b>
I1	Male	24	Geesteren	Student
I2	Male	57	Geesteren	Farmer
I3	Female	19	Geesteren	Student
I4 & I5 (group)	Female & male	53 & 53	Geesteren	Receptionist &

interview)				Chief Technical Officer
I6	Female	22	Tubbergen	Student
I7	Female	20	Geesteren	Student
I8	Female	24	Tubbergen	Student
I9 & I10 (group interview)	Female & male	20 & 24	Albergen en Geesteren	Student
I11 & I12 (group interview)	Female & male	55 & 24	Geesteren	Nurse and business owner
I13 & I14 (group interview)	Male & male	24 & 24	Geesteren en Albergen	IT professional and architect
I15	Male	24	Geesteren	Student
I16 & I17 (group interview)	Male & male	24 & 22	Tubbergen	Data analyst and student
I18	Male	24	Tubbergen	Consultant

### 3.4 Data analysis

Drawing on the recorded interview, the maps, and interview notes, the researcher entered the analysis phase. Ultimately, the researcher needed to identify (in)consistencies between interviews and maps, patterns and subtleties that served to elevate our understanding across personal/political, micro/macro terrains of lived/ing experiences (Thompson, 2017).

The interviews, maps, and interview notes were analyzed using thematic analysis. Thematic analysis is a method for identifying, organizing, and offering insights into themes across several forms of qualitative data (Alyavina et al., 2020). The researcher first familiarized himself with the data. Thereafter, the researcher searched for themes within the data.

Themes and corresponding codes were developed both inductively and deductively. Pre-determined themes and codes were derived from the theoretical framework on climate adaptation behavior intention, climate anxiety, perceived climate risk, and the societal and individual characteristics in which they are embedded. With regard to the climate risks that are recognized by the citizens of rural parts of the Netherlands themes were developed exclusively through inductive coding. All themes can be found in the codebook (Appendix II).

### 3.5 Ethical considerations

Participants signed a consent form (Appendix III), agreeing to participate in the research project. By signing this document they declared to be aware of their rights allowing the researcher to use the research outputs, including the maps and interviews. Furthermore, they allowed the researcher to record the

interviews. The participants could withdraw from the study and exclude the research output from the project at any time. By signing the consent form the participants agreed that they had enough time to ask questions about the research project and that their involvement in the research project was voluntary.

The data gathered is confidential. The recordings made were used by the researcher and will not be published anywhere else. After transcribing the sound recording will be destroyed. Furthermore, the identity of the interviewees will not be disclosed for privacy reasons.

Lastly, it is mentioned that the research performed the ethical review set up by the Ethics Committee (EC) of Campus Fryslân (Rijksuniversiteit Groningen).



## Chapter 4: Results

In this chapter, the results of the thematic analysis are displayed. In the subsequent paragraphs, the results will be presented through the structure that was established in the theoretical framework. Climate anxiety, perceived climate risk, and societal and individual characteristics in the context of the municipality of Tubbergen will be discussed. Under these themes, a narrative of the interviewee's experiences will be given.

### 4.1 Climate Adaptation Behavior Intention

#### Adaptation incentives

From the analysis, there was one main incentive for adaptive or mitigative measures and that was the financial gains that come along with taking climate adaptation or mitigation measures. Adaptive and mitigative measures are both mentioned, as interviewees repeatedly confused the two. This is best illustrated by the following quote from interviewee 13:

“Yeah, you know on the other hand I’m just selfish by nature. I only do it when there is something to gain for me.” (I13)

Interviewees mentioned installing solar panels on their roofs. The motivation for installing solar panels stemmed from government subsidies and the opportunities for individuals to feed excess solar power back into the grid, thereby reducing their energy bills. The financial incentive was dominant in all of the adaptive measures discussed, one interviewee said:

“It’s a return on investment calculation, it pays off. I think it’s the same with electric cars. Most people I speak to indicate that it’s financially attractive to drive them. I don’t hear many people saying they do it for the climate, no it’s financially appealing.” (I2)

A common view amongst interviewees however was that, besides the financial gain, contributing to a more climate-adaptive world was seen as a nice extra (I4, I18). Some interviewees indicated that they exhibited climate-friendly behavior unintentionally (I2, I18). Examples included choosing cycling over driving or vacationing close to home. Once more, the primary motivator was not the environment; it was a nice bonus.

Another factor mentioned in taking adaptive or mitigative measures is governmental regulation. On the one hand, the government can provide motivation through the aforementioned subsidies. On the other hand, the government can compel its citizens to take adaptive measures through its regulatory framework. Several interviewees mentioned that they had implemented adaptive measures when constructing their homes, primarily due to the building regulations in force (I2, I16, I17 & I13). Moreover, an interviewee who is a farmer by profession argued that he is forced to take adaptive measures as in their field there are strong regulations and strong enforcement :

“I’m not going to spray my land to death tomorrow. There are, of course, very strict controls in place. The officials aren’t foolish; they just lack knowledge. You can easily get fined 1000 euros.” (I2)

Thus, the financial gains, subsidies, and regulations encouraged the participants to take adaptive and mitigative measures. However, this regulatory framework is essential, one interviewee said:

“But even my father chose an electric car because it was subsidized. Now that the subsidies are gone, he sells the electric car and opts for a hybrid. So, yes, you can see, at least in my father’s case, that the financial factor plays the bigger role after all.”

What emerges from the results reported here is that interviewees were inclined to exhibit adaptive or mitigative behavior when it aligned with their personal interest, such as their financial situation, or when it is enforced or encouraged by the government.

### **Reliance on public adaptation**

From the previous paragraphs, it becomes prevalent that regulations are a powerful way to mobilize citizens to engage in climate adaptive measures. Nevertheless, overall, interviewees expressed that they have little knowledge about what climate-related regulations are in place, one interviewee said:

“Not entirely; you pick up on a lot of things, but I believe there’s also a lot that goes unnoticed. So no, I don’t think so.” (I17).

