Radboud Universiteit - Nijmegen School of Management

The influence of the Environment and Planning Act on the outcome of area development processes

An institutional analysis of the rules of the game.

Master's Thesis for the Spatial Planning programme,
specialisation Cities, Water and Climate Change.

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Abstract

This study examined how the Dutch Environment and Planning Act influences the outcome of area development processes.

Firstly, the Institutional Analysis and Development Framework of Ostrom was applied to analyse how the new Environment and Planning Act affects the rules of the game for the parties involved in spatial planning at the municipal level. The main instrument of the Act introduces several changes that influence the rules of the game.

Secondly, it analysed what the expected influence of these new rules is on the outcomes of area development processes on the subject of climate change adaptation. The legislator identifies three bottlenecks of current Dutch spatial planning and the Environment and Planning Act will be introduced to overcome these bottlenecks.

Thirdly, simulation gaming was used to analyse whether the expected effects can be demonstrated on the subject of climate change adaptation.

Keywords: Environment and Planning Act, Omgevingsplan, Institutional Analyses and Development Framework, simulation gaming

Content

Chapter 1 Introduction

1.1 Context of research

In recent years, climate change in the form of heat waves became much more present in the Netherlands with almost new heat records measured each year (NRC, 2020). At the same time, the number of heat waves per year became also more frequent. A heatwave in the Netherlands is defined as a "succession of at least 5 summer days (maximum temperature 25.0 °C or higher) in De Bilt (a place close to the geographic centre of the Netherlands), of which at least three are tropical (maximum temperature 30.0 °C or higher)" (KNMI, 2020).

In addition to hotter and more frequent heat waves, severe flooding events shocked Western Europe in 2021 including the province of Limburg in the Netherlands. While the damage in Limburg that was caused by flooding was not as drastic as in Germany, where entire villages were destroyed and houses are still uninhabitable at this moment (ARD, 2021), it is still considered an eye-opening shock event.

Recently, a lot of attention was paid to the Climate Act (Klimaatakkoord) in the Netherlands and the Paris Climate Agreement. The Climate Act was published by the Dutch parliament on the 27th of June 2018. The goal of the Climate Act is that CO2 emissions must be reduced. The targets set were a reduction of 49% in 2030 and 95% in 2050 compared to the levels of 1990 (PBL, 2017, p.10).

This is an important step in the realisation of the objectives of the Paris Climate Agreement, which stipulates that states that signed the convention must take measures to limit the increase of global temperature to below 2 degrees and, if possible, to 1.5 degrees Celsius (European Council, 2016, p.1).

Both the Climate Act and the Paris Climate convention focus primarily on climate change mitigation which according to Fröhlich and Knieling (2013, p.10) can be defined as "the prevention of greenhouse gas emissions", thus: reducing the speed and magnitude of climate change by reducing greenhouse gas emissions.

It is inevitable that events such as heat waves and flooding will become more frequent in the decades to come and that cities are vulnerable to these events. The total reported economic losses in the European Economic Area caused by climate-related extremes in the period between 1985-2015 were over 433 billion Euros (European Environment Agency, 2017,p.12). For this reason, in addition to climate mitigation, attention should be paid to climate adaptation: adaptation to the consequences of climate change by making cities more resilient to heat waves and flooding.

In June 2014, the Dutch Ministry for Infrastructure and Environment submitted the bill for the *Environment and Planning Act* (Omgevingswet) to the Dutch parliament. The final Act was adopted by

the parliament and published on the 23rd of March 2016 (Dutch Ministry for Infrastructure and Environment, 2017, p.1). The law is expected to be introduced on the 1st of January 2024.
The Environment and Planning Act combines the current legislation (26 laws) for space, housing, infrastructure, the environment, nature, and water. It forms the basis for a coherent approach to the *physical environment*. The term physical environment is a key term of the act. The physical environment in the sense of the Environment and Planning Act (Omgevingswet, 2022, art. 1.2) consists of:

a) buildings,
b) infrastructure,
c) water systems,
d) water,
e) soil,
f) sky,
g) landscapes,
h) nature,
i) cultural heritage,
j) world heritage.

The Environment and Planning Act simplifies the legal framework for various aspects of the physical environment. The Environment and Planning Act aims to achieve and maintain a safe and healthy physical environment and good environmental quality. Furthermore, it aims to efficiently manage, use, and develop the physical environment to meet social needs. The various authorities will be given more legislative instruments to make their decisions on a local, and municipal scale. There are fewer rules and more room for initiatives. The goals of the law have been set to achieve sustainable development, sustain the habitability of the land, and protect and improve the environment (Rijksoverheid, UvW, VNG, and IPO, n.d). Sustainable development, sustaining the habitability of the land, and improving the environment are goals that also include climate adaptation as an aspect of the physical environment. Even though the law ought to simply combine the current legislation (26 laws into one law), the implementation of the law is considered by experts and the media to be the biggest change in legislation since the implementation of the Dutch basic law in 1814 (NOS, 2015).

1.2 Research problem statement

The Environment and Planning Act has been already published and adopted by the Dutch parliament in 2016 but has not yet been implemented. It has often been postponed because of different problems with the *Digital system of the Environment and Planning Act* (Digitaal Stelsel Omgevingswet). Initially, the law was ought to be implemented in 2017 but it was delayed until 2019. In 2019 it was again delayed until 2021 and again, in 2022 it was delayed until July 2023. Most recently, the date of implementation was delayed until the first of January 2024. Some experts and the media frame the law as 'problematic' and consider it to be too 'difficult' (NRC, 2021).

The Environment and Planning Act aims to erase many problems with the current Dutch planning system. The legislator acknowledges three bottlenecks of the current Dutch environment and planning law.

First, there are "too many complex and fragmented regulations that are ordered per sector that lead to less clarity, predictability and coherence" (Tweede Kamer, 2014, p.14).

Secondly, an "imbalance between certainty and dynamism, which leads to lingering decision-making processes, high research burdens, detailed plans and to norms with little room for political direction, ownership, regional differentiation, and innovation" (Tweede Kamer, 2014, p.14).

Thirdly, a bottleneck in "governance culture and quality of implementation, as a result of insufficient cooperation, coordination and knowledge, and skills" (Tweede Kamer, 2014, p.14).

The Environment and Planning Act has not yet been implemented and real-life case studies are not available, therefore there has not been much research about how the Act influences the outcome of area development processes.

In area development processes, many actors at different levels come together to work on an urban zoning plan. In the current system, this urban zoning plan is called *Bestemmingsplan.* The environment and Planning Act will introduce the *Omgevingsplan* which aims to decentralise rules at the national level and shift responsibilities to the municipal level. It is unclear how the Omgevingsplan affects the institutional *rules of the game* when different parties are involved in spatial planning at the municipal level. Furthermore, it is unclear what the expected influence of these new rules is on the outcome of area development processes on the subject of climate change adaptation.

1.3 Research aim

This research aims to explore the Environment and Planning Act and analyse how its main instrument the Omgevingsplan influences the outcome of area development processes.

A literature review in chapter 4 investigates firstly what the expectations of the legislator are and what changes there are to the rules of the game and secondly what the expected influence of these new rules are on the outcomes of area development processes.

Thirdly, expected effects are demonstrated in a simulation gaming that simulated the making of an *Omgevingsplan*, the central instrument that the Act will introduce, with climate change adaptation measures as the main focus. Simulation gaming replaced an action situation, one of the main variables of the Institutional Analysis and Development (IAD) framework of Ostrom which is used as the conceptual model.

1.4 Research questions

Main question:

How does the new Environment and Planning Act influence the outcome of area development processes?

Sub-questions:

1. How does the new Environment and Planning Act affect the rules of the game for the parties involved in spatial planning at the municipal level?
2. What is the expected influence of these new rules on the outcomes of area development processes?
3. Can these expected effects be demonstrated in simulation gaming on the subject of climate change adaptation?

1.5 Societal & scientific relevance of the research

The Netherlands will face major spatial and global challenges in the upcoming years. The new Environment and Planning Act will be introduced to overcome the three acknowledged bottlenecks of the current Dutch planning system.

The act aims to fulfil several societal goals. It is, intended to ensure sustainable development, enhance the habitability of the land, protection, and improvement of the living environment aimed at achieving and maintaining a safe and healthy physical environment and good environmental quality and efficiently manage, use, and develop the physical environment to fulfil societal needs (Omgevingswet, 2022, art. 1.3).

