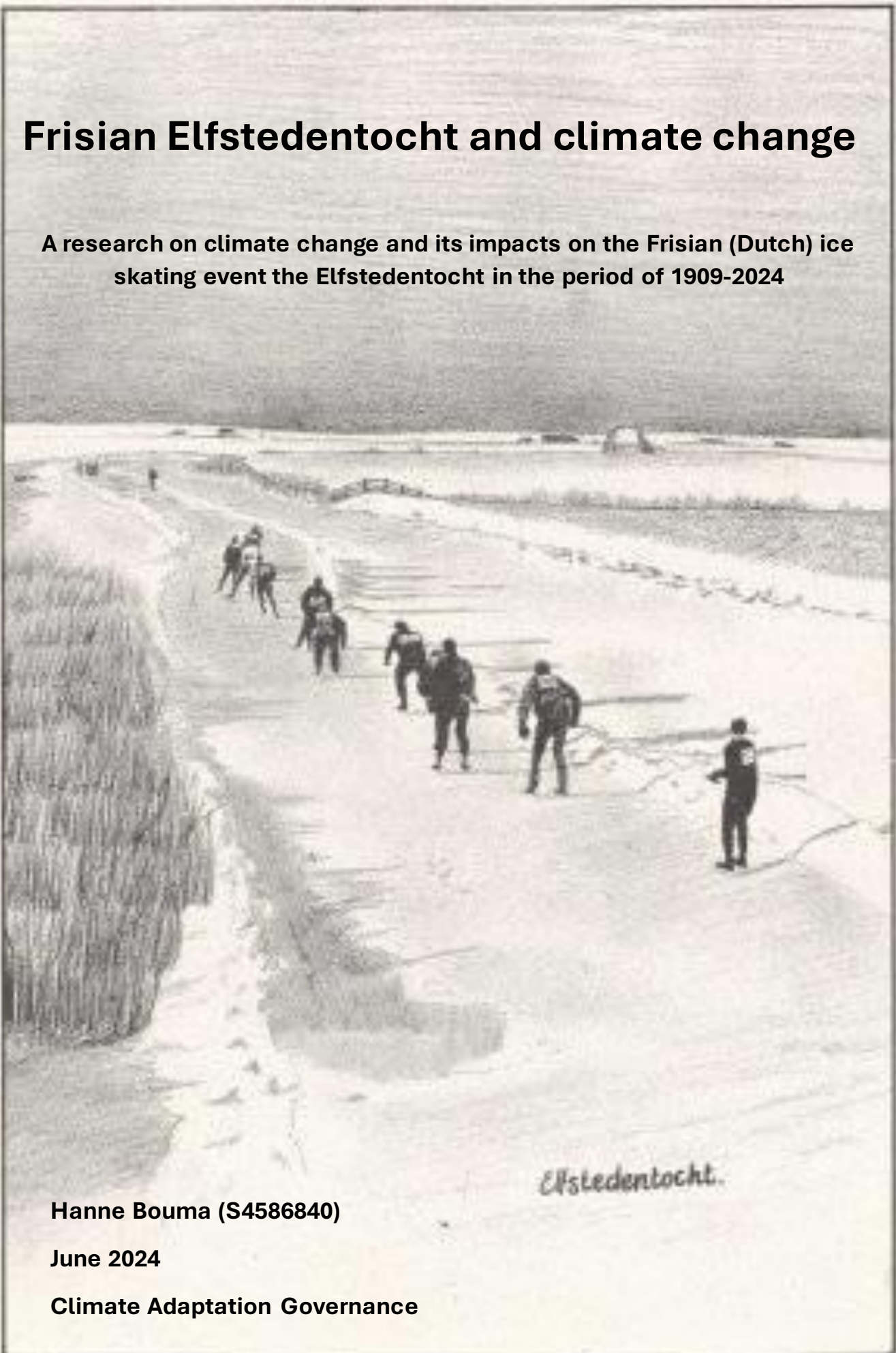


Frisian Elfstedentocht and climate change

A research on climate change and its impacts on the Frisian (Dutch) ice skating event the Elfstedentocht in the period of 1909-2024



Elfstedentocht.

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June 2024

Climate Adaptation Governance



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June 2024

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Abstract

As climate change poses threats around the world, the growing body of research on anthropogenic climate change since the 1970s has linked this phenomenon to various disciplines, including cultural heritage. This research focuses on the physical impacts, but intangible cultural heritage is also affected by our changing climate. The aim of this research is to investigate the effects and reactions of climate change on intangible cultural heritage using the example of the Frisian ice-skating tournament, the Elfstedentocht (The Netherlands). This event is highly dependent on weather and climate and has only taken place fifteen times in the twentieth century. Through a literature review, archival research and an interview, the development of the organisation of the event in relation to climate change was investigated. The main findings are that the decline of the event is not only due to climate change, but also to the growth of the event throughout the century and to changes in the landscape. These factors have influenced the organisation of the Elfstedentocht, especially since the 1970s. The organisation has kept up with innovative technologies and research but has also maintained its position that the event is based on natural processes. This has led to the preservation of the cultural heritage of the event. However, as the event is a once-in-a-lifetime experience for many people, the preservation of this cultural heritage is important for future generations and is recommended as a topic for future research.

Keywords: *Elfstedentocht, 'Vereniging', climate change, intangible cultural heritage, and special events.*

Table of contents

1. Project Outline	1
Study objectives and research questions	2
2. Literature review & theory	4
2.1 Climate change: mitigation and adaptation	4
2.2 Cultural heritage	5
2.3 (Cultural) special events	5
2.4 The Elfstedentocht	6
2.5 Research gap	8
2.6 Study area	8
3. Methodology	10
3.1 Literature review	10
3.2 Archival research	11
3.3 Interview	12
3.4 Research ethics	13
4. Results & discussion	15
4.1 Awareness of climate change.....	15
4.2 Response to climate change	18
4.3 Current situation	23
5. Conclusion & recommendations	26
6. Bibliography	28
6.1 Archive and newspapers	28
6.2 Literature.....	31
6.3 Figures	33
Appendix I Information sheet & informed consent form interview	34

1. Project Outline

Talk about the '*Tocht der Tochten*' and everyone in the Netherlands knows what you are talking about: a 200-kilometre ice skating tournament along the eleven towns of the province of *Friesland* in one day, known as the '*Elfstedentocht*' (Eleven City Tours) (Betten 2013). Additionally, mentioned by Betten (2013), it is not surprising that this event takes place in this part of the world, as waterways have been the main source of transport in past centuries, especially within these parts of western Europe. In colder times, when the water turned to ice, people also used the waterways as a means of transportation, but this time on ice skates.

As it was a cheap means of transportation for ordinary people, ice skating became more popular towards the end of the nineteenth century and as a sporty, 'fun' activity, people started to visit all eleven cities of the province in one day. This ice-skating phenomenon became an organised event in the beginning of the twentieth century, which was the start of fifteen organised *Elfstedentochten* distributed over 88 years (1909-1997) (Lolkama 2007; Lolkama 2008).¹

Nowadays it has been twenty-seven years since an *Elfstedentocht* was organised. A generation of Frisian (and Dutch and international) people have not experienced an *Elfstedentocht*, but still, it is a very well-known event and focus of (recent) research. Van Oldenborgh et al. (February 2019) investigated the probability of an *Elfstedentocht* occurring again. As the ice-skating event is highly dependent on the weather, only fifteen *Elfstedentochten* have been organised and it has been given a unique status. Since 1909, an *Elfstedentocht* could only be organised every seven years and only three times in the last fifty years (van Oldenborgh et al. February 2019). Nowadays, even a whiff of freezing temperatures in the Netherlands makes people excitedly wonder if there will be an *Elfstedentocht* that year (Betten 2013; van Oldenborgh et al. March 2019). This feeling, also known as '*Elfstedenkoorts*', was last felt in 2012, when various national and international media closely followed the organisation to announce whether the event would take place, as the end of January/beginning of February knew a cold spell for a few days. In the end, the president of the organisation of the *Elfstedentocht* the '*Koninklijke Vereniging De Friesche Elf Steden*' (also referred to as '*Vereniging*') Wiebe Wieling had to disappoint everyone that the ice was not thick enough everywhere for the event to take place (Betten 2013)². With 2012 being the last year in which the event could have taken place, it has already been twenty-seven years since the last *Elfstedentocht* was organised and with our current changing climate, the likelihood of the Frisian ice-skating event taking place again is diminishing (van Oldenborgh et al. March 2019).

Academic relevance

As our changing climate is increasingly studied and predicted, some researchers have tried to do the same in relation to the *Elfstedentocht*. Van Oldenborgh et al. (February 2019) investigated the probability of an *Elfstedentocht* being organised again. Looking at the environmental conditions needed for the ice to be thick enough to support all 20,000-30,000 participants in the race today, rising temperatures due to climate change reduce the likelihood of extreme cold. In addition to the requirements of ice thickness for the event, there are other factors that can ruin the ice, such as hard wind that prevent the water from being still and being able to freeze, as well as a layer of snow, which also prevented the ice-skating event from taking place in 2012 (van Oldenborgh et al. February 2019). Both publications by Visser & Petersen (2008) and van Oldenborgh et al. (February

¹ More information about the history of the event can be found in the literature review.

² AP Archive 2012; Coleman 2012; NOS Sport 2012; RTL Nieuws 2012.

2019) examine the weather conditions and the probability of an Elfstedentocht in the past (twentieth century) and compare it with the nowadays and future climate predictions. However, these studies focus on statistical information about the probability of the Vereniging to organise the event.

There is a lack of information about how the organisation coped with climate change in the twentieth century, when all the skating events took place. By exploring this knowledge gap, we can learn from the organisation's decisions and perspectives on climate change and the Elfstedentocht in the twentieth century for the future. Additionally, researching how the organisation adapted to the changing weather in the past may give us insights into how to safeguard organising the Elfstedentocht.

Societal relevance

As climate change is a 'hot topic' today, this research can also be placed in a broader context of climate change research in relation to threats to cultural events (or intangible cultural heritage). Research has shown that climate change poses threats to cultural events such as the Cherry Blossom festival in Japan (Sakurai et al. 2011) and the Canadian Tulip Festival (Hewer & Gough 2017). The changing climate has influence on flowering seasons of species that are at the core of these events, threatening the perseverance of these cultural aspects. Despite some research, there is still a research gap between the effects of climate change and possibilities of climate adaptation regarding cultural events. This research gap is elaborated in the literature review and theory chapter.