One interviewee stressed the desire for a centralized platform where all regulations and subsidies for homeowners could be easily accessed with just one click, all on one government page (I15). However, the municipality of Tubbergen, in which the interviewee resides, already has such an internet page (Tubbergen, 2024). This accentuates the point the interviewee makes in the interview:

“Well, you’re also assuming a level of engagement from the citizens themselves. But evidently, the citizens don’t consider it important enough to actively seek out what they can do themselves for subsidies. I think that’s where the bottleneck is.” (I15)

Providing the citizen with more information on the subject was mentioned by various interviewees (I15, I18, I18). The majority of interviewees depend on the government to furnish them with information about climate adaptive measures. However, a majority of the interviewees were particularly critical of the government, stating that the government is primarily engaged in rhetoric and expenditure regarding the subject rather than solving the issues:

“But not by the government. I believe that the government mostly just wants to talk about it and spend a lot of money on it.” (I13)

“Yes, I think it’s just that it will come, but for now it is a lot of talking and deliberating and actually not taking action.” (I8)

Consequently, the government and its fitness to address the problem is doubted by various interviewees. There are various reasons for their doubts which include a lack of knowledge:

“The government has the capacity, the government has resources, but the government lacks knowledge. The average civil servant has a complete lack of knowledge. I’ve had enough civil servants check on me, who have to tell me things. They don’t even know what they are talking about.” (I15)

“They don’t have a clue, that’s what I always think.” (I4)

Another reason for doubtfulness with regard to the fitness of the government is the approach taken. Interviewees feel like a forceful top-down approach is implemented for climate-related measures:

“No, but on such matters, you really need to talk with more people. That’s when I think, people will feel more heard. And then people are more likely to go along with your plans.” (I8)

“They do what they have to do, of course. But the way they do it is sometimes questionable. Forcing things down the throats of the province, municipality, the farmers, among others.” (I12)

A third factor mentioned by interviewees is the current state of politics. I6 argued that the state of politics is currently mainly driven by other issues in the Netherlands, such as poverty, and housing, and that a lot of attention is being paid to those matters. A further consequence noted by I6 is that citizens tend to align more with right-wing and populist parties. However, as demonstrated by the statement below, it is the more leftist parties that champion climate adaptive measures:

“Then you encounter more political issues than climate issues, and they all want to cater to their own support base. Actually, the ones who have the most to do with climate, especially climate adaptation, are the left-wing parties, but they are not in power. The right-wing parties have their own priorities.” (I18)

Together these results provide important insights into the role of the government in taking adaptive measures. On the one hand, the results show that the interviewees rely on the government to provide them with information, a regulatory framework, and corresponding incentives. On the other hand, interviewees are critical of the government and their effectiveness with regard to climate adaptation.

### **Objective adaptive capacity and coping appraisal**

Several interviewees expressed the belief the market and private companies will offer solutions to our problems:

“I actually personally think that the government can’t do much about this and that it’s just, you know, the new technology. And you know, if we, if there’s climate change now and perhaps water management issues in the future, then we’ll have new technologies in the future that can solve that problem at that time.” (I13)

“I think that we, as the Netherlands, are very advanced in that regard. When I look at the consulting firms and all the reinforcement projects that are being carried out.” (I17)

In all cases, the interviewees reported that they are confident that things will turn out positively and that issues will be solved. One interviewee commented that:

“And I think that the consequences of climate change in the municipality of Tubbergen, that they can always be solved, or that someone will always come up with a solution, and then yeah, they just find a way to solve it.” (I6)

## 4.2 Perceived climate risks

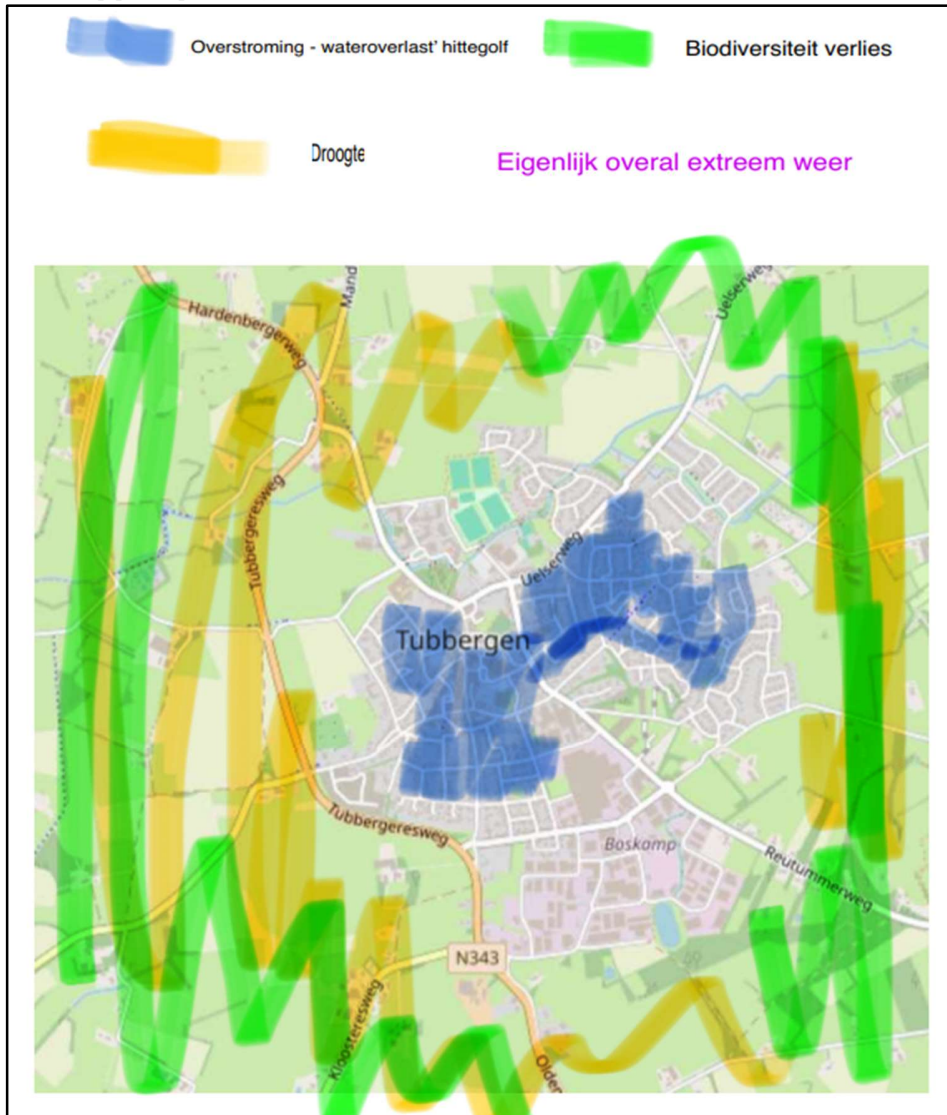
Risks are produced through specific spatial dynamics. Thus the geographical location wherein one lives influences risk exposure and perceived risk. The perceived risks of the interviewees were collected through a combination of narrative mapping and interview questions. For illustrative purposes, two of the narrative maps created by participants I7 and I8 are shown in Figure 3\* and Figure 4\*.

Figure 3 - Narrative map participant I7 (Source: author, 2024)



\*The Dutch text written on the narrative map: “droogt uit” can be translated into “dries out”.

Figure 4 - Narrative map participant 18 (Source: author, 2024)



\*The Dutch text written on the narrative map: “Overstroming-wateroverlast’ hittegolf” can be translated into “Flooding-water nuisance’ heat wave”. The text “Biodiversiteit verlies” can be translated into “Biodiversity loss”. “Droogte” can be translated into “Drought”. Lastly, “Eigenlijk overall extreem weer” can be translated into “Actually, extreme weather everywhere”.