There is an urgent societal need to implement climate change adaptation within spatial planning and the physical environment. It is important to examine how climate change adaptation can be implemented under the new rules of the game that the Act and the Omgevingsplan will introduce and what the expected effects are on area development processes. This research, therefore, focuses on what changes in the rules of the game the Act will introduce and how these changes will probably work out in practice at the hand of climate change adaptation.

As for the scientific relevance, it is important to thoroughly analyse which institutional changes the Act will introduce and how the rules of the game change, and which expectations the legislator has of these changes. The Institutional Analysis and Development (IAD) framework of Ostrom is used to analyse the changes in the rules of the game. The Environment and Planning Act has not yet been implemented and its main instrument, the Omgevingsplan, is not there yet, hence empirical data on the subject is also not there yet. Therefore, experimental methods such as simulation gaming have to be applied to research if the changed rules of the game lead to the desired and expected results that the legislator intends. An institutional analysis of this act and its new instruments is scientifically relevant to research. The Institutional Analysis and Development (IAD) framework of Ostrom is rarely applied to analyse new legislation. It provides new insights on how the Institutional Analysis and Development framework of Ostrom can be used to analyse new legislation and the effects that new legislation has on relevant issues to social sciences.

The outline of the thesis is as follows. The theoretical and conceptual framework (chapter 2) elaborates on the term institutions, institutional change, and the institutional theory of rational choice

institutionalism. It also elaborates why the Institutional Analysis and Development framework of Ostrom was used as the conceptual model of this research.

Chapter 3 discusses the research approach, strategy, data collection, and the reliability and validity of the research. Two research methods were used: document analysis and simulation gaming.

Chapter 4 concludes the document analysis. It demonstrates which changes in the rules of the game the Environment and Planning Act introduces. Furthermore, it discusses the expected influence of these new rules on the outcome of area development processes.

Chapter 5 discusses the simulation gaming and whether the expected effects can be demonstrated in simulation gaming or not.

Chapter 6 presents the conclusions of the research.

Chapter 2 Theoretical and conceptual framework

This chapter introduces the theoretical framework and discusses the conceptual framework as well as the main theoretical concepts of the research. It elaborates on why the Institutional Analysis and Development framework of Ostrom was chosen as the conceptual framework.

The chapter starts by discussing the main findings about the theoretical key terms of the research: institutions, institutional change, and the institutional theory of rational choice institutionalism. Afterward, the conceptual framework is introduced, and how the Institutional Analysis and Development framework is used in this research to analyse the institutional changes and changes in rules of the game that the Environment and Planning Act and the Omgevingsplan will introduce. The Environment and Planning Act and the Omgevingsplan are relatively new institutional changes. As stated in the introduction, it is considered to be the biggest change in Dutch law since the introduction of the basic law. The Environment and Planning Act and the Omgevingsplan are deeply analysed in chapter 4. Chapter 4 focuses on the first two research questions: 1. How does the new Environmental and Planning Act affect the rules of the game for the parties involved in spatial planning at the municipal level? And 2. What is the expected influence of these new rules on the outcomes of area development processes on the subject of climate change adaptation?

2.1 Institutions and institutional change

What are institutions? The most commonly cited definition is the one of North (1990, p.3): "Institutions are the rules of the game in a society, or more formally, are the humanly devised constraints that shape human interaction". Institutions influence political, social, and economic exchange among actors. They can reduce uncertainties and guide human interaction (North, 1990, p.3). Institutions can be formal or informal. North (1990, p.4) defines formal institutions as "formal constraints- such as rules that human beings devise" and informal institutions as "informal constraints – such as conventions and codes of behavior".

Institutions can be created or evolved, a process which is called institutional change: Institutional change influences how societies evolve through time and it affects the choice set that actors have at a moment in time. (North, 1990, p.3). For example, the US constitution is a formal institution that was created. Common law, for example, has evolved (North, 1990, p.4). In our case, the Environment and Planning Act as an institution was both created but also evolved from insights about the current spatial law (see chapter 4).

Institutions, whether formal or informal constrain human behaviour. According to North (1990, p.4): "Institutional constraints include both what individuals are prohibited from doing and, sometimes, under what conditions some individuals are permitted to undertake certain activities".

North (1990, p.4) defines them as "the framework within which human interactions take place". North (1990, p.4) mentions an analogy and compares institutional constraints to the rules of the game in a competitive team sport where players have to adhere to formal written rules but also unwritten codes of conduct such as not intentionally hurting the key player of the other team. In this analogy, North (1990, p.4) also implies that these rules and conducts are sometimes violated and punishment is enacted. This also applies to spatial planning. In the spatial planning discipline, institutions are equated with rules unlike in law and everyday parlance in which institutions are often equated with organisations.

According to North (1990, p.4), there is a crucial distinction between institutions and organisations: "Like institutions, organizations provide a structure to human interaction". Organisations can enforce the rules of the game. Whereas "the purpose of the rules is to define the way the game is played" (North, 1990, p.4). Formal rules about for example constructing a building can be stated in an urban zoning plan by a municipality. It can be stated that a building permit is needed and if an actor does to comply with that rule (if he or she builds without a permit), punishment can be enforced such as forcing the owner to tear down the building that has been built without a permit. The rules are then enforced by an organisation. In the Netherlands and with urban zoning plans in the Netherlands these rules are often enforced by political bodies such as municipalities.

Organisations (such as municipalities) consist of groups of individuals that are bound by a common purpose to achieve objectives (North, 1990, p.5). In current Dutch spatial planning, that objective is establishing one or more zoning plans for the entire territory of the municipality, in which the destination of the land included in the plan is designated for *good spatial planning* and rules are laid down with a view to that destination (Wet ruimtelijke ordening, art. 3.1). Under the Environment and Planning Act, that objective is broadened to "ensure sustainable development, enhance the habitability of the land, protection, and improvement of the living environment aimed at achieving and maintaining a safe and healthy physical environment and good environmental quality and efficiently manage, use and develop the physical environment to fulfil societal needs " (Omgevingswet, 2022, art. 1.3).

In this research, the focus is on institutions as the rules of the game and organisations and their members as what North (1990, p.5) calls "agents of institutional change". According to North (1990, p.5): "Organizations are created with the purposive intent in consequence of the opportunity set

resulting from the existing set of constraints […] and in the course of attempts to accomplish their objectives are a major agent of institutional change". In the case of this research, the existing set of constraints are the three bottlenecks of the current Dutch environment and planning law, and the institutional change is the introduction of the Environment and Planning Act which aims to overcome the current constraints and in consequence introduces new opportunity sets.

In this case, we are dealing with formal constraints in the form of formal rules and not with informal rules. The difference between the two is, according to North (1990, p.46), that informal rules are not written and formal rules are. Formal and informal rules cannot be considered completely separated from each other. Formal rules can be complementary to and increase the effectiveness of informal constraints. The move from unwritten rules to written rules has been unidirectional (Nort, 1990, p.46). Societies moved from less to more complex societies due to "the increasing specialization and division of labor associated with more complex societies" (North, 1990, p.46). This increasing specialisation and complexity lead to the creation of formal legal systems which incorporate formal rules to handle complex disputes. This increasing complexity is also the reason why the Environment and Planning Act will be introduced: to eliminate complexity.

Once the Environment and Planning Act is introduced, organisations are confronted with new institutions. An institutional change will then take place. In that situation, according to North (1990, p.73), organisations (in the case of this research municipalities) and their employees will "engage in purposive activity and are the agents of, and shape the direction of, institutional change" (North, 1990, p.73). This institutional change will take time over a long period, as intended by the legislator. A transitional period until 2030 will give municipalities enough time to get used to the new formal rules. North (1990, p.74) uses the competitive team sports analogy that is mentioned above to demonstrate this. Formal rules are the rules of the game that define how the game is played. The new rules of the game that the Environment and Planning Act will introduce define how spatial planning as a game will be played. In this game, not only the rules of the game are a factor but also the skills of the player and the knowledge they possess of the game. As North (1990, p.74) puts it: "Even with a constant set of rules, the games played will differ if they are played between ranked amateurs and professionals or between a team in its first game and the same team in its one hundredth game together". Furthermore, North (1990, p.74) states that "these contrasts come from the differences in communicable knowledge and tactic knowledge in the case of amateurs and professionals and from learning by doing in the case of repeated play". Communicable knowledge is the knowledge that is communicated from one player to another whereas tactile knowledge is acquired by practice (North, 1990, p.74).