Study objectives and research questions

In a broader context, the main aim of this research is to add to the existing literature on the impact of climate change on cultural events, with a case study of the Frisian Elfstedentocht. With historical research on the organisation of the event and the view of the *Koninklijke Vereniging De Friesche Elf Steden* on climate change adaptation, we can learn from this for the future, when the conditions are right, and the ice-skating event can occur again. The main question to be answered in this research is: **how has the development of the organisation of the Frisian Elfstedentocht in the twentieth century reflected changing approaches to climate change and adaptation?**

To answer the main question, the first objective is to gain insight into the organisations' awareness of climate change, as climate change affects the likelihood of the event taking place. The first sub-question that will be answered is: *to what extent were organisers of the Frisian Elfstedentocht aware of climate change issues during the twentieth century?*

After gaining knowledge about the awareness of the 'Vereniging', the objective is to identify how the organisation adapted to changing climate patterns and environmental conditions. The second sub-question that will be answered is: *how did the organisers of the Frisian Elfstedentocht respond to observable changes in climate patterns and environmental conditions in the twentieth century?* This objective gives an insight into how the event has evolved over time, adapting to the weather conditions, e.g. in terms of innovative technology and route planning.

After gaining insight into awareness and response in the twentieth century, the research will be extended to the current situation of the *Koninklijke Vereniging the Friesche Elf Steden*. The objective is to assess climate adaptation strategies for the organisation of the ice-skating event in the future. The last sub-question that will be answered is: *how does the organisation deal with climate change nowadays and are they able to change prospects of the event in the future?*

After discussing the research gap and research questions in this chapter, the next chapter will focus on the different theories used during this master thesis. Chapter three will explain the methodology of literature review, archival research and an interview conducted to execute the research. The results and discussion can be found in chapter four, where the three sub-questions are answered in relation with the theory of chapter two. These results will come together in chapter five where the conclusion of the thesis can be found, answering the main research question. Additionally, the limitations of the research will be discussed, as well as recommendations for future research. Chapter six includes the sources used during this master thesis research and the at the end one appendix can be found.

2. Literature review & theory

The thesis is based on a theoretical framework that combines different theories and concepts on climate change mitigation and adaptation, cultural heritage and (cultural) special events. This chapter explains the different main theories, leading to the research gap addressed in this thesis.

2.1 Climate change: mitigation and adaptation

Since the Industrial Revolution in the second half of the eighteenth century, the quantities of greenhouse gas (GHG) emissions in the atmosphere have significantly increased. This has led to an observable change in the global **climate**, which is defined as “long-term weather patterns that characterize the regions of the world” (VijayaVenkataRaman et al. 2012, p. 878). There is an overall increase in temperature, which leads to melting ice caps in the arctic regions resulting in an increase of the sea level. Additionally, there is also an increase of ocean temperatures and there are observable changes in rainfall patterns, such as extreme events of dry and wet periods. These shifting patterns pose threats to ecosystems and biodiversity as the environmental conditions change, which also influences human life (e.g. threatening food production, freshwater supply and certain places become inhabitable) (VijayaVenkataRaman et al. 2012).

Although the effects of this anthropogenic climate change cannot be avoided in its entirety, to prevent further and more severe impacts, the emission of GHG through human actions must decrease drastically (VijayaVenkataRaman et al. 2012). Sesana et al. (2018) define **mitigation** as: “encompasses measures and activities aimed at reducing GHG emissions or enhancing the sinks of such gases” (p. 2).

Since around the 1970s, climate change has increasingly become part of scientific research and policy. Research has focused on economics, environmental sciences, agriculture, and water resources, and has included human dimensions such as geography and urban and regional planning (Nalau & Verall 2021). One leading organisation on research about climate change is the *Intergovernmental Panel on Climate Change* (IPCC), founded in 1988 (IPCC n.d.). Since then, the organization published six Assessment Reports as well as additional research concerning climate change, known as scientific credible sources on climate change (United Nations Climate Change n.d.).

Since the start of research about climate change, Sesana et al. (2018) found in their literature review that mitigation has always been one of the primary focus. As is also evident in the Paris Agreement established in 2015, with the main goal to “hold global temperatures well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C” (Streck et al. 2016, p. 10).

Whereas the focus of climate change was first on mitigation, as focussing on adaptation would take the urge away from mitigating, **adaptation** became also important in the 1990s (Streck et al. 2016). Pham & Saner (2021) define climate change adaptation as: “the process of adjustment to actual or expected climate effects, intended to avoid harm or exploit beneficial opportunities” (p. 1). The IPCC played a significant role in starting to bring more focus on climate change adaptation, by including it in their third Assessment report in 2001 and fourth Assessment report in 2007 as a field of research (Nalau & Verall 2021). Their publication made it evident that mitigation alone would be deficient, as a certain amount of climate change is unavoidable and already noticeable (United Nations Climate Change Secretariat 2019). Nowadays, researchers are predicting

different climate scenarios based on future GHG emissions, focussing on mitigation as well as adaptation strategies.

2.2 Cultural heritage

As the climate changes, it poses threats all over the world. Societies fear that their customs and ways of life will be threatened, and that these may not be able to survive because of their changing environment. As stated by Fatorić and Seekamp (2017), research has been done on the impacts of climate change on natural and socio-economic systems, but they noticed the lack of impacts on cultural heritage sites. Orr et al. (2021) define **cultural heritage** as “an umbrella term for *tangible* and *intangible* aspects of society and culture that are valued. This includes monuments, groups of buildings and archaeological sites, as well as objects (and collections) and intangible cultural practices such as dance and storytelling” (p. 434).

According to a systematic literature review by Fatorić and Seekamp (2017) research on the impacts of climate change on **tangible cultural heritage** sites began around 2003 and has increased since. This is also supported by Sesana et al. (2018), whose study aims to highlight the importance of research on climate change and cultural heritage to adapt to the changing environment and to preserve and manage cultural heritage. As tangible cultural heritage is under threat from changing environmental conditions and extreme events, e.g. the impact of extreme rainfall on building materials, the authors highlight the importance of incorporating climate adaptation (Sesana et al. 2018), which are also supported by Fatorić and Egberts (2020) in a more recent study.

Sesana et al. (2018) found that the growing body of research on cultural heritage is focused on assessing the impacts of climate change, but it includes limited research on adaptation strategies. However, subsequent research by Fatorić and Egberts (2020) states that research in recent years increasingly focuses on understanding current and future climate change impacts on cultural heritage. Within this research field, they also include mitigation and adaptation strategies to limit the impacts of climate change on cultural heritage and safeguard them for future generations (Fatorić & Egberts 2020).

Cultural heritage is not only important for being a source of information about economic, societal, and environmental developments in the past, but are also for creating a shared identity and history. It also plays a role in tourism and therefore has an economic purpose. Intangible heritage is perceived as equally important as tangible heritage, as traditional or local knowledge, skills and practices can play a significant role in informational benefits for climate change mitigation and adaptation fields. Safeguarding intangible heritage for future generations can be done through conserving or bringing back traditional techniques (Fatorić & Egberts 2020).

Additionally, Orr et al. (2021) found that the research gap on the effects of climate change on cultural heritage is increasingly being addressed but is still relatively little about **intangible cultural heritage** compared to research on physical impacts (Fatorić & Seekamp 2017; Sesana et al. 2018).

2.3 (Cultural) special events

While research on climate change and cultural heritage has increased in recent years, as Jones et al. (2006) noted eighteen years ago, the impact of climate change on (cultural) event planning is absent from academic research. Some of the research that has been conducted on this topic has mostly taken place in Canada. Hewer & Gough (2017) provide an overview of the impacts of

climate change on outdoor recreation and tourism in Canada from 1986 to 2016. Hewer & Gough (2017) highlight **special events**, which they define as "major one-time or recurring events of limited duration [...] Including things like festivals, fairs, and major sporting events" (p. 9). Case studies of special events in Canada include the Winterlude festival in Ottawa, the Canadian Tulip Festival, and the Canada Day celebration. The authors conducted this research as an assessment of outdoor recreation and tourism in Canada. They evaluate the threats of climate change to current recreational opportunities in the country – e.g. the alpine ski industry, golf and outdoor festivals and events–, but also *new* recreation and tourism opportunities that arise from climate change, such as arctic cruises as ship mobility will increase due to melting sea ice.

Another example of research focusing on climate change and cultural events is a study by Sakurai et al. (2011) on the effects of climate change on the earlier flowering of cherry trees and its impact on the culturally and economically important event of the Cherry Blossom Festival in Japan. The research was about climate change awareness. As stakeholders depend on the festival - for economic or cultural reasons or both - the authors wanted to investigate how the stakeholder's perceptions of climate change was influenced by the considerations of the impacts on the blooming of Cherry Blossom and the festivals. Their awareness might influence their actions in adjusting or addressing the impacts of global warming (Sakurai et al. 2011).

Finally, another example of special events that are influenced by global warming is a study by Sparks (2014) about the effects of climate change on the Daffodil Local Flower Festival of Thriplow (a small village in the UK). Plant tourism is a major economic business, but it is threatened by climate change as it influences the flowering and blooming periods. The author investigates the flower festival in Thriplow as a case study how adaptation to flower festivals are needed for it to still be economically sustainable (Sparks 2014).

Although some research has been done linking intangible cultural heritage and special events with climate change, there is still much to learn to research about the subject.

2.4 The Elfstedentocht

The above examples are annual events that are affected by climate change; in the northern part of the Netherlands there is an ice-skating event that took place fifteen times in the twentieth century when climatic conditions were favourable, known as the *Frisian Elfstedentocht*.

There are historical documents that refer to the Elfstedentocht as early as 1749, but the lack of documentation leaves us with little information about skating along the eleven cities of Friesland before the 1900s (Lolkama 2007). Lolkama researched and tells the story of the Elfstedentocht in a trilogy: (1) *'Triomf en Tragiek'* about the history of the event; (2) *'De Tocht der Tochten'*, which focusses on the development of the Elfstedentocht into an international well-known ice skating tournament (Lolkama 2007); and (3) *'It Sil Heve'*, which focusses on the participants and people important in the development of and during the events in the twentieth century (Lolkama 2008). Although there is overlap between the books, they give a thorough and complete overview of the development of the Elfstedentocht through time.