The main risks in the Netherlands that came forward through the interview questions were the rise of the sea level, heavy rainfall causing flooding, and droughts. The interviewees were tasked with identifying climate risks on a map of their residential area. The table below indicates the frequency with which certain risks were marked.

Table 4 - Climate risks acknowledged in the narrative mapping exercise

Climate risk	Times drawn in narrative maps
Flooding	8
Loss of biodiversity	6
Heat stress	8
Water safety	1
Drought	4

Thus, the most frequently mentioned climate risks were flooding and heat stress. Followed by loss of biodiversity, drought, and water safety.

### **Risk exposure**

When asked about the vulnerability with regard to climate risks within the municipality, interviewees argued that the municipality of Tubbergen is not necessarily a vulnerable geographical area. One interviewee said,

“Well yeah, I mean, we’re definitely above sea level anyway. So, in that respect, I mean, the other half of the Netherlands has more of a problem. They’ll face quite a situation if the dikes are not in good condition soon.” (I9)

However, various interviewees were exposed to more proportionate climate change effects in foreign countries. One interviewee recently visited Cambodia and reported that:

“But I also think that the problem largely passes us by, because we live here in Twente, and of course, you notice it, for example, that it rains more heavily. But as I experienced in Cambodia, you come across totally different things, where you think, there really needs to be done much more if we want to save our world than what you see here in Twente.” (I6)

Another interviewee (I18) expressed that he once experienced a drought in South Africa. The experience made it so that he was much more careful with the scarce resource of water. Simultaneously, the inconveniences encountered in their day-to-day lives by the interviewees were generally perceived as minor. Interviewees predominantly cited challenges related to the sewage system during waterlogging, periods of drought leading to less vibrant gardens, the inability to go to the skating rink in winter, and difficulties faced by farmers due to weather variations affecting their business operations (I13, I9, I10, I2). These inconveniences fail to stimulate action, a sentiment underscored by the following quotes:

“Like, in Deventer, where you live along the IJssel, and then you see the high water levels, maybe you’re a bit more aware that you really need to do something. What I am trying to say is: we need to feel it first before action is taken.” (I17)

“It’s a bit of a negative emotion because even now I think: yeah, we do need to take action or we can’t turn back anymore. But it’s still a bit too far from me personally. How much difference does it really make that I can’t go ice skating anymore?” (I7)

One concern expressed above, namely the difficulties faced by farmers due to weather variations, affecting their business operations was echoed by various interviewees. Risks that were mentioned are drying out and depletion of the soil, as well as salinization of agricultural land (I3, I1).

What emerges from the results reported here is that the main risks identified by interviewees were flooding, loss of biodiversity, heat stress, drought, and water safety. These effects were observed to have minimal impacts on the daily lives of interviewees, particularly when compared to the effects observed overseas. Interviewees expressed particular concern about the effects of climate change on the farming sector, which plays a significant role in the municipality’s economy.

### **Knowledge**

The manner in which most interviewees were exposed to the risks of climate change was through media outlets. Interviewees found that the media mostly focuses on disasters that happen due to climate change:

“Yes, but it’s always quite negative that sometimes I think, “Yes, but there’s already so much happening that contributes to addressing climate change,” and that doesn’t really come across, which I find disappointing because I think it might also be demotivating.” (I3)

“People only talk about the negative because negative news is news; good news isn’t news. Take a disaster, and it’s highlighted endlessly.” (I2)

Furthermore, certain interviewees expressed that the media’s flow of information leaned too much to the left.

“Well, massively one-sided, super left-wing, very pro-climate.” (I13)

“Yes, I think the media leans too much to the left, actually, but well that’s something that you often see with the media” (I12)

This was also illustrated by the example given by I12 to illustrate this:

“That it leans very much towards the left side of the whole story, because they just want, for example, if you look now, if you look at the weather again and it warmer, then they now all use red and orange in maps, whereas a few years ago they would have used green in maps. Yeah, to make climate change seem even more extreme than what it actually is.” (I12)

According to one interviewee, the media’s portrayal of the Extinction Rebellion and other activist groups contributes to this aversion to the media (I6). Similarly, multiple interviewees contended that disruptive action groups like Extinction Rebellion left them with negative sentiments and a dislike for climate action

(I8, I5). Moreover, several interviewees expressed a desire for a more informative and scientific approach to reporting on climate change, which is best illustrated by the following quote:

“Well, not from the media, I think, because I find that the media does give a distorted image of these kinds of things, but I think I should get that information from someone who has looked at it in a scientific way because I’m also quite scientifically minded and I really believe in that.” (I7)

Some interviewees also reported that the amount of information on the subject of climate change is overwhelming, to the point that they did not know what to believe:

“I think we’re bombarded with it so much that at some point, I just don’t believe in it anymore. That’s why personally, I think I actually don’t know enough about it. I don’t know what to believe anymore. I do believe in climate change, it does happen. There’s so much said and speculated, I think: we’ll see. My knowledge is minimal when it comes to the effects and changes.” (I14)

Those who expressed that they have above-average knowledge on the subject of climate change have an interest in the subject, mostly due to their studies or area of expertise (I6, I8). Furthermore, these interviewees also expressed more concern and action with regard to climate action.

### **Threat appraisal**

Several interviewees reported that it is such a long-term problem, and therefore a distant problem, which makes it so that they are not necessarily prone to action, illustrated by the following quote:

“Now and then, really huge doomsday scenarios are painted, but that’s still many years in the future. Yeah, yeah, that’s going to be really tough in the future. But then, we, our, and our grandchildren, who know, we will all be gone.” (I18)

Another factor identified in threat and coping appraisal that was underscored by almost all interviewees is that they find that the Netherlands is such a small country, that our climate actions are negligible.

“I do have this feeling that we, as a small country, can really make a huge difference. By that, I don’t mean that we don’t need to do anything, because I do think it’s important, also in the context of the European Union. If, for example, you have China emitting such a ridiculous amount, you can ruin the whole economy here, but that won’t help either.” (I7)

“No, really. Like I said, the impact I have on that is so minimal. I do know that if everyone thinks like that, then nothing will change. That’s the flip side of the coin. But as long as so many new coal plants are still being opened in China, and in the US, cars still run one out of five.” (I5)

Because of environmentally harmful actions abroad and the relatively small size of our country, interviewees expressed doubt about our ability to effectively address the consequences as an individual nation, highlighting the crucial need for global cooperation on the matter.



### 4.3 Climate Anxiety

The belief that problems that arise will always be solved also informs the anxiety interviewees have with regard to climate change:

“No, I don’t have any fear, really none. I do have trust in technology to minimize the consequences of climate change.” (I6)

However, although the interviewees stated that they didn’t experience climate anxiety, some did acknowledge that watching negative news segments about climate change did affect their state of mind:

“If you delve too much into it, you only hear all the horror stories and all the bad stuff associated with it. If you’re too preoccupied with it, you hear too much bad news. It just doesn’t make you happy.” (I1)

“The consequences are already real. And there are plenty of videos where they explain that if we don’t act, things like tornadoes, floods, and such will happen. And those videos, like those of the forest fires from Greece, then you think: “Ouch!”. You really are confronted with the facts.” (I3)

Moreover, several interviewees reported that the sense that the government is not doing enough is causing them restlessness.