Learning by doing thus also influences how agents shape the direction of institutional change. In addition, in social science, institutional theories were developed to study institutions and their development. One of these theories will be described in the next subchapter.

2.2 Institutional theory: rational choice institutionalism

In the last subchapter, institutions and institutional change were elaborated on. It was demonstrated that institutions can be informal and formal. The Environment and Planning Act is considered a formal institution. An institutional change will take place wherein individuals have to adhere to the new formal institution or new rules of the game. In social sciences, institutional change lead to the development of institutional theories that study institutions and their development. This subchapter focuses on one of these institutional theories: rational choice institutionalism.

There is a wide variety of theoretical perspectives to study institutions and their development. The most common distinction is made by Hall & Taylor (1996). Hall & Taylor (1996) distinguish three types of institutionalism, each containing an approach to the term institution: historical institutionalism, sociological institutionalism, and rational choice institutionalism. All three clarify which role institutions play in the determination of social and political outcomes (Hall & Taylor, 1996, p.936). Each type deals with two fundamental issues that institutional analysis is concerned with: interpreting the relationship between institutions and behaviour and explaining the process whereby institutions change (Hall & Taylor, 1996, p.937).

The main assumption of rational choice institutionalism is that actors or agents of institutional change are rational individuals that when confronted with a decision, choose the alternative that is most likely to lead to personal profit. The approach consists of different features.

First, rational choice institutionalism postulates that actors have a set of preferences that they strategically want to attain (Hall & Taylor, 1996, p.944-945).

In the case of urban planning, the set of preferences comes from each actor's specialisation. For example, an urban planner that is working for a municipality and who is specialised in climate change adaptation wants to realise climate change adaptive measures. Whereas an urban planner that is specialised in economic development wants to attain economic development.

Secondly, rational choice institutionalists cater to a unique image of politics, namely that politics are a set of collective action dilemmas. These are situations that occur when individual actors act to maximise their preferences, not foreseeing that this may lead to an outcome that is collectively deficient. Examples of this can be the *prisoner's dilemma* and *tragedy of the commons* (Hall & Taylor, 1996, p.945). As an example, the preference of an urban planner that is specialised in climate change

adaptation could clash with the preference of an urban planner that is specialised in economic development as the space available in for example a municipality is limited. Therefore, collective action dilemmas could arise.

Lastly, the approach highlights the role of strategic interaction between actors to determine political outcomes. An actor's behaviour is determined by a 'strategic calculus' and this calculus is influenced by the actor's expectations about the behaviour of other actors. Institutions structure interactions between actors. As Hall & Taylor (1996, p.945) clarify: "Institutions structure such interactions, by affecting the range and sequence of alternatives on the choice-agenda or by providing information and enforcement mechanisms that reduce uncertainty about the corresponding behaviour of others and allow 'gains from exchange', thereby leading actors toward particular calculations and potentially better social outcomes". A deficit in the strategic interaction between actors has been acknowledged by the legislator of the Environment and Planning Act. There is a bottleneck in "governance culture and quality of implementation, as a result of insufficient cooperation, coordination and knowledge, and skills" (Tweede Kamer, 2014, p.14).

The Environment and Planning Act aims to enhance cooperation. In theory, it should allow gains from exchange.

For this research, rational choice institutionalism was chosen as the main theoretical perspective because it focuses on the relationship between institutions and the behaviour of individuals (Hall & Taylor, 1996, p.950). In the urban planning discipline, different actors with different sets of preferences and with unique images of politics come together to work on an urban zoning plan. The Environment and Planning Act will among other aims be introduced to enhance cooperation and to allow gains from exchange. The main instrument is the new urban zoning plan, the Omgevingsplan. As the Omgevingsplan is a new institution that is not there yet, it is interesting to study how it affects the rules of the game for the parties that are involved in spatial planning at the municipal level and what the expected influence of these new *rules of the game* are on the outcome of area development processes under the new system.

The Omgevingsplan aims to reduce transaction costs as it enhances the exchange of information across actors and sets clear structures for procedures. This could lead to a change in behaviour. When making an urban zoning plan, actors from different perspectives come together to achieve their specific policy goals. Urban zoning plans such as the Omgevingsplan are managerial tools that manage a common resource, namely private and public spaces. It is interesting to study if actors that make an Omgevingsplan try to maximise their preferences and if this leads to collective deficient outcomes or

if the new rules of the game would assure complementary actions by other actors. This can be studied by looking at how the structure and the co-creation process of an Omgevingsplan structure interactions between different actors. The Omgevingsplan aims to achieve better social outcomes than the current planning system (see chapter 4). To study this interactive process, a conceptual and analytical framework is required.

2.3 The Institutional Analysis and Development Framework

The last two sub-chapters focused on the terms institutions, institutional change, and the theory of rational choice institutionalism. In this subchapter, the Institutional Analysis and Development framework of Ostrom is introduced. This subchapter discusses why the IAD framework was chosen as the conceptual model of this research and how it can be used to identify elements for institutional analysis.

The Omgevingsplan can be seen as a new institutional arrangement that introduces new rules of the game for spatial planners. The introduction of the Environment and Planning Act is an issue of reform and transition.

To analyse the transition in rules of the game that is taking place, the IAD framework can be used as a particular model that helps to analyse institutional changes. Models are useful in policy analysis when they are well-tailored to the particular problem at hand Ostrom (2011, p.9). In the case of this research, the particular problem is how the Omgevingsplan as an institutional change influences the outcome of area development processes. In this research, the model is tailored to the societal issue of implementing climate change adaptation in urban development processes and therefore the IAD is suitable for analysis.

An institutional framework should identify the major types of structural variables that are present in institutional arrangements Ostrom, 2011, p.9). Its variables and components are shown in Fig. 1.

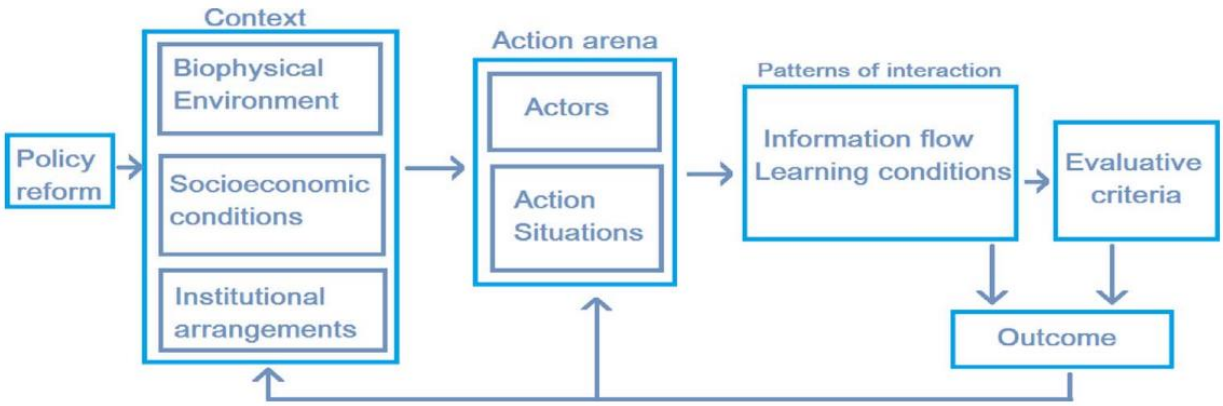

Fig. 1. The IAD Framework. Nigussie et al (2018).

In this research, the policy reform is the introduction of the Environment and Planning Act. Its main instrument, the Omgevingsplan, introduces new institutional arrangements (new rules of the game). It

is expected that this policy reform that is taking place influences the inputs of an action situation. Inputs include the contextual factors that set the context of an action situation (McGinnis, 2011, p.172).

An action situation is a situation where policy choices are made. The outcomes of the action situation are shaped by both the action situation and exogenous factors. In this case the context. (McGinnis, 2011, p.172). The action situation in my research is the actors working on climate change adaptation strategies in an Omgevingsplan.