In the winter of 1890-'91, the Elfstedentocht became increasingly popular and was skated by more and more people. To prove they visited all the cities in one day, they collected autographs from innkeepers at all the cities (Lolkama 2008). One of those people was Frisian sportsman Pim Mulier (Couwenhoven & Snoep 1999. In 1908 he approached the *'Friesche Ijsbond'* (Frisian Ice-organisation) to organise an official Elfstedentocht, and their initiative led to the first of fifteen organised Elfstedentochten in 1909 (Lolkama 2008). Although the *'Friesche Ijsbond'* organised

the first Elfstedentocht, they did not think it was their job to organise the event. So, a few weeks later, some Frisians, on the initiative of the Frisian Mindert Hepkema, founded the ‘*Koninklijke Vereniging De Friesche Elf Steden*’ (Koninklijke Vereniging De Friesche Elf Steden n.d.-a). The aims of the organisation were (1) to promote ice sports in the province of Friesland (2), if possible, to organise the Elfstedentocht every year, (3) organising the event from the province of Friesland, and (4) promote cooperation with the ‘*Friesche Ijsbond*’ (Lolkama 2007; van de Vooren 2019).

Since then, the *Vereniging* organised twenty-five Elfstedentochten. But due to weather and ice problems a few were cancelled, and some were organised again later, leading to a total of fifteen Elfstedentochten in the twentieth century (table 1).

Table 1: Dates of (cancelled) Elfstedentochten in the twentieth century (Couwenhoven & Snoep 1999)

Date	Elfstedentocht / cancelled
Saturday 2 January 1909	First Elfstedentocht
<i>Saturday 20 January 1912</i>	<i>Cancelled</i>
<i>Tuesday 23 January 1912</i>	<i>Cancelled</i>
Wednesday 7 February 1912	Second Elfstedentocht
<i>Tuesday 27 January 1914</i>	<i>Cancelled</i>
Saturday 27 January 1917	Third Elfstedentocht
<i>Saturday 12 January 1924</i>	<i>Cancelled</i>
Tuesday 12 February 1929	Fourth Elfstedentocht
Saturday 16 December 1933	Fifth Elfstedentocht
<i>Saturday 24 December 1938</i>	<i>Cancelled</i>
<i>Thursday 29 December 1938</i>	<i>Cancelled</i>
<i>Monday 15 January 1940</i>	<i>Cancelled</i>
Tuesday 30 January 1940	Sixth Elfstedentocht
Thursday 6 February 1941	Seventh Elfstedentocht
Thursday 22 January 1942	Eight Elfstedentocht
<i>Saturday 28 December 1946</i>	<i>Cancelled</i>
<i>Thursday 9 January 1947</i>	<i>Cancelled</i>
<i>Thursday 6 February 1947</i>	<i>Cancelled</i>
Saturday 8 February 1947	Ninth Elfstedentocht
Wednesday 3 February 1954	Tenth Elfstedentocht
Tuesday 14 February 1956	Eleventh Elfstedentocht
<i>Saturday 30 December 1961</i>	<i>Cancelled</i>
Friday 18 January 1963	Twelfth Elfstedentocht
Thursday 21 February 1985	Thirteenth Elfstedentocht
Wednesday 26 February 1986	Fourteenth Elfstedentocht
Saturday 4 January 1997	Fifteenth Elfstedentocht

The Elfstedentocht has been the focus of different research. Lolkama (2008) mentions that the Elfstedentocht has been the focus of many dissertations, in disciplines of social, legal, medical, exact, agricultural, and technical sciences. Additionally, the event was the focus of two previous (recent) theses, by Bosch (2016) on the portrayal of the event in the national and international media during the twentieth century, and a few years earlier by van Diemen (2010), who investigated whether if the Elfstedentocht could be considered intangible cultural heritage.

Looking at the definition of cultural heritage by Orr et al. mentioned in chapter 2.2 and the research by van Diemen, it would be fair to say that the Elfstedentocht can be considered intangible cultural heritage. Although the event itself is a sporting event, the cultural aspects

surrounding it also make it intangible heritage. Some of these aspects are the stories and poems that have been written about the Elfstedentocht, as well as the paintings and the crowds of people that come from all over the country (and even the world) to witness the ice-skating event. Even though the event does not take place every year, it seems that the longer it does not take place, the more mysterious and interesting it becomes. People are not only interested in the event, but also in the memories of it, which is why it is considered cultural heritage (van Diemen 2010). The popularity of the event nowadays may also be because there are less organised because of climate change, leading it to being a once in a lifetime experience (van Oldenborgh et al. March 2019).

2.5 Research gap

A review of the existing literature shows that research has been done on the impacts of climate change for the environment and people and other species living in it, and on the environmental/physical impacts of climate change on cultural heritage sites. However, the link between climate change and intangible cultural heritage is absent from the literature, except for some research on tourism threats and opportunities because of climate change in Canada, perception of climate change of stakeholders of the Cherry Blossom festivals in Japan and climate adaptation in flower business with an example of Thriplow (UK).

Looking at the *Elfstedentocht* ice-skating event, research has been done on the history of the event and linking it to the concept of intangible cultural heritage and climate change for future predictions. The link between the *Elfstedentocht* and climate change, as well as intangible cultural heritage, has not yet been researched. This Master thesis will focus the research gap about historical information about the event in relation to climate change and adaptation and how this information can be used for the future, when climatic conditions allow this special event to occur again.

Based on the theory and research gap of this chapter, the *hypothesis* of this master's thesis research question is that the organisation of the *Elfstedentocht* has been affected by research about anthropogenic climate change since the 1970s, leading to adaptation efforts by the 'Vereniging' from the 1970s onwards.

2.6 Study area

The province of Friesland in the northern part of the Netherlands will be the research area for this master thesis. This coastal area has historically been very dependent on water for national and international trade. In the seventeenth century, the dredging and widening of the existing waterways connecting the then seven towns of the province, made transport by water increasingly popular. In freezing weather, people also turned to ice skating when the water turned to ice. This was not only an efficient way for them to travel longer distances, but also had a social purpose. Historical documents describe people skating along the eleven towns, but it was not until 1909 that an official *Elfstedentocht* event was organised (Lolkama 2007). Since then, the event has been recognised nationally and internationally as a *special event* due to the rarity of its organisation and the pride people take in being able to complete the 200-kilometre tour on natural ice along the province's eleven towns in one day (figure 1) (Betten 2013; van Oldenborgh et al. February 2019).

The *Elfstedentocht* is not only a skating tournament that can be held somewhere else in the world. In 1917 an *Elfstedentocht* was organised in the province of South-Holland (*Zuid-Holland*, the Netherlands); eleven cities were selected realising a length of 200-kilometres. But it missed the

cultural aspect of the event that can only be felt in Friesland, which is also why there was not much national attention for the event (Van de Vooren 2019). It shows that nowhere else in the world there is a similar ice-skating event, length wise and as well as a cultural significance that dates back hundreds of years. So, the Elfstedentocht is associated with the province of Friesland, which makes it a logical research area. In addition, research has been done on the Elfstedentocht in relation to intangible cultural heritage and climate change, but these two concepts have not been linked to the event, which makes it an interesting research topic.

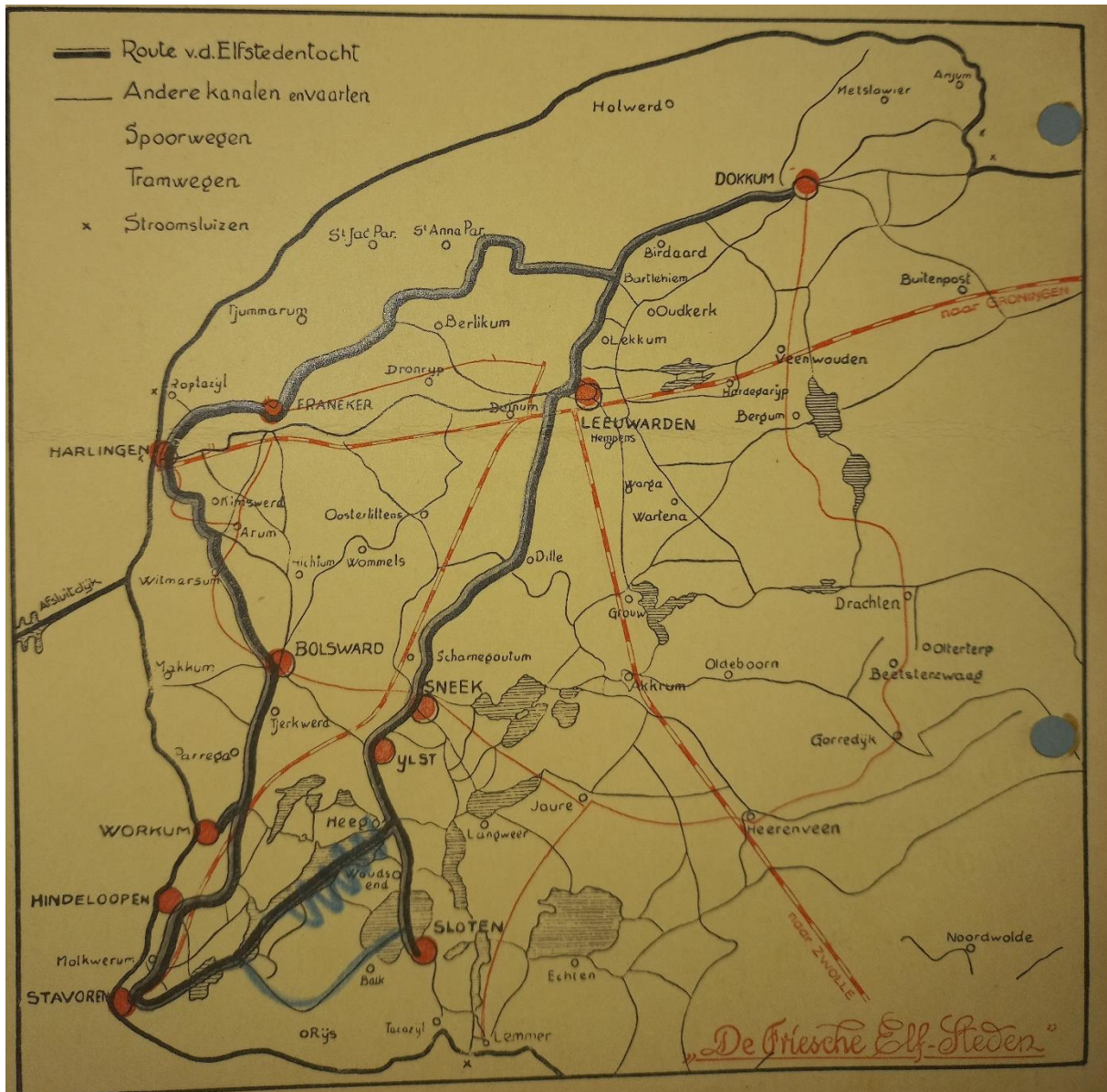


Figure 1: Elfstedenroute, distributed among participants for the (cancelled) Elfstedentocht in 1938. The thick black line represents the route and the red dots the eleven cities, riding along the route in the order: (start) Leeuwarden, Sneek, IJlst, Sloten, Stavoren, Hindeloopen, Workum, Bolsward, Harlingen, Franeker, Dokkum and Leeuwarden (finish).