“Not in the sense of fear, but occasionally I do think, “Yes, things are going the wrong direction with this country or with the world.”” (I4)

“I think especially now, maybe still some powerlessness, because, yeah, but I think it will always remain a bit like that because you’re not really in a position where you can make real change.” (I8)

### 4.4 Societal and individual characteristics

#### A down-to-earth, conservative nature

A recurrent theme in the interviews was a sense amongst interviewees that the inhabitants of the municipality of Tubbergen have a down-to-earth attitude, one interviewee argued that:

“On the other hand, I think there’s also many people who don’t believe in it. They’re just very down-to-earth and think, “Well, what can I do about it?” (I5)

Further analysis showed that this is further amplified by a conservative and stubborn nature. Talking about this issue, two interviewees said the following:

“What I often notice is that people are very hesitant about changes, very shy about changes.” (I16)

“Well, I think that people here are quite stubborn by nature, but I do believe that once you bring it to their attention they are willing to help out.” (I18)

Commenting on the conservative and stubborn nature, I15 stated that this is intertwined with the rural lifestyle:

“I believe that compared to other parts of the Netherlands, people here are less pro-climate on average. I think people from Tubbergen are quite conservative. I believe that people in villages, especially in rural areas, are somewhat more conservative. This is also related to the way of life in a village, where you often hold on to traditions and existing patterns. It’s all intertwined.” (I15)

I15 further argued that the nature of the inhabitants in Tubbergen is further reflected in local politics:

“I don’t get the impression that the municipality of Tubbergen is very proactive in terms of climate action. It mainly comes from the top, from the province, from the national government. In my perception, the municipality itself takes little initiative. The basic measures are directed from above, and that’s where it ends. I don’t think there is something wrong with that because it also aligns with the beliefs and needs of the average resident of Tubbergen.” (I15)

### **Social norms**

A common view among interviewees was that climate-adaptive behavior is not the social norm within the municipality of Tubbergen. For example, one interviewee said when talking about climate adaptive action:

“Yeah, why don’t I do it for the other aspects? I think I just see it as normal. Maybe that’s more because I come from the municipality of Tubbergen. ” (I16)

This view was echoed by another interviewee who stated the following:

“Especially in a very small village, you know, and what’s strange is, they all find that strange, because if you find that normal, then you are immediately looked at strangely. And I think, let’s say you’re in the football canteen and you say: “Well, I’m vegetarian because I care about the environment.” I think the whole football canteen would start laughing and everyone would think: what a complete idiot, right?” (I17)

### **Social networks**

Countering the conservative and stubborn nature, there were some suggestions that strong social networks could provide a basis for undertaking effective action:

“I think there’s also just a very strong sense of being there for each other, guided by faith, in times of trouble.” (I1)

### **Proximity to nature**

In addition to robust social networks, two interviewees also suggested that the close proximity to nature motives residents of Tubbergen to take adaptive measures to preserve the landscape in which they reside:

“I think that if you look at people in rural areas, they have a stronger connection to nature than people in big cities. Because of this, they may notice more clearly that nature is changing. That could be an incentive to do more.” (I5)

“I still believe that the average Twentenaar, Tubbergenaar, is willing to adapt. We live in a national landscape. It’s a beautiful environment.” (I2)

### **Socio-economic environment**

During the interviews, it was found that the socio-economic environment in the municipality is overall favorable for taking action. Two interviewees suggested that there are plenty of resources and opportunities within the community:

“I think the municipality is not a poor municipality. It’s just, it’s not super wealthy, but overall, yeah I think we all, especially if you look at Geesteren or something, that’s just a really beautiful village, I don’t think anyone lacks any resources.” (I1)

“So, the hustle and bustle remains, so to speak. That ensures that it remains economically viable. There are plenty of companies in Twente where young people can find work.” (I18)

Nevertheless, some felt concerned about the effects of climate change on the farming sector, which plays a significant role in the municipality’s economy.

## Chapter 5: Discussion

This study reveals that citizens of the municipality of Tubbergen are concerned about climate risks such as flooding, biodiversity loss, and heat stress, especially regarding the agricultural sector. These concerns are influenced by media and foreign experiences. Despite these concerns, residents perceive their municipality as invulnerable to climate risks, especially since climate change has had minimal impact on their daily lives. Barriers to adaptation efforts are reliance on innovation and technology, a belief that the government should address climate issues, and a belief that individual impacts have little impact given the scale of the problem. This is strengthened by societal and individual characteristics. Whilst participants did not directly experience negative emotions, negative news coverage about climate risks did affect their mental state. Financial incentives and knowledge enrichment can facilitate adaptive behavior, as well as strong social networks and a connection to nature.

The findings were largely consistent among interviewees, any exceptions within themes will be discussed in the following sections. A possible explanation for this is that, despite efforts to create a diverse group of participants, many shared similar backgrounds in terms of age group, geographical location, and socio-economic status. A majority of participants are highly educated, between the ages of 19 and 24, and from similar geographical areas and socioeconomic backgrounds. The socio-economic and demographic background of interviewees influences the results. With regard to the aforementioned factors, the Social and Cultural Planning Office (SCP) of the Netherlands found that within the Dutch population, younger people and older adults are relatively concerned about climate change and see it as an urgent problem (SCP, 2024). Moreover, as established in the theoretical framework, in other geographical settings younger individuals are more prone to be dissatisfied with governmental action on climate change, are more likely to show climate anxiety and have a heightened perception of climate change risk (Hickman et al., 2021; Larionow et al., 2021; Gilbert & Lachlan, 2023). Younger people are less likely to believe that they can contribute to combating climate change, so their high concern and sense of urgency do not translate into more sustainable behavior (SCP, 2024). However, women have a higher awareness of the problem than men (SCP, 2024; Gilbert & Lachlan, 2023; Kollmuss & Agyeman, 2002; Larionow et al., 2022). Lastly, concern about the consequences and urgency of climate-related issues is positively associated with the level of education (SCP, 2024). This is also further supported by the findings of Gilbert & Lachlan, 2023 as established in the theoretical framework.

Moreover, in this chapter, the aforementioned results are discussed and compared to the findings of previous studies. The results are examined in relation to the concepts introduced in the theoretical framework: 'Climate Adaptation Behavior Intention', 'Climate Anxiety', and 'Perceived Climate Risk'. Moreover, the influence of the societal and individual characteristics on the findings will be addressed.