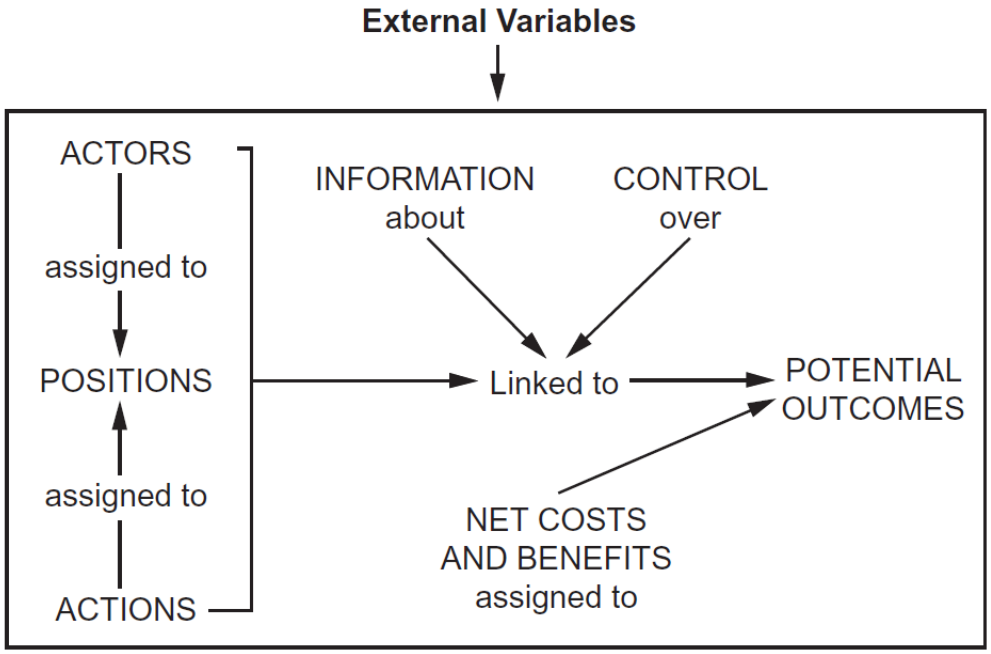

Figure 2. The Internal Structure of an Action Situation.
Source: Adapted from E. Ostrom (2005, p. 33).

Fig. 2 is illustrating the internal structure of an action situation. Ostrom (2011, p.12) states that the structure of an action situation includes:

1. The set of actors
2. The specific positions to be filled by the participants
3. The set of allowable actions and their linkage to outcomes
4. The potential outcomes that are linked to individual sequences of actions
5. The level of control each participant has over choice
6. The information available to participants about the structure of the action situation

7. The costs and benefits (which serve as incentives and deterrents) assigned to actions and outcomes

Rules are an important term in the 'language' of Ostrom. When actors are confronted with legislation and regulation such as situated in an Omgevingsplan, they are participating in the crafting of institutions. The crafting of institutions underlies certain rules. These rules need to be classified according to their impact on an action situation. Fig. 3 shows which types of working rules can affect the structure of an action situation.

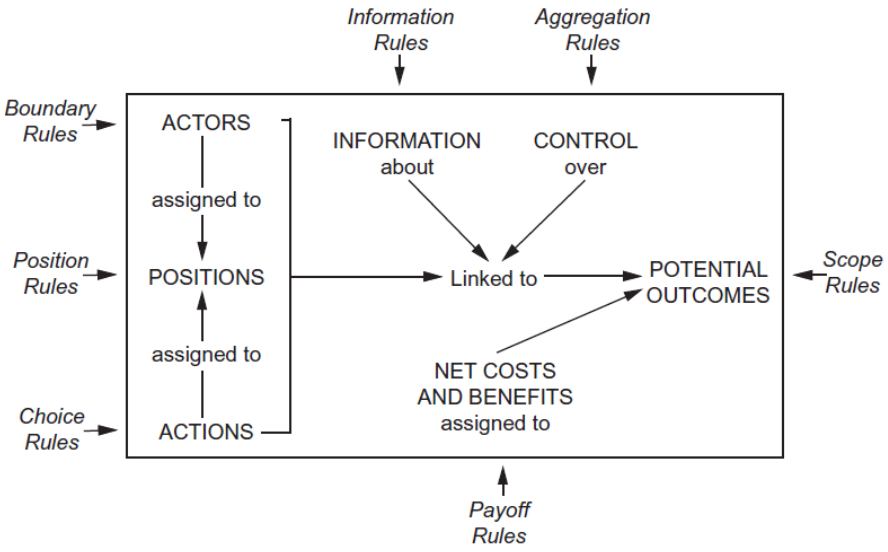

Figure 3. Rules as Exogenous Variables Directly Affecting the Elements of an Action Situation.
Source: Adapted from E. Ostrom (2005, p. 189).

These seven rules are connected to the seven elements of an action situation (Fig. 3). According to Ostrom (2011, p.19), all rules have a cumulative effect on the seven elements of an action situation. Formal rules can be broken down into seven rules Ostrom (2011, p.19:

1. Boundary rules affect the number of participants.
2. Position rules establish positions in the situation.
3. Choice rules assign sets of actions that actors in positions at particular nodes may, must, or must not take. they determine the shape of the decision tree that links actions to outcomes.
4. Aggregation rules affect the level of control that a participant in a position exercises.
5. Scope rules specify the set of outcomes that may be affected.
6. Information rules affect the information sets of participants.

7. Payoff rules affect the benefits and costs that will be assigned to particular combinations of actions and outcomes.

The IAD framework was adapted and filled in with the working parts of this research. The theoretical framework guides the research. It shows what needs to be studied to gain an empirical as well as a theoretical answer to the chosen research question (Van Thiel, 2014).

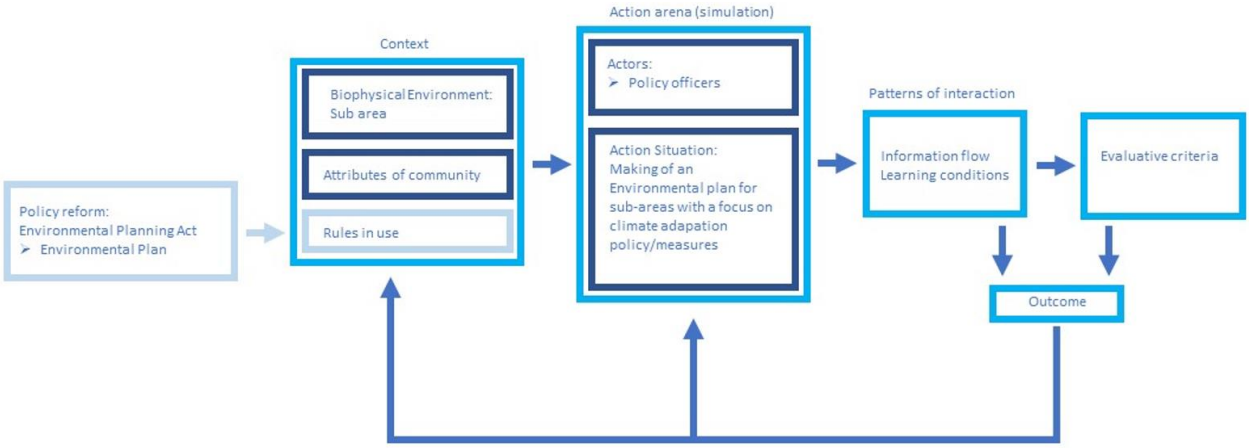

Fig. 4. The adapted IAD Framework. Own work author.

At the beginning of the framework (Fig. 4, from left to right) is the policy reform. In the case of my research, the policy reform is the Environment and Planning Act and its main instrument is the Omgevingsplan (Omgevingsplan) which directly influences the rules of the game.

The context consists of three variables:

1. The biophysical environment which in this case is a sub-area. A sub-area in an Omgevingsplan refers to a sub-area of a municipality. In this research, two different sub-areas were chosen as the focus of the action situation: a residential area and an industrial area. This variable is constant.
2. The attributes of community is the creation of a task group of a municipality that explores the new Omgevingsplan and its possibilities to implement climate change adaptation measures. This variable is also constant.
3. Rules in use refer to the rules of the game, the seven rules as stated by Ostrom. The main focus of this research is on the rules in use and how they influence the action situation as well as the outcomes of the action situation. The rules in use are directly influenced by the policy reform and therefore it is the variable that is the most interesting to study as it is inconsistent and not constant.

In chapter 4, the Environment and Planning Act and the Omgevingsplan are analysed in more detail. Firstly, an analysis of how the new Environmental and Planning Act affects the rules of the game for the parties involved in spatial planning at the municipal level. Secondly, an analysis of what the expected influence of these new rules on the outcomes of area development processes.