3. Methodology

Several different *qualitative methods* are used in this research. Hay and Cope (2021) describe qualitative research as: “Qualitative research engages primarily with *non-numerical data*, which includes a wide range of forms such as texts, photos and video, oral recordings, drawings and sketches, maps, observations of human behaviour, historical documents, material artifacts and social media posts” (p. 4). This research relies on historical research as it focuses on the twentieth century. Historical research is considered a qualitative research method as it depends on the interpretation of historical documents by the researcher. In some cases, e.g. when it involves numerical data such as tax information, it is considered as a *quantitative method*. However, this is not the case with this master's thesis.

This chapter discusses the three diverse types of qualitative research methods used to answer the main research question (figure 2). Firstly, a literature review was conducted, which consisted of collecting secondary sources (chapter 3.1). Based on this information, primary sources will be consulted through archival research (chapter 3.2) and an interview with the ‘*Vereniging*’ (chapter 3.3). Finally, ethical considerations are discussed (chapter 3.4).

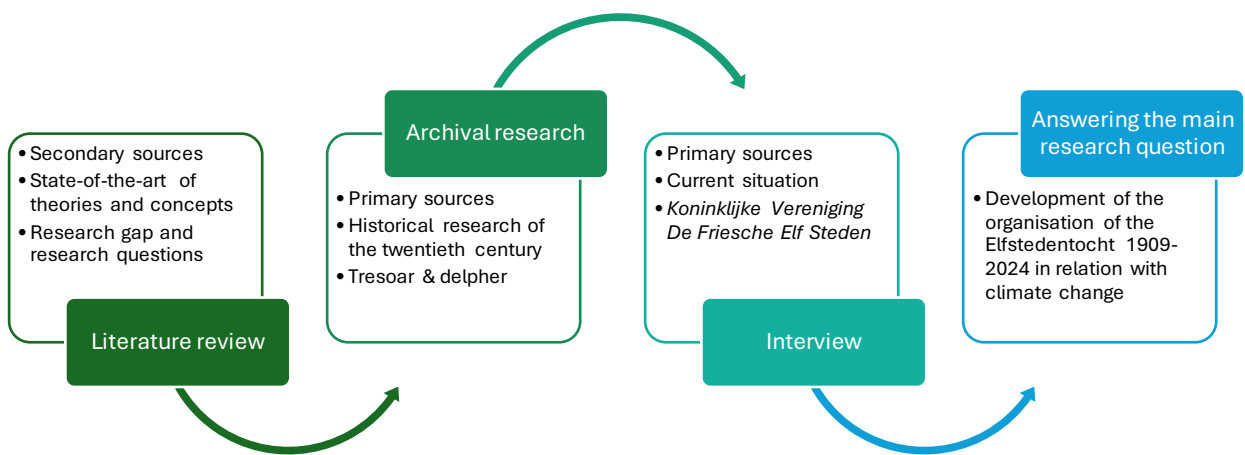


Figure 2: Conceptual model of the research methodology.

3.1 Literature review

Research always starts with collecting and examining existing knowledge on the subject, in any field of research. As research is growing rapidly (in the field of climate change), yet remains fragmented, it can be difficult to get a handle on this existing knowledge. Therefore, it is important to conduct a literature review (Snyder 2019). Snyder (2019) defines a literature review as: “a more or less systematic way of collecting and synthesizing previous research” (p. 333).

Existing literature for this thesis was searched on Google Scholar and Worldcat to get an insight into the different concepts and theories. The research method gives an insight into the research that has been done on the different topics: climate change (adaptation) in relation to (intangible)

cultural heritage and the Elfstedentocht. For each concept, search terms were used with the additional search term 'literature review'. By exploring different literature review papers, (recent) papers were selected for the literature review. Based on these papers and information, additional search terms were formulated and used to find further information. Furthermore, by exploring the bibliography of the selected papers, a wider range of papers were consulted for the literature review to provide a state of the art of the different theories.

By elaborating these concepts and the link between them, the research gap became clear, which led to the formulation of the research problem and the main research question. In addition, further literature searches were conducted to better explore certain issues and to make the (missing) link clearer.

These publications form the basis of the research, providing background information on the ice-skating event that places the research in the broader context of climate change and intangible cultural heritage. In addition, some of these sources from the literature review are also used to answer the first and second sub-questions about the organisation's awareness and response to climate change.

As this research focuses on the historical development of the '*Vereniging*', historical research methods are also used to understand this development. Before applying these methods, it was necessary to gain insight into the secondary information available on the subject to narrow down the research topic and search terms (Hay & Cope 2021). By reading books, (recent) news articles and the organisation's website, as well as watching some recordings of news broadcasts about the event, the available secondary information was explored. Relevant parts of the research (awareness, response, and current situation) were written down in a document and colour coded by topic. This information was used in the archival research discussed in the next chapter.

3.2 Archival research

Archival sources are also referred to as primary sources. Hay and Cope (2021) define archival sources as: "They include non-current records of government departments held in public archives but can be extended to include company records and private papers. As well as documents, handwritten and typed, these sources can embrace personal letters, diaries, logbooks, and minutes of meetings, as well as reports, plans, maps, and photographs" (p. 223). As this research focuses on historical change, archival research can provide insight into twentieth-century developments. It is also quite accessible, as governmental/institutional sources and documents from the twentieth century are mostly typed, making them easy to read compared to older, written sources.

As the Elfstedentocht is a historically and culturally significant event, a lot of archival material was documented at the time and preserved until today. These records, some of which have been preserved for more than a hundred years, provide an insight into situations and decisions in the past. A similar research where archival documents are used to bring together intangible and natural heritage to show the impact of climate change on the environment is the Sakura Archives in Kyoto (Japan). Chapter 2.3 discusses the change of the first cherry blossom and the problems it poses for the festival that celebrates it. Based on this festival and its cultural significance, Scott & Slogget (2023) examined the Sakura archival documents to link cultural and natural heritage to climate change. They also highlight that these archival documents are not unique and that other archives, art galleries, libraries and private collections contain documents about the environment, weather, climate, and significant events. Therefore, this thesis will use the archival

research method to link the Elfstedentocht to climate change by gaining insight into the ‘Vereniging’s’ awareness of climate change (first sub-question) and how they responded to these changes with the organisation of the event (second sub-question).

A distinction is made between the primary (archival and historical newspaper) and secondary (literary) sources used in this thesis, as can be seen from the referencing and bibliography in Chapter 6. As archival sources often do not meet the standard bibliographic requirements of author, date, title and publisher/location for referencing, historians refer to them through footnotes (Hay & Cope 2021). Therefore, in this thesis, primary archival sources are referenced in footnotes and secondary literature sources are referenced in the text.

Government agencies are often responsible for the preservation of long-term archival records (Hay & Cope 2021). In the Netherlands, archival records are distributed and preserved in different regions. In addition to the Dutch National Archives in The Hague, each province has its own provincial archives in its capital (Hoitink 2005). The provincial archives of Friesland are in Tresoar in the city of Leeuwarden. This is where the ‘Vereniging’s’ archival sources are housed, and the database has been arranged online. Based on the descriptions of the archives and the secondary data, certain archives in Tresoar were requested to be consulted. These provided a variety of information, such as annual general meetings, organisational meetings, and correspondence.

In addition, as newspapers all over the Netherlands wrote about the event, these were accessed via the Delpher online database (<https://www.delpher.nl/>). This database made it possible to access the various newspaper articles from all over the Netherlands without having to go to the archives all over the country where the physical versions are kept. As the search term Elfstedentocht in Delpher produced too many results (45,687 articles), I refined the search with additional terms: ‘Elfstedentocht en [and] weerprofeet [weather prophet]’ (60 articles), ‘Elfstedentocht en [and] klimaat [climate]’ (291 articles) and ‘Elfstedentocht en [and] klimaatverandering [climate change]’ (8 articles).

The results of the archival research were written up in Word and Excel documents and colour coded based on the same themes of awareness and response (current situation was not applicable) as the secondary data in the literature review and brought together to answer the first two sub-questions in chapters 4.1 and 4.2.

3.3 Interview

Finally, to gain an insight into the current situation of the ‘Vereniging’ regarding climate change and to answer the third sub-question, an interview was conducted. Interviews can have different structures and can be face-to-face as well as digital, such as video and telephone interviews. Both types are data collection methods in which information is exchanged by voice instead of paper (Hay & Cope 2021).

The two main motivations for using an interview as a research method for this master's thesis are that it provides insight into the ‘Vereniging’s’ motivations in relation to climate change and how they organise the event, and that it provides knowledge that other research methods - such as the literature review - cannot provide (Hay & Cope 2021).

Before conducting the interview, I focused on the research methods mentioned in chapters 3.1 and 3.2. This allowed me to write down the topics I wanted to discuss with the interviewee. The formulated themes were *climate mitigation, climate adaptation, technology, and innovation, and alternative Elfstedentocht and cooperation*. By answering the first two sub-questions, these

themes and related questions were formulated to transition the historical research of the twentieth century to the current situation. The prepared questions were used in a semi-structured interview, where flexibility in questioning was allowed if it was in line with the research topic and themes (Hay & Cope 2021).