### 5.1 Climate Adaptation Behavior Intention

The results of the study found that with regards to coping appraisal and threat appraisal, interviewees exhibit a profound confidence in the assurance that the potential severity of climate damage will be minimal, and therefore the intention to adapt is minimal. This finding is consistent with that of Xue et al. (2021) who argue that the intention to adapt is largely driven by assessing the magnitude of the consequences and the likelihood of it happening. A possible explanation for this is that interviewees reported trust in advanced technologies and the government to solve issues that forthcome from climate

change impacts. Thus, consistent with the research by Grothmann & Pratt (2005), interviewees conveyed a sense of reliance on the objective adaptive capacity. This also mirrors the previous findings of Heggens et al. (2017), who argued that citizens play a passive role in the adaptation domain, emphasizing the need for governmental leadership in the Netherlands. They expressed confidence in the availability of resources such as power, financial means, entitlements, and institutional and social support to address potential adaptive manners. Therefore, in accordance with present results, previous studies have demonstrated that a strong institutional framework is needed for 'adaptation goods' (Tompkins & Eakin, 2012; Xue et al., 2021).

As mentioned in the literature review, adaptation incentives such as tax reductions, laws, or subsidies are needed to encourage individuals to engage in adaptive efforts (Grothmann & Pratt, 2005). One interesting finding in line with this is that the role of the government mainly pertains to providing financial incentives to mobilize people to adapt. Moreover, interviewees expected the government to provide them with the right information to act. However, Xue et al. (2021) found that providing information about climate change impacts does impact the risk appraisal of residents, but does affect the intent to adapt. This is in line with the findings of Bouman & Steg (2022) who argue that governments play a crucial role in reversing the cycle of inaction, as they are well-positioned to remove obstacles for citizens. Moreover, it is consistent with the finding that society is now organized in such a manner, which makes using unsustainable alternatives easier and cheaper (Bouman & Steg, 2022). Interviewees reported that financial gains are the most important reason to take adaptive measures. This aligns with a report from the SCP, which found that the Dutch are primarily motivated to change their behavior for financial reasons: they are more likely to adopt sustainable practices if unsustainable behavior becomes more expensive (SCP, 2024).

What is surprising is that whilst interviewees reported relying on the government to provide them with incentives and information, interviewees did doubt the fitness of the government to address the problem. The reasons were the lack of knowledge experienced in governmental organizations, the bureaucratic manner of handling things, top-down regulations, and the current state of politics. Nevertheless, the trend found in this study that trust in government amongst interviewees is declining did not make them more inclined to take precautionary measures themselves. Contrasting the study of Grothmann & Pratt (2005) who argue that reliance on public adaptation means that people will take less precautionary action themselves.

Lastly, an interesting finding is that interviewees find the Netherlands such a small country, that the actions are negligible. Moreover, they pointed out that other countries, such as China and the United States are still promoting unsustainable practices, making their actions not effective. Therefore, this study supports the findings of Bouman & Steg (2022) who found that when individuals perceive their own climate actions as futile due to the inactions of others, they may become less convinced that the benefits of their efforts justify the associated costs.

## **5.2 Climate Anxiety**

Prior studies noted the importance of eco-anxiety, or climate anxiety, in predicting climate adaptation behavior intention (Arya & Kumar, 2023). In the theoretical frameworks, both behavioral and affective symptoms of climate anxiety are discussed. None of the interviewees reported experiencing behavioral

symptoms such as panic attacks, loss of appetite, or sleeplessness. This observation could potentially stem from their expressed confidence in governmental interventions and technological advancement to address future challenges. Moreover, this observation might be attributed to the fact that interviewees did not deem the municipality of Tubbergen as specifically vulnerable to climate change. This is also found in the study by Hegger et al. (2017), that Dutch residents take on a passive role concerning adaptation, as they lack awareness of the risk with regard to the matter. This sentiment is echoed in the study by Michetti & Ghinoi (2020) who found that whilst there is some awareness of risk, the lacking effect of adaptive capacity and experiential knowledge seems to characterize the perception of climate-related hazards. Thus, this study has been unable to demonstrate that this feeling of restlessness that was reported by some of the interviewees has led to heightened emotional distress (Dodds, 2021).

Rather, the interviewees articulated a sense of restlessness regarding the topic. Restlessness can be described as an affective symptom (Hickman et al., 2021). This unease may be attributed to their acknowledgment that the negative media coverage influences their mental well-being. This finding was also reported by the studies of Ogunbode et al. (2022) who argue that climate anxiety is related to the information individuals receive through the media. Another important finding is that the aforementioned restlessness is informed by the sentiment that the government is not doing enough, which was reported by various younger and mainly female interviewees. This finding is in accordance with the study of Hickman et al. (2021) who argue that dissatisfaction with government responses is widespread in young people from 16 to 25 years of age. Furthermore, the results are in agreement with findings from Larionow et al. (2022) and Kollmuss & Agyeman (2002) who found that primarily women and younger individuals reveal higher levels of negative emotions about climate change.

### **5.3 Perceived Climate Risks**

In reviewing the literature, it was found that on the individual level risk perception is mostly shaped by fear, knowledge, and risk exposure (Lemée et al., 2019). Risk exposure, perception, or threat appraisal is also one of the factors influencing climate adaptation behavior intention (Xue et al., 2021). Furthermore, the assessment of the potential scope and impact of dangerous climate change is also one of the factors informing climate anxiety (Clayton, 2021). In the previous paragraph on climate anxiety, it was established that interviewees did not manifest fear or anxiety concerning the impacts of climate change. Nevertheless, the results of this study show that interviewees regard flooding, loss of biodiversity, heat stress, water safety, and drought as the most prominent climate change impacts within the municipality of Tubbergen. This is in correspondence with the climate risks mentioned in the municipal and national climate adaptation policy (Municipality of Tubbergen, 2021; Klimaatadaptatie Nederland, 2024).

With regard to threat appraisal, it is noteworthy that interviewees did not perceive themselves as susceptible to potential threats. This is consistent with the findings of Bonaiuto et al. (2016) who argue that despite finding strong risk awareness in communities, increased risk perception does not necessarily have to translate into a sense of feeling exposed. There are several possible explanations for this result. One of them is that due to the geographical location of the municipality, the municipality was not deemed vulnerable to climate impacts by the interviewees. Moreover, effects were observed to have minimal impacts on the daily lives of interviewees, particularly when compared to the effects observed overseas. This finding is consistent with that of Xue et al. (2021), Clayton (2021), and Lemée et al. (2019) who argue that the assessment of threat informs risk perception, anxiety, and ultimately climate adaptation

behavior intention. Moreover, consistent with the findings of Clayton (2021) the interviewees did not find the minimal loss of place, activities and traditions as sufficient to prompt action.

