Anticipating the Future: Understanding Matches and Mismatches between Future Narratives of Climate Change Adaptation and Housing

A qualitative case study of climate change adaptation and housing policies in the municipality of Arnhem

Radboud University

Nijmegen School of Management

Master Environment and Society

Master thesis

(Joris van Gennip / ANP)

Teun van Schendel

Master's Thesis for the Environment and Society Studies programme, Local Environmental Change and Sustainable Cities

Nijmegen School of Management

January 2025

Colophon

Title:	Anticipating the Future: Matches and Mismatches between Future Narratives of Climate Change Adaptation and Housing
Author:	Teun van Schendel
Student number:	s1042334
Contact information:	Teunvanschendel@gmail.com
Submission date:	27-01-2025
Institution:	Radboud University
Master specialisation:	Local Environmental Change and Sustainable Cities
Supervisor:	Sietske Veenman
Word count:	19.690

Abstract

The urgent need to adapt to climate change and the environmental pressure resulting from the housing shortage in the Netherlands underscore the importance of understanding to what extent these issues are concurrently addressed. This insight is essential for effective policy making and addressing the transdisciplinary challenges of climate adaptation and housing provision. By studying how future narratives in the governance systems of climate change adaptation and housing create (mis)matches, this research aims to gain these insights. Future narratives, consisting of preferred futures and future assumptions, which are grounded in literature on anticipatory governance, the use of futures and the expected future are used as central concepts. The research strategy entails a case study, qualitative policy document analysis using Atlas.ti and semi-structured interviews with policy makers. Policy documents and policy makers are selected at the Dutch local level, within the municipality of Arnhem. The results show how future assumptions in preferred futures lead to various matches and mismatches between future narratives of housing and climate change adaptation. These (mis)matches can arise when divergent preferred futures are envisioned as when similar preferred futures considered. Matches as well as mismatches between both policy fields occur on various themes, yet no clear patterns emerge.

Keywords: transformative governance, governance system, future narrative, preferred future, future assumptions.

Preface

After completing the first year of my bachelor's in Geography, Spatial Planning, and Environment, I chose to specialize in the spatial planning track. During the bachelor program my focus started to shift more towards environmental topics, yet my interest in spatial planning remained. Upon earning my bachelor's degree, I started an internship at Companen, a research and consultancy firm based in Arnhem specializing in the housing market and liveability issues. This internship aligned perfectly with my interests in spatial planning. Before selecting a master's program, I already knew that I wanted to continue working at this intersection of spatial planning and the environment. As I continued working part-time at Companen during my master's studies, I chose a master's program in Environment and Society Studies, specializing in *Local Environmental Change and Sustainable Cities*. My master's thesis provided an ideal opportunity to explore this intersection of spatial planning and environmental issues further. During a lecture in the course *Preparing for Your Master's Thesis*, Sietske Veenman introduced the field of futures studies, which immediately sparked my interests. Until then, I had never encountered a research field that placed the future as a central concept. After further exploring the topic, I developed the idea of investigating mismatches between future narratives in housing policy and climate change adaptation. This research enabled me to combine the fields of spatial planning and environment.

Throughout the research process, I enjoyed discussing with Sietske Veenman how best to define and use the concept of the future for this study. I would like to thank Sietske Veenman, firstly for introducing me to the topic of futures studies and secondly for being my supervisor during the writing of this thesis. Our discussions on methodological approaches and the framing of future narratives were of much value to me, as were her other insights during our meetings. I also want to thank all policy makers from the municipality of Arnhem who took the time to participate in the interviews for this research. Their inputs really elevated the depth of this study. Furthermore, I would like to thank Laurens van Dongen, my thesis sparring partner at Companen. Our conversations about research challenges, his feedback on my research design, and his willingness to participate in a test interview all contributed greatly to my work. Finally, I would like to thank Companen for allowing me to write my master thesis while working parttime with them. As I complete my master's degree, I am excited to continue working at Companen with new insights from the field of futures studies.

Table of contents

Figures

Tables

1 Introduction

Climate change presents one of the most significant challenges of our time, impacting society in various ways relating to floods, droughts, heat and more. These effects are only expected to increase in the future (PBL, 2021). Simultaneously, the pressing housing shortage in the Netherlands poses another societal dilemma, demanding urgent attention and putting the environment under additional stress (BZK, 2022). Dutch municipalities are responsible for implementing climate change adaptation measures and housing construction decisions. These institutions face the challenge of addressing these intersecting issues, necessitating that municipal policies on climate change adaptation and housing development are aligned and complementary. However, the extent to which the policies of housing and climate change adaptation are aligned and the reasons for either matches or mismatches between policy sectors requires further understanding. The municipality of Arnhem presents a compelling case for investigating this issue. Arnhem faces significant climate adaptation challenges due to its location along the Rhine and its vulnerability to both flooding and drought (De Wit et al., 2007). Simultaneously, Arnhem is under pressure to address the national housing shortage with the region Arnhem-Nijmegen needing over 40,000 additional homes by 2030, which puts additional strain on its limited space and resources (Lijzenga et al., 2023). These factors make it a prime example of the tensions between climate change adaptation and housing policies that municipalities across the Netherlands face. Moreover, urban planning in the Netherlands is characterized by a strong sectoral division between tasks. This sectoral divide allows planners to deal with urban challenges in an efficient manner (Leiren & Jacobsen, 2018). The strength of this system is also its weakness, when facing challenges that are complex and transcend organizational boundaries. The limitations of the sectoral systems become visible when dealing with complex issues, such as climate adaptation, separately (Pasquini & Shearing, 2014). The limitations of these sectoral systems could lead to mismatches between policy domains.

Understanding how and why municipal policies regarding climate change adaptation and housing are matching or not could provide valuable insights for other municipalities dealing with similar challenges. By examining this process, policymakers can identify opportunities to improve the coherence and effectiveness of their implementation strategies. This study adopts a future-oriented perspective to explore the integration of climate change adaptation and housing policies in Arnhem, investigating the underlying dynamics and motivations behind the matches and mismatches of future narratives.

Implications and impacts of climate change adaptation are not limited to the policy field of climate change adaptation, it is therefore classified as a transdisciplinary issue (Biesbroek & Candel, 2019). Moreover, because climate change transcends sectors, climate change adaptation requires a transformative change approach (Roggema et al., 2012). Transformative change indicates the change of the stable landscape itself to create a new system, instead of establishing change through a slow or fluent process (Folke et al., 2010; Walker et al., 2004). Achieving transformative change can be accomplished through transformative governance (Visseren-Hamakers & Kok, 2022).

Examining the subject of climate change and transformations can be characterised as the exploration of potential futures (Burch et al., 2019). Futures studies is an exciting field that offers a valuable lens through which the potential trajectories of urban development and climate change adaptation can be explored, enabling it to address both risks and opportunities, as well as to purposely create desired futures (Masini, 1983). Our daily decisions, from purchasing a car to policy planning, inherently rely on anticipating the future. When buying a car, this anticipates the future availability of car fuel, either fossil or renewable. The concept of anticipating futures can be applied to every decision, hence also for making decisions in the policy fields of climate change adaptation and housing. In the context of housing- and climate change adaptation policy, anticipation manifests through future narratives, consisting of preferred futures and future assumptions. In short, a preferred future can be viewed as a policy goal and future assumptions are the events or changes needed to achieve the policy goal. Together these concepts form a future narrative. The foundation of future narratives in this research will be grounded in the concepts of anticipatory governance, conceptions of the future and the use of futures (Amara, 1991, Veenman et al., 2023, Visseren-Hamakers, 2021).

Mismatches between future narratives of policy fields such as housing and climate change adaptation can create policy conflicts or inefficiencies, leading to challenges in meeting both environmental and social goals. A historical example of a mismatch in housing policy is found in the Dutch VINEX locations in the 1990s. During this period, environmental policies emphasized high-density housing to limit land use, while housing policies favoured low-density construction to meet consumer preferences (Priemus, 1997). This misalignment illustrates the potential risks of policies with differing future narratives.

It is therefore important to consider how the future is anticipated in these policy fields, as this shapes the nature of the narratives themselves (Bourgeois et al., 2022). Scholars have proposed classifications of future conceptions that can help systematically study how future scenarios are envisioned and utilized in policymaking (Muiderman et al., 2020). This study will use the concepts of preferred futures and future assumptions to understand which future narratives are used and to uncover how possible (mis)matches are created between policy fields.

1.1 Research aim and questions

The aim of this research is to understand to what extent the issues of climate change adaptation and housing are concurrently addressed. This will be done by gaining insight into the way policy makers in housing and climate change adaptation governance systems anticipate futures through future assumptions in preferred futures. Additionally, it seeks to assess the potential (mis)matches between future narratives in the fields of housing and climate change adaptation. To achieve the aim, the following research questions are formed:

"How do future narratives, consisting of preferred futures and future assumptions, in the governance systems of housing and climate change adaptation create (mis)matches?"

In order to answer the research question, several sub-questions are compiled. These include:

- *Which preferred futures are used in the governance systems of housing and climate change adaptation?*
- *What future assumptions are used in the preferred futures in the governance systems of housing and climate change adaptation?*
- *Which (mis)matches occur between future narratives of housing and climate change adaptation governance systems?*

The first sub-question is used to understand the ways in which preferred futures are envisioned within both governance systems. Subsequently, the second sub-question aims to understand which assumptions about the future policy makers from both governance systems use with each preferred future. The final sub-question involves looking at future narratives of both governance systems, identified by combining the answers of the previous sub-questions, to point out (mis)matches between the future narratives of climate change adaptation and housing.

1.2 Scientific relevance

Futures research has been evolving in the past 50 years from the prediction of the future into the study of shaping desired futures (Inayatullah, 2013). Futures studies are used to anticipate negative futures and future risks as well as to purposely create desired futures (Masini, 1983). In this study the future will be approached in a way to utilise the future as a resource to deal with current problems and enable more advanced and effective use of the resources currently available (Inayatulla, 1993). Furthermore, futures research is particularly important for issues related to or arising from climate change (Bengston et al., 2012; Gidley, 2016; Nordlund, 2008; Van der Leeuw, 2019).

An important dimension of futures research concerns the power dynamics involved in the construction of futures, as highlighted by the concept of colonising the future (Bourgeois et al., 2022). This concept explains how certain actors, often those in positions of power, dominate the views of the future and share these, thereby marginalizing alternative perspectives and possibilities. For example, institutionalized preferences for specific futures may exclude vulnerable groups or these dominant perspectives ''occupy'' futures (Miller, 2015; Poli, 2015). These dynamics are particularly relevant in transdisciplinary challenges like housing and climate adaptation, where diverse stakeholders and priorities must converge. While this study recognizes the importance of understanding power dynamics in anticipating the future, it focuses instead on the (mis)matches between future narratives in governance systems. By narrowing the scope, this study aims to provide a detailed analysis of how specific preferred futures and future assumptions relate to each other, rather than exploring the broader implications of power asymmetries in future anticipation.

Furthermore, futures research on the topic of climate change adaptation can be approached in several ways (Muiderman et al., 2020). One widely used and effective approach is distinguishing between the possible, expected and preferred futures (Amara, 1991; Enserink et al., 2013; Haarbosch et al., 2021; Nowotny, 2010). Some studies blend the concept of preferred and possible futures; for example, Vervoort and Gupta (2018) explore how foresight processes imagine diverse futures without clearly distinguishing between preferred and possible or expected futures. However, a clear distinction between the possible, expected, and preferred futures is what stands out in this research. The preferred and expected future are used to understand how the future is anticipated by policy makers. The possible future will be excluded from this study as previous research has shown the insignificance of possible futures in policy documents (Haarbosch et al., 2021)

Moreover, Veenman et al. (2023) differentiate between the use of futures and the making of futures. This differentiation, often overlooked in futures studies, will be integral in this study. In addition, the use and making of futures are part of and form the process of anticipation. When examining futures of climate change the notion of anticipation thus becomes of importance (Granjou et al., 2017). Despite the significance of this relationship, understanding the role and content of anticipation processes in future imaginations remains underdeveloped (Burch et al., 2019; Muiderman, 2020; Vervoort & Gupta, 2018). This raises the question of how futures are anticipated, which can be viewed in terms of conceptions of the future (Muiderman et al., 2020). Thus, examining these conceptions within anticipation processes is both necessary and urgent for understanding how climate futures are imagined and realised (Pulver & VanDeveer, 2009; Vervoort & Gupta, 2018). This research directly addresses gap of underdeveloped knowledge on the content of anticipation processes and addresses the need to explore how conceptions of the future shape anticipation processes.

Finally, this research will integrate anticipatory governance, a concept of transformative governance (Visseren-Hamakers & Kok, 2022). By focusing on the underlying societal causes of unsustainable practices within a specific context, it aims to contribute to the primary focus of transformative governance. Additionally, the study seeks to enhance the underdeveloped knowledge surrounding the role of anticipation processes and the use of futures. It will integrate several concepts used in futures research to provide a different perspective to study anticipation processes. Conceptions of the future, an integrative governance perspective, elements from anticipatory governance and the use of futures are applied to expand the understanding of how futures are utilized in policy and decision-making processes.

1.3 Societal relevance

Climate change is a so-called ''creeping crisis'', a slow-moving yet profound challenge that complicates governance and decision-making (Boin et al., 2021). Consequently, it has become unclear which governmental departments have to act and how they should act. This lack of clarity, combined with the transdisciplinary nature of climate adaptation, limits the capacity of nation-states and policy sectors to respond effectively. Therefore, integrated and multi-level governance approaches are necessary (Biesbroek & Candel, 2019). At the same time, the urgency of addressing climate change and its effects demands that adaptation policies are not only efficient but also generate significant societal value (De Gooyert & De Coninck, 2021; 't Hart et al., 2023). In particular, the alignment between climate adaptation and housing policies is crucial, as both sectors face pressing challenges that must be addressed simultaneously to maximize benefits. This research aims to uncover the establishment of (mis)matches between climate change adaptation and housing policies, offering insights into how these policies can be structured to complement each other. By identifying and addressing these (mis)matches, policymakers can create more effective strategies that contribute to multiple societal goals simultaneously, from reducing climate risks to addressing the housing shortage. Recognizing the process of future anticipation will allow policy makers in general to think about their policies in a more anticipatory way. By using a more anticipatory approach in policy making the implemented policies of one field, take housing, can become more aligned with other policy fields, such as climate change adaptation. This implies that policies, when implemented, would complement and reinforce each other, working toward a common purpose rather than conflicting when pursued in isolation to achieve their individual goal. Policy makers can use insights from this research to assess their own future assumptions and that of other policy fields in their municipality. Specifically, policy makers in the municipality of Arnhem can use the results of this study to improve their policies by aligning the implementation of housing and climate change adaptation policies. If policies in these fields complement each other, this would make the municipality of Arnhem more liveable and future-proof. It would improve the availability of good housing while simultaneously making the city more adaptive to climate change, benefiting its residents

2 Literature review and theoretical framework

This chapter illustrates and discusses literature relevant to this research. Its starts by discussing literature on transformations and conceptualisations of anticipatory governance. Following, relevant literature and existing theories regarding futures research are discussed to create a theoretical framework. Finally, the conceptual model of this study will be presented.

2.1 Transformations

The impact of climate change on both our present and future lifestyles underscores the imperative for change and the essential need to incorporate climate change adaptation into spatial planning (Roggema et al., 2012). This much needed change can occur in several ways. Which can be incremental change, transition change or transformational change. Whereas incremental change is a slow process, and transitional change is viewed as a fluent process, transformational change can alter the stable landscape itself to become a different kind of system or start from scratch when the current system becomes unsustainable due to social, economic, or ecological factors (Folke et al., 2010; Walker et al., 2004). Roggema et al. (2012) state that when dealing with futures that are uncertain, unexpected, and unprecedented, transformational change provides the best viewpoint. Transformational change thus provides a suitable way to address climate change adaptation in spatial planning.

When studying transformations, it is important to question the role of governance. This determines whether transformations are useful for consciously guiding society towards sustainability or are mostly limited to an ex-post role to characterise change processes after they take place (Patterson et al., 2017). There are several angles to study governance and transformations. In this study the perspective governance of transformations will be used. This perspective focuses on ways in which change is actively steered and triggered towards transformation. In this case, climate change and housing policy makers perform the act of actively steering and triggering trough implementing policies. Hence, the focus will not be on governing for transformations, which entails governance that establishes the foundation for complex dynamics in socio-technical-ecological systems to give rise to transformations. Nor will the focus be on transformations in governance, meaning changing the regime (Patterson et al., 2017). The approach governing for transformations would be less suitable for this study, as it focuses more on creating the enabling conditions for transformation, rather than directly steering change. Similarly, the approach of transformations in governance is not relevant in this research, as it relates to changes within the governance system itself, rather than the active management of transformations through policies.

Studying the governance of transformations can be performed by using the concept of transformative governance. Transformational change, as used by Folke et al. (2010) and Walker et al. (2004), neatly ties in with the concept of transformative governance (Chaffin et al., 2016). Transformative governance involves steering the change, rather than looking at the actual change taking place (Visseren-Hamakers, 2022). The process of steering the change can be hindered by capitalist economic systems, the cognitive capabilities of people and the established power dynamics (Chaffin et al., 2016).

The primary focus of transformative governance is on addressing the underlying societal causes of unsustainable practices in a specific context, leading to systemic societal change. This focus distinguishes transformative from conventional governance approaches (Visseren-Hamakers et al., 2021). While addressing or discovering these underlying causes, transformative governance considers the relationship between sectors, scales, issues and places and takes a precautionary approach in uncertain situations (Visseren-Hamakers & Kok, 2022). Especially the focus on the relationship between sectors and issues by transformative governance is of relevance for this research. The use of transformative governance can help to understand the relationship between two different policy fields, which is what this study focusses on.

Transformative governance, as proposed by Visseren-Hamakers & Kok (2022), entails the implementation of five governance approaches: integrative, inclusive, adaptive, transdisciplinary and anticipatory governance. The authors state that for governance to become transformative these governance approaches need to be:

- ''focused on addressing the underlying causes of unsustainability;
- implemented in conjunction; and
- operationalized in the following specific manners'' (Visseren-Hamakers & Kok, 2022, p. 10).

Integrative governance requires looking at the relationship between governance instruments and/or governance systems. These governance systems can be defined as all instruments combined on an issue at a certain level of governance (Visseren-Hamakers, 2018). Inclusive governance is operationalised as empowering and emancipating groups and individuals whose values embody profound shifts leading to transformative change, but which are not adhered to (Blythe et al., 2018). Adaptive governance needs to ensure that learning is integrated in its processes, as well as experimentation, reflexivity, monitoring and feedback (Chaffin et al., 2016). It must be adaptive to deal with the complexity that comes with environmental change (Visseren-Hamakers et al., 2021). To be adaptive key elements need to be in place. Certain elements are management with feedback loops, institutional and stakeholder diversity and networked policy actors (Meadowcroft, 2009). Transdisciplinary governance should acknowledge diverse knowledge systems and advocate for the integration of sustainable and equitable values. This can be achieved by having a focus on underrepresented knowledge (Keitsch & Vermeulen, 2021). Visseren-Hamakers & Kok (2022) operationalise anticipatory governance in a way that it entails proactively addressing future scenarios, challenges and uncertainties. Anticipatory governance is used to gain the capacity to deal with future situations, rather than reacting to them only when they occur (Burch et al., 2019; Guston, 2014). All governance is anticipatory to some extent, these anticipatory governance processes question possible futures by pre-experiencing and imagining complex and diverse futures (Burch et al., 2019). These assumptions about the future play a key role in guiding the overall governance approach, including the selection of pathways for transformative change and the strategies used to tackle sustainability challenges (Linnér & Wibeck, 2019; Visseren-Hamakers et al., 2021). By considering these assumptions, policymakers can anticipate potential future scenarios and design policies that are flexible and responsive to emerging needs.

Other scholars have used different conceptualisations of anticipatory governance. One emphasizes anticipatory governance as a structured prediction system as that can be used to collect information and perform analysis over a long period of time and linking these predictions to the process of policy making (Poli, 2009). Nordman (2014), on the other hand, highlights caution against determinism in anticipatory processes as future worlds are inherently unknowable. When engaging with uncertain futures, it is essential to acknowledge the inherently superficial nature of knowing the future. This conceptualisation emphasizes the limits of anticipation processes. A last distinct conceptualisation to anticipatory governance focusses attention on the political dimensions in its processes. The present-day political implications influence and create ''fabrications of the future'' (Jasanoff, 2015). Essentially it implies that collectively shared visions of desirable futures are shaped in tandem with scientific and technological development by interactions in the political dimension.

The conceptualisation to anticipatory governance presented by Poli (2009) takes prediction-oriented capabilities into account. By collecting data and analysing it over a longer period, policy makers or researchers can to a certain degree predict the future. The conceptualisation of anticipatory governance by Visseren-Hamakers & Kok (2022) shows the need for questioning complex futures to develop flexible and responsive policies. Their conceptualisation does not recognise capabilities to predict the future. The conceptualisation by Jasanoff (2015) highlights the political implications on anticipatory governance. The political dimension includes power dynamics and institutionalised preferences. This relates to the notion of colonising the future as discussed in the scientific relevance (Bourgeois et al., 2022). In practice these power relations play an important role in anticipatory governance, determining which futures are included, characterised, interpreted and criticised (Burch et al., 2019; Muiderman et al., 2023; Stirling, 2008). Although the significance of power dynamics in anticipatory governance is acknowledged, it does not fit within the scope of this research. The conceptualisation of anticipatory governance by Nordman (2014) critiques anticipation processes for acting deterministic and being to prediction oriented and thus the conceptualisation by Poli (2009). The issue highlighted by Nordman (2014) resonates with the precautionary stance to anticipatory governance in transformative governance conceptualised by Visseren-Hamakers & Kok (2022). This critique on deterministic anticipation of the future is also recognised by others who state that governance processes in practice often fail to critically examine diverse futures (Muiderman et al., 2022). Anticipation processes focused on prediction tend to restrict discussions, potentially affecting actions by prioritising certain futures over others, even if those alternative futures might be more favourable (Paprocki, 2019).

The conceptualisation of anticipation used by Visseren-Hamakers & Kok (2022) is most suited for this research, considering the critique on prediction oriented anticipatory governance. The idea that future scenarios are pre-experienced in a precautionary stance and used to determine actions in the present provides a strong foundation to operationalise future assumptions of housing and climate change adaptation. However, the concept of future assumptions in the context of anticipatory governance remains broad as it does not distinguish between the different processes involved in future anticipation, nor does it differentiate between various approaches to anticipating the future. This lack of specificity makes it difficult to systematically analyse how future assumptions are formed and applied. Futures studies literature provides these different categories and defining approaches to future anticipation, offering valuable insights to refine and further operationalise the concept of future assumptions for the purpose of this study.

2.2 Futures

Studying the topic of climate change and transformations can be defined as the study of futures (Burch et al., 2019). As transformations involve fundamental structural changes in systems, this also entails a purposively (re)imagination and pursuit of desirable futures. As Inayatulla (1993) puts it, futures studies utilise the future as a resource to address current issues or to make it possible to utilise the resources currently available more wisely and efficiently. To understand and study futures, it is important to have a classification and clear definition of the concepts used in the classification.

Veenman et al. (2023) differentiate between two ongoing processes related to futures: making of futures and using of futures. The making of futures happens every day at any moment one takes action. The underlying idea of the making of futures is that any action in the present will have an impact on the future, either big or small (Knappe et al., 2018). The impact on the future will either be known or unknown. In the context of climate change adaptation and housing the making of futures can be illustrated by an example of building 20.000 new houses in the Randstad, the most urbanised area in the Netherlands below sea level. As a result of the assumption that this area will need additional houses and expected sea level rise will be held back, the decision to build is made. The decision could also be to build houses in the most rural areas of the Netherlands above sea level. Because the assumption is that sea level rise will impact the Randstad and create inhabitable areas. Either way, by making a decision, other futures are closed off and certain futures are consciously or unconsciously, intentionally or unintentionally created. The decision to build in the Randstad could lead to flooding of an additional 20.000 houses in the future because the sea level rise turned out to be more intensive than expected. The houses built in the most rural parts of the Netherlands could turn out to have created beautiful villages free from the danger of sea level rise. The decisions and actions of the present lead to certain futures and close other futures.

Contiguous to the process of making futures is the use of futures (Veenman et al., 2023). This can be defined as the argumentation to make a decision or take action. When talking about using futures, it is about the part that anticipation of futures plays in processes like capacity building and improving our ability to create desired futures (Inayatullah, 2008). The examples mentioned before, illustrate the way in which the use and making of futures are intertwined. When making the decision to build houses in the Randstad, the anticipated future, or the future assuption, of the Netherlands being able to withstand sea level rise and the need for homes in the Randstad is used to justify this decision. The same process happens with the decision to build homes in the most rural parts of the Netherlands. The future assumption of not being able to withstand sea level rise and the Randstad therefore being a non-preferred living area in the future is used as an argumentation for the decision made. These examples illustrate the interconnectedness of making and using futures but also show its distinctions. Both the making of and the use of futures can be viewed as assumptions of what will happen in the future. Either by understanding the implications of a decision in the future (making of futures) or the argumentation to make a decision (use of futures). These concepts help to operationalise future assumptions in this study.

A broad array of futures studies has used the expected, possible and preferred futures as a categorisation of different approaches in their research (Amara, 1991). The expected future can be derived by extending current patterns and trends into the future, presenting a logical outcome based on historical events (Nowotny, 2010). This approach explicitly relies on assumptions about the future, specifically the expectation that certain patterns will persist consistently over time and that any significant changes or disruptions will either not occur or unfold in a predictable manner. Possible futures are always presented in multiple scenarios, where scenarios are future descriptions of what could happen (Enserink et al., 2013; Goodwin & Wright, 2010). The final category, the preferred future, differs from the expected and the possible futures by favouring normativity (Haarbosch et al., 2021). Instead of focussing on neutrality, it presents a desired future where backcasting can be used to derive ways towards this future.

Haarbosch et al. (2021) used the classical categorisation as used by Amara (1991) of the expected, possible and preferred future in their research on mismatches in future narratives. They explored mismatches between energy futures envisioned by policymakers and those imagined by citizens. The analysed documents are local, regional and national policy documents from Dutch municipalities, provinces and the national government. Their analysis showed that possible futures played an insignificant role in policy documents. As this study also uses Dutch local and regional policy documents for the analysis, the concept of possible futures will most likely play a minor role and will therefore be set aside.

The concepts of anticipation and futures relate to each other and form an important research agenda. Anticipation processes are used to ‘’anticipate’’ possible futures (Granjou et al., 2017). Every type of futures study incorporates anticipatory goals, yet they are distinguished by varying epistemological frameworks (Rossel, 2010; Ramírez & Selin, 2014; Wilkinson & Eidinow, 2008). Besides epistemologies of futures that can be concerned with probability or plausibility there are also other conceptions of the future.

Vervoort & Gupta (2018) Explain how all decisions and planning processes involve future assumptions on potential futures. These considerations about future take place when assumptions about the future remain implicit or unexamined, when the future is presumed to resemble the present, or when only a single possible future is acknowledged (Vervoort et al., 2015). Regardless of way the framing of futures occurs, it shapes processes of decision making (Wright, 2005). Muiderman et al. (2020) acknowledge this by explain how different conceptions of the future shape contemporary governance approaches and choices. The four conceptions of the future as presented by Muiderman et al. (2020) are:

1. The future is categorised in probable and improbable futures to reduce future risks in strategic policy planning. Assuming futures can be partially knowable through scientific exploration.
2. Plausible futures are explored, to navigate the future in a reflexive way and create adaptive capabilities. Because of the fundamental and ineradicable uncertainties, future scenarios cannot be prioritised or boiled down to just one most likely future.
3. Pluralistic futures are explored to create new futures and mobilise an array of societal actors. It expands the view on possible futures beyond the probable and plausible futures that are based on the present.
4. Futures are conceptualised in performative futures that analyse the performative power of these future imaginaries, critically examining the political implications on the present. The future is characterised by unanswerable questions and uncertainties. Acknowledging the performative power of future narratives, especially in influencing current decisions, highlights the complex relationship between imagined futures and current realities.

Muiderman et al. (2023) present a framework linking the notion of opening and closing futures presented by Stirling (2008) to the conceptions of the future. This framework states that governance processes using approach 1 appear to offer policy suggestions that align with existing policy frameworks, making them usually preferred when translating outcomes into policy decisions. They state that this approach closes down future possibilities, which in turn also leads to closing down the number of possibilities for action. Processes using this approach frame the world in non-inclusive and limited ways because of their assumptions in probable and improbable futures. Approach 1 closes down future possibilities and possibilities for action the most, with approach 4 closing down the least. Approach 4 conceptualises futures as performative futures. This conceptualisation offers a critical and reflective academic lens, where one can examine the political implications of the other future conceptions and the corresponding implications for current actions, as depicted in the other three approaches. It must be combined with one of the other approaches (primarily 2 and 3) to be used in practice. The first approach of conceptualising the future by Muiderman et al. (2020) aligns the best with the scope of this study, as the focus will be on policy decisions on a municipal level. The second conception of plausible futures has already been proven to play a minor role in policy documents (Haarbosch et al., 2021). As the conceptions of pluralistic futures and performative futures encompass an even more broad and reflective view on the future than the conceptions of plausible futures, they will not be integrated, given the focus and goal of this study.

2.3 Theoretical framework

Although studying the topic of climate change and futures can be defined as a study of transformations (Burch et al., 2019), not all governance approaches of transformative governance proposed by Visseren-Hamakers (2022) apply to this research. Considering the focus of this study, the (mis)matches between future narratives of climate change adaptation and housing policy makers, certain aspects of the transformative governance framework align well. The framework considers interrelationships among sectors, scales, and issues, which is inevitable to consider when researching a transdisciplinary issue like climate change. Additionally, transformative governance embraces diverse perspectives and adopts a precautionary stance in uncertain situations, aligning with the notion of anticipation of futures. These fitting characteristics of transformative governance relate mostly to integrative- and anticipatory governance, therefore these approaches will be used.

As stated before, taking an integrative governance perspective means looking at the relationship between governance instruments and/or governance systems (Visseren-Hamakers, 2018). This approach can significantly aid in conceptualising the relationship between space and politics, primarily through endeavours of sustainable urban and regional planning. It can also provide an understanding of the balancing act between development and environmental concerns. Thus, looking at the governance systems of climate change adaptation and housing makes integrative governance a suitable approach. The governance systems in this study are defined as all public policies of climate change adaptation and housing on the local level of the municipality Arnhem.

Anticipation and futures are two intertwined concepts (Muiderman et al., 2020). Anticipatory governance questions possible futures by pre-experiencing and imagining complex, and diverse futures (Burch et al., 2019). Anticipatory governance as used by Visseren-Hamakers & Kok (2021) focuses on the act of pre-experiencing futures. They define anticipation of the future in a general sense and fail to distinguish between various types of approaches to futures or differentiate between processes of future anticipation.

Veenman et al. (2023) showed the distinction between the making of futures and the use of futures. In this study the use of futures is used to further refine the concept of future assumptions. The use of futures reflects the argumentation, or the assumptions about the future, to make a decision or take action. Because this study aims to use future assumptions to understand how (mis)matches between future narratives occur the use of futures is more suited than the making of futures. The making of futures does not fit the research question because this study does not try to identify future implications of decisions which are the subject of research on the making of futures.

It is essential to distinguish not only between the use and making of futures but also to examine how the future is conceptualized (Muiderman et al., 2023). According to Muiderman et al. (2020), policy planning often frames the future in terms of probable and improbable scenarios. This perspective aligns with the notion of an ‘expected future,’ which extrapolates current patterns and trends into the future to create logical outcomes based on historical developments (Nowotny, 2010). In this study, assumptions about the future will encompass these expected futures, defined as expectations grounded in ongoing trends and patterns that underpin policy decisions.

This study conceptualises future assumptions as the expectations and arguments about the future that guide decision-making and action. These assumptions are based on the concepts of anticipation, use of futures and the expected future, where current trends, patterns, and anticipatory thinking inform predictions about what is likely to occur. Future assumptions also imply that when a preferred future is chosen in policy making, it is based on the expectation that all necessary events, conditions, and developments will unfold to bring that future to fruition. Essentially, future assumptions are the beliefs or expectations about the future that underpin decisions, including the anticipation that certain events or patterns will occur as required to achieve the desired outcome.

In this study, the concept of the preferred future is central to understanding how future assumptions are constructed. Future assumptions emerge during the drafting of policy plans, which are designed to achieve specific, desired outcomes. These future outcomes are envisioned in a policy goal, this can be described as a preferred future. Haarbosch et al. (2021) already showed that possible futures are not present in policy documents. Delineating future assumptions in policy documents will therefore be based on preferred futures. The preferred future and the future assumptions related to the preferred future are, in this study, conceptualised as future narratives.

Combined, the concepts of future assumptions and the preferred future collectively form a future narrative. Future narratives in this study entail the preferred future, commonly used (Amara, 1991; Enserink et al., 2013; Goodwin & Wright, 2010; Haarbosch et al., 2021;

Nowotny, 2010), and future assumptions that originate from anticipation, the use of futures and the expected future (Amara, 1991, Veenman et al., 2023, Visseren-Hamakers, 2021). Thus, a future narrative will consist of a policy goal (the preferred future) and future assumptions made by pursuing the policy goal.

2.4 Conceptual model

All the mentioned concepts provide the basis for the conceptual model that will be used in this research. The conceptual model, visible in figure 1, assumes a relationship between the preferred future and the future assumptions by climate change adaptation and housing policy makers. Drafting a preferred future creates certain assumptions about the future, but the reverse is also true where certain future assumptions of policy makers have an influence on the drafted preferred future. Together, the preferred future and the future assumptions create a future narrative. The assumptions and the preferred futures lead to (mis)matches between the future narratives of both systems. It is precisely these (mis)matches between future narratives this research attempts to uncover.

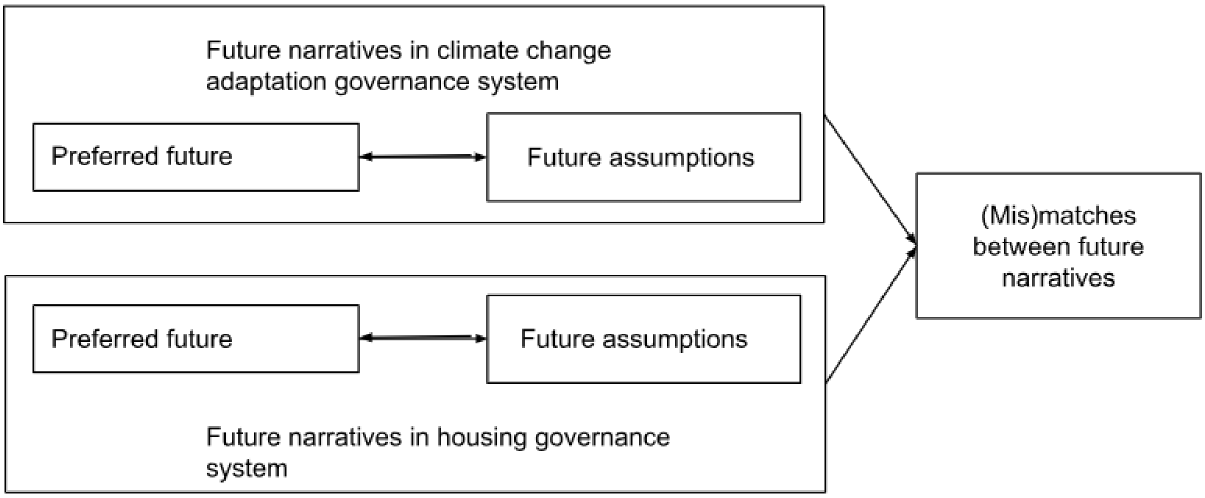

Figure 1: Conceptual model (own work)

3 Methodology

This chapter illustrates the choices made in this study regarding the methods, strategy and analyses that are used. First, the research strategy will be explained. Secondly, the research philosophy of this study and how this aligns with research is addressed. Thirdly, the research methods, data collection and analysis of this study are explained. Finally, the positionality of the researcher on this research is described. Reliability and validity of the research are addressed throughout the sections.

3.1 Research strategy

This research will conduct a single case study where the municipality of Arnhem is used to understand how and what futures are anticipated in climate change adaptation and housing policy. A case study can be used to explore and understand underlying phenomena in their real-life context (Stake, 1996). As this research tries to understand the phenomena of anticipating the future and whether certain (mis)matches are created this method is a suitable approach. Moreover, as the anticipation of futures and the establishment of (mis)matches involves context-dependent dynamics that are best studied within their real-life setting, a case study serves as a suitable method to investigate this. Yin (2014) emphasizes that a case study is particularly useful for studying phenomena where the context plays a critical role in shaping outcomes.

There are several criteria associated with selecting a case (Miles & Huberman, 1994). First, the case should be relevant to the conceptual framework and the research question. The conceptual framework and research questions of this study focus future narratives in the governance systems of housing and climate change adaptation on the municipal level in the Netherlands. Therefore, a Dutch municipality provides a good case. Secondly, the case selection should generate information that is rich on the phenomenon under research. The municipality of Arnhem fits this criterion as it already has extensive policies in place in the governance systems of housing and climate change adaptation. Moreover, due to its location along the Rhine River and its sloped terrain, Arnhem faces considerable challenges in adapting to climate change, with heightened risks of both flooding and drought while also suffering from a housing shortage that needs to be addressed (De Wit et al., 2007; Lijzenga et al., 2023). Thirdly, the case should enhance the generalizability on the results. Choosing a medium-sized municipality like Arnhem will make the results more generalisable to other municipalities than choosing a very small or large municipality. However, considering the physical, social and other context specific differences between municipalities in the Netherlands, the generalisability remains limited. Finally, the criteria of ethics and feasibility of the case are also met. As being a public entity and focusing on the way it addresses its challenges (such as climate adaptation and housing), does not involve directly investigating any vulnerable populations or require informed consent from individuals for participation. Furthermore, it is a feasible case because policies are publicly available through the municipalities' website. This study is performed under guidance of Companen, a research and consultancy company focused on the housing market and liveability, based in Arnhem. Besides the methodological justification for using Arnhem as a case as discussed above, there are additional characteristics that make Arnhem a suitable case for this research. As the internship company Companen was based in Arnhem, they could provide valuable local knowledge and had established contacts within the municipality, which made it easier to arrange interviews with policymakers.

Arnhem is a medium-sized municipality in the east of the Netherlands. It is part of the province of Gelderland and has around 165.000 inhabitants. The Veluwe, a Natura2000 area, can be found north of Arnhem. In the south lies a more urbanised area consisting of smaller neighbouring municipalities. Arnhem is characterised by height differences between the north and the south of the city where it is situated along the river rhine.

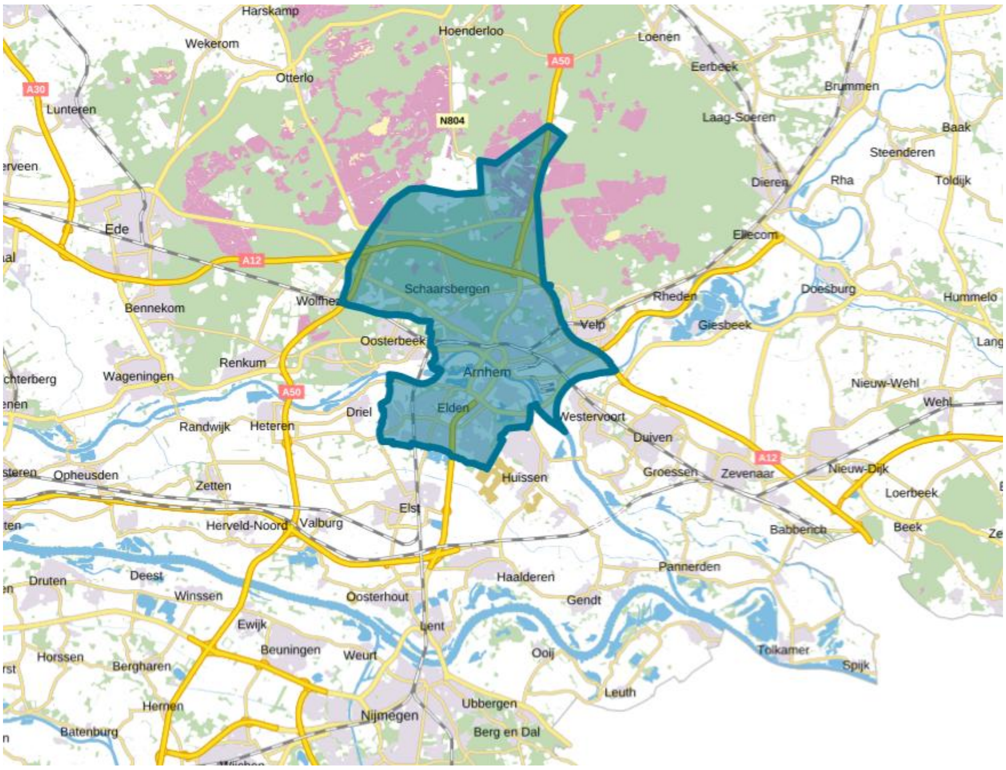

Figure 2: The municipality of Arnhem, highlighted in blue (PDOK Viewer, n.d.).

A qualitative policy document analysis will be used in this research. This method can be used to understand how people interpret and construct the world (Morgan, 2022). Based on the steps used by Wach & Ward (2013), inclusion criteria to select policy documents are created first. This involves defining the scale, which is the municipality of Arnhem, the relevant government departments and determining the sample size of policy documents appropriate for this research. The sample size in this study is defined by the governance systems of housing and climate change adaptation within the municipality. All policy documents related to these governance systems are included in the document selection process. Secondly, the collection of the documents takes place. All documents were available through online sources. Thirdly, areas of interest were formed. The areas of interest provide an important starting point for the analysis of policy documents. Farthing (2016) explains that getting familiar with the raw data, reading through the texts, deciding what parts will be analysed and in which themes is essential to start the coding process. Fourthly, the policy documents will be coded and analysed using Atlas.ti. A coding scheme based on the areas of interest is used in the first round of coding. During the coding process additional codes were added and irrelevant codes were removed. Fifthly, policy goals (preferred futures) and preliminary assumptions about the future will be identified based on the codes and the accompanying policy passages. The preferred futures that are found in the policy document analyses as well as the preliminary assumptions form the basis for the interviews with policy makers.

Policy makers responsible for drafting up the analysed documents or currently responsible for implementing the analysed policies are interviewed using semi-structured interviews to assess the identified preferred futures and find out which future assumptions are present. This process is referred to as member checking (Lincoln & Guba, 1985). Member checking can be used to validate the finding of the analysis. By asking the respondents if the preferred futures accurately represent their own views, the validity of the results increases. In case-study research the combination of different methods to gather and analyse data is recommended (Yin, 2014). By using a different method to collect the same data, triangulation is possible, which benefits the internal validity of policy document analysis (Morgan, 2022). Experts of both policy fields will be interviewed using semi-structured interviews. Semi-structured interviews are chosen because this allows for a thorough exploration of issues (Longhurst, 2009). Structured interviews could limit the possibilities of policy makers to elaborate on preferred futures and the future assumptions. Unstructured interviews, however, risk drifting away from the identified preferred futures and assumptions, potentially hindering the interviewers intended goals and decreasing the method's reliability due to inconsistencies in focus and outcomes. Finally, the matches and mismatches between future narratives of both governance systems are identified by analysing the assumptions, which are strengthened by input from the interviews.

3.2 Research philosophy

The research philosophy of this study is grounded in a bounded relativist ontology and a subjectivist epistemology. The ontology determines how reality is shaped. According to bounded relativism there are shared realities within bounded groups, whereas realities of various groups can be different (Moon & Blackman, 2014). In the context of this study, this applies to the reality of climate change adaptation policy makers and the reality of policy makers within the field of housing. By adopting a bounded relativist ontology, it is assumed that within these groups the same reality exists, but between groups the realities differ from each other. The subjectivist epistemology assumes that people's individual perspectives influence how they see and understand the world. This is about the ways people create knowledge and what knowledge is available to know (Moon & Blackman, 2014). For the issues addressed in this research, it would imply that the future narrative, which includes how the short- and long-term spatial development of the Netherlands should look and what events need to take place to reach this, depends on the individual’s focus. Specifically, this depends on whether the individual is concerned with the housing shortage or with adaptation to climate change

3.3 Research methods and data collection

The data collection for this research involves primary and secondary collection. The data collection starts with secondary collection by selecting and collecting relevant governmental policy documents. The relevant documents were found through government websites and were publicly available. Table 1 shows an overview of the selected and analysed documents in this study.

To enhance the reliability of data selection, it is important to assess how well the collected documents adhere to the requirements of this research (Hox & Boeije, 2005). The analysed policy documents are categorised based on their focus and scale. A regional scale involves multiple municipalities, whereas a local scale involves a policy document specifically for the municipality of Arnhem. Document collection and selection are important steps in this research as most results will be grounded in the used documents. It is therefore important to have an exhaustive collection. To ensure this, the involved internship company (Companen) was asked to give a different point of view to assess the selected documents and possibly point out documents that were missed. Fortunately, this was not the case. The selection of documents was also checked with the policy makers from the municipality during the interviews. This also did not cause an extension of the policy document selection.

Document	Focus	Date of release	Scale
Woonvisie Arnhem	Housing & climate change adaptation	2024	Local
Omgevingsvisie Arnhem	Housing & climate change adaptation	2023	Local
Verstedelijkingsstrategie Arnhem-Nijmegen-Foodvalley	Housing	2022	Regional
Woondeal Arnhem-Nijmegen	Housing	2023	Regional
Strategie klimaatadaptatie Arnhem	Climate change adaptation	2020	Local
Uitvoeringsagenda Klimaatadaptatief Arnhem	Climate change adaptation	2021	Local
Groenvisie 2017-2035	Climate change adaptation	2018	Local

Table 1: Selected documents, including the focus, date of release and scale.

After analysing the selected documents, a round of primary data collection took place trough semi-structured interviews with policymakers related to the field of climate change adaptation and housing in the municipality of Arnhem. These interviews were conducted online through a video-connection. By conducting the interviews online, finding a suitable moment was easier or even made possible as one interview was conducted while the interviewee was abroad during the interview. After the interviews were conducted, they were transcribed. Transcribing the interviews made it possible to use quotations to explain and justify the results and conclusions of this study. Table 2 below gives an overview of the policy makers that were interviewed, including their role and the reasoning for choosing them.

<table>
<tr><th>Respondent</th><th>Role</th><th>Reasoning</th></tr>
<tr><td>1</td><td>Housing policy maker and adviser at Arnhem municipality</td><td rowspan="3">By selecting municipal policymakers responsible for drafting or implementing the documents analysed, the researcher was able to validate their initial assumptions. Additionally, these interviews provided an opportunity to explore unresolved issues in greater depth, offering insights that went beyond what the document analysis could reveal.</td></tr>
<tr><td>2</td><td>Housing policy maker and adviser at Arnhem municipality</td></tr>
<tr><td>3</td><td>Housing policy maker and adviser at Arnhem municipality</td></tr>
<tr><td>4</td><td>Climate change adaptation policy maker and adviser at Arnhem municipality</td><td rowspan="2">By selecting municipal policymakers responsible for drafting or implementing the documents analysed, the researcher was able to validate their initial assumptions. Additionally, these interviews provided an opportunity to explore unresolved issues in greater depth, offering insights that went beyond what the document analysis could reveal.</td></tr>
<tr><td>5</td><td>Climate change adaptation policy maker and adviser at Arnhem municipality</td></tr>
</table>

Table 2: Overview of interviewed policymakers' role and reasoning.

3.4 Analysis

The analysis is conducted using deductive coding in Atlas.ti, following the guidelines from Miles & Huberman (1994) who recommend using a computer program to ensure a systematic approach. An iterative approach including several rounds of coding has been completed on the policy documents from the governance system of housing and the governance system of climate change adaptation (Van Thiel, 2014). The iterative coding process was conducted until no new codes emerged, to achieve data saturation in the policy document analysis (Braun & Clarke, 2019). This enhances the reliability of the findings by ensuring consistent identification of themes across the policy documents.

In the initial coding round, relevant sections of these policy documents were highlighted using the theoretical concepts of this study. The codes incorporate the theoretical concepts utilized in this research, as in deductive coding processes the theory reveals which concepts should be included (Van Thiel, 2014). In a subsequent coding round, based on the contents of the policy document a preliminary selection of various thematic codes was developed (Van Thiel, 2014). These codes include economic futures, climate change adaptive futures, housing futures, social/behavioural futures, technological futures, and sustainability futures.

These themes guided the coding of passages that express statements regarding the preferred future within the two governance systems. During this coding round, it was found that few to no passages corresponded to the themes of technological and social/ behavioural futures. Consequently, these themes were excluded from the analysis. Additionally, it was discovered that some passages initially classified under housing were better suited to a newly defined theme: spatial arrangement. A new code for spatial arrangement was created, and an additional coding round was conducted to assign passages to this theme. Certain passages were found to align with multiple themes and were accordingly categorized under various codes. The several rounds of coding eventually led to no new codes being added. Indicating that all preferred futures as well as all future assumptions that are visible to the researcher in the policy documents were assigned a code. Table 3 describes the exhaustive coding scheme, resulting of several coding rounds as an iterative process (Van Thiel, 2014).

Dimension	Sub-dimensions	Aspects
Preferred future	Preferred futures in climate change adaptation	- Economic - Climate change adaptive - Housing - Spatial arrangement - Sustainability
	Preferred futures in housing	- Economic - Climate change adaptive - Housing - Spatial arrangement - Sustainability
Future assumptions	Future assumptions in climate change adaptation	- Economic - Climate change adaptive - Housing - Spatial arrangement - Sustainability
	Future assumptions in housing	- Economic - Climate change adaptive - Housing - Spatial arrangement - Sustainability

Table 3: Coding scheme.

Following this coding round, the identification of various preferred futures for both governance systems was achieved. By creating an overview of the passages for each theme, several preferred futures were established, though they were still numerous and highly specific. A subsequent analysis grouped and combined specific preferred futures by content, resulting in fewer and more overarching preferred futures. For each preferred future, the preliminary underlying future assumptions were examined. Some of these future assumptions became apparent from the policy documents through coding, while others were identified through interpretation and discussions with experts from the internship organization (Companen). These preferred futures and the interpreted assumptions form the foundation for conducting the interviews.

Through the coding process, various preferred futures were identified and categorized based on thematic codes such as housing, economic, and climate change adaptation. The claims regarding different futures are supported by quotations from the policy documents (Perelman, 1982). This approach was used to addresses the issue of consistency in data interpretation and the analysis was performed with an emphasis on objectivity to strengthen internal validity. To further enhance internal validity, the coding scheme, coded texts, methods employed, and anonymized interviews will be made available (Van Thiel, 2014). Although the coding process was performed as objectively as possible, the inter-coder reliability in this research is low (Nili et al., 2020). Inter-coder reliability ensures that the results of a study are not formulated based on the subjective coding process of a single coder but are based on a consensus of several different coders. As this coding process was only performed by a single coder it establishes low inter-coder reliability, increasing the risk of bias in the results.

The second part of the analysis takes place after the data collection through conducting interviews. The data collected from these interviews is utilized to identify the future assumptions made by policy makers with certain preferred futures. The interviews started with broad and open questions. Policy makers were asked about the most important, hardest and easiest challenges the municipality faces in the future. The broad and open questions were meant to capture the true perspectives of the policymakers without influencing their responses based on predefined preferred futures, possibly containing research bias, which ensures higher content-validity. After asking broad questions, more specific questions about the identified preferred futures and assumptions were asked. These questions focused on verifying the preferred futures and future assumptions, as well as discovering missing elements or new assumptions. The full interview guides are available in the appendix for clarification. After transcribing the interviews, each preferred future was analysed again. This time the focus was on identifying the assumptions. By using the interviews, it became possible to verify and further explore the assumptions about future events associated with each preferred future, offering deeper insights into the reasoning behind the policy objectives.

The final part of the analysis includes defining the matches and mismatches between the future assumptions and preferred futures. First overlapping future assumptions within the policy fields are derived. This includes matching similar future assumptions of different future narratives within a policy field. This step of assessing the internal overlap of future assumptions helps strengthen the final part of the analysis. It makes the analysis of the matches and mismatches between future narratives more comprehensive as it becomes possible to match and mismatch several future narratives simultaneously. Finally, the matches and mismatches between the preferred futures and future assumptions are made. This is done by systematically juxtaposing each future assumption of housing with the future assumptions of climate change adaptation and vice versa.

Because there are no facts about the future, reliability of the results in futures research is hard to meet. Researchers focus should therefore be on whether predictions regarding future trends and events can be reliably repeated rather than concentrating on whether the actual trends or occurrences can be duplicated (Amara, 1991). Therefore, to increase the reliability of the results, this study focuses on how and what futures are anticipated by policy makers in the field of housing and climate change adaptation. Whether the future assumptions of policy makers that are used in the analysis will materialise is not included in this study.

Positionality of the researcher could impact the validity and reliability (Holmes, 2020). For example, when analysing the policy documents, certain implicit preconceived ideas of the researcher about the preferred futures might lead to overlooking or over exaggerating certain results. Not only do preconceived ideas of the researcher create the possibility of bias, also the policy documents itself can be biassed (Morgan, 2022). When using futures to analyse policy documents one should consider that institutions distort language in order to serve a particular interest. Certain futures could for example question the current power structures. The examination of those interests, as well as the strategies they use to acquire and hold onto power, serve as the basis for determining what future visions are both plausible and likely to come to pass (Inayatullah, 2013).

4 Results

In this chapter the results of the policy document analysis and the analysis of the conducted interviews are presented. For each governance system future narratives are defined, which will be presented by showing the preferred future and the future assumptions. After delineating the future narratives, the preferred future, its assumptions and internally overlapping future assumptions, matches and mismatches between the assumptions will be presented.

4.1 Future narratives of housing

4.1.1 Social housing corporations build new housing in neighbourhoods which currently have few social housing and preserve their social housing stock in vulnerable neighbourhoods

In the municipality of Arnhem there is a division within the city between neighbourhoods with few social housing and a lot of social housing. The municipality envisions a future in which there is an *undivided city where everyone can live, irrespective of their income* (Housing policy maker, personal communication (PC), April 23, 2024). This future includes an equal spread of housing supply throughout the city; *we have the task to increase the number and share of social housing in resilient neighbourhoods* (Gemeente Arnhem, 2023, p. 37). Social housing corporations are responsible for building housing with a social rental price and are therefore part of this preferred future. Because there are *currently not enough social rental houses, we want social housing corporations to be frugal on their current stock* (Housing policy maker, PC, June 18, 2024).

This policy goal can be categorized as a preferred future. The municipality wants to reduce the social divide within the city and therefore sees this future as part of the solution. Based on the interviews with policy makers from the municipality it became clear that this future has some obstacles to be achieved and will not materialize based on current trends.

Future assumptions

To build social rental housing *the most important prerequisite for this to be achieved is that social housing corporations or the municipality have enough money* (Housing policy maker, PC, June 11, 2024). Because of the increase in construction and material costs in the past few years as well as the costs of acquiring land, *the corporations barely break even on their newly constructed houses* (Housing policy maker, PC, June 11, 2024). Any additions such as parking facilities are no longer possible, unless the municipality or the state are willing and able to pay for it. Thus, a future in which social housing corporations have enough financial resources, as well as governmental institutions is assumed.

To build more social housing in the richer neighbourhoods of Arnhem *the municipality needs to explicitly take charge by buying land and must be very clear in their policy about the required amount of social housing and the locations of these houses* (Housing policy maker, PC, June 11, 2024). This prerequisite differs from the need for money in that the municipality must actively purchase land and implement a clear policy about new locations for social housing. If the policy is not clear *developers will possibly buy land very expensively, expecting to build expensive houses* (Housing policy maker, PC, June 11, 2024).

Building enough affordable housing will continue to be difficult in the future because of additional demands from different policy domains in housing construction. *To reach the desired amount of affordable housing ambitions concerning nature inclusiveness and circular might be limited* (Housing policy maker, PC, June 18, 2024).

4.1.2 In 10 years, there will be enough affordable housing for the current and new residents of Arnhem

The municipality has set a goal to have *in 10 years enough housing for our current residents as well as for new residents* (Gemeente Arnhem, 2023, p. 25). Affordable houses will be created in both the rent and buy sector. In the construction task the priority in the coming years will be on affordability and creating housing for people with the lowest income (Housing policy maker, PC, April 23, 2024). Affordable in this context means for 2024 a maximum of €390.000 in the buying sector, and social housing prices (<€880) in the renting sector.

Housing policy makers consider this one of the biggest challenges as well as one of the most important ones for the municipality to realise (Housing policy maker, PC, April 23, 2024; Housing policy maker, PC, June 11, 2024; Housing policy maker, PC, June 18, 2024). Consequently, because extending past trends will most likely not lead to this future and it is a desire from the municipality to achieve, this policy goal can be classified as a preferred future.

Future assumptions

The construction of affordable housing typically involves addressing an ''unprofitable top'', which necessitates public funding to make these projects feasible. An unprofitable top refers to the part of a project which is not cost covering and does not generate a return. Therefore, costs exceed the revenue from rentals or sales. Making a profit cannot be the primary objective in this type of housing construction (Housing policy maker, PC, April 23, 2024). This unprofitable top is usually financed by housing corporations, municipalities, provinces and ultimately the state. Municipalities rely on financial support from the state and provincial governments to realize these developments. When costs rise the first areas affected are often circularity measures or interior features of the homes, exactly where costs are cut depends on regional agreements (Housing policy maker, PC, June 18, 2024). To minimize costs a consistent political direction should be clear, no switching in policy, criteria and demands in the short term (Housing policy maker, PC, April 23, 2024).

Cutting costs in the social domain, on welfare, healthcare and social support will be enough to prevent the cutting of costs in the spatial development sector (Housing policy maker, PC, June 11, 2024). The municipality has determined in its plans that there will be no budget cuts in the spatial development sector, but rather in the social domain. Even if this leads to delays in construction, the municipality has decided that it *rather builds a little bit slower and create a good affordable housing product*, instead of building as much affordable housing as fast as possible and regretting the product in the long term (Housing policy maker, PC, June 11, 2024).

All the (affordable) houses will be constructed within the city's boundaries and will comply with criteria such as no increase in wind chill temperature, sustainability and parking norms. Despite this being more risk-laden and costly. At the same time, it is assumed by the municipality that the affordable housing challenge as well as the climate change adaptation challenge can be solved simultaneously, because *these challenges have different municipal funds* (Housing policy maker, PC, June 11, 2024).

4.1.3 In housing construction, green spaces and population composition are the top priorities

When constructing new houses by infill the municipality will look very carefully at the plants and green structures already present and leave them as much as possible. National park De Veluwe, *but also a single tree, is therefore a real obstacle when building new houses* (Housing policy maker, PC, April 23, 2024). Putting population composition first means *building to decrease the divide within the city's neighbourhoods, creating a more equal division of gains and losses across the city* (Housing policy maker, PC, April 23, 2024).

Policy makers from the municipality state *finding locations and affordability are the biggest challenges* to realise (Housing policy makers, PC, June 18, 2024). Policy makers don't assume this future is self-evident, but they do want it to unfold. Scarcity of locations in combination with realizing affordable housing are what make this a desired, and not an expected outcome of the past and thus a preferred future.

Future assumptions

The assumptions made by envisioning this future are in large part in line with the assumptions that belong to the future ''Social housing corporations build new housing in neighbourhoods which currently have few social housing and preserve their social housing stock in vulnerable neighbourhoods.'' There is one additional assumption specific for this future which is addressed here.

To prioritize green development in housing construction, it must be possible to densify the existing city without reducing the current amount of green space. Densification in contrast to building in an expansion site is a *more complex, challenging, expensive, and risk-laden process* (Housing policy maker, PC, April 23, 2024).

4.1.4 Social interest takes precedence over economic interest in housing construction

When deciding on or approving of new housing construction projects the municipality will choose to maximize social benefits instead of maximizing financial benefits. This means that *when constructing new housing the goal is not to make as much money as possible but build what the city and its residents require* (Housing policy maker, PC, April 23, 2024). Putting this in practice would mean *realising projects with a lot of social rental housing and a lot of space for green areas* (Housing policy maker, PC, June 11, 2024).

This policy goal can clearly be classified as a preferred future, because it is a desire from the municipality to reduce the social divide within the city by putting social interest first in housing construction. Moreover, there are no expectations among policy makers that extending current trends and processes will create a future where this is the case.

Future assumptions

To realise social gains above financial gains in every new construction, it is assumed that private developers who already own land, which has the legal destination of housing, are willing to abide to this goal. Because *making restrictions for prices of newly build housing is not possible on land which already has a destination housing* (Housing policy maker, PC, April 23, 2024). If a developer owns land and it is still possible for the municipality to make price restrictions of newly build housing, the municipality is still dependent on developers. The municipality can't force developers to start building the houses (Housing policy maker, PC, June 11, 2024). Developers can decide to delay the start of construction, sometimes even with multiple years and possibly wait for a political shift in the municipal council or more favourable times.

The national government has imposed nationwide requirements for the construction of new housing, 2/3 of new construction needs to be affordable of which 1/3 is social housing. *By making this a restriction, developers are willing to do this, therefore it is important that the state maintains these restrictions to keep developers on board of this goal* (Housing policy maker, PC, June 11, 2024). An unchanged political direction from the national government is thus important to realise the maximization of social benefits instead of financial benefits.

Private developers are not willing to pay for the unprofitable top, *building for social gains requires building social housing which often lead to unprofitable tops* (Housing policy maker, PC, April 23, 2024). The unprofitable top requires additional funding from governments, *if* *funding from the state or province stops, we will need to revise our ambitions* (Housing policy maker, PC, June 11, 2024). As a result, continued funding from governmental institutions is thus necessary to fulfil this future.

4.1.5 Make better use of the current housing stockpile

To create a diverse supply of housing in Arnhem, the municipality *wants to maximally use the current housing stockpile in a more effective and intensive way* (Housing policy maker, PC, April 23, 2024), because housing is scarce and *the supply of certain housing types is not in balance with their demand* (Housing policy maker, PC, June 11, 2024). The stockpile of social housing corporations consists mainly of single-family houses or even larger houses. However, their target group mainly consists of one or two person households. They make better use of the stockpile by making house-sharing more frequent. This involves splitting larger houses to accommodate more households within the same area and adding additional housing by constructing an extra layer on top. These measures apply to both corporation owned and privately owned housing.

To help address the housing shortage the municipality envisions a future where the current housing stockpile is used more effectively. However, this is not self-evident, homeowners need to be encouraged, legal adjustments need to take place and liveability standards should remain the same or improve. As it requires legal adjustments and a change in current behaviour, extending trends of the past will not lead to this future situation. Therefore, it can be classified as a preferred future.

Future assumptions

House-sharing, splitting and topping up of housing in the social housing sector *requires very good agreements with the social housing corporations on how to do it* (Housing policy maker, PC, June 11, 2024). To maintain or increase current liveability standards in neighbourhoods it is important to set criteria for sharing, splitting or topping up. When splitting, sharing or topping up *legal adjustments to the omgevingsplan (*environmental plan*), parkeernota (*parking policy) *and in some cases the natuurbeschermingswet (*nature protection law*) are often required* (Housing policy maker, PC, April 23, 2024). This decreases the number of social houses which become eligible for this, *the amount of living additional living spaces created will be in the hundreds, not thousands* (Housing policy maker, PC, June 11, 2024). Because the social housing corporations own a lot of houses in Arnhem and work closely together with the municipality it is much easier to realise larger numbers in contrast to private homeowners.

Persuading private homeowners, often older people, who live by themselves or with two people in very large houses to split their home is *harder as these individuals do require some encouragement to take this step* (Housing policy maker, PC, June 11, 2024). The municipality will use a ''splitting coach'' to help and encourage people to split their house. This coach will go door to door to inform residents about splitting and show people where and how to start if they want to split their house. This coach will need to clear doubts and increase the willingness of particularly older people to split their house.

4.1.6 We need to build more houses that are suitable to live in for longer, resulting in more available houses for first-time home buyers and families

The increasing population of older people will require different approaches on how to deal with 'living with care', as *the group of single elderly people that lives independently at home will increase fast* (Gemeente Arnhem, 2023, p. 64). In the future there will not be enough places in care-homes for older people which requires a different approach to living with care (Gemeente Arnhem, 2023). We need to build more houses where old people can live longer. Creating lifetime homes for older people will free-up houses for first-time home buyers and families. By *creating attractive lifetime homes for older people, a flow in the housing market can be established which will free up houses for first-time home buyers and families* (Gemeente Arnhem, 2023, p. 24). Older people, who now live in larger houses, will move out of their current house to these lifetime houses. The larger houses will become available for first-time home buyers and families (Gemeente Arnhem, 2023).

The future in which older people will move out of their large house into a lifetime home and leaving their house for a first-time home buyer or families is not certain. Policy makers indicate realizing this is not an easy task and simultaneously desire the outcome, it should therefore be classified as a preferred future.

Future assumptions

The need to build more lifetime homes is based on the assumption that the amount of older people will increase in the future. Although this seems like a very logical and fixed future scenario, until it materializes it must be viewed as an assumption.

Every neighbourhood of Arnhem has older people who could be persuaded to a lifetime home, *because older people mainly want to live in the neighbourhood they already live in* (Housing policy maker, PC, June 11, 2024). However, the municipality *expects these lifetime home to be built unevenly throughout the city* (Housing policy maker, PC, June 11, 2024). Most older homeowners have paid of their mortgage and therefore have very low living expenses. If a lifetime home is a rental house, living expenses of people will most likely increase. Even though homeowners can sell their house, most of them will need to leave a home, street and neighbourhood they possibly lived in for many years or their whole life and need to start paying rent each month. This means that the willingness of older people to move into a lifetime home is a crucial prerequisite for this future to become reality (Policy consultant Companen, PC, 2024).

To classify a house as a lifetime home, it requires a lot of criteria such as *barrier-free rooms, a lift and a wheelchair friendly design* (Housing policy maker, PC, June 11, 2024). Newly constructed buildings need to comply with buildings codes and are in theory all lifetime suitable, including heat resistance. Housing policy makers do not use heat resistance as a criterium for a lifetime home when assessing or adjusting current houses.

Creating more lifetime homes as well as building affordable housing both present challenges. Therefore, monitoring the amount of lifetime homes that are present in the municipality provides possibilities to interfere and adjust their policies and plans. However, housing policy assumes that building enough lifetime homes will be achieved without monitoring the amount as, *the municipality does not keep track of the amount of lifetime homes present in Arnhem* (Housing policy maker, PC, June 18, 2024).

4.1.7 Housing development takes place within urban areas through densification

To reduce the shortage of housing in Arnhem, new houses will be constructed. Because building outside the city is irreversible and building trough densification allows the municipality to adjust the urban environment when demographic developments require this, the construction of new houses will all take place within current city limits resulting in densification of the city (Gemeente Arnhem, 2023).

This policy goal can be categorized as a preferred future, it also contains expectations by the municipality of Arnhem, that *this is easily achievable because Arnhem does not have any more suburban areas to build new houses* (Housing policy maker, PC, April 23, 2024). The municipality desires to build new housing within urban areas to preserve current green structures and be able to adjust the environment in the future when this is required.

Future assumptions

The municipality of Arnhem is not able to expand anymore according to policy makers; the expansion is blocked by national park De Veluwe in the north, by water in the east and by other municipalities in the south and west. Policy makers of Arnhem refer to this future as easily achievable because we don't have the possibility to give out new land positions outside of the city's boundaries where we can build new houses (Housing policy maker, PC, April 23, 2024). *At this moment there is an old Vinex location which is already been built up on the edge of the city* which policy makers *would not call out of the city anymore* (Housing policy maker, PC, June 11, 2024). Policy makers thus assume in this future that nature and other green areas will not be disclosed for housing construction.

4.2 Future narratives of climate change adaptation

4.2.1 Social housing corporations make their houses and terrains adaptive to climate change

Social housing corporations have a lot of houses and terrains under management. They will make an effort to make these houses and terrains adaptive and will work together with other social housing corporations in the municipality to achieve this. *The municipality has high expectations from the corporations* (Adaptation policy maker, PC, April 15, 2024).

Making terrains and housing adaptive to climate change is not a core business of housing corporations and therefore not their primary focus. Moreover, they don't have the specialized knowledge to do this efficiently (Policy consultant Companen, PC, 2024). Extending past trends will therefore not lead to this future, which is why this future can be classified as a preferred future.

Future assumptions

Because *making houses and terrain climate change adaptive is not a core business of housing corporations* (Policy consultant, Companen), they will be able to acquire this knowledge, learn from each other and put it in practice. Social housing corporations will make it one of their priorities to increase the adaptive capabilities of their possessions. They invest both financial resources and time to address this issue. For social housing corporations *building new housing is priority number one now, secondly making their stockpile more sustainable and thirdly come adaptation measures* (Adaptation policy maker, PC, July 8, 2024). Corporations will find a way to make their houses and terrains more adaptive without raising rents for their tenants, which often cannot be done. Corporations are willing to address the issue and are willing to work together with the municipality, each other and their tenants to make their houses and terrains more adaptive (Adaptation Policy maker, PC, April 15, 2024).

4.2.2 The housing challenge and climate change adaptation need to be combined on policy and implementation level

Climate change adaptation will ride on with developments in the fields of the energy transition, restructuring and the development of new areas (Gemeente Arnhem, 2020). Because of this climate change adaptation will be aligned with these other challenges on a policy and implementation level. The alignment will take place by considering adaptation practices as soon as people start thinking about a new development or restructuring. *Right now, a new built development always means a worsening of the adaptive capabilities of the city*, therefore by aligning it on a policy and implementation level *it means thinking about how a development does not lead to a worsening of the situation as it was* (Adaptation policy maker, PC, July 8, 2024).

In the past there has not been a combination of housing and climate change adaptation at the start of the design process. This future thus requires a shift in current trends and is a desire from the municipality to take place, it can therefore be classified as a preferred future.

Future assumptions

A delay in housing construction will not cause the implementation of adaptation in housing construction to be neglected as *the additional task of adding adaptation measures could possibly lead to delays in housing construction plans* (Adaptation policy maker, PC, July 8, 2024). If additional measures do lead to a delay in construction plans, climate change adaptation is to be important and implemented well enough, so developers and also the municipality will not dismiss it.

It is assumed that policy makers from housing and climate change adaptation have the same views on how to combine these challenges on a policy level. For this combination to take place, policy makers from both fields will work and decide together on how to implement it. It might also require a new way of collaboration between the municipality and developers.

4.2.3 There is a shared responsibility to make the city of Arnhem adaptive to climate change

In its policy documents the municipality stresses the importance of a shared responsibility to make the city adaptive to climate change. This responsibility is shared between the municipality, fellow government organisations, residents, private companies and other institutions (Gemeente Arnhem, 2023). Because most of the built environment in Arnhem is not owned by the municipality, making the city adaptive requires a collaborative approach between all stakeholders. Every stakeholder must be responsible for its own property. The municipality will behave like a partner and will support local initiatives in neighbourhoods. Depending on the type of neighbourhood the municipality will *mainly focus on supporting or they will take the lead, which mostly happens in vulnerable neighbourhoods, but not exclusively* (Adaptation policy maker, PC, April 15, 2024). For every neighbourhood the municipality will draft neighbourhood greening agenda's, which will be produced in cooperation with residents and other stakeholders.

This policy goal can be categorized as a preferred future, because the municipality has a desire for a future in which the responsibility of creating an adaptive city is shared. By extending current trends this future will most likely not take place as the awareness needed amongst all stakeholders will need to be created by effort of the municipality (Adaptation policy maker, PC, July 8, 2024).

Future assumptions

For the municipality to take its responsibility, there will be enough resources in the form of time and money available at the municipality to create awareness and to take the lead in neighbourhoods where this is necessary. Taking the lead involves *organizing resident information evenings, think-along sessions with residents and taking actual adaptation measures* (Adaptation policy maker, PC, April 15, 2024). Aligned with this assumption, the municipality will be able to create enough awareness for residents to take action. Residents, companies and institutions will need to feel the urge to act or join processes lead by the municipality. The willingness to act in making their properties more adaptive is especially important because *making the built environment climate change adaptive does not bring any revenue, while making buildings more sustainable does create a revenue in reduced costs* (Adaptation policy maker, PC, July 8, 2024). Even though making a building more sustainable raises money and adaptation measures do not immediately, stakeholders will choose to act on both issues simultaneously.

4.2.4 Constructing new housing will not happen at the expense of climate change adaptation

With the construction of new housing, climate change adaptation measures will be considered when designing the structure of a building and the general plan. Parks, nature and other existing green space will not be sacrificed at the expense of building houses.

Adaptation policy makers mention that a different political administration in the municipality could choose to loosen the ambitions on preserving existing green space, however the expectations of this are very low *considering the value residents of Arnhem give to their green space* (Adaptation policy maker, PC, July 8, 2024). Considering climate change adaptation measures in housing constructing has not been done sufficiently in the past while it is a policy goal, extending past trends will therefore not lead to this future. This future situation can therefore be classified as a preferred future.

Future assumptions

Every newly constructed building means a worsening of the adaptive capabilities of the city. This means to achieve this goal, *for every new construction climate change adaptation measures should be taken into account at the drawing board stage of a construction* process (Adaptation policy maker, PC, July 8, 2024). It needs to be one of the primary focus points when designing a new building. The (increasing) pressure because of the housing shortage will not cause this focus to shift or lower adaptation ambitions.

4.2.5 A nature-inclusive points system will lead to climate change adaptive new developments

With every new development in the municipality the developing party needs to score a certain number of ‘’nature inclusive points’’. They can choose themselves from a list which measures they implement. Each measure has its own set of points. The amount of points a developer needs to attain depends on the size of the development, the price of the housing (social housing, middle class, upper class) and if the developer will design parts of public space. The higher the number of houses, the more points it will have. Upper-class developments require more points than social housing projects, and additional points are also required for the development of public spaces

Although the points system has been implemented in 2021, adaptation policy makers in the municipality point out that *not all new construction will be adaptive in the first few years, because it will not lead to thinking at the start of the design process* and *we have a minimum requirement by implementing this system, but I do not think it will be enough* (Adaptation policy maker, PC, July 8, 2024). Because the extension of current trends is not aligned with the desired future situation, it can be classified as a preferred future.

Future assumptions

A lot of measures in the points system include adding more green space such as plants and trees. In periods of drought these green spaces need access to water. Smart ways to keep water close to green spaces such as subsurface water retention systems will be installed. Green spaces should not be watered using *big diesel-powered trucks, this is not good* (Adaptation policy maker, PC, April 15, 2024).

Developers who are ambitious and try to get a lot of points, would also have taken these measures if there was no points system (Adaptation policy maker, PC, July 8, 2024). Developers with less ambition *will try to get the bare minimum or even go to the municipality and try to lower their adaptive construction obligations* (Adaptation policy maker, PC, July 8, 2024). The assumption is made that these wishes will not be granted by the municipality and developers will continue to construct new housing while abiding to the points system.

Developers who operate nationwide are willing to and can deal with specific aspects of the system in Arnhem. There is no climate change adaptation system that has been implemented throughout the whole country. That approach is ineffective; *one cannot instruct a developer operating on a national scale to accommodate the specific preferences of all the various municipalities* (Adaptation policy maker, PC, July 8, 2024). Despite this mosaic of adaptation requirements, it is assumed that developers will be able to use the points system in Arnhem effectively.

4.2.6 We need to set up cooling areas around care-homes and make houses of older people more heat resistant

The amount of older people is expected to increase, which will also increase the vulnerability of the city, because older people are more vulnerable to extreme heat. To combat this increase in vulnerability the municipality will need to set-up areas which can be cooled around care homes to accommodate elderly people in days with extreme heat. In addition, the heat resistance of houses for older people should increase as well.

The set up of cooling areas and making houses of older people more heat resistant can be classified as a preferred future. The municipality expects an increase in vulnerability and wants to realise a future in which the vulnerability is reduced. They prefer to see a future in which this vulnerability is reduced by setting up cooling areas and making houses more heat resistant.

Future assumptions

The need to set up cooling areas around care-homes and making housing of older people more heat resistant is based on the assumption that the amount of older people will increase in the future. Although this seems like a very logical and fixed future scenario, until it materializes it must be viewed as an assumption.

Uncertainties surrounding this issue must be resolved. It must become clear who is responsible for making houses with vulnerable older people more heat resistant and how to do it, *who takes responsibility for this is and how to do this is not clear yet* (Adaptation policy maker, PC, April 15, 2024).

When creating lifetime homes, newly constructed houses will all be heat resistant due to national building codes. However, already existing houses that are lifetime homes should be heat resistant as well. To increase the amount of heat resistance houses for older people, *this should be part of the criteria to call a house a lifetime home* (Adaptation policy maker, PC, July 8, 2024).

4.2.7 Densification of the city is not allowed to create an increase in wind chill temperature

An increase in building volume within the city must not lead to an increase in the wind chill temperature on days with extreme heat. Measures to prevent this must be implemented with every densification activity. *The municipality tries to achieve this through the nature-inclusive points system* (Adaptation policy maker, PC, April 15, 2024).

This policy goal can be categorized as a preferred future. The municipality does not measure or review construction projects after implementation if the densification does not lead to an increase in wind chill temperature. *It is very uncertain if a construction will have zero influence* *on the city and the wind chill temperature* (Adaptation policy maker, PC, April 15, 2024). The policy goal describes a desired state of the future which is not an expectation of current trends.

Future assumptions

To achieve this *for every new construction climate change adaptation measures should be considered at the drawing board stage of a construction* (Adaptation policy maker, PC, July 8, 2024), which is in line with the assumptions within the preferred future that construction of housing will not happen at the expense of climate change adaptation. Important aspects to consider in the drawing board stage are *material choice, positioning, structure and hight of the building, shading and reducing heat emission from cooling installations such as air conditioning* (Adaptation policy maker, PC, July 8, 2024).

4.3 Overview

In this paragraph an overview of the preferred futures and its assumptions is given. This overview makes it possible to identify frequently and infrequently used assumptions and reveals how assumptions relate to each other within and across governance systems. For the sake of clarity, the preferred futures and the future assumptions are presented in a table (Table 4). Preferred futures for each governance system are placed close to preferred futures within their governance system that share similar assumptions and close to preferred futures of the other governance systems that have differing or even contradicting future assumptions. A short description of the assumptions of each preferred future is given. The numbers in the columns relate to the corresponding preferred futures in the results sections 4.1 and 4.2 above. The preferred futures and the assumptions associated with the future together form the future narrative. In the following sections on matches and mismatches, future narratives will be referred to by using the letters H (for housing) and A (for adaptation) and the numbers corresponding to table 4. For clarity, this means that H1 relates to the preferred future of housing on social housing corporations building new housing and preserving their current social housing stock, along with the related future assumptions.

To systematically analyse the matches and mismatches between the future narratives of both governance systems, it is helpful to uncover the internal overlap between future narratives within the governance systems themselves. Below the overlapping future assumptions within the governance systems of housing and climate change adaptation are presented.

Within the governance system of housing several future assumptions are used in multiple preferred futures. The assumption that social housing corporations and/or the municipality have enough financial resources frequently arises. This assumption takes place in preferred futures H1, H2, H3 and H4 within the housing governance system. In the same preferred futures of housing another recurring assumption becomes visible. In these futures a consistent political direction and municipal implementation are assumed. Preferred futures H1 and H3 even show more overlapping assumptions. The assumption that ambitions concerning nature inclusiveness and circularity might be limited are also present in both preferred futures. The assumption that older people will need to be convinced or persuaded to take action is present in preferred futures H5 and H6 of housing. Finally, overlapping assumptions are visible between preferred futures H3 and H7 of housing, which both assume that densification of the city is possible without reducing the amount of green space. Some assumptions appear only once within the governance system of housing. The assumptions that private developers with ongoing housing plans show willingness, that heat resistance is not part of the criteria of lifetime homes and that the municipality does not keep track of the amount of lifetime homes are specifically related to one preferred future.

Future narratives housing			Future narratives adaptation		
H	**Preferred future**	**Future assumptions**	**A**	**Preferred future**	**Future assumptions**
1.	Social housing corporations build new housing and preserve their current social housing stock.	• Enough financial resources gov. & corporations • Clear policies • Limiting ambitions	**1.**	Social housing corporations make their houses and terrains adaptive to climate change	• Adaptation priority of corporations • Adaptation without raising rents • Collaborative corporations
2.	In 10 years, there will be enough affordable housing for the current and new residents of Arnhem	• Clear policies • Enough money gov. • Building slow and good • Densification • Housing & adaptation simultaneously • Limiting ambitions	**2.**	The housing challenge and climate change adaptation need to be combined on policy and implementation level	• No lowering adaptive ambitions • Shared view policy makers
3.	In housing construction, green spaces and population composition are the top priorities.	• Enough money • Clear policies • Densification & retain green	**3.**	There is a shared responsibility to make the city of Arnhem adaptive to climate change	• Enough money and time municipality • Willingness residents & stakeholders
4.	Social interest takes precedence over economic interest in housing construction	• Willingness private developers • Cooperative private developers • Clear policies • Enough money	**4.**	Constructing new housing will not happen at the expense of climate change adaptation	• Adaptation is primary focus point in design • Focus on adaptation remains
5.	Make better use of the current housing stockpile	• Collaboration municipality & corporations • Persuading (older) homeowners	**5.**	A nature inclusive points system will lead to climate change adaptative new developments	• Smart ways to retain water • No exemption for unambitious developers • Arnhem-specific development environment
6.	We need to create more lifetime homes.	• Increase of older people • Willingness to move older people • Criteria lifetime home • Enough lifetime homes built	**6.**	We need to set up cooling areas around care-homes and make houses of older people more heat resistant.	• Increase of older people • Responsibility resolved • Criteria lifetime homes
7.	Housing development takes place through densification	• Densification & retaining green	**7.**	Densification of the city is not allowed to create an increase in wind chill temperature	• Adaptation is primary focus point in design

Table 4: Overview of preferred futures and future assumptions of housing and adaptation governance systems (own work).

As with housing assumptions, there are also overlapping future assumptions within the governance system of adaptation. Both preferred futures A1 and A3 assume a collaboration between the municipality and social housing corporations and the willingness of housing corporations. These assumptions are centred around the willingness of stakeholders. Assumptions regarding the design process of new buildings, where adaptation is a primary focus point are used within the preferred futures A4, A5 and A7. Preferred futures A4 and A5 show another overlapping assumption. This assumption relates to external pressure on the adaptation ambitions, both futures assume adaptative ambitions will not be decreased. This assumption is also visible in preferred future A2. In the governance system of adaptation multiple assumptions are only related to one identified preferred future. These include social housing corporations will make adaptation one of their priorities and make their houses and terrains more adaptive without raising rents, policy makers from housing and climate adaptation share views on how to combine both policy fields, the municipality has the resources (time and money) to create awareness and take the lead, smart ways to retain water in neighbourhoods will be installed, who takes responsibility for this issue and how to solve it will be resolved and the final assumption that heat resistance will be part of the criteria for a house to be called a lifetime home.

4.4 Matching assumptions

In housing construction, green spaces and population composition are top priorities (H3). In this future housing policy makers assume that when constructing new housing preserving current green structures and creating new ones are a top priority. This matches with the assumption in adaptation policy that newly constructed buildings will add green space to the city through the points systems (A5). In both futures the assumption is made that each new development also creates new green space. Another preferred future from the adaptation field shows a possible match with these futures. When constructing new housing, this will not happen at the expense of climate change adaptation (A4). This future assumes a focus on adaptation measures in the drawing stage of a building. As adaptation measures in Arnhem focus on adding more green space, this aligns with the preferred future of housing.

Both adaptation policy as well as housing policy contain preferred futures in which they assume a close cooperation between the municipality and social housing corporations. In the future of making better use of the current housing stockpile (H5), good agreements and cooperation with social housing corporations for this to be achieved are assumed. Moreover, in the future of creating enough affordable housing (H2), housing corporations are the primary partners of the municipality. In adaptation policy, this collaboration is also assumed. In the future of social housing corporations that make their housing and terrains more climate change adaptive (A1), a close collaboration with the social housing corporations is assumed. A possible match between these future narratives thus arises by seeking cooperation between the municipality and the social housing corporations.

A clear match between both governance systems becomes visible in the assumption that the amount of older people will increase in the future (H6-A6). Policy makers from both fields view this trend as inevitable. Within the preferred futures of housing (H5-6) the assumption is made that older people who live in a large house or not yet in a lifetime home, need to be persuaded to move or act. A similar assumption also arises in a preferred future of adaptation (A3). Here it is assumed that the municipality needs to create willingness and can persuade residents to take action for climate change adaptation. The willingness to act in making their properties more adaptive is especially important because *making the built environment climate change adaptive does not bring any revenue, while making buildings more sustainable does create a revenue in reduced costs* (Adaptation policy maker, PC, July 8, 2024). Although the willingness of both assumptions is directed towards another goal, both preferred futures assume persuading capabilities by the municipality and a good understanding between municipality and its residents. This shows a possible match between the assumptions of both governance systems.

Another possible match with the assumption that older people who live in a large house or not yet in a lifetime home, need to be persuaded to move or act can be identified (H5-6). In the future of creating more heat-resistant housing (A6), adaptation policy makers assume that heat resistance will be part of the criteria of a lifetime home. By including heat resistance as a criterion for lifetime homes, older people might be more likely and willing to move towards a lifetime home.

4.5 Mismatching assumptions

Housing policy assumes that corporations will have enough money to build new social housing (H1). This has its challenges as *corporations are barely able to break even on newly constructed houses* (Housing policy maker, Arnhem). Meanwhile, adaptation policy assumes that corporations will increase the adaptive capabilities of terrains and housing as one of their priorities and invest financial resources to address the issue (A1). This shows a possible mismatch between assumptions if corporations are unable to build new social housing while simultaneously making adaptation one of their priorities and investing money to address the issue. As a housing policy maker puts it *to reach the desired amount of affordable housing, ambitions concerning nature inclusiveness and circularity might possibly be limited* (Housing policy maker, PC, June 18, 2024). Even though the preferred futures don't show a clear mismatch, building new affordable housing and making current housing and terrains more adaptive, the future assumptions do show a possible mismatch. Housing policy makers assume that social housing corporations will have enough financial resources to build new housing, however adaptation policy makers assume that social housing corporations will be able to make their terrains and current housing adaptive to climate change while not raising rents. Both assumptions require substantial investments and could possibly create a mismatch. The assumption of having enough financial resources is used in several preferred futures, as described in paragraph 4.3. Therefore, a possible mismatch also occurs between preferred future A1 and preferred futures H2, H3 and H4.

A lot of new lifetime homes need to be created, because the amount of older people is going to increase. This preferred future is shared by both governance systems (H6-A6). However, a mismatch occurs in the future assumptions concerning the criteria for lifetime homes. Housing policy makers use criteria for lifetime homes such as *barrier-free rooms, a lift and a wheelchair friendly design* (Housing policy maker, PC, June 11, 2024). Heat resistance is not a criterium used to assess how many lifetime homes are present in Arnhem by housing policy makers. In adaptation policy it is assumed that heat resistance is part of the criteria to call a house a lifetime home. Despite futures from both fields envision the same, the assumptions used in the futures differ between both governance systems.

There is a possible mismatch between the futures of housing in which it is assumed that there is a need for a consistent political direction without switches in policy, for example when building affordable housing and putting social interest above financial gains, as described in paragraph 4.3 (H1,2,3,4). The mismatch occurs with the assumption that housing developers will be able to adjust to different policies, criteria and demands concerning climate change adaptive buildings throughout the country (A5). In their preferred future, adaptation policy makers assume developers can adjust to a mosaic of criteria and demands on adaptive building across municipalities. Housing policy makers assume the opposite and assume the need to minimize costs is a consistent political direction (Housing policy maker, PC, April 23, 2024).

There is a possible mismatch between the assumptions made in the preferred futures of achieving social gains over financial gains in new housing developments (H4) and implementing a climate-adaptive points system (A5). Housing policy makers assume that, while developers may already own land designated for housing, the municipality is dependent on these developers and cannot force them to start construction. Developers could delay the start of construction to wait for more favourable conditions, indicating limited municipal control over when and how these developments proceed. In contrast, adaptation policy makers assume that developers, regardless of their level of ambition, will eventually be made to comply with the adaptive construction obligations set out by the points system. The municipality will not lower the obligations of those developers with less ambition. These different assumptions create a possible mismatch.

A similar possible mismatch occurs between the assumptions that *for every new construction climate change adaptation measures should be taken into account at the drawing board stage of a construction* (Adaptation policy maker, PC, July 8, 2024) and building enough affordable housing, which typically involves addressing an ''unprofitable top'', because *the additional task of adding adaptation measures could possibly lead to delays in housing construction plans* (Adaptation policy maker, PC, July 8, 2024). The mismatch takes place between the assumption that for every new housing construction climate change adaptation is a primary focus point and the assumption that it will be possible to address the unprofitable top with affordable housing construction. These assumptions are made with the preferred futures to realise enough affordable housing (H2) and the goal to construct new housing without sacrificing the adaptive capabilities of the city and without increasing wind chill temperature (A7). The adaptation future assumes a primary focus on adaptiveness when designing a new building, realising enough affordable housing within a short period of time could therefore possibly lead to adaptation not being a primary focus in all projects.

5 Conclusion and discussion

This chapter will answer the research question, after which it will discuss the results, address the limitations and give recommendations. The discussion will start by relating the findings of this study to the literature review. Then implications on the generalisability of the findings is discussed. After this, limitations of the research and recommendations for future research and praxis are given. This chapter ends with a general reflection.

5.1 Conclusion

This research studies the way in which future narratives in the governance systems of housing- and climate change adaptation create matches or mismatches. The municipality of Arnhem was used as a case to understand and study this process. First a policy document analyses was performed to identify preferred futures in the governance systems of housing and climate change adaptation and identify preliminary future assumptions. Followed by interviews with housing- and climate change adaptation policy makers to further refine the future assumptions. The results gathered from the policy document analysis and the interviews led to answering the main research question:

"How do future narratives, consisting of preferred futures and future assumptions, in the governance systems of housing and climate change adaptation create (mis)matches?"

As results indicate, between the governance systems of climate change adaptation and housing, future narratives can create both matches and mismatches. A match occurs when similar future assumptions are shared between both governance systems. The results showed that even differing preferred futures can bring about shared future assumptions. For example, the preferred future of a shared responsibility in increasing the adaptability in Arnhem and the preferred future of making better use of the current housing stockpile show differing preferred futures, but both bring about the assumption that external motivation will be necessary.

Mismatches arise when the future assumptions diverge and contrast with each other. This was for instance observed in the definition of lifetime homes, where one policy field (adaptation) includes climate resilience as a criterion, while the other (housing) does not. Mismatches between future assumptions occur when their respective preferred futures are focused on a similar issue. Which is the case in a mismatch between preferred futures on social housing corporations in both governance systems. However, mismatches also occur when preferred futures do not address the same issue, for example a mismatch between the role of social housing corporations in the field of housing and the shared responsibility to make the city adaptive from the adaptation field. Although the focus of both preferred futures is not directed towards the same issue, a possible mismatch between the future assumption of available financial resources occurs.

Matching future narratives occur on various topics. They occur through assumptions on spatial qualities such as adding green, governance related assumptions such as collaborative practices between the municipality and social housing corporations, demographic assumptions and assumptions on the role of citizens. Mismatching future narratives also occur on differing topics. Occurring through finance related assumptions, definitional discrepancies, assumptions about the significance of political uniformity and assumptions regarding the steadfastness of the municipality on predetermined ambitions and obligations.

While some mismatches between future assumptions are evident, there are no fundamental differences in how both governance systems anticipate the future through their assumptions. Policy makers from both fields address largely the same issues, envision futures centred around similar issues and can agree on which challenges the municipality faces. Both fields are in their own way concerned with property of social housing corporations, the housing challenge and housing development, creating social value, the current housing stockpile and the ageing population. Although both fields address the same issues, they approach them from a different perspective. These perspectives lead, in some cases, to shared future assumptions and, in other cases, to conflicting future assumptions.

5.2 Discussion

Transformative governance is used to understand the relationship between two policy fields (Visseren-Hamakers, 2018). By taking an integrative governance approach this study showed that between the policy fields of housing and climate change adaptation mismatches occur through their assumptions about the future. It shows that the relationship between both policy fields is rather divided. On some aspects both fields seem to develop policies from a sectoral perspective. An example of this is the difference between the definition of a lifetime home between both governance systems. This underscores the statement of Leiren & Jacobsen (2018), which mention a strong sectoral division in Dutch urban planning. The findings of matches show that although a planning process might be characterised by a sectoral division, a shared vision about the future can still be in place on several topics. The significance both fields give to green spaces in the city is a good example of this.

By answering the main research question this study adds to the underdeveloped knowledge of the role and content of anticipation processes (Burch et al., 2019; Muiderman, 2020; Vervoort & Gupta, 2018). This study examines the content of anticipation processes using the case of Arnhem and uses different approaches and processes of future anticipation to explain how future narratives can create (mis)matches and the role anticipation processes play in this. The formulation of the concept ''future assumptions'' by integrating anticipation, the use of futures and the expected future (Muiderman et al., 2023; Veenman et al., 2023; Visseren-Hamakers & Kok, 2021) made it possible to systematically expose matches and mismatches between the governance systems. Although the research question is answered, the results of this study did not show a clear pattern emerging within the appearance of matches or mismatches. Despite various topics on which matches and mismatches occur are found, a pattern between topics or a clear distinction in the type of topics is not visible. As a result, this study does contribute to the theoretical knowledge of future anticipation processes but does not provide explanations or insights into certain themes or topics that primarily lead to the creation of (mis)matches. This relates to the notion of generalisability, which is addressed below.

The findings of this study show how matches and mismatches between future narratives occur and on which issues or topics the (mis)matches, in the case of the municipality of Arnhem, take place. However, generalisation of the results is limited. Arnhem is a middle-sized municipality in terms of the number of residents and faces similar housing and climate change adaptation challenges as other municipalities in the Netherlands. All municipalities in the Netherlands are responsible for drafting policies and making decisions in the field of housing and climate change adaptation. The findings of how future narratives create matches and mismatches can therefore be generalised to other municipalities in the Netherlands on a conceptual level. Irrespective of the level of joint policy making, consultation between housing policy makers and adaptation policy in a municipality or the contents, preferred futures and future assumptions will exist and can be expected to create matches and/or mismatches, as this study proves. However, the contents of the matches and mismatches or the number of occurrences are not generalisable to other municipalities. Contents of preferred futures and related future assumptions are dependent on the specific situation in a municipality. Moreover, in practice, policies constantly change over time as new (municipal) elections take place, new insights are developed or when documents become outdated. This makes the content specific matches and mismatches not suited to be generalised.

The results of this study show different preferred futures by policy makers. To achieve these preferred futures certain events or changes need to take place. These events or changes are presented through future assumptions in this research. A critical examination of the findings highlights the importance of assessing the likelihood of events or changes materializing. A high or low likelihood of materialising might influence the extent to which future narratives mismatch or rather match. Differentiating between the severity of a mismatch or the degree of alignment in the case of a match is not possible because of the research design.

5.3 Limitations

Some limitations are associated with this study. This section will outline the limitations, discuss the implications of these limitations, and explain how this study attempted to address them.

The first limitation concerns the reliability of the coding process. All results are grounded in the policy document analysis which was performed by coding the documents. Although several rounds of coding took place, there was no second coder to review and assess the assigned codes. This results in a low inter-coder reliability regarding consistency of the coding process and could also lead to bias in the coding process because of the positionality of the researcher. During the analysis of policy documents, the researcher's own implicit assumptions or biases regarding desirable future outcomes could result in either underestimating or overstating specific findings. In terms of validity, the coding process is further limited by the fact that only one researcher was involved in the analysis. While data saturation was considered to be reached when no new codes emerged, the absence of a second coder means that saturation may not have been fully achieved, as a second perspective might have led to the identification of additional codes. This study aimed to address these issues by double checking the defined preferred futures in the semi-structured interviews with policy makers and by starting the interviews with open-ended questions. Although this might decrease the bias in the results to some extent, the limitations of the study persist.

A second limitation in this research relates to the validity and reliability of the interviews. As policy makers of a municipality inherently must deal with politics in their work, they may provide socially desirable or politically correct answers, which could impact the content validity of this study by not fully reflecting their genuine perspectives. Additionally, if the tendency to give such responses is inconsistent across participants, this also affects the reliability of the findings. Despite emphasizing the anonymity of the results before conducting the interviews the inclination to give socially desirable answers or answers that are in line with the dominant view within the municipality might remain.

Thirdly, a sampling constraint was encountered during the interview process. Three policy makers from the field of housing were interviewed yet only two from the field of climate change adaptation. Although a third policymaker from the climate change adaptation sector was approached, it was not possible to schedule an interview due to circumstances beyond the control of the researcher. The researcher tried to prevent this situation by conducting the interviews online, minimizing the time required to participate in the study. Since only two policymakers from this field were interviewed, the results on climate change adaptation got less confirmation compared to results on housing. Moreover, different insights for housing were possible to arise from three interviews whereas for climate change adaptation this was only possible during two interviews. This limitation may have influenced the comprehensiveness of the findings, particularly the findings on the field of climate change adaptation compared to the findings on the field of housing.

5.4 Recommendations

This study integrated the concept of the use of futures and purposively did not apply and study the concept making of futures. If a study were to integrate the use of futures between two governance fields while also integrating the making of futures, this could provide interesting insights. It should investigate whether mismatches in future assumptions also create mismatches in the making of futures. By studying this it becomes possible to better understand the relationship between the use and the making of futures and further explain the consequences of (mis)matches between future narratives. Moreover, it would help policy makers in practice to structure their policies better and implement more effective policies.

This study focused on future narratives between two governance systems within one organisation on a local level. Contents as climate change adaptation and the housing market are not confined by municipal boundaries. A recommendation for future research would therefore be to study future assumptions across municipalities or between the local level-, regional- and national level. When comparing between municipalities or scale, including the political views and preferences could provide important insights. The significance of political views and power dynamics is widely recognised as an important aspect of future anticipation. Other studies with a different scope can integrate this in their research design to study anticipation processes. Relating to this recommendation is the possibility of future research on certain patterns in the existence of (mis)matches. The findings did not show patterns emerging between the topics or themes on which (mis)matches between future narratives take place. However, a study that uses a broader case selection, several municipalities, might indeed discover patterns related to the creation of (mis)matches.

A final recommendation focusses on the implementation of knowledge on futures studies in praxis. While conducting this research it has become apparent that no interviewed policymakers and policy consultants are familiar with the concepts of futures studies. Expanding knowledge around the implementation of futures studies among policy makers and bringing the scientific concepts and knowledge closer to the praxis can greatly improve decision making and possibly lead to a more transdisciplinary approach. Revealing future assumptions clarifies where policy objectives overlap with those of different policy fields. It states the dependencies of one’s own objectives on external policy fields and identifies the resources or support required from other areas to achieve desired outcomes. A practical recommendation for municipal policy makers is to actively engage with future assumptions. In their own policy field as well as other policy fields. If new policy documents are drafted, a session with other policy makers from other fields should be integrated into the process. This session should involve a systematic review of the future assumptions within the policy. By assessing each other’s future assumptions policy makers from different fields might provide new insights and can point out missed assumptions. Moreover, they can structure their own goals and implementation practices in such a way that it complements implementation practices of other policy fields. This will make it easier to achieve their goals. If policy makers face challenges in discussing future assumptions, a tool like the futures wheel can help structure these sessions. Specifically, policy makers from the municipality of Arnhem can use the findings of this research to organise a constructive discussion between housing and climate change adaptation policy makers to address the possible mismatches in practice. Aligning their views on lifetime homes and being ahead of possible future financial issues can help them in achieving their goals more effectively.

5.5 Reflection

Reliability of results in futures research is hard to meet (Amara, 1991). To increase reliability the research should focus on whether similar predictions can be repeated across different contexts. By asking more broad open questions at the start of the interview, researcher interpretation of future assumptions was minimized. However, following broad questions more interpretative focused questions were asked to the interviewees. Certain future assumptions could have been missed or misjudged. Determining whether future narratives mismatched or matched was clear for some cases, however it often remained unclear or uncertain if futures showed a match or mismatch. Despite the interpretation of the future assumptions and the matches and mismatches the results are still viewed as sufficient to answer the research question. The results of this study concerning potential mismatches should not be viewed as an expected failure to achieve these goals. This study did not perform a risk assessment or a feasibility analysis and did not consider the future assumptions of other governance systems such as economic, social healthcare, migration and mobility policies.

References

Amara, R. (1991). Views on futures research methodology. *Futures*, 23(6), 645–649. https://doi.org/10.1016/0016-3287(91)90085-g

Bengston, D. N., Kubik, G. H., & Bishop, P. (2012). Strengthening Environmental Foresight: Potential Contributions of Futures research. *Ecology and Society*, 17(2). https://doi.org/10.5751/es-04794-170210

Biesbroek, R., & Candel, J. (2019). Mechanisms for policy (dis)integration: explaining food policy and climate change adaptation policy in the Netherlands. *Policy Sciences*, 53(1), 61–84. https://doi.org/10.1007/s11077-019-09354-2

Blythe, J., Silver, J. J., Evans, L., Armitage, D., Bennett, N., Moore, M., Morrison, T. H., & Brown, K. (2018). The Dark Side of Transformation: Latent risks in contemporary sustainability Discourse. *Antipode*, 50(5), 1206–1223. https://doi.org/10.1111/anti.12405

Boin, A., Ekengren, M., & Rhinard, M. (2021). Understanding the creeping crisis. In *Springer eBooks*. https://doi.org/10.1007/978-3-030-70692-0

Bourgeois, R., Karuri-Sebina, G., & Feukeu, K. E. (2022). The future as a public good: decolonising the future through anticipatory participatory action research. *Foresight*. https://doi.org/10.1108/fs-11-2021-0225

Braun, V., & Clarke, V. (2019). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport Exercise and Health*, *13*(2), 201–216. https://doi.org/10.1080/2159676x.2019.1704846

Burch, S., Gupta, A., Inoue, C. Y. A., Kalfagianni, A., Persson, Å., Gerlak, A. K., Ishii, A., Patterson, J., Pickering, J., Scobie, M., Van Der Heijden, J., Vervoort, J., Adler, C., Bloomfield, M., Djalante, R., Dryzek, J. S., Galaz, V., Gordon, C. J., Harmon, R., Zondervan, R. (2019). New directions in earth system governance research. *Earth System Governance*, 1, 100006. https://doi.org/10.1016/j.esg.2019.100006

Chaffin, B. C., Garmestani, A. S., Gunderson, L., Benson, M. H., Angeler, D. G., Arnold, C. A., Cosens, B., Craig, R. K., Ruhl, J. B., & Allen, C. R. (2016). Transformative environmental governance. *Annual Review of Environment and Resources*, 41(1), 399–423. https://doi.org/10.1146/annurev-environ-110615-085817

De Gooyert, V., & De Coninck, H. (2021). De dynamiek van sluipende crises: meekoppelen van klimaatbeleid met besluiten van vandaag. *Bestuurskunde*, 30(4), 31–40. https://doi.org/10.5553/bk/092733872021030004004

De Wit, M., Buiteveld, H., & Van Deursen, W. (2007). Klimaatverandering en de afvoer van Rijn en Maas. In *RIZA*. http://library.wur.nl/ebooks/hydrotheek/1880402.pdf

Enserink, B., Kwakkel, J. H., & Veenman, S. (2013). Coping with uncertainty in climate policy making: (Mis)understanding scenario studies. *Futures*, 53, 1–12. https://doi.org/10.1016/j.futures.2013.09.006

Farthing, S. (2016). Data analysis. In *SAGE Publications Ltd eBooks* (pp. 149–177). https://doi.org/10.4135/9781473921375.n8

Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., & Rockström, J. (2010). Resilience Thinking: integrating resilience, adaptability and transformability. *Ecology and Society*, 15(4). https://doi.org/10.5751/es-03610-150420

Gemeente Arnhem. (2020). *Strategie klimaatadaptatie Arnhem 2020-2030*. https://www.arnhem.nl/stad_en_wijken/Arnhem_en_het_veranderende_klimaat/Beleid_en_beleidsmaatregelen_klimaatadaptatie/Strategie_Klimaatadaptatie_Arnhem

Gemeente Arnhem. (2023). *Woonvisie Arnhem 2024 – 2029/2034*. https://arnhem.bestuurlijkeinformatie.nl/Agenda/Document/f255d975-18ba-4b4d-8ed7-7e652204b9c4?documentId=1221a65d-d785-435e-b308-67f59941bb81&agendaItemId=3ccfb9dd-fb51-425a-be0a-3d637f5f31b4

Gemeente Arnhem: Inwoners. (n.d.). Gemeente Arnhem. Retrieved February 22, 2024, from https://www.arnhem.nl/

Gidley, J. M. (2016). Understanding the Breadth of Futures Studies through a Dialogue with Climate Change. *World Futures Review*, 8(1), 24–38. https://doi.org/10.1177/1946756715627369

Goodwin, P., & Wright, G. (2010). The limits of forecasting methods in anticipating rare events. *Technological Forecasting and Social Change*, 77(3), 355–368. https://doi.org/10.1016/j.techfore.2009.10.008

Granjou, C., Walker, J., & Salazar, J. F. (2017). The politics of anticipation: On knowing and governing environmental futures. *Futures*, 92, 5–11. https://doi.org/10.1016/j.futures.2017.05.007

Guston, D. H. (2014). Understanding 'anticipatory governance.' *Social Studies of Science*, 44(2), 218–242. https://doi.org/10.1177/0306312713508669

Haaland, C., & Van Den Bosch, C. C. K. (2015). Challenges and strategies for urban green-space planning in cities undergoing densification: A review. *Urban Forestry & Urban Greening*, *14*(4), 760–771. https://doi.org/10.1016/j.ufug.2015.07.009

Haarbosch, S., Kaufmann, M., & Veenman, S. (2021). A mismatch in future narratives? A comparative analysis between energy futures in policy and of citizens. *Frontiers in Sustainable Cities, 3*. https://doi.org/10.3389/frsc.2021.654162

Holmes, A. G. D. (2020). Researcher Positionality—A Consideration of Its Influence and Place in Qualitative Research—A New Researcher Guide. *Shanlax International Journal of Education, 8*(4), 1–10. https://doi.org/10.34293/education.v8i4.3232

Hox, J. J., & Boeije, H. R. (2005). Data Collection, Primary vs. Secondary. In *Elsevier eBooks* (pp. 593–599). https://doi.org/10.1016/b0-12-369398-5/00041-4

Inayatullah, S. (1993). From 'who am I?' to 'when am I?' *Futures*, 25(3), 235–253. https://doi.org/10.1016/0016-3287(93)90135-g

Inayatullah, S. (2008). Six pillars: futures thinking for transforming. *Foresight*, 10(1), 4–21. https://doi.org/10.1108/14636680810855991

Inayatullah, S. (2013). Futures studies: Theories and methods. In *There's a future: Visions for a better world* (pp. 36-66).

Jasanoff, S. (2015). Future imperfect: Science, technology, and the imaginations of modernity. *Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power*, 1-33.

Keitsch, M., & Vermeulen, W. J. (2021). *Transdisciplinarity for sustainability: Aligning diverse practices*. Routledge. https://doi.org/10.4324/9780429199127-1

Knappe, H., Holfelder, A., Beer, D. L., & Nanz, P. (2018). The politics of making and un-making (sustainable) futures. *Sustainability Science*, *13*(2), 273–274. https://doi.org/10.1007/s11625-018-0541-x

Leiren, M. D., & Jacobsen, J. K. S. (2018). Silos as barriers to public sector climate adaptation and preparedness: insights from road closures in Norway. *Local Government Studies*, 44(4), 492–511. https://doi.org/10.1080/03003930.2018.1465933

Lijzenga, J., Van Dongen, L., & Tiggeloven, P. (2023). *Woonbehoefteonderzoek 2022 Groene Metropoolregio Arnhem-Nijmegen*. https://arnhem.bestuurlijkeinformatie.nl/Agenda/Document/6b41899b-b12f-49bd-9638-f73eba99165d?documentId=323b0c45-27de-4a26-b5a4-2ede354fccb2&agendaItemId=81b3072d-3681-4736-aecb-8c75f2ccc0b3

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications

Linnér, B., & Wibeck, V. (2019). *Sustainability transformations*. https://doi.org/10.1017/9781108766975

Longhurst, R. (2009). Interviews: In-Depth, Semi-Structured. In *Elsevier eBooks* (pp. 580–584). https://doi.org/10.1016/b978-008044910-4.00458-2

Masini, E. (1983). *Visions of desirable societies*. Pergamon.

Meadowcroft, J. (2009). What about the politics? Sustainable development, transition management, and long term energy transitions. *Policy Sciences*, 42(4), 323–340. https://doi.org/10.1007/s11077-009-9097-z

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). SAGE Publications

Miller, R. (2015). Learning, the Future, and Complexity. An essay on the emergence of Futures Literacy. *European Journal of Education, 50*(4), 513–523. https://doi.org/10.1111/ejed.12157

Ministerie van Binnenlandse Zaken en Koninkrijksrelaties [BZK], Ministerie van Infrastructuur en Waterstaat [IenW], & Ministerie van Landbouw, Natuur en Voedselkwaliteit [LNV]. (2022). Nationale aanpak klimaatadaptatie gebouwde omgeving. In *Rijksoverheid*. Retrieved January 13, 2024, from https://www.rijksoverheid.nl/documenten/rapporten/2022/11/23/nationale-aanpak-klimaatadaptatie-gebouwde-omgeving-fase-1

Moon, K., & Blackman, D. (2014). A guide to understanding social science research for Natural Scientists. *Conservation Biology, 28*(5), 1167–1177. https://doi.org/10.1111/cobi.12326

Morgan, H. (2022). Conducting a qualitative document analysis. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2022.5044

Muiderman, K., Gupta, A., Vervoort, J., & Biermann, F. (2020). Four approaches to anticipatory climate governance: Different conceptions of the future and implications for the present. *WIREs Climate Change, 11*(6). https://doi.org/10.1002/wcc.673

Muiderman, K., Vervoort, J., Gupta, A., Norbert-Munns, R. P., Veeger, M., Muzammil, M., & Driessen, P. (2023). Is anticipatory governance opening up or closing down future possibilities? Findings from diverse contexts in the Global South. *Global Environmental Change, 81*, 102694. https://doi.org/10.1016/j.gloenvcha.2023.102694

Muiderman, K., Zurek, M., Vervoort, J., Gupta, A., Hasnain, S., & Driessen, P. (2022). The anticipatory governance of sustainability transformations: Hybrid approaches and dominant perspectives. *Global Environmental Change, 73*, 102452. https://doi.org/10.1016/j.gloenvcha.2021.102452

Nili, A., Tate, M., Barros, A., & Johnstone, D. (2020). An approach for selecting and using a method of inter-coder reliability in information management research. *International Journal of Information Management*, *54*, 102154. https://doi.org/10.1016/j.ijinfomgt.2020.102154

Nordlund, G. (2008). Futures research and the IPCC assessment study on the effects of climate change. *Futures, 40*(10), 873–876. https://doi.org/10.1016/j.futures.2008.07.022

Nordmann, A. (2014). Responsible innovation, the art and craft of anticipation. *Journal of Responsible Innovation*, *1*(1), 87–98. https://doi.org/10.1080/23299460.2014.882064

Nowotny, H. (2010). *Insatiable curiosity: Innovation in a Fragile Future*. MIT Press (MA). Cambridge

Paprocki, K. (2018). All That Is Solid Melts into the Bay: Anticipatory Ruination and Climate Change Adaptation. *Antipode, 51*(1), 295–315. https://doi.org/10.1111/anti.12421

Pasquini, L., & Shearing, C. (2014). Municipalities, Politics, and Climate Change: An example of the process of institutionalizing an environmental agenda within local government. *The Journal of Environment & Development, 23*(2), 271–296. https://doi.org/10.1177/1070496514525406

Patterson, J., Schulz, K., Vervoort, J., Van Der Hel, S., Widerberg, O., Adler, C., Hurlbert, M., Anderton, K., Sethi, M., & Barau, A. S. (2017). Exploring the governance and politics of transformations towards sustainability. *Environmental Innovation and Societal Transitions, 24*, 1–16. https://doi.org/10.1016/j.eist.2016.09.001

PBL. (2021). Grote opgaven in een beperkte ruimte. In *Planbureau Voor De Leefomgeving*. Retrieved December 10, 2023, from https://www.pbl.nl/publicaties/grote-opgaven-in-een-beperkte-ruimte

PDOK Viewer. (n.d.). PDOK Viewer. Retrieved September 30, 2024, from https://app.pdok.nl/viewer/#x=187080.32&y=445713.44&z=6.9673&background=BRT-A%20standaard&layers=

Perelman, C. (1982). The realm of rhetoric (W. Kluback, Trans.). Notre Dame, IN: *University of Notre Dame Press*.

Poli, R. (2009). The complexity of anticipation. *Balkan Journal of Philosophy*, *1*(1), 19–29. https://doi.org/10.5840/bjp20091117

Poli, R. (2015). The implicit future orientation of the capability approach. *Futures, 71*, 105–113. https://doi.org/10.1016/j.futures.2015.03.002

Priemus, H. (1997). Spatial planning and housing policy: On the ties that bind. *Netherlands Journal of Housing and the Built Environment, 12*(1), 77–90. https://doi.org/10.1007/bf02502624

Pulver, S., & VanDeveer, S. D. (2009). "Thinking About Tomorrows": Scenarios, global environmental politics, and social Science scholarship. *Global Environmental Politics, 9*(2), 1–13. https://doi.org/10.1162/glep.2009.9.2.1

Ramírez, R., & Selin, C. (2014). Plausibility and probability in scenario planning. *Foresight, 16*(1), 54–74. https://doi.org/10.1108/fs-08-2012-0061

Robert K. Yin. (2014). Case Study Research Design and Methods (5th ed.). *The Canadian Journal of Program Evaluation*, *30*(1), 108–110. https://doi.org/10.3138/cjpe.30.1.108

Roggema, R., Vermeend, T., & Van Den Dobbelsteen, A. (2012). Incremental change, transition or transformation? Optimising change pathways for climate adaptation in spatial planning. *Sustainability, 4*(10), 2525–2549. https://doi.org/10.3390/su4102525

Rossel, P. (2010). Making anticipatory systems more robust. *Foresight, 12*(3), 72–85. https://doi.org/10.1108/14636681011049893

Stake, R. E. (1996). The Art of Case Study Research. *The Modern Language Journal*, *80*(4), 556. https://doi.org/10.2307/329758

Stirling, A. (2008). "Opening up" and "Closing down." *Science, Technology, & Human Values, 33*(2), 262–294. https://doi.org/10.1177/0162243907311265

't Hart, P., Pot, W., & Biesbroek, R. (2023). *Klimaatadaptatie: hoe leggen we onze oogkleppen af?* https://www.researchgate.net/publication/371138995_Klimaatadaptatie_hoe_leggen_we_onze_oogkleppen_af

Van Der Leeuw, S. (2019). The role of narratives in human-environmental relations: an essay on elaborating win-win solutions to climate change and sustainability. *Climatic Change*, *160*(4), 509–519. https://doi.org/10.1007/s10584-019-02403-y

Van Thiel, S. (2014). *Research methods in public administration and public management: An Introduction*. Routledge.

Veenman, S., Kaufmann, M., & Haarbosch, S. (2023). Futures in the present: Unraveling foreclosing and pre-opening desired futures in the local environment with a Bourdieusian perspective. *Futures*, *149*, 103134. https://doi.org/10.1016/j.futures.2023.103134

Vervoort, J., & Gupta, A. (2018). Anticipating climate futures in a 1.5 °C era: the link between foresight and governance. *Current Opinion in Environmental Sustainability*, *31*, 104–111. https://doi.org/10.1016/j.cosust.2018.01.004

Vervoort, J. M., Bendor, R., Kelliher, A., Strik, O., & Helfgott, A. E. (2015). Scenarios and the art of worldmaking. *Futures*, *74*, 62–70. https://doi.org/10.1016/j.futures.2015.08.009

Visseren-Hamakers, I. (2018). Integrative governance: The relationships between governance instruments taking center stage. *Environment and Planning C: Politics and Space, 36*(8), 1341–1354. https://doi.org/10.1177/0263774x18803634

Visseren-Hamakers, I., Razzaque, J., McElwee, P., Turnhout, E., Kelemen, E., Rusch, G. M., Fernández-Llamazares, Á., Chan, I., Lim, M., Işlar, M., Gautam, A. P., Williams, M. J., Mungatana, E., Karim, M. S., Muradian, R., Gerber, L. R., Lui, G. H., Liu, J., Spangenberg, J. H., & Zaleski, D. (2021). Transformative governance of biodiversity: insights for sustainable development. *Current Opinion in Environmental Sustainability, 53*, 20–28. https://doi.org/10.1016/j.cosust.2021.06.002

Visseren-Hamakers, I. J., & Kok, M. T. J. (2022). The Urgency of Transforming Biodiversity Governance. In I. J. Visseren-Hamakers & M. T. J. Kok (Eds.), *Transforming Biodiversity Governance* (pp. 3–22). chapter, Cambridge: Cambridge University Press.

Wach, E., & Ward, R. (2013). Learning about Qualitative Document Analysis. *IDS Practice Paper in Brief, 13*. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/2989

Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. P. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society, 9*(2). https://doi.org/10.5751/es-00650-090205

Wilkinson, A., & Eidinow, E. (2008). Evolving practices in environmental scenarios: a new scenario typology. *Environmental Research Letters, 3*(4), 045017. https://doi.org/10.1088/1748-9326/3/4/045017

Wright, A. (2005). The role of scenarios as prospective sensemaking devices. *Management Decision*, *43*(1), 86–101. https://doi.org/10.1108/00251740510572506

Appendix

Interview guide housing

Wat was jouw rol binnen de gemeente en jouw rol in het opstellen van beleidsdocumenten zoals de woonvisie, verstedelijkingsstrategie en de woondeal?

Waar liggen de grootste uitdagingen voor Arnhem op het gebied van wonen; waarom, wat moet er gebeuren?

Welke beleidsdoelen lopen het grootste risico om niet behaald te worden? En waarom?

Waar liggen de grootste risico's voor het niet halen van jullie beleidsdoelen?

Zijn alle problemen en oplossingen vanuit het domein wonen goed in beeld?

Verwacht je dat jullie alle doelstellingen vanuit woonbeleid gaan halen?

Welke doelstellingen uit die jullie op dit moment nastreven zijn makkelijk te realiseren?

Het puntensysteem: verwachten ze daar problemen als vertraagde bouwplannen of eenzijdige keuzes?

Corporaties

Corporaties gaan veel woningen bijbouwen in wijken waar nu weinig sociale huur is en behouden sociale huurwoningen in kwetsbare wijken.

-> waarom staat dit in het beleid? Waarom niet op een andere manier

-> wat zijn de randvoorwaarden om dit beleidsdoel te bereiken? (duidelijke kaders, eenduidige afspraken, goedkope grond, financiële middelen corporatie).

-> Zal er weerstand vanuit veerkrachtige wijken zijn voor de bouw van sociale huur?

->Verwachten jullie dat corporaties net zo veel aandacht (tijd en geld) zullen hebben voor de woningbouwopgave als de adaptatie als de verduurzamingsopgave?

Waar ligt de prioriteit?

Bestaande voorraad

De bestaande voorraad wordt beter benut door splitsing, intensiever en creatiever gebruik

-> Waarom staat dit in het beleid? Gaat het om zo snel mogelijk realiseren?

-> Worden er bij transformatie nog adaptatie/verduurzamings eisen gesteld of gaat snelheid voor?

-> geldt dit ook voor corporatiewoningen? Verwachten jullie dat corporaties hieraan mee zullen -+werken?

-> Zullen inwoners welwillend zijn om dit te doen of is er veel overtuigingskracht nodig?

-> wat zijn randvoorwaarden om dit mogelijk te maken?

-> Welke risico’s zijn er waardoor dit splitsing of creatiever gebruik niet lukt om efficiënt toe te passen? (parkeernormen, bewoners bezwaar) Maar jullie verwachten geen problemen?

-> Verwachten jullie dat alle woonbehoefte binnenstedelijk kan worden opgelost?

Ouderen

Het aantal ouderen zal toenemen in de toekomst, daarom moeten we levensloopgeschikte woningen bouwen, dit zorgt ervoor dat doorstroming op gang komt.

-> wat verstaan jullie onder levensloopgeschikte woningen? (ook adaptief?)

-> is er ruimte voor het bouwen van levensloopgeschikte woningen op plekken waar ouderen willen wonen, waar willen ouderen wonen?

-> hoe groot is deze opgave, groot aandachtspunt of slecht een van de velen?

Betaalbare woningen (nieuwbouw)

Er zijn over 10 jaar genoeg betaalbare woningen voor de huidige inwoners en nieuwkomers van Arnhem.

-> Hoe willen jullie zo veel betaalbare woningen realiseren? (nieuwbouw, huur, koop), hoe zorg je dat het betaalbaar is.

-> hoeveel woningen is genoeg?

-> Is het realiseren van betaalbare woningen haalbaar in combinatie met alle gewenste klimaatadaptieve maatregelen of wordt dit lastig?

-> heeft betaalbaarheid een voorrang op hogere eisen aan duurzaamheid of adaptatie?

-> wordt dit binnenstedelijk of buitenstedelijk opgelost?

-> verwachten jullie dit te gaan halen binnen 10 jaar?

Nieuwbouw en ontwikkeling

Woningbouw vindt hoofdzakelijk plaats binnenstedelijk, maar ook gedeeltelijk in buitenstedelijke ontwikkeling, groen en samenlevingsopbouw staan voorop.

-> Hoe zien jullie de verhouding tussen binnenstedelijk en buitenstedelijke ontwikkeling?

Kan alles binnenstedelijk? Heeft arnhem buitenstedelijke ontwikkeling?

-> Groen en samenlevingsopbouw staan voorop bij woningbouw, hoe ziet dat eruit in de praktijk?

-> Verwachten jullie dat bouwende partijen zich commiteren aan de doelstelling; groen en samenlevingsopbouw voorop? Waarom?

-> is binnenstedelijk ontwikkelen moelijker of duurder dan buitenstedelijk ontwikkelen?

Verwacht je dat eisen en wensen vanuit klimaatadaptatie nog voor belemmeringen kunnen zorgen bij woningbouw/ locaties voor woningbouw?

Voor het bouwen van woningen gaan we uit van een gedeelde verantwoordelijkheid. Het maatschappelijk belang gaat boven het economisch belang bij nieuwbouw.

-> Wat bedoelen jullie hier mee, hoe ziet dit er in de praktijk uit?

-> Wat verstaan jullie onder maatschappelijk belang?

-> Willen ontwikkelende partijen hieraan meewerken?

-> Wat als plannen financieel onhaalbaar worden, blijft dit punt dan gelden?

Grote binnenstedelijke ontwikkeling in spoorzone Arnhem-Oost met <u>Eigen regie</u> gemeente.

-> betekent dit actieve planontwikkeling of iets anders?

De focus ligt op gebiedsontwikkelingen van 500+ woningen die snel gerealiseerd kunnen worden.

-> dit staat in de woondeal, hoe kijken jullie naar deze doelstelling?

-> sluit dit aan bij de verhouding binnenstedelijk/buitenstedelijk

-> en de doelstelling groen en samenlevingsopbouw voorop?

Adaptatie

Bewoners tonen zelf initiatief en zijn welwillend bij het verduurzamen en adaptief maken van hun woonomgeving.

-> In welke mate verwacht je deze welwillendheid en het nemen van initiatief bij bewoners?

-> Zal dit in alle wijken gebeuren?

Geen ongelijkheid?

-> verwachten jullie dat dit voldoende is om de stad duurzaam en adaptief te maken?

Hoe zien jullie dit en hoe verhoudt dit zich tot: marktpartijen spelen een belangrijke rol in de woonopgave?

Het bouwen van woningen krijgt geen voorrang op klimaatadaptatie, het moet slim gecombineerd worden. (Klimaatadaptatie).

-> hoe kijk je tegen deze uitspraak aan--> Volgen jullie deze lijn in vanuit het wonen?

-> Hoe kijken externe partijen buiten de gemeente tegen dit aan?

Verdichten mag niet leiden toe een verhoging van de gevoelstemperatuur

-> verwachten jullie dat dit mogelijk is met de aantallen woningen die nodig zijn om te realiseren in de bestaande stad?

Wordt er vanuit het wonen hiernaar gekeken als harde eis of richtlijn? Hoe meten jullie dit?

Is de woningbouwopgave haalbaar gezien de vraag naar stroom? Zien jullie hier risico's?

Interview guide climate change adaptation

Wat is jouw rol binnen de gemeente en jouw rol in het opstellen van de beleidsdocumenten zoals groenvisie, strategieklimaatadaptatie en de uitvoeringsagenda

Waar liggen de grootste uitdagingen voor Arnhem op het gebied van klimaatadaptatie, waarom, wat moet er gebeuren?

Welke beleidsdoelen lopen het grootste risico om niet behaald te worden? En waarom?

Waar liggen de grootste risico's voor het niet halen van jullie beleidsdoelen?

Zijn alle problemen en oplossingen vanuit het domein klimaatadaptatie in beeld?

Verwacht je dat jullie alle doelstellingen vanuit klimaatadaptief beleid gaan halen?

Welke doelstellingen uit die jullie op dit moment nastreven zijn makkelijk te realiseren?

Gedeelde verantwoordelijkheid

De gemeente voorziet een gedeelde verantwoordelijkheid bij het klimaatadaptief maken van de stad

Welke stakeholders vallen hieronder?

Hoe zien jullie die gedeelde verantwoordelijkheid voor je, (financieel gedeelde verantwoordelijkheid, initiatief, uitvoering?)

Zien jullie op elk thema een gedeelde verantwoordelijkheid? (water, hitte, droogte)

Bij het klimaatadaptief maken van de stad wordt er verschillende partijen financiële bijdrage gevraagd, de gemeente doet veel, corporaties moeten veel gaan bouwen en adaptief maken en inwoners en bedrijven delen in de verantwoordelijkheid,

In hoeverre zijn de beleidsdoelstelling gevoelig voor financiële risico's?

In het geval van financiële tegenvallers, kans dat er voor klimaatadaptatie minder geld beschikbaar wordt gesteld door de gemeente?

Bijvoorbeeld de doelstelling: woningbouw krijgt geen voorrang op klimaatadaptatie?

Combinatie + verdichting versus uitbreiding.

De woningbouwopgave gaat gepaard met klimaatadaptatieve maatregelen en wordt op beleidsmatig- en uitvoeringsniveau gecombineerd met elkaar.

Kun je toelichten wat er bedoel wordt met beleidsmatig en uitvoerend combineren?

- Waarom is dit nodig om te combineren?

- Heeft dit gevolgen heeft dit voor de woningbouwopgave of de adaptatie opgave? Vertraging…?

- Groen en samenlevingsopbouw staan voorop bij woningbouw, wat betekent dit in de praktijk?

Er worden d.m.v. een puntensysteem bij nieuwe bestemmingsplannen eisen gesteld aan nieuwbouw voor natuur inclusieve bouw.

Geldt het puntensysteem ook voor corporaties?

Verwacht je dat partijen meer zullen doen dan slechts voldoen aan het minimaal aantal punten?

Bestaat het risico dat dure nieuwbouw meer punten worden gehaald dan bij goedkoop/sociaal- -> hierdoor ongelijke verdeling adaptatiekracht van wijken.

- verwachten jullie dat de maatregelen die nu punten opleveren over 10-15 of 20 jaar ook nog gewenst zijn?

Worden er aan splitsing en creatiever gebruik van woningen (transformatie) ook adaptatie eisen gesteld, of verwachten jullie dat men die neemt?

Klimaattoets: hoe verhoudt dat zich tot het puntensysteem?

Er worden veel woningen gebouwd in de komende jaren, dit zal vooral zijn door verdichting, aan uitbreiding (en hoogbouw-grootschalige projecten) stellen we strenge voorwaarden in het kader van dal- en convectiewinden.

- verwachten jullie dat er voldoende ruimte en mogelijkheden zijn om alle benodigde woningen in de huidige stad te realiseren?

- zijn er uitbreidingslocaties in Arnhem?

Bij het bouwen van woningen gaat het maatschappelijk belang boven het economisch belang, wat verstaan jullie onder maatschappelijk belang.

Het bouwen van woningen krijgt geen voorrang op klimaatadaptatie, het moet slim gecombineerd worden. (strategie)

Kun je dit wat verder toelichten, refereert dit naar het puntensysteem of gaat het over nog meer?

Verwacht je in de toekomst ook dat dit zo blijft? Of zou het kunnen dat een van de twee wel voorrang krijgt op de ander?

-> hoe kijken externe partijen buiten de gemeenten tegen deze doelstelling aan?

Verdichting mag niet leiden tot een verhoging van de gevoelstemperatuur

Wat is hiervoor nodig? (materialen, afspraken)?

Technologische oplossingen of ruimtelijke/groen?

Is het mogelijk met de woningbouwopgave en de benodigde materialen?

Is de woningbouwopgave haalbaar gezien de vraag naar stroom en de extra vraag naar stroom op warme dagen?

Zien jullie hier risico’s?

Rol corporaties

Woningcorporaties zetten in op het klimaatbestendig maken van hun woningen en terreinen en werken hierin samen met andere corporaties.

- wat is ervoor nodig--> wat zijn de randvoorwaarden hiervoor?

Hebben corporaties de kennis en middelen om dit te doen?

Verwachten jullie dat corporaties net zo veel aandacht (tijd en geld) zullen hebben voor de adaptatie opgave als de woningbouw en de verduurzamingsopgave?

Waar ligt de prioriteit?

Ouderen

Het aantal ouderen huishoudens zal toenemen waardoor de kwetsbaarheid voor hitte toeneemt. (strategie)

- Hoe groot is dit probleem? levert dit een extra uitdaging op?

Wie is verantwoordelijk om dit op te lossen? Gemeente/burgers/corporaties

Wat verstaan jullie onder levensloopgeschikte woningen? (ook een bepaalde mate van isolatie?)

Zou dit niet zo moeten zijn?

- wat betekent dit voor woningen/nieuwbouw in de stad?--> wat verstaan jullie onder levensloopgeschikte woningen.

Wijkniveau

Er wordt op wijkniveau samen met inwoners en stakeholders plannen gemaakt om de wijk klimaatbestendig te maken.

Gaat het dan om publieke ruimtes in de wijk of de particuliere stukken grond?

Waarom staat dit op deze manier in het beleid, gaat het hier om de particuliere ruimtes?

- wie zijn stakeholders?

- ligt het initiatief hiervoor bij de bewoners/gemeente/stakeholders?

- verwachten jullie dat inwoners hiertoe bereid zijn? In elke wijk?