To comply with the principles of research, transparency and voluntariness for the interviewee, an information sheet and an informed consent form were prepared. The interviewee agreed to participate by signing the consent form (Appendix I contains the information sheet and consent form given to the participant).

For logistical reasons, the interview was conducted by telephone. During the interview, audio recording was chosen in addition to some notetaking to make the record of the interview as complete as possible. In addition, the interviewer is not distracted by note-taking and can concentrate on the interview (Hay & Cope 2021). The interviewee consented to being recorded and the recording was deleted after the data had been transcribed. Hay & Cope (2021) define transcripts as: “digital text documents that can originate from...recorded verbal accounts, expressions, exchange and interactions that occur in research activities such as focus groups, interviews and oral histories” (p. 168). By transcribing the voice recording into text, I was able to colour code various parts according to the pre-formulated themes mentioned above. Based on these themes, Chapter 4.3 is divided into different topics and sections to answer the third sub-question.

As the interviewee did not speak for himself, but for the ‘*Vereniging*’, it was decided, also for reasons of anonymity, that the name of the interviewee would not appear in this thesis. Instead, the information used from the interview is referred to in the footnotes as "*Koninklijke Vereniging De Friesche Elf Steden, personal communication, 29 May 2024*".

3.4 Research ethics

When conducting research at the University of Groningen, Campus Fryslân, students and researchers are bound by the '*Netherlands Code of Conduct for Research Integrity*' (2018). This code is based on five principles: (1) reporting results **honestly** and not making unfounded claims; (2) using scientific or scholarly methods and applying them correctly (**scrupulousness**); (3) being **transparent** about how the research was conducted/data were collected; (4) **independence** from non-scientific and non-scholarly sources and statements of others; and (5) taking **responsibility** for certain interests within the research (for example, interests of human subjects) (Algra et al. 2018).

In addition to following these research principles, it is also important to be aware of the data that is used for the research. Firstly, the data from the literature review and archival research are all public data. So, the data is free to use, but it is important to be transparent about where the data was obtained. Therefore, referencing is particularly important and will be done according to APA guidelines.

For the interview that is conducted, it is important to be transparent and honest with the interviewee about how the results will be used. The interview is recorded, but this recording is deleted after it has been transcribed into text, which will only be accessible to the researcher. Prior to the interview, written consent is obtained from the interviewee through an informed consent form to allow the researcher to use the data for this master thesis.

Finally, the researcher's position on the topic is what drives this master thesis, as the researcher is interested in adaptation to climate change and, as a Frisian, in the cultural ice-skating event. The knowledge gained during the master's programme *Cultural Geography: Climate Adaptation Governance* is used to select information about climate change adaptation in general, to give an honest and independent overview of the subject. Although this knowledge can be helpful, it can also pose a problem for bias towards certain issues. To make sure these biases do not influence the research and its outcomes, I will make sure to adhere to the Code of Conduct principles.

4. Results & discussion

This chapter will discuss the findings from the archival research and the interview in relation to the theories from the literature review in chapter 2. This will answer the three sub-questions in this chapter. Firstly, the organisation's *awareness* of climate change is discussed, and the first sub-question is answered (chapter 4.1). Chapter 4.2 provides an insight into the organisation's *response* to climate change and answers the second sub-question. The chapter ends with the *current situation* of the organisation regarding the Elfstedentocht and climate change, answering the last sub-question (chapter 4.3).

4.1 Awareness of climate change

The Dutch love to talk about the weather. This is not just something they do nowadays, but something they have done for at least a hundred years. A newspaper article from 1940 makes this clear: "Everywhere a comment must be made about the one subject that apparently always interests us: the weather".³ The same article notes that it is natural for the Dutch to talk so much about the weather in this country, because the climate is so varied. But just because the weather is an important topic in the Netherlands, it does not mean that the climate is. This chapter discusses and answers the first sub-question: 'To what extent were organisers of the Frisian Elfstedentocht aware of climate change issues during the twentieth century?'

Weather prophets and the KNMI

A weather prophet (Dutch: '*weerprofeet*') is "a person who predicts the weather" (Moerdijk 1988). This paragraph explains the role of weather prophets during the organisation of the Elfstedentocht and their collaboration with the '*Vereniging*.'

As the weather plays a key role in the organisation of the Elfstedentocht, the '*Vereniging*' worked closely with various weather prophets. The organisation worked with a number of individuals, but also with the '*Koninklijk Nederlands Meteorologisch Instituut*' (KNMI). This national organisation was founded by the meteorologist Christophorus Buys Ballot to predict the weather for economic purposes, e.g. shipping companies for their trade and the aviation industry (KNMI n.d.). The cooperation between the KNMI and the '*Vereniging*' becomes clear when we look at the tasks of the various members of the latter organisation. Around 1960, the organisation wrote down the duties of the various members in case someone else had to take over their work. For the secretary of the '*Vereniging*,' the second point of their duties is mentioned: "to obtain the weather forecast from the KNMI and the military aviation base in Leeuwarden".⁴

Based on the division of tasks within the organization, this explains why the secretary Van Welderen Rengers of the '*Vereniging*' mentioned something in 1917 about the climate changes predicted by the weather prophets: "We almost believed the prophets who spoke of a different time, a changing climate; cool summers and mild winters" (Lolkama 2008, p. 9-10)⁵ Unfortunately, correspondence between any secretary of the '*Vereniging*' in the twentieth century and the weather prophets of the KNMI has not been found in the archives of the organisation in Leeuwarden.

³ Haarlem's Dagblad 1940, p. 9.

⁴ Tresoar, Provinciaal bestuur 1962-1986, 12-19 [4415].

⁵ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [11].

Weather predictions and climate change

Going back to the aforementioned changing climate by the secretary Van Welderen Rengers, he speaks about “changing climate to cool summers and mild winters”.⁶ A few years later in 1921, an article in the *‘Deli Courant’* talks about a changing climate, but towards a colder environment: “Our climate will change. I cannot judge whether this is due to a change in the state of the earth’s axis. Now at the end of November we suddenly got a chill, and it is freezing.”⁷ This chapter will continue to discuss development of climate change awareness during the twentieth century.

The possibility of the quick changing of the Dutch climate is also mentioned in 1924 in the *‘Leeuwarder Courant’*: “In our small country with its changing climate, everyone knows about making plans, counting on certain weather, which is different when the plans are actually there”.⁸ The changing weather and therefore predicting the weather and the climate is very difficult, which is also evident in a later publication about the cancelled Elfstedentocht of 15 January 1940. The publication mentions the difficulty of organising an Elfstedentocht, as the changing climate in the Netherlands does not guarantee weeks of freezing temperatures.⁹

A few years earlier in 1938, it is also mentioned in a newspaper that the winters are not what they used to be in the Netherlands. The article talks about a cold winter being something that the new generation knows nothing about. A really frosty winter, where an Elfstedentocht can be held; they would have to hear about it from their (grand)parents, read about it or can only witness it in winter paintings in museums. They would not have experienced it themselves. But finally, an upcoming colder period would give the KNMI the opportunity to show that they are capable of more than predicting *‘kwakkelwinter’* for the winter season.¹⁰ Although a *‘kwakkelwinter’* can have different meanings, the *‘Vereniging’* defines it as: “a winter that is a bit ‘soft’, it knows both freezing and thawing”.¹¹

Although there are still some exceptions of years where there are cold winters, such as 1940-‘43 when the Elfstedentocht could be organized three years in a row, overall, it is acknowledged that the winters are less cold than earlier times. From around 1940 onwards, it gets increasingly mentioned that organising an Elfstedentocht might get harder with the *‘kwakkelwinters’* that the Dutch have each year. And even though there are some times that there is a colder week and people all over the country can put on their skates to move around on the ice, it does not last long enough for the ice to become thick enough for the whole course of the Elfstedentocht.¹² This is also underlined again in 1958, when the *‘Volkskrant’* publishes that “the Elfstedentocht in 1956 will be the last for now, as the ice classic of 200-kilometres will not be able to be organised during the soft winters we know”.¹³

The archives show that the *‘Vereniging’* invests time in predicting the weather for organising the Elfstedentocht through secondary parties (e.g. the KNMI). This is because the event is and will always be dependent on the weather conditions, also mentioned in 1948 by the secretary of the

⁶ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [11].

⁷ Deli Courant 1921, p. 20.

⁸ Leeuwarder Courant 1924, p. 5.

⁹ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [13].

¹⁰ De Maasbode 1938, p. 11.

¹¹ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [5].

¹² Nieuwe Courant 1950, p. 3.

¹³ De Volkskrant 1958, p. 5.

organisation K. Westerling.¹⁴ Therefore, weather predictions, short-term as well as long-term, will always be part of the organisation of the Elfstedentocht.

Up until now, the weather has played a key role in the organisation of the Elfstedentocht. Without the correct weather conditions for ice to grow during the winter season, the event cannot be organised. But these changing weather and climate conditions that are recognised, are connected with more natural phenomena: sunspots and air pressure distribution. The sunspots were around 1943 linked by different scientists to our weather, being much colder during times of more sunspots. But it was also acknowledged that a clear link was still being established.¹⁵ Later in 1968, the link between sunspots and air pressure and the weather is mentioned again: “the mean air pressure distribution of November of this year [1968] is the same as the air pressure distribution in November of the fifteen coldest winters in the last hundred years. [...] Additionally, we will have a sunspot maximum in 1968. Recent years have shown that in a year close to such a sunspot maximum, the chances of a colder winter are much higher.”¹⁶

Anthropogenic climate change

Around the 1970s the link between anthropogenic acts and climate change becomes evident. At that time, the ‘*Telegraaf*’ acknowledged (historical) climatology being a new scientific research area. Archival materials can tell something about the weather in the past, but the changing climate is still recognised as something fairly unknown. Not about the part that there is a changing climate (researchers and scientists found that evident), but they were not exactly sure about the reasons what causes it.¹⁷

Around the 1990s, when more research about anthropogenic climate change had been conducted, the ‘*Vereniging Milieudefensie*’ [organisation for environmental protection] presented a report about the causes and implications of anthropogenic climate change. The first copy of the report was gifted to the ‘*Vereniging*’. Chairman J. Sipkema received the copy, but also mentions not to be too concerned about it: “In the past the Elfstedentocht could not be held for years, without prove that anthropogenic climate change was the cause of this. However, it would be a shame that climate change would cause these periods between Elfstedentochten to lengthen.”¹⁸ Sipkema also mentioned that it is not the end of the world if the event would not occur again because of climate change, but it would be a shame for lost cultural heritage.¹⁹

Although increased scientist proved and believed in anthropogenic climate change, the effects of it were still debatable. Scientists predicted warmer temperature across the globe, but they also predicted more weather extremes²⁰: “the climate might be changing, but the extreme warmer and colder periods continue to exist, posing an opportunity for an Elfstedentocht to be organised again.”²¹

¹⁴ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [12].