A third factor found in the study by Lemée et al. (2019) to inform perceived climate risk is knowledge. Interviewees reported gaining the most knowledge on the subject from the media. Generally, interviewees reported that they find the information provided by the media too extreme. Various possible explanations were given by interviewees, namely that the media only portrayed negative and disastrous information, was too leftist, and provided too much information. Several interviewees reported a desire for a more scientific and informative stream of information on the subject. This corresponds with the findings of a study among rural residents in Australia where it was found that residents struggle to receive a consistent and coherent message from the media, leading to a lack of trust in politicians and government officials in general (Austin et al., 2020). This also relates to the dissatisfaction with government explored in paragraph 5.1.

#### **5.4 Societal and individual characteristics**

Prior studies have noted the importance of societal and individual characteristics (Geiger et al., 2019; Xue et al., 2021; van der Linden, 2014). The results of this study show that there are 5 societal and individual factors reported by the interviewees that influence adaptive behavior in the municipality of Tubbergen. Namely, a down-to-earth conservative nature, social norms, social networks, proximity to nature and the socio-economic environment.

The down-to-earth conservative nature works through the social norms in the social networks of the citizens within the municipality. Climate-adaptive behavior is not the social norm. One interesting finding was that one interviewee reported that pro-environmental behavior is sometimes ridiculed within day-to-day conversations. This supports findings in the current body of literature that argues that people want to be accepted by others and are inclined to act in line with what they think others would do and care about (Bouman & Steg, 2020). Additionally, in the earlier mentioned report of the SCP (2024), it was found that the Dutch only start to take action when others do so as well. This is especially true if they feel that helpful behavior positively impacts their reputation (SCP, 2024). Adding to that Pechar Diamond et al. (2020) and argue that rural residents tend to be less supportive of government actions concerning the environment. Similarly, the SCP (2024) found that in the Netherlands citizens of urban areas have a higher problem recognition concerning climate change. The combination of lower awareness of human-caused climate change and reduced support for governmental actions impacts the community's collective values. This has a detrimental effect on individuals' perception of the effectiveness of actions in adapting to climate-related hazards (van Valkengoed & Steg, 2019).

Furthermore, the down-to-earth nature informs a mindset wherein people trust in forthcoming technological advancements that will offer solutions to issues as they arise. Similarly, Austin et al. (2020) found that when dealing with the impacts of extreme climate events, rural residents do not necessarily associate their lived experience with climate change or their response as adaptation, rather they are confronted with a situation they cannot ignore and simply proceed with their response.

It is important to note that the belief in technology, innovation, and the government for solving the issues that go alongside climate change is rooted in the socio-economic environment. Besides the

acknowledgment of the vulnerability of the farming sector, which will be discussed in the following paragraphs, the interviewees suggested that there are plenty of resources and opportunities available within the municipality to deal with potential consequences. Thus, interviewees believe there is enough power, money, entitlement, and institutional and social support to adapt (Grothmann & Pratt, 2005).

Moreover, interviewees also expressed that strong social networks could provide a basis for undertaking effective action. In rural communities with stronger social ties and a sense of community, climate messages may resonate more effectively when delivered within the context of close-knit relationships. Strong social networks and support are recognized as critical resilience factors by Buikstra et al. (2010). Shared beliefs and practices, such as belonging to the same church, are seen as important components of community resilience.

Interviewees expressed particular concern about the effects of climate change on the farming sector, which plays a significant role in the municipality's economy. This aligns with a study conducted among rural residents in Australia, which found that rural communities consider themselves especially vulnerable to climate change due to their reliance on climate-dependent agriculture (Austin et al., 2020). Earlier studies in rural areas also indicated that livelihood and geography are argued to be key drivers for perceiving vulnerability, particularly in rural areas where people and the economy are closely tied to the local environment (Michetti & Ghinoi, 2020; Tenbrink & Willcock, 2023). Therefore, concerning perceived adaptation costs as proposed by Grothmann & Patt (2005), residents in rural areas determine that the potential costs of inaction outweigh the benefits. This is, for instance, due to their reliance on the environment for their livelihood.

Lastly, interviewees also suggested that the proximity to nature motivates residents of Tubbergen to take adaptive measures to preserve the landscape in which they reside due to their attachment to it. This was also found in earlier studies in rural areas, exposure to nature is argued to evoke higher awareness of environmental issues and greater environmental concern (Braun et al., 2018). Taking pride in the natural environment can contribute to community resilience (Buikstra et al., 2010). Thus, because of their regular experiences in the natural surroundings, people living in rural areas develop an ingrained social norm to take care of the environment.



## Chapter 6: Conclusion, limitations, and recommendations

The purpose of this research was to explore the perceived climate risks and participation in climate adaptive actions within rural areas of the Netherlands. The main research question was: “How does the perception of climate risk in Dutch rural areas, including the emerging concept of climate anxiety, influence the willingness to participate in climate adaptive actions?”. The relevance of this study was twofold. Firstly, climate adaptation literature has given limited attention to the roles of residents, although their role is crucial. Secondly, focus within the academic field has primarily been focused on large urban and metro areas, whilst a geographical area wherein an individual exists plays an important role in shaping their actions.

From the analysis, it was found that flooding, loss of biodiversity, heat stress, water safety, and drought were the main perceived climate risks. The climate risks were mostly mentioned in relation to farming and agriculture, which is a prominent economic sector within the area. A further important finding was that the perception of risk was further developed by the media on climate risks and experiences in foreign countries. Insights gathered from the interviews underscore that the media predominantly highlighted extreme events, contributing to an enhanced understanding of the potential risks involved. Moreover, the negative media coverage of climate change was reported to cause restlessness and negative emotions. Interviewees found that media coverage leaned towards leftist outlooks and was overly supportive of climate advocacy, suggesting that the media aimed to steer public opinion in a particular direction.

Due to the geographical location of the municipality of Tubbergen, interviewees deemed the municipality relatively invulnerable to climate risks. The inconveniences caused by climate change in the day-to-day lives of interviewees were perceived to be minor. Therefore, interviewees reported that these are long-term and distant problems. The results of this study further indicate that this is further informed by a belief in innovation and technological progress, a belief that the government should address climate issues, and a belief that individual actions have little impact given the scale of the problem.

The aforementioned beliefs remain barriers for citizens of the municipality to participate in adaptive actions. Therefore, the results of this study support the idea that individual behavior is determined by the perceived severity and vulnerability of the threat. Nevertheless, interviewees reported that financial gains, subsidies, and regulations can encourage participants to take adaptive measures. Furthermore, a smaller group of interviewees who expressed they have above-average knowledge of climate change due to their area of study or expertise also expressed more concern and action about climate adaptation initiatives. Hence, these findings support the role of information and enriching knowledge to encourage action.

The relevance of societal and individual characteristics within taking climate adaptive action is clearly supported by the current findings. The study found that the down-to-earth attitude and traditional values of the interviewees and the municipality as a whole fosters reluctance to change, which in turn reinforces social norms. Embracing adaptive measures is not widely accepted as the norm. However, the interviewees mentioned that there are enough resources within the municipality to tackle the upcoming problems effectively. Additionally, factors such as robust social networks and close proximity to nature may facilitate successful adaptation. Interviewees emphasized their attachment to the natural landscape, which motivates them to preserve it.