The action arena consists of the actors, in this case, the actors simulate a group of policymakers and urban planners that interact in the action situation to co-create an Omgevingsplan for two biophysical environments: two sub-areas with a focus on effectuating climate change adaptation policies and measures.

The next part of the framework focuses on the patterns of interaction and consists of information flow and learning conditions. Due to a change in the rules of the game, more actors are involved in the planning process. Two cases (two biophysical environments) were chosen to see if learning conditions arise from the first case that could speed up decision-making in the second case.

During the evaluation stage of the framework, the results (outcomes) of the simulation gaming are analysed to answer the research question(s).

Chapter 3 Methodology

In this chapter, the research methodology used in this research is introduced. It starts with explaining the research approach and strategy. Afterward, the methods that have been used will be discussed. Lastly, this chapter elaborates on how the data was collected and ends with a reflection on the research's reliability and validity. The first step of the research was to thoroughly analyse which rules of the game change under the Environment and Planning Act for the parties that are involved in spatial planning. The second step was to analyse the expected influence the legislator has on these changes in the rules of the game on area development processes. The third step was to test whether these expected effects can be demonstrated in simulation gaming.

3.1 Research Approach and strategy

For this research, a deductive and qualitative research approach was chosen. Van Thiel (2014) distinguishes many different research strategies such as experiments, surveys, case studies, or desk research.

Desk research in the form of a document analysis (chapter 4) was used to answer the first two research questions. The first aim of the document analysis was to thoroughly analyse how the Environment and Planning act affects the rules of the game for parties that are involved in spatial planning. Secondly, the same document was analysed to deduct what the expected influence of these new rules is on the outcome of area development processes.

As the Environment and Planning Act has not yet been introduced and therefore there are not many examples of the central instrument of the Act yet, the Omgevingsplan, simulation gaming was used to demonstrate how these expected effects may work out in real life. It wasn't possible to conduct the research in a real life action situation. Therefore, simulation gaming was used to replace a real life action situation. To design the simulation gaming, information from the document analysis was used. The choice of strategy was also influenced by the researcher's preferences and expertise. A pragmatic attitude towards the research was chosen. During work experience, the researcher gained many insights on how an Omgevingsplan could be structured. The insights gained were used to design the simulation gaming to ensure that it represented reality as closely as possible. The details of the simulation gaming and its design are summarised in chapter 5.

The simulation gaming resulted in a simplified version of an Omgevingsplan. The results of the simulation gaming were used to answer the third research question. Thus, if simulation gaming demonstrates the expected effect or not.

3.2 Operationalisation of the rules in use

In this subchapter, the rules in use are operationalised. The operationalisation is based on the contents of subchapter 2.3 which summarises the Institutional Analysis and Development framework as well as the theoretical concept 'rules in use' based on Ostrom (2011).

(Theoretical) concept	Dimension	Indicator(s)
Rules in use	Boundary	Number of participants Attributes and resources Whether they can enter and leave freely
	Position	Position(s) of actors in the action situation
	Choice	Sets of actions that actors in positions can take Shape of the decision tree
	Aggregation	Level of control that a participant in a position exercises
	Scope	Potential outcomes that are affected Actions linked to specific outcomes
	Information	Information sets that are available to the actors Quantity and quality of information
	Payoff	Benefits and costs that will be assigned to particular combinations of actions and outcomes

Table 1. Operationalisation of the rules in use. Own work author.

3.3 Document analysis

A document analysis (chapter 4) was conducted to summarise the changes that the Environment and Planning Act introduces. This was done by using the seven different rules in use as operationalised above. The document analysis demonstrates how the Environment and Planning Act affects the rules of the game for parties that are involved in spatial planning. The Environment and Planning Act is accessible online, as well as an explanatory document that consists of around 500-600 pages. From this large document, the changes in the rules of the game were extracted. The same document was also analysed to deduct what the expected influence of these new rules of the game that the legislator intends are on the outcome of area development processes. Three hypotheses were extracted from the document analysis.

For designing the simulation gaming, different documents were also analysed. The simulation gaming focused on two real life locations and made use of the *environmental vision* of the municipality Alphen aan den Rhijn. A handbook that explains the standard structure of the Omgevingsplan published by the Dutch Municipality Association (VNG, 2022) was also analysed and used to design a simplified structure of the Omgevingsplan which was used in the simulation gaming.

3.4 Simulation gaming and data collection

Simulation gaming was used to demonstrate whether the expected effects of the Environment and Planning Act can be demonstrated. Two cases of two biophysical environments were designed. Several actors participated in the simulation gaming. The main aim was to realise climate change adaptive measures in two areas of the Dutch municipality Alphen aan den Rijn.

Simulation gaming can be used as an interactive actor-focused research strategy to analyse climate change adaptive policy (Root, 2016, p.56). It is also complementary to analysis of planning policy and documents and is frequently used in research about climate adaptation governance (Hamin & Gurran, 2009).

There is little empirical data available about the Omgevingsplan and therefore simulation gaming serves as a suitable research method. As elaborated in chapter 2, simulation gaming fits well as a replacement for an action situation that at this stage is not there yet. The Environment and Planning Act has not yet been introduced and therefore action situations in the sense of Ostrom have not yet occurred. Simulation gaming as a replacement for an action situation within the IAD framework is thus a valid option.

Drawing from simulation gaming literature (Mayer et al, 2005: Mayer & Veeneman, 2003) and (Shubik, 2009) simulation gaming can fulfil three functions:

First, as a learning and teaching tool where participants can learn about new systems that are used within the game. In the case of this research, the new system is the Omgevingsplan that introduces new rules of the game.

Second, it can be used for research as it discovers an experimental environment where the researcher can learn from the interactions of the participants that act within the system that is introduced in the simulation gaming (Mayer et al, 2005) and it can validate the hypothesis of this research by matching theory with a pragmatic approach (Shubik, 2009). Third, for the researcher and the participants, it can be used as a tool to discover policy intervention in a simplified environment. In the case of this research, these two functions can be used to demonstrate if the expected influence on area development processes can be demonstrated.

The simulation gaming took place during a 2.5-hour session and was held at the consultancy where the researcher was working. The participants of the simulation gaming were co-workers whom all were acquainted with the Omgevingsplan but who also had many years of experience working under the current planning system. The participant's experience ranged from (junior) urban planners that are

involved with working on environmental visions and plans to experienced project leaders, senior spatial lawyers, and a head of the department. All materials and discussions were in Dutch.

Two weeks before the simulation took place, the participants received an invitation and each participant received different factsheets, each containing information that was extracted from a real environmental vision of the municipality of Alphen aan de Rijn. The document analysis in chapter 4 elaborates further on the relationship between an environmental vision and the Omgevingsplan. The simulation gaming was constructed in the form of a role-playing game. Each actor received a role, in this case, they work for the municipality, each with a different profession (see chapter 5). Alphen aan den Rijn was selected as a case as the environmental vision summarises the main policies and vision on certain topics. The goal of the session was to fill in a simplified version of an Omgevingsplan with a focus on climate change adaptation measures. The participants also received this basic structure two weeks before the research. All participants were familiar with this structure from their work experience. The simulation gaming started with a half-hour presentation explaining the goal of the simulation and its contents and materials. Afterward, the simulation began (this will be further discussed in chapter 5). During the simulation, the researcher took an observant role and did not interfere with the co-creation process.

The data was collected using two methods: 1) the session was audio-recorded and transcribed; 2) the group filled in a simplified version of an Omgevingsplan for two sub-areas which was the final product of the session (Dutch original included in the appendix).

The final product was translated into English and will be discussed in chapter 5. In chapter 5, the third research question is the centre of analysis: whether the expected effects extracted from the document analysis can be demonstrated in simulation gaming or not.

3.5 Research Reliability and Validity

In this chapter, a reflection on the reliability and validity of the approach is given.

Simulation gaming is a qualitative method used to generate and collect data that embody strategies to counter threats to validity (Meijer, 2009). A qualitative approach is needed for the theoretical framework which focuses on the interaction between different participants. The simulation gaming literature (Peters et al, 1998) indicated that four criteria for validity can be identified to counter these threats:

First, simulation gaming should act as a reference system that represents a realistic environment to the participant. Otherwise, they would not interact as they would in reality. This criterion is called *psychological reality*.