¹⁵ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [98].

¹⁶ *Het vrije volk* 1968, p. 1.

¹⁷ *De Telegraaf* 1979, p. 25.

¹⁸ *De Volkskrant* 1993, p. 8.

¹⁹ *De Volkskrant* 1993, p. 8.

²⁰ *Leeuwarder Courant* 1933, p. 1; *Trouw* 1933, p. 2.

²¹ *Trouw* 1995, p. 3.

Conclusion

To conclude this chapter, it can be said that the '*Vereniging*' was aware of climate change during the twentieth century. Different research and notions in archival material show that weather prophets did not only focus on the weather at that time, but also looked at the long-term patterns: the climate. Although this was first linked with natural phenomena, from the 1970s onwards - consistent with climate change research discussed in chapter 2.1 - this was linked to anthropogenic acts. Because of the threat a warmer climate poses to the Elfstedentocht, it was linked with the probability of the occurrence of the event in multiple newspapers.

4.2 Response to climate change

The archives mentions innovations that were used to improve the ice thickness along the route or other organisational changes to be able to organise the Elfstedentocht. After the discussion of the awareness of climate change in the twentieth century in chapter 4.1, this chapter will focus on the response to climate change in the twentieth century and answer the second sub-question: 'How did the organisers of the Frisian Elfstedentocht respond to observable changes in climate patterns and environmental conditions in the twentieth century?'

Ice transplantation and other (technical) solutions

"Transplantations: we don't associate it with operations anymore, but instantly think about ice."²²

Lolkama (2008) had already mentioned the use of ice transplants to close gaps in the ice - called '*wakken*' in Dutch - which are particularly common near bridges. For transplantation, large blocks of ice are cut out and removed from areas where the ice is not needed for the Elfstedentocht. The blocks are then moved to a '*wak*' in the ice along the route (figure 3). The idea here is that the ice blocks freeze together, creating ice that can carry the thousands of participants in the Elfstedentocht (Lolkama 2008). This section will discuss the ice transplantations conducted during the Elfstedentocht.

The first ice transplant took place in 1956 for the eleventh Elfstedentocht. It was done to close two open spaces behind the town hall of *Hindeloopen* (Lolkama 2008). Although the transplantations were conducted a few times before the last Elfstedentocht, they are mainly known from the fifteenth Elfstedentocht in 1997.²³ The conduction of ice transplantation



Figure 3: Conducting an ice transplantation in a '*wak*' near the old *Waterpoort* in *Sneek* in preparation for a possible fifteenth Elfstedentocht. The ice is delivered here by truck.

²² Omrop Fryslân 1996.

²³ *Andere Tijden Sport* 2019.

for the fifteenth Elfstedentocht can be found in several news articles. For example, the '*Friesch Dagblad*' reported that the organisation of the Elfstedentocht had done all it could to improve the ice along the route a few days before the event. It was clear that the ice was thick enough for ninety percent of the 200-kilometre route, but there were still some weaker spots. One of the solutions to promote the growth of the ice were the transplantations.²⁴ Although the transplanted is different from natural ice, the transplants have proven to be quite effective in terms of ice growth and closing '*wakken*'.²⁵

Another solution mentioned by the '*Friesch Dagblad*' is that the Ee-bridge in Dokkum and the Zwette-bridge in Sneek were left open during the night a few nights before the last Elfstedentocht to encourage ice growth. In addition, to close the '*wakken*' along the entire route in 1996-'97, a three-metre-high plastic screen was placed along a large '*wak*' in Sneek to block the strong wind that prevented ice formation. Soon after, the water in this open space was able to freeze and close (Lolkama 2008).

Eventually, after doing everything possible to encourage ice growth in closing all the '*wakken*' along the route of the Elfstedentocht, there would still be some open or weak spots that could not support all the participants. To pass these places, the participants would have to walk over land (with their skates still on), known as '*klunen*' (figure 4). First hay and later special carpets were laid over the land to protect the skates (Van de Vooren 2019).



Figure 4: Participants of the sixth Elfstedentocht in 1940 '*klunen*' in *Hindeloopen* over hay to protect the skates.

Research 'reinforced ice' through polyester

In 1983, students at the Technical University of Delft (*Technische Hogeschool Delft*) conducted research into the strengthening of ice using a polyester fleece (Colbont P 350). In 1982-'83 the technique was used to strengthen the ice for the *Oldambttocht* ice skating tournament in the province of *Groningen* (east of Friesland).²⁶ This section discusses the application of the research for the Elfstedentocht.

Colbont's polyester fleece is originally used on construction sites to make some impassable terrain passable. An ex-contractor from Groningen, did an experiment at home to see if it could also be used to reinforce ice.²⁷ This experiment also reached the Technical University, and few students conducted research to evaluate the strengthening of ice with polyester. During the research, the polyester fleece was laid on the ice and sprayed with water several times during the night. This resulted in a few centimetres of ice forming on the polyester. The researchers

²⁴ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [260]; Omrop Fryslân 1996.

²⁵ Andere Tijden Sport 2019.

²⁶ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [206].

²⁷ Leeuwarder Courant 1982, p. 13.

concluded that the areas where the polyester had been added were significantly stronger than where it had not been added.²⁸

The recommendations of the researchers reached the '*Vereniging*' and around 1980-'85, the organisation's ice expert, H. Kroes, mentioned the potential of using the polyester fleece to strengthen the ice, as the load-bearing capacity of ice decreases considerably at temperatures around 0°C.²⁹ In January 1982, an article in the '*Leeuwarder Courant*' mentioned that H. Kroes, on behalf of the '*Vereniging*', had purchased a number of rolls of Colbont.³⁰ The polyester fabric was also mentioned during a press conference in the period of 1982-'86 about the Elfstedentocht in Leeuwarden. During the press conference it was asked "if the *Vereniging* knows about the material that can strengthen the ice, as was used in the *Oldambttocht*, to which it was answered "yes, Colbont is already present".³¹

One of the disadvantages of the Colbont is that it needs to be frozen repeatedly to keep the ice on the polyester. When the ice thaws, the fleece can still be used, but people cannot skate over it. They would have to walk or '*kluun*' over it.³² Apart from these few mentions of the use of Colbont by the '*Vereniging*', it is not mentioned that they used it during the last three Elfstedentochten.

Ice professor ('*ijsmeester*')

In addition to the more technical innovations in the preparation of the ice route for the Elfstedentocht mentioned above, this section will discuss the increase in knowledge about ice growth within the '*Vereniging*' from the 1970s onwards. The organisation was interested in having someone trained in ice mechanics.³³

Before officially organising announcing an Elfstedentocht, the '*Vereniging*' has done everything it can to predict the weather, (stimulate) ice growth and ensuring that the Elfstedentocht is safe for all participants. To check the thickness of the ice and the quality of the track, the 200-kilometres are divided into twenty-two sections called '*rayons*'. Each rayon has a '*rayonhoofd*', who is responsible for reporting the ice thickness to the '*ijsmeester*' of the '*Vereniging*' (Koninklijke Vereniging De Friesche Elf Steden n.d.-b). In 1969 the *Vereniging* got its first '*ijsmeester*' in H. Kroes.³⁴

In August 1982, Kroes went to North America and Canada for three weeks to specialise in ice mechanics. Because parts of these countries are covered with ice for much of the year, a lot of research had been done there about ice growth for military and economic interests. On Kroes' return, he summarised his findings and research in a document entitled '*Natuurijis in relatie tot de schaatssport*' [Natural ice in relation to skating].³⁵

²⁸ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [206].

²⁹ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [5].

³⁰ *Leeuwarder Courant* 1982, p. 13.

³¹ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [5].

³² *Leeuwarder Courant* 1982, p. 13.

³³ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [5].

³⁴ Scheffer 2022.

³⁵ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [205].

Growing popularity and changing landscape

While the first Elfstedentocht in 1909 had only twenty-two participants, the number of participants increased throughout the century and the last Elfstedentocht in 1997 had almost 17.000 participants. This massive increase led to stricter rules for the ice thickness to ensure safety (table 2). This is not only due to the increase of participants, but also to the increase in the number of spectators. This section discusses the change in the organisation of the Elfstedentocht due to growing popularity of the event as well as a changing landscape.

Table 2: Number of participants during the Elfstedentocht in the twentieth century (Couwenhoven & Snoep 1999, p. 220).

Year	Participants (competition and tour)
1909	22
1912	61
1917	153
1929	301
1933	540
1940	3404
1941	2499
1942	4857
1947	2073
1954	2735
1956	6329
1963	9862
1985	16.513
1986	17.316
1997	16.688

The increase in the number of participants and spectators has led to stricter rules regarding the ice thickness to accommodate all these people. In order to organise a safe event, these rules have to be followed and the 'Vereniging' only wants to set a date for the Elfstedentocht when they are sure that the ice is strong enough.³⁶ In addition, around the 1980s, the 'Vereniging' set a maximum for the number of participants in the race (300 participants) and the tour (16.000 participants) of the Elfstedentocht to keep the participation within the limits of the safety regulations.³⁷

Not only has the number of participants increased over the years, but in 1972 it was also noted that the landscape had changed, with more obstacles than at the beginning of the twentieth century. Technical innovations and economic interests made it more difficult to organise an Elfstedentocht. Land consolidation with the damming of waterways and the construction of culverts has drastically changed the landscape. This means that the number of 'kluunplekken' had increased.³⁸ Because of the changing landscape, the organisation is also less flexible when it comes to differentiating the route. Although the Elfstedentocht requires participants to visit all eleven cities in the province, and the main route has always been the same, the route between the cities has changed several times. Especially in the first half of the twentieth century (Van de Vooren 2019).³⁹ Furthermore, economic measures e.g. trade routes over water, water locks and

³⁶ De Wereld Draait Door 2020.