To investigate the concepts of climate anxiety, perceived climate risks, and climate adaptation behavior intention in the rural context, an exploratory case study was performed. Given the nature of a case study, it should be noted that there are a few factors that limit the study's generalizability. As the results are context-specific, and involve a limited number of participants, it is challenging to generalize findings to broader populations. Moreover, many participants shared similar backgrounds in terms of age group, geographical location, and socio-economic status. The scope of this study was limited in terms of time and resources.

Notwithstanding these limitations, these findings suggest several courses of action for climate adaptation policy in the municipality of Tubbergen and other (rural) contexts. Firstly, adaptation measures in Tubbergen can effectively be undertaken when the measures provide tangible personal (financial) benefits for the citizens, for example through subsidies. Secondly, climate adaptation measures can be effectively implemented when the measures are part of a strong regulatory framework that is reinforced. Thirdly, providing information on climate adaptation could encourage action. Lastly, the policy could make use of strong social networks and proximity to nature to facilitate adaptive measures.

There are various recommendations for future research. A natural progression of this work is to perform similar case studies in other rural communities, to see if the results correspond with those of the municipality of Tubbergen. A further study could also assess the similar phenomenon through a quantitative study, to create more generalizable results. Furthermore, similar work can be done in the municipality, encompassing a broader and more varied group of interviewees. This could lead to a more elaborate understanding of the relationship between climate change beliefs, age, gender, well-being, and financial position. Lastly, the role of the media in shaping rural opinions on climate anxiety, climate adaptation behavior intention, and perceived climate risks can be further explored.

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## Appendix

### *Appendix I Interview guide*

#### Interview guide: Nederlands

Hallo, mijn naam is Thijs Perik en ik doe op dit moment onderzoek voor mijn Masterscriptie aan de Rijksuniversiteit Groningen. Kort gezegd gaat mijn onderzoek over hoe mensen op het platteland kijken naar klimaatverandering, welke risico's ze zien, en of ze bereid zijn om actie te ondernemen om zich aan te passen aan het veranderende klimaat. Dank voor de toezegging om deel te nemen in het onderzoek. Het is belangrijk om te vermelden dat, zoals reeds aangegeven in het toestemmingsformulier, deelname op vrijwillige basis is en u op elk moment kunt stoppen met deelname aan het onderzoek.

De volgende activiteiten zullen plaatsvinden tijdens het onderzoek:

- We beginnen met een interview over de volgende thema's: klimaatangst, waargenomen klimaatrisico's en tot hoeverre deze van invloed zijn op de intentie om zich aan te passen aan het veranderende klimaat.
- Na het interview krijgt u een kaart met daarop een kaart van uw omgeving, pen en potlood. Op de kaart mag u de klimaatrisico's in uw omgeving tekenen, markeren, opschrijven.
- Als u het gevoel heeft alle risico's in kaart te hebben gebracht, gaan we samen de kaart bespreken.

Mochten er nog vragen zijn over het onderzoek hoor ik het graag. Verder ben ik benieuwd of u weet wat klimaatangst, klimaatrisico's en klimaatadaptatie zijn, en of u verdere toelichting hierover wenst.

#### Algemeen

Zou u een korte omschrijving van uzelf kunnen geven?

- Wie bent u, hoe oud bent u en werk (indien toepasbaar) doet u?

Bent u (on)tevreden over alle dingen die de overheid/media doet met betrekking tot klimaatadaptatie?

- Waarom (niet)?

Wat vindt u van de regelgeving omtrent klimaatadaptatie?

Hoe kan de overheid en media overtuigen om actie te ondernemen?

#### Intentie om adaptief gedrag te vertonen

- Zou u kunnen beschrijven welke acties u tot nu toe heeft ondernomen of van plan bent te ondernemen om u aan te passen aan klimaatverandering?
- Welke factoren beïnvloeden uw beslissing om u aan te passen aan klimaatverandering?
- Hoe ernstig beschouwt u de mogelijke gevolgen van klimaatgerelateerde bedreigingen?
- Hoe prioriteert u het aanpakken van deze gevolgen ten opzichte van andere uitdagingen in uw leven?

- Bent u in het verleden regelgeving van de overheid tegen gekomen die klimaatadaptatie aanmoedigt?
  - Tot in hoeverre moedigen deze regels aan om u aan te passen aan het veranderende klimaat?
- Hoeveel vertrouwen heeft u in uw vermogen om acties te ondernemen om u aan te passen aan klimaatverandering?
- Vertrouwt u op publieke maatregelen (overheid, anderen, etc.) om de gevolgen van klimaatverandering te beperken?
  - Hoe beïnvloedt dit uw eigen acties?

#### Klimaat angst

- Heeft u persoonlijk enige effecten van klimaatverandering ervaren?
  - Hoe dragen deze ervaringen bij aan uw perceptie van klimaat gerelateerde risico's?
- Ervaart u negatieve emoties als gevolg van klimaatverandering?
  - Hoe zou u deze emoties beschrijven?

#### Perceptie van klimaatrisico's

- Hoe schat u het risiconiveau dat gepaard gaat met klimaatverandering in?
  - Welke specifieke factoren dragen volgens u bij aan kwetsbaarheid voor deze klimaat gerelateerde bedreigingen?
  - Hoe schat u uw kennis over klimaatrisico's in?
  - Denkt u dat de plek waar u woont invloed heeft op klimaat gerelateerde risico's?

#### Maatschappelijke en individuele kenmerken

- Hoe beïnvloeden de bredere sociale, politieke en economische factoren uw houding en gedrag met betrekking tot klimaatveranderingen en het ondernemen van actie?
- Kunt u persoonlijke of gemeenschap kenmerken beschrijven die van invloed zijn op uw benadering van klimaatadaptatie?

Nu we het interview hebben gehad, krijgt u een kaart van uw omgeving. Op de kaart mag u de klimaatrisico's in uw omgeving markeren, opschrijven. We hebben er net kort over gesproken. Als u het gevoel heeft alle risico's in kaart te hebben gebracht, zullen we de kaart bespreken.

Dan wil ik u bedanken voor het interview. Zijn er verder nog vragen of dingen die u graag wilt vermelden?

#### **Interview guide: English**

Hello, I am Thijs Perik and I am currently conducting research for my Master's thesis at the University of Groningen. In short, my researcher focuses on how rural residents perceive climate change, what risks they identify, and whether they are willing to take action to adapt to the changing climate. Thank you for agreeing to participate in this study. It is important to mention that, as stated in the consent form, participation is voluntary, and you may withdraw from the study at any time.