Second, simulation gaming aims to illustrate *structural validity*. The structure of the simulation gaming should reduce and simplify the real-life reference system.

Third, *process validity* also refers to the creation of a realistic environment. This environment should enable a flow of information and interaction between the participants.

The last criterion is *predictive validity*. The simulation gaming should be consistent and comparable among different cases so that differences in behaviour can be studied.

3.5.2 Validity Criteria - Simulation gaming

A range of strategies was applied in the Omgevingsplan Alphen aan den Rijn simulation gaming. Based on the above-mentioned overview, they are summarised in this table.

Validity criteria	Strategies applied in Omgevingsplan Alphen aan den Rijn simulation gaming
Structural validity - Simplification of reality	- All of the material used and the discussions during the simulation gaming were issued in the native language of the participants (Dutch). All participants were aware that a 30-minute presentation at the beginning of the simulation would take place. - The roles and positions of the participants were developed to reflect the actors and positions that would be part of such a meeting. - The roles and positions of the participants were similar or the same as their real-life roles.
Psychological Reality	- The issues identified in the game reflect real-life issues (based on the literature research) - Feedback was given by professionals about the design of the simulation gaming, strengthening the scenario of the simulation gaming and ensuring that it reflected a simplified abstraction of reality.
Process validity	- All of the materials are slightly modified materials from reality. A real environmental vision, real zoning plans, and maps were used. - Participants received a formal invitation 2 weeks before the session.

Predictive validity – consistency	- By using two cases, one existing residential area and one industrial area – development area, consistent or non-consistent behaviour can be analysed.

Table 2. Validity criteria simulation gaming. Own work author.

Chapter 4 Institutional Changes induced by the Environment and Planning Act

This chapter analysis the institutional changes induced by the Environment and Planning Act.

The first subchapter focuses on the changes in rules of the game for the parties involved in spatial planning at the municipal level (as shown in Fig. 4). This subchapter also gives an overview of the instruments of the Act. It shows how the different instruments relate to each other. As stated before, the main focus of this research is on the Omgevingsplan and not on all of the instruments that the Act will introduce. It is necessary though to briefly introduce the other instruments for a coherent understanding of the Act. At the end of the first subchapter, the changes in the rules of the game are summarised by the means of a table and sub-subchapters for each of the seven rules of Ostrom.

The second subchapter analysis the expected influence of these new rules of the game that the legislator intends on the outcome of area development processes.

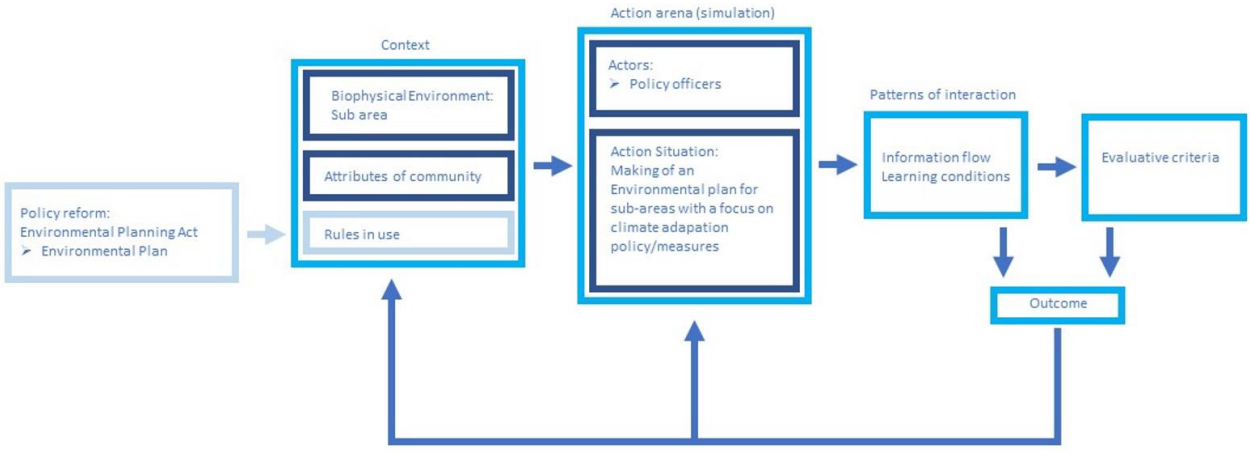

Fig. 4. The adapted IAD Framework. Own work author

4.1 Changes in rules of the game for the parties involved in spatial planning at the municipal level

Environment and planning law is a diverse area of legislation for conservation, the management, use, and development of the physical environment. Environment and planning law in the Netherlands comprises several dozen laws, about 120 general measures of governmental regulations, and a comparable number of ministerial regulations. Environment and planning law is constantly evolving as a result of social developments. Due to the sheer amount of laws, measures, and regulations in the current environment and planning law, the realisation has arisen that decision-making about new developments is too slow (Tweede Kamer, 2014, p.10).

In the past two decades, laws have been added to this system to improve and accelerate decision-making processes, such as the coordination procedures in various laws, including the Spatial Planning Act (Wro), the General Provisions Environment and planning law Act (Wabo) and the Crisis and recovery law (Chw). A movement has also started in various sectors of environment and planning law aimed at speeding up and improving procedures and reducing the administrative burden for municipalities (Tweede Kamer, 2014, p.10).

The amendments to the law of recent years were necessary and have had results. Yet many still experience the current environment and planning law as too complex. With the bill for the Environment and Planning Act, the government is continuing on the path of simplification and integration of area-specific regulations and better use of general rules (Tweede Kamer, 2014, p.10).

In the densely built-up and densely populated Netherlands, social tasks relating to economic development, flood risk management, raw materials, water and (sustainable) energy supplies, housing construction, accessibility, and agriculture do not always agree with the protection of health, environmental quality, nature, landscape, and cultural heritage. Because the tasks are so closely related, working from a sectoral approach – on the one hand for development, on the other for protection – is becoming increasingly complex (Tweede Kamer, 2014, p.11). In addition, it has been found that combining tasks can lead to better results. The growing cohesion is recognized for some time (Tweede Kamer, 2014, p.11). Society is increasingly aware of the relationship between the tasks in the physical environment, the importance of sustainable development, and regional differences. There is also a need for transparent regulations and rapid, coherent decision-making about initiatives. Apart from these developments in society, users experience various bottlenecks with the current environment and planning law, especially in the case of projects that deal with multiple legal frameworks. It is concluded that current legislation no longer meets the needs of society (Tweede Kamer, 2014, p.11).

The legislator identifies three main bottlenecks of the current Dutch environment and planning law. First, there are "too many complex and fragmented regulations that are ordered per sector that lead to less clarity, predictability and coherence" (Tweede Kamer, 2014, p.14).

General rules can be found in approximately 120 council orders, several bye-laws per local authority, and, within municipalities, sometimes more than 100 zoning plans. A large number of rules and plans make it difficult for a project or activity initiator to determine what is and what is not allowed in an area. The complexity and uncertainty hamper proposed projects in the fields of the energy transition, resource extraction, mobility, nature, rural development, urban restructuring, and water safety. There is currently no coherent system of environment and planning law. There are different jurisdictions with different histories, structures, and cultures. For example, the current Wro (Wet Ruimtelijke Ordening) is based on municipal policy freedom to regulate the use of land and buildings. Construction and environmental legislation restrict this policy freedom though due to national and sometimes European standards and rules. The legislation for water, nature, soil removal, aviation, and infrastructure management assigns tasks and powers to administrative bodies other than municipalities (Tweede Kamer, 2014, p.15).

There is also no coherent digital system between the different laws. As a result, data about the physical environment is still not always sufficiently available, usable, or resistant to use by initiators or governments in practice. This leads to extra research and research costs (Tweede Kamer, 2014, p.16). In the terms of Ostrom, the set of information, the information rules are spread across different documents and plans. This makes it difficult for actors to establish clear choice rules which are the rules that determine the shape of the decision tree that links actions to outcomes. The choices that actors want or need to take must be carefully researched which leads to additional costs as stated above. Secondly, an "imbalance between certainty and dynamism, which leads to lingering decision-making processes, high research burdens, detailed plans and to norms with little room for political direction, ownership, regional differentiation, and innovation" (Tweede Kamer, 2014, p.14).

Many medium-sized and large projects are complex due to the large number of interests that an initiator and the public administration have to take into account. As more and more policies and regulations have been added in recent years, this complexity is only increasing. In practice, how assessment frameworks and research requirements are designed in the environment and planning law leads to additional complexity. Sometimes a lot of detailed information has to be supplied at a too early stage of planning that is not yet available or which stands in the way of innovation. Calculation models and scientific proof are given an absolute character. And sometimes additional research requirements are

set for fear of procedural errors, without there being a factual need for research. The aim is to provide certainty that cannot be given, so that goals unintentionally disappear into the background and standards or norms come first. This is not in line with the intended transition to sustainable development. The possibility for municipalities to make their assessments are limited by the rules of the European Union, the national government, and the province. This can lead to a locally desirable development turning out to be legally or financially economically impossible (Tweede Kamer, 2014, p.16-17).

In the terms of Ostrom, this can be characterised as an aggregation rule: the level of control that a participant in a position exercises.

Zoning plans are often very detailed and usually include one possible spatial layout and a limited number of possible functions and construction methods. Detailed plans make it difficult to respond to current events or market developments, while society demands quick and flexible government action. Municipalities, however, feel compelled by research obligations and case law to draw up detailed zoning plans. Some legal requirements for a zoning plan do not seem to match today's social challenges (Tweede Kamer, 2014, p.17).

Thirdly, a bottleneck in "governance culture and quality of implementation, as a result of insufficient cooperation, coordination of knowledge and skills" (Tweede Kamer, 2014, p.14).

The legal context partly determines the culture surrounding decision-making. Projects such as the construction of a road, the realization of a water storage facility, inner-city restructuring, sand extraction, or a nature reserve always involve a convergence of interests and powers of various parties (Tweede Kamer, 2014, p.17-18).

In the terms of Ostrom, boundary rules (which affect the number of participants, their attributes and resources, whether they can enter freely, and the conditions they face for leaving) are determined by the fragmented legal context.

Under the current planning system, urban zoning plans are developed from a specific perspective and in a fairly isolated manner, after which the interests of other parties and the associated environmental restrictions are discussed too late. In that case, there is a lack of cooperation, coordination and knowledge, and skills. Where there is cooperation, many actors are often involved in decision-making and it is difficult to reach a decision together and stick to a decision once made (Tweede Kamer, 2014, p.17-18).

Knowledge of the legal options is sometimes insufficient, which means that administrative bodies needlessly slow down desired developments or choose sub-optimal instruments. These problems

cannot be solved by new legislation alone but the Environment and Planning Act can help with this by setting clear standards (Tweede Kamer, 2014, p.17-18).

In the terms of Ostrom, the Act aims to strengthen the scope rules: the potential outcomes that are affected and the actions linked to specific outcomes by setting clear standards.

The quality of permit granting, supervision, and enforcement (VTH) in environment and planning law has been a matter of concern for several years now. Structural and partly institutional bottlenecks make it difficult to carry out these tasks effectively and efficiently (Tweede Kamer, 2014, p.18).

The Environment and Planning Act should leave room for private and public initiatives and create a physical environment that is safe, healthy, and pleasant to live in. The Environment and Planning Act and the implementing regulations that have yet to be drawn up aim to achieve a better balance by enabling a more coherent assessment of interests at the area level on the one hand, and improving the physical environment if the quality falls short on the other. The new system should contribute to ensuring that not only administrative authorities but also private initiators become more aware of the coherence of the relevant components and aspects of the physical environment and the interests directly involved (Tweede Kamer, 2014, p.20-21).

Fig. 5 shows the policy cycle of the Environment and Planning Act. It gives an overview of the relationship between the different instruments of the Act and how they affect each other.

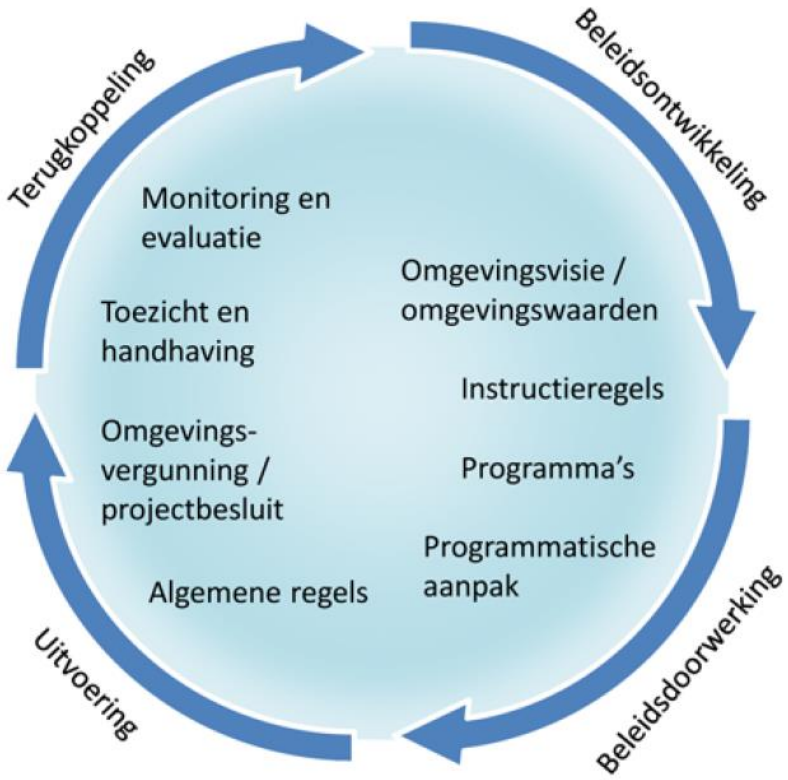

Fig 5. The policy cycle of the Environment and Planning Act. Tweede Kamer. (2014).

On the left-hand side of the cycle, in the part labelled *implementation* (uitvoering), the initiators of activities and projects in the physical environment play a central role. These initiators can be citizens, companies, or governments who want to develop something. An activity or project can be the expansion of a building such as a home or a company building, the construction of a building but also the construction of for example a nature reserve, highway, or wind farm (Tweede Kamer, 2014, p.22). In the case of this research, it could also be about implementing climate adaptive measures such as constructing a *wadi* (a valley, ravine, or channel that is dry except in the rainy season) or urban greening. Where activities are required to be framed by the government, this is done as much as possible through *general rules* (algemene regels) in the Omgevingsplan. In that case, initiators do not have to request permission from the government in advance. If permission from the government is required for a certain activity, this is primarily done via an *environmental permit* (omgevingsvergunning). In addition, the Environment and Planning Act includes the *project decision* (projectbesluit) that allows a government agency to take control of the decision-making process for a project for which it is responsible, such as the construction of a highway or a dyke relocation. This also applies to private projects with a public interest, such as the construction of a wind farm or the extraction of raw materials. An important link

in the cycle is *supervision and enforcement* (toezicht en handhaving) in the upper-left part of the diagram (Tweede Kamer, 2014, p.22).

The main task of the government is to improve the state of the physical environment if it is threatened and to maintain a positive state of the physical environment. This results in that the Environment and Planning Act can bind governments to take measures if the state of the physical environment is threatened. This leaves as much room as possible for initiatives by citizens and businesses, in particular for initiatives that contribute to the quality of the physical environment. A strategic, integrated *environmental vision* (omgevingsvisie) for the entire territory is necessary to determine how the tasks of an administrative body are fulfilled and to formulate further ambitions for the physical environment (Tweede Kamer, 2014, p.22). The environmental vision is an integrated long-term vision of an administrative body about the necessary and desired developments of the physical environment in its administrative area. The development of a vision in various areas such as spatial development, traffic, and transport, water, environment, nature, use of natural resources, and cultural heritage is not only combined in the environmental vision, but also connected. In this way, potentially conflicting or, conversely, related developments are linked to each other at an early stage (Tweede Kamer, 2014, p.51). Through this integration, the environmental vision, therefore, provides a set of information for the actors involved in spatial planning at the municipal level and can be characterised as an information rule. The environmental vision provides information to actors and positions that are involved in spatial planning on the municipal level and forms a basis for discussion. The environmental vision is an area-wide policy document.

An *environmental value* (omgevingswaarde) is a measure of the state or quality of the physical environment. For example, the permissible load, concentration, or deposition of substances in the physical environment of activities. This concerns, for example, quality requirements for water or air and values for flood protection, and the safety of flood defences (Tweede Kamer, 2014, p.22-23). An environmental value is a measurable value that determines the actions needed to achieve a specific value or goal. It, therefore, determines the shape of the decision tree that links actions to outcomes and can be characterised as a choice rule.

In *programs* (programma's) the government formulates the measures that lead to the desired quality of a part of the physical environment, an aspect, or an area. This will often involve a more focused elaboration of the environmental vision, for example, a program about the main features of the development of an area. (Tweede Kamer, 2014, p.22-23).

The domain of the environmental vision focuses on an integrated development policy for the physical environment, while the program focuses on the multi-sectoral coordination of various domains (Rijksoverheid, UvW, VNG, and IPO, n.d).

The horizon and legal status of the environmental vision are aimed at the long term and within the determining body (Municipal Council, Provincial Council, Minister of the Interior, and Kingdom Relations). The program is an addition here because it is mainly focused on the short term.

An *instruction rule* (instructieregel) is a rule about the exercise of a task or power by an administrative body. This concerns, for example, rules about the content, explanation, or motivation of a decision related to external safety (Tweede Kamer, 2014, p.23).

The instruments proposed here are generic but are in line with instruments in the current sectoral legislation. Laws such as the *Water Act* (Waterwet), the *Environmental Management Act* (Wet milieubeheer), and the *Nature Protection Act* (Wet natuurbescherming) also have standards, monitoring, visions, plans, general rules, and permissions, but these instruments only apply to one sector. The *General Provisions for Environment and planning law Act* (Wet algemene bepalingen omgevingsrecht) has a broader character but only concerns the procedure for granting permission and the associated enforcement (Tweede Kamer, 2014, p.23).

The cyclical approach is an expression of an institutional change that will take place: from conservation and protection to an active approach to continuously work on a good quality of the physical environment. The environmental values and qualities formulated must be achieved. To all stakeholders (other authorities, citizens, companies, and organisations) it must be clear what room there is for development and what role and involvement they have in the various phases of the cycle (Tweede Kamer, 2014, p.23).

The cycle shows how administrative bodies relate to other actors in the physical environment when it comes to caring for the physical environment. Activities in the physical environment are mostly undertaken by actors other than the government. An important task for the government is to link initiatives and monitor overall quality. The policy cycle forms the general thinking model for situations in which governments take up a task in the physical environment and formulate policy for that purpose (Tweede Kamer, 2014, p.23).

4.1.1 Summary of changes in rules in use and the expected influence on area development processes

In this subchapter, the changes in rules in use are summarised and categorised in the rules in use of the institutional analysis and development framework of Ostrom. The rules in use directly affect the elements of an action situation (see Fig. 3).

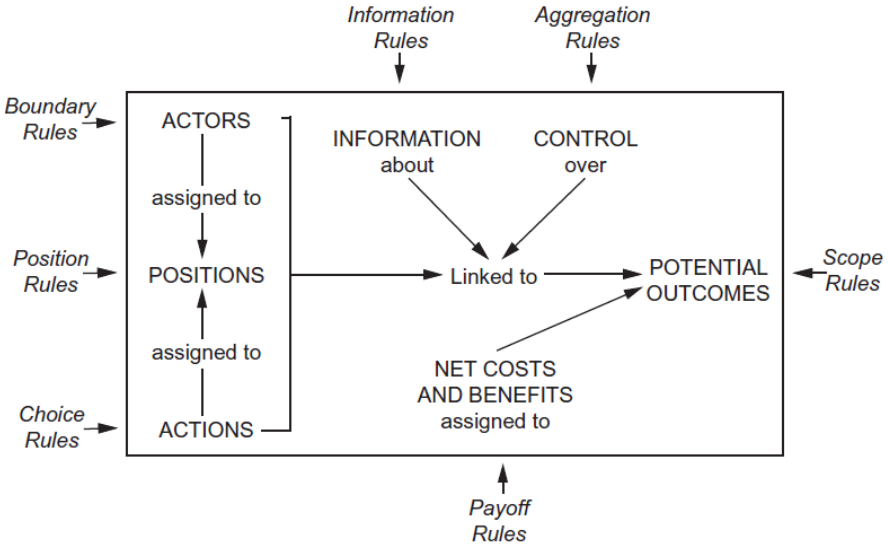

Figure 3. Rules as Exogenous Variables Directly Affecting the Elements of an Action Situation.
Source: Adapted from E. Ostrom (2005, p. 189).

(Theoretical) concept	Dimension	Indicator(s)	Indicated by
Rules in use	Boundary	Number of participants Attributes and resources Whether they can enter and leave freely	The aim of the Act to break the fragmented legal context and bring parties that are involved in urban planning together.
	Position	Position(s) of actors in the action situation	-
	Choice	Sets of actions that actors in positions can take Shape of the decision tree	Actors can choose environmental values which are measurable values that determine the actions needed to achieve a specific value or goal.

	Aggregation	Level of control that a participant in a position exercises	Development goals unintentionally disappear into the background and standards or norms come first.
	Scope	Potential outcomes that are affected Actions linked to specific outcomes	Knowledge of the legal options is sometimes insufficient, which means that administrative bodies needlessly slow down desired developments or choose sub-optimal instruments. Clear standards determine the scope and thus the outcome
	Information	Information sets that are available to the actors Quantity and quality of information	Integration of all aspects of the physical environment of a municipality in the form of the environmental vision provides a set of information for the actors involved in spatial planning at the municipal level The information about the physical environment in the current planning system is divided into sometimes up to 100 urban zoning plans, under the Environment and Planning Act there is only one plan: the Omgevingsplan The Digital system of the Environment and Planning Act (DSO) will in the future be a helpful tool to bundle information
	Payoff	Benefits and costs that will be assigned to particular combinations of actions and outcomes	-

Table 3. Indicators of the rules in use. Own work author

4.1.2 Boundary rule

In the terms of Ostrom, the boundary rules of the current planning system are insufficient and the Omgevingsplan will strengthen the boundary rules: "Boundary rules affect the number of participants, their attributes and resources, whether they can enter freely, and the conditions they face for leaving" (Ostrom, 2011, p.13)

As indicated by the document analysis, the Act aims to break the fragmented legal context and bring parties that are involved in urban planning at the municipal level together, see Fig. X.

This also happens in the current planning system but as mentioned above many different plans and policy documents are made separately. Projects always involve many interests and various parties. It is expected that experts from different disciplines that are now working in fragmented will come together within an action situation to make one coherent plan.

4.1.3 Position rule

Position rules concern the specific positions to be filled by the participants of an action situation. "Position rules establish positions in the situation" (Ostrom, 2011, p.13).

The document analysis did not reveal if the position rules change under the new system.

4.1.4 Choice rule

"Choice rules determine the shape of the decision tree that links actions to outcomes" (Ostrom, 2011, p.13).

Actors and positions can choose to implement environmental values in the Omgevingsplan which are measurable values that determine the actions needed to achieve a specific value or goal. This gives the actors in the action situation the ability to directly influence the decision tree and influence the actions that are needed to achieve their personal goals.

This possibility does not exist in the current planning system.

4.1.5 Aggregation rule

"Aggregation rules affect the level of control that a participant in a position exercises in the selection of an action at a node" (Ostrom, 2011, p.13).

The Environment and Planning Act will lead directly to better options for integrated policy in the form of the environmental vision and the Omgevingsplan. Plans and permits are bundled as much as

possible and therefore procedures are expected to be faster. Also as indicated by the document analysis, development goals unintentionally disappear into the background, and standards or norms come first.

4.1.6 Scope rule

"Scope rules specify the set of outcomes that may be affected, including whether outcomes are intermediate or final" (Ostrom, 2011, p.13).

The Environment and Planning Act can set clear standards, clarity about the scope for flexibility, and procedures that invite collaboration. In the terms of an Omgevingsplan, the scope is written down in an environmental vision. An environmental vision, therefore, sets the scope and priorities, shaping the input of the action situation. Clear standards determine the scope and thus the outcome. Also, the knowledge of the legal options is sometimes insufficient, which means that administrative bodies needlessly slow down desired developments or choose sub-optimal instruments.

In the current system, a zoning plan only concerns rules about good spatial planning. In an Omgevingsplan rules about good spatial planning are integrated with for example rules about the environment, nature, cultural heritage, trees, and well-being.

4.1.7 Information rule

"Information rules affect the knowledge-contingent information sets of participants" (Ostrom, 2011, p.13).

Working from a sectoral approach is becoming increasingly complex. An integral environmental vision can eliminate this sectoral approach. Based on