³⁷ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [5].

³⁸ Tresoar, Vereniging De Friesche Elf steden, 205-09 [5].

³⁹ Tresoar, Vereniging De Friesche Elf Steden, 205-09 [2].

the inflow of warm water from the provincial electricity company have been obstacles to the formation of ice during colder periods since the 1940s.⁴⁰

Alternative Elfstedentocht

Although the Elfstedentocht started as an ice-skating event through the province, there are also (annual) different means of transportations used to visit all eleven cities of Friesland. People go past them on e.g. (motor)bike, on the step, antique cars, and walking (divided over multiple days). But talking about *the* Elfstedentocht, people refer to the Elfstedentocht on ice-skates. The Elfstedentocht on ice-skates has received a special status.⁴¹ As no other Elfstedentocht in Friesland can be compared to the original on ice-skates, some have opted in the past for the ‘*Vereniging*’ to organise an event somewhere else. This part will discuss the alternative Elfstedentocht.

In 1973 it had been ten years since the last Elfstedentocht was organised in 1963 and the desire to skate on natural ice increased. Which is also why a member of the ‘*Vereniging*’ opted during the annual membership meeting in 1973 if there was a task for the ‘*Vereniging*’ to organise an Elfstedentocht elsewhere. The chairman of the organisation answered that they do not have the wish to adhere to this, as their task is organising the event in Friesland if the conditions are right.⁴²

Although the ‘*Vereniging*’ did not want to organise an event elsewhere, there are some (foreign) parties who took it upon them in the 1970s and 1980s to do this and organise an Elfstedentocht in e.g. Norway, Sweden, Finland, and the United States (figure 5). The organisation wants to support the skating sport but poses the question why these tournaments are called ‘*Elfsteden*’ [eleven cities], as they don’t ride along eleven cities but are mostly comparable looking at the distance of the Elfstedentocht and these alternative routes.⁴³ The long history of the event and its connection to the province of Friesland that led to the Elfstedentocht being such a cultural special event, cannot just be moved somewhere else. The cultural significance of the event cannot be felt in other places, which makes them merely ‘just’ an ice-skating even of 200-kilometers.

Conclusion

To conclude this chapter, (innovative) measures were taken to be able to organise the Elfstedentocht in a changing climate. However, not only our changing climate decreased the probability of and Elfstedentocht occurring, but this is also because of an increase in participants and spectators as well as our changing landscape. The measures taken by the ‘*Vereniging*’ to be able to organise the event, are also reactions to these changes. They implemented stricter rules for ice thickness due to safety reasons. Together with our warmer climate, this poses threats to the organisation of the event. To help ice growth - especially during the last Elfstedentocht – they conducted ice

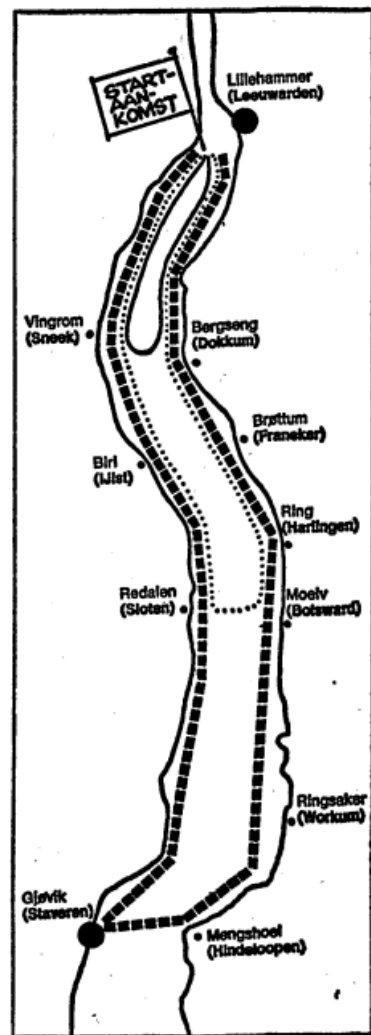


Figure 5: The alternative Elfstedenroute in Norway in 1974, with the Frisian city names under the names of the cities in Norway. The skaters had to skate two rounds, one big round (120 kilometres) and one small round (70 kilometres).

⁴⁰ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [36]; Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [98].

⁴¹ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [12].

⁴² Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [5].

⁴³ Tresoar, *Vereniging De Friesche Elf Steden*, 205-09 [5].

transplantations to close open spaces in the ice. Additionally, a research about Colbont to strengthen the ice was consulted, but eventually (probably) not used during the organisation of the event. Furthermore, it was opted to organise the event elsewhere – which was also done by other parties. But the ‘*Vereniging*’ did not address this option as the cultural aspect would be missing.

4.3 Current situation

After the development of the Elfstedentocht in the twentieth century in terms of climate awareness and adaptation to these changing times in chapters 4.1 and 4.2, this chapter will focus on the current situation of the Elfstedentocht and climate change. The third sub-question will be answered: ‘how does the organisation deal with climate change nowadays and are they able to change prospects of the event in the future?’

Climate neutral Elfstedentocht

Climate change has been the subject of research since the 1970s and has increased in significance since then. It affects the living environment around the world, but also poses a threat to (cultural) heritage sites. Cultural events that depend on weather and climate phenomena are threatened by climate change. The Elfstedentocht has been identified by the association as one of the events threatened by climate change, as the weather and climate have a direct impact on whether the event can take place. For this reason, they want to make sure that the impact on the environment and climate is as low as possible if the event is to take place.⁴⁴ In this section, the ‘*Vereniging’s*’ efforts to mitigate climate change in the organisation of the Elfstedentocht will be discussed.

Because the ‘*Vereniging*’ wants to minimise its impact on the environment, it has developed a sustainability plan over the past few years. They’ve come to the conclusion that it’s probably not possible to have a zero carbon footprint, but they’ve taken steps to reduce their emissions when organising the event.⁴⁵ Each year, when the planning for the Elfstedentocht is discussed - so that it can be organised within 48 hours if the conditions are right - the ‘*Vereniging*’ has taken smaller and larger steps to reduce its impact on the climate. For example, they want to ban the use of plastic during the event, switch to electricity or biofuel for the generators, and check the food production and taxation of the companies they work with. They also work with the Dutch railway company ‘*Nederlandse Spoorwegen*’ (NS) when they can arrange for participants to travel to Friesland by public transport. They only look at the participants because they can have an influence on that, which is difficult for spectators who travel to the province.⁴⁶

The organisation has also reduced its paper trail by going digital. For example, instead of sending their annual newsletter to all 30,000 members, they send it to them by email and only provide a paper copy if requested. This differs from at least 20,000 newsletters per year, which is a lot of paper.⁴⁷

⁴⁴ De Vries 2022.

⁴⁵ De Vries 2022; Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

⁴⁶ Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

⁴⁷ Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

Technology and innovation

Throughout the twentieth and into the twenty-first century, the '*Vereniging*' has evolved in line with innovation, technology, and the growing knowledge of the times. First, the traditional elements of the Elfstedentocht, which form part of its cultural heritage, are preserved, such as the stamp posts in each town and the secret posts along the route. The organisation of the event itself keeps pace with developments such as technological innovations. For example, in addition to the stamp posts, each participant will be given a transponder that will track them as a security measure and to ensure that no one cheats. Moreover, registering for the Elfstedentocht is online and as easy as buying concert tickets. This chapter describes the technology and innovation that the association uses to organise the event.⁴⁸

Various methods of increasing ice growth and reliability were mentioned in chapter 4.2. In the second half of the twentieth century, ice transplantation and Colbont were mentioned as techniques to strengthen the ice and increase ice growth. Although it is certain that ice transplantation was used during the last Elfstedentocht in 1997 and will be used if another Elfstedentocht is organised, the use of Colbont in the past is unlikely. It was mentioned in a news article that the '*Vereniging*' had bought rolls of Colbont to use, but it was never mentioned that it was used during the organisation of the event. Personal correspondence with the '*Vereniging*' confirmed that it was not used, as the board member had never heard of it. It would also contradict their belief that "nature is the basis of the Elfstedentocht. The ice must grow as naturally as possible; nature must do it. We will help where we can, for example with the transplants and plastic screens to close off certain '*wakken*', and we will ask for help with the Friesland waterboard (*Wetterskip Fryslân*) to reduce run-off and keep the water still to help the ice grow. But in the end, the Elfstedentocht can only be organised if the natural conditions allow it."⁴⁹ Artificial solutions - such as Colbont and the artificial ice used in indoor ice rinks - are therefore not suitable as a starting point for the organisation of the event.

Although the '*Vereniging*' helps natural processes in ice growth when possible (and when this is not possible, they create '*kluunplekken*'), there are limits as to what they are prepared to do to organise the event. However, to do use modern technology in organising the event, for instance looking at the weather predictions. The '*Vereniging*' has its own ice expert, who has close contact with the KNMI. The KNMI uses the most modern technology for weather and climate predictions and updates the '*Vereniging*' regularly from the ending of October about predictions of colder periods. Besides the KNMI, the '*Vereniging*' also has close contact with a local weather prophet in *Friesland*, who uses different models than the KNMI. They do this to have different viewpoints on weather prediction.⁵⁰

Alternative Elfstedentochten

As mentioned in chapter 4.2, there are various alternative Elfstedentochten organised in other countries. The most well-known (and only) right now is the *Weissensee* in Austria. But as stated before, the goal of the '*Vereniging*' is the organisation of the cultural special event the Elfstedentocht in *Friesland*. If the event is moved to another country, it loses its cultural significance and is 'merely' an ice-skating event of 200-kilometres. The '*Vereniging*' supports any ice-skating event abroad, as they are promoters of skating events, but have rights to the event being called Elfstedentocht. The name 'the Elfstedentocht' is protected for the '*Vereniging*' to use

⁴⁸ Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

⁴⁹ Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

⁵⁰ Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

for the original event in Friesland, but they cannot do anything if people choose to call it ‘alternative Elfstedentocht.’⁵¹

Additionally, they have stayed with their position that they do not want to be involved in the organisation of an event elsewhere. However, they are available for consultation. As “the ice-skating world is small,” every organisation of a bigger ice-skating event in the world knows where to find another. Exchange of knowledge is certainly possible, as the ‘*Vereniging*’ can also benefit from this when an Elfstedentocht can be organised again.⁵²

Conclusion

To conclude this chapter, it can be said that the organisation of the Elfstedentocht follows modern innovations, technologies, and research. They are up to date with climate change studies and invest in mitigation measures, as they have developed a sustainability plan over the last few years. With this plan they try to minimise their carbon footprint and not to contribute to climate change, which is one of the threats to the event. In organising the event, the ‘*Vereniging*’ uses modern technology for weather and climate forecasting as well as for the application of participants, but also preserves the traditional aspects that are important for the intangible cultural aspects of the event. This also applies to their position in organising the event: they will help where possible, but natural processes will eventually have to work themselves out.

⁵¹ Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

⁵² Koninklijke Vereniging De Friesche Elf Steden, personal communication, May 29 2024.

5. Conclusion & recommendations

After discussing the organisation's awareness of and response to climate change in the twentieth century and the current situation, this chapter will summarise the information and answer the main research question of this thesis: **'how has the development of the organisation of the Frisian Elfstedentocht in the twentieth century reflected changing approaches to climate change and adaptation?'**. The limitations of the research and recommendations for future research are also discussed.

Main findings

The weather has always played a key role in the organisation of the Elfstedentocht. Certain weather conditions are required for ice to form along the 200-kilometre route. To predict the weather and ice formation, the '*Vereniging*' has always worked closely with weather prophets. Although they mostly focused on weather forecasts for a short period of time (the next week or two), the archives show that they also looked at longer-term developments: the climate. There are a few references in the archives and in the newspapers to a changing climate, but there is no clear distinction as to what this change entailed. One mentions 'cooler summers and milder winters', while another predicts a few colder years because of sunspots. It is clear, however, that around the 1940s these ideas of a changing climate increased. This included the observation that winters were becoming milder, with exceptions when it was colder and an Elfstedentocht could be organised. It is increasingly recognised that winters were different then around the 1900s and earlier. This is linked to natural climate change phenomena such as sunspots and the distribution of air pressure.

In line with research into anthropogenic climate change since the 1970s, the weather prophets link the likelihood of another Elfstedentocht to our changing climate. Although there was no consensus among scientists at the time about the reasons for our changing climate (is it due to anthropogenic actions or natural fluctuations), there have been some observable changes in the organisation of the event since that time. However, this is also due to the growth of the Elfstedentocht in terms of participants and spectators, as well as a changing landscape. Taking all these factors into account, the '*Vereniging*' has introduced stricter safety regulations and the possibility of organising the event has diminished. If we look at the ice conditions for the first Elfstedentocht in 1909, they were not good enough to hold the event in the second half of the twentieth century. From the 1970s onwards, only three events could be organised and the '*Vereniging*' took measures to improve certain weaker ice spots.

For the last three Elfstedentochten, the organisation has collaborated with various parties (e.g. the Waterboard) to keep the water still and promote ice growth, as well as conducting ice transplants and keeping up with innovative technology. The '*Vereniging's*' starting point is to help nature as much as possible, but natural processes must provide the right (ice) conditions for the Elfstedentocht to take place. This starting point is also the one that preserves the cultural aspects of the Elfstedentocht, which is what makes it such a unique event.

It can therefore be said that climate change is not the only factor in the recurrence of the Elfstedentocht. Although the organisers of the event acknowledge the importance of weather and climate, they also state that the occurrence of the Elfstedentocht has always been susceptible to weather fluctuations, which is why only fifteen have been organised in the last 115 years since the first event in 1909. However, this does not mean that the chances of an Elfstedentocht happening again are zero. Extreme weather events in the future are likely to create cold spells with the right

conditions for ice growth and an Elfstedentocht. The chances of the Elfstedentocht being a once-in-a-lifetime experience will be high for many people, which will add to the special status of the event. Therefore, we probably do not have to worry about this cultural heritage disappearing completely, even though the event is not organised so often.

Future research

Based on the results of this master's thesis, it would be advisable for future research to invest in the preservation of the cultural heritage and memories of the Elfstedentocht. As mentioned before, the changes of a repeated Elfstedentocht are decreasing, and the number of people who have never experienced the ice-skating event will increase to the number of people who have. Although the organisation of the event itself invests a lot in preserving the cultural aspects, the last time an Elfstedentocht was held is becoming more and more distant. It is important to preserve these memories to keep this special event alive for future generations.

Limitations

The different research methods used in this study complement each other and provide an overview of the development of the organisation of the Elfstedentocht from the past to the present in relation to climate change. However, there are limitations to this research. The first is that the literature review was only conducted with open access English and Dutch literature. Articles and information (such as certain news articles) with restricted access were not used as sources for the research, although they may contain valuable information. Although archival research provides insight into past activities, thoughts, and processes, it is also incomplete because not all archives are accessible and/or preserved. Sometimes these gaps leave the researcher with more questions than answers. For example, the correspondence between the '*Vereniging*' and the weather prophets, which is probably to be found (at least what is left of it) in the personal archive of the '*ijsmeester*'. This leads to the last point of limitation, namely that (more) consultation with the '*Vereniging*' or the KNMI would have been beneficial. Unfortunately, due to the time constraints and difficulties in communication (long response time), it was not possible to consult this option any further during this master's thesis.

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Besides the use of the following sources, the AI-tool ChatGPT (3.5) was used for brainstorming for formulating the research questions (with own input of certain elements that it needs to contain) and the AI-tool DeepL (<https://www.deepl.com/write>) was used to check and improve grammar of the researcher's written text.

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6.3 Figures

Frontpage: Grift, M. (1963). *Een getekende kaart met een sfeerbeeld van de 12e Elfstedentocht in 1963. De tekening toont een aantal wedstrijdrijders en / of toerrijders op een kanaal / vaart, ergens onderweg in Friesland. Exacte locatie onbekend. N.b. tekening (vrij) gemaakt naar foto ELF 0637.* Accessed on 5 June 2024, <http://collections.tresoar.nl/digital/collection/TRLffa/id/1784/rec/3>.

Figure 1: [picture taken from the archive] Tresoar, Vereniging De Friesche Elf Steden, archive inventory 205-09, inventory number 13 [1927-1950].

Figure 2: Self-made figure.

Figure 3: Walta, W. (31 January 1996). *Het uitvoeren van een ijstransplantatie in een wak bij de Waterpoort in Sneek als voorbereiding voor een eventuele 15e Elfstedentocht. De ijsschotsen worden hier met een vrachtwagen aangeleverd.* Accessed on 5 June 2024, <http://collections.tresoar.nl/digital/collection/TRLffa/id/47625/rec/2>.

Figure 4: Koninklijke Vereniging De Friesche Elf Steden (30 January 1940). *Image of the 6th Elfstedentocht in 1940. Klunen near Hindeloopen. This photo is part of the archives of the Koninklijke Vereniging De Friesche Elf Steden and belongs to archive inventory 205-09, number of inventory 83 [p. 15].* Accessed on 5 June 2024, <http://collections.tresoar.nl/digital/collection/TRLffa/id/66490/rec/31>.

Figure 5: Nieuwsblad van het Noorden (21 February 1974). *Alternative Elfstedentocht in Noorwegen* (p. 24). Accessed on 5 June 2024, <https://www.delpher.nl/nl/kranten/view?coll=ddd&query=klimaat+and+Elfstedentocht&sortfield=date&page=13&identifier=ddd:011016866:mpeg21:a0302&resultsidentifier=ddd:011016866:mpeg21:a0302&rowid=10>.

Appendix I Information sheet & informed consent form interview

Information sheet

Dear participant,

Thank you for your interest in taking part in this study. This letter explains what the research involves and how it will be conducted. Please take some time to read the following information carefully. If anything is not clear, please ask questions using the researchers' contact details at the end of this letter.

Purpose of the investigation

The aim of the research is to establish a link between the Elfstedentocht and climate change. Through historical (archival) research it will be investigated whether the organisation of the Elfstedentocht was aware of climate change in the twentieth century and how they dealt with it to organise the tour. To extend this to the current situation, your contribution has been requested in the form of an interview. As a member of the board of the *Koninklijke Vereniging De Friesche Elf Steden*, you can provide an insight into this current situation and thus give a complete picture of the historical situation up to the present day.

What does participation involve and do you have to participate

Participation in the research will consist of a (telephone) interview lasting a maximum of 45 minutes. This is completely voluntary, and you can choose not to answer certain questions. You can also withdraw from the study at any time by email or telephone contact.

Risks and benefits

There are no risks involved in taking part in the study. Your participation is voluntary, you are under no obligation to answer any questions, and you can decide what you do and do not want to share with the researcher. You may also choose to withdraw from the study in whole or in part after the interview. Although there is no direct benefit to you from taking part in the research, you will be contributing to the research and raising awareness of the Elfstedentocht (in relation to climate change). The results of the research will be shared with the supervisor and the second reader of the master's thesis and will also be published on the RUG website (Campus Fryslân).

Data storage

If you have given permission for the interview to be recorded, it will be transcribed into a Word file after the interview and the recording will then be deleted. The transcribed interview will be stored on a password-protected laptop of the researcher and anonymised if requested. This data will be used for the master's thesis and possible further publication.

Ethics

The research meets the ethical requirements of Campus Fryslân and has been approved by the Campus Fryslân Ethics Committee. The researcher will comply with the ethical standards of (scientific) research.

Please sign the form below if the information provided is clear and you still wish to participate in the study. After signing this form, you have the possibility to withdraw until the research is published.

Contact details:

Hanne Bouma

Email: [for privacy reasons left out]

Phone number: [for privacy reasons left out]

Informed consent

Assessment

- I have read the information sheet and was able to ask any additional question to the researcher.
- I understand I may ask questions about the study at any time.
- I understand I have the right to withdraw from the study at any time without giving a reason.
- I understand that at any time I can refuse to answer any question without any consequences.
- I understand that I will not benefit directly from participating in this research.

Confidentiality and data use

- I understand that none of my individual information will be disclosed to anyone outside the study team and my name will not be published.
- I understand that the information provided will be used only for this research and publications directly related to this research project.
- I understand that data (interview transcripts) will be kept on the researcher's password protected laptop.