The following activities will take place during the research:

- We will begin with an interview covering the themes: of climate anxiety, perceived climate risks, and the extent to which these influence the intention to adapt to the changing climate.
- After the interview, you will be provided with a map of your living area, a pen, and a pencil. On the map, you will be asked to draw, mark, or write down the climate risks in your area.
- Once you feel you have identified all the risks, we will discuss the map together.

If you have any questions about the research, please feel free to ask. I am also curious to know if you are familiar with the concepts of climate anxiety, climate risk, and climate adaptation, and whether you would like further explanation on these topics.

### General

- Could you please provide me with a brief description of yourself?
  - Who are you, how old are you, and what work (if applicable) do you do?

### Climate Adaptation Behavior Intention

- Could you describe what actions you have taken or plan to take to adapt to climate change?
- What factors influence your decision to adapt to climate change?
- How seriously do you consider the potential consequences of climate-related threats?
- How do you prioritize addressing these consequences compared to other challenges in your life?
- Have you encountered any government regulations in the past that encourage climate adaptation?
  - To what extent do these regulations in the past encourage climate adaptation?
- How confident are you in your ability to take action to adapt to climate change?
- Do you rely on public measures (government, other individuals, etc.) to adapt to climate change?
  - How does this affect your actions?

### Climate anxiety

- What is your feeling regarding climate change?
- Have you personally experienced any effects of climate change?
  - How do these experiences affect your perception of climate-related risks?
- Do you experience any negative emotions due to climate change?
  - How would you describe these emotions?

### Perception of climate risks

- How do you assess the level of risk associated with climate change?
  - Which specific factor do you believe contributes to the vulnerability of these climate-related risks?
- How do you assess your knowledge of climate risks?
- Do you think your place of residence influences climate-related risks?

Frequency and severity of risk. Do you think these hazards are becoming more frequent? And are they becoming more severe?

Name examples of risks to bring them to the topic of discussion.

*Societal and individual characteristics*

- How do broader social, political, and economic factors influence your attitudes and behaviors regarding climate change and taking action?
- Can you describe personal or community characteristics that influence your approach to climate adaptation?

Now that we completed the interview, you will be given a map of your surroundings. On the map, you may mark the risks in your area. We briefly discussed this earlier. Once you feel you have identified all the risks, we will discuss the map.

Thank you for the interview. Are there any further questions or anything else you would like to mention?

Appendix II Codebook

Code group	Code	Code description
Climate Adaptation Behavior Intention	Threat appraisal	Assessing how likely it is that a threat might happen (how vulnerable you feel to potential threats).
	Coping Appraisal	Assessing the magnitude of the consequences if a threat happens (perceived severity of potential damage). This is relative to how urgent other problems or challenges in life are.
	Adaptation incentives	Adaptation incentives (tax reductions, laws, or social norms for adaptation) can play the role of providing additional motivation for adaptation.
	Objective adaptive capacity	The power, money, entitlements, knowledge, institutional and social support an individual has to address potential hazards.
	Self-efficacy	The individual believes in his or her capacity to execute a certain behavior, in this case: taking adaptive manners.
	Reliance on public adaptation	If people rely on the efficacy of the public or administrative adaptation they will probably take less precautionary action themselves.
Climate Anxiety	Negative emotions	Feelings of worry, fear, anger, grief, despair, guilt, shame, and hope are caused by the ecological state of the world, which causes panic attacks, loss of appetite, and sleeplessness.
	Experience with climate change effects	Climate anxiety is triggered by the loss of place, activities, and traditions due to climate change or the fear of the potential scope and impact of dangerous climate change.
Perceived Climate Risk	Risk exposure	Risks are produced through specific spatial dynamics, therefore the effects of climate change are differentiated. Thus, the geographical location wherein one lives influences risk exposure and perceived risk.
	Knowledge	The knowledge level of climate change influences how individuals perceive climate risks.
	Perceived climate risks in the municipality of Tubbergen	Perceived climate risks in the municipality by interviewees consisted of flooding, loss of biodiversity, heat stress, water safety and drought.
Societal and individual characteristics	A common denominator in the aforementioned phenomena is that to get a comprehensive overview of factors influencing adaptive behavior, climate anxiety, and perceived climate risks these models are further embedded in the broader social,	

	political, and economic system(s) in which the assessed individuals operate, or: the societal and individual context wherein the individuals operate.	
	Character	
	Social norms	
	Social networks	
	Proximity to nature	
	Socio-economic environment	

### *Appendix III Consent form*

#### **Toestemmingsformulier (Dutch)**

Toestemmingsformulier onderzoeksproject: “Perspectieven op het platteland: inzicht in klimaat angst, waargenomen risico’s en de bereidheid om klimaatadaptieve acties te ondernemen.” voor de geïnterviewden.

Ik heb informatie over het onderzoeksproject gelezen. Ik heb de kans gehad om vragen te stellen en mijn vragen zijn op juiste wijze behandeld. Ik heb genoeg tijd gehad om te beslissen of ik mee wilde werken aan het onderzoeksproject. Mijn betrokkenheid is volledig op vrijwillige basis. Ik kan mij op elk gewenst moment terugtrekken uit het onderzoeksproject, zonder hiervoor een reden te geven.

(De geluidsopname en verdere verslaglegging wordt alleen gebruikt door de onderzoeker, om het interview terug te kunnen luisteren. De geluidsopname wordt verder nergens gepubliceerd en na de verwerking van de inhoud vernietigd. Tevens zal de naam van de organisatie van de geïnterviewde niet in het verslag worden benoemd, maar worden gecodeerd)

- Ik ga akkoord met deelname aan het onderzoeksproject
- Ik ga ermee akkoord dat de interviewgegevens voor educatieve doeleinden worden gebruikt
- Ik ga ermee akkoord dat er een opname (geluidsopname) van het interview wordt gemaakt

Naam geïnterviewde:

Datum:

Handtekening:

#### **Consent form (English)**

Consent form research project: “Rural Perspectives: Understanding Climate Anxiety, Perceived Risk, and the Willingness to Take Climate Adaptive Measures” for the interviewee.

I have read the information about the research project. I have had the opportunity to ask questions and my questions have been answered adequately. I had enough time to decide if I wanted to participate in the research project. My involvement is entirely voluntary. I can withdraw from the research project at any time, without giving any reason.

(The sound recording and other outputs will only be used by the researcher, to be able to listen back to the interview. The sound recording will not be published anywhere else and will be destroyed after the content has been processed. Also, the name of the interviewee or the organization of the interviewee will not be included in the report, but coded).

- I agree to participate in the research project
- I agree that the interview data is used for educative purposes
- I agree that the interview will be recorded (voice-recorded)

Name interviewee:

Date:

Signature:



*Appendix IV Transcription interviews*

The transcriptions of the interviews were provided to the supervisors in a separate document and will not be published for the privacy of the participants.

*Appendix V Narrative maps*

The narrative maps were provided to the supervisors in a separate document and will not be published for the privacy of the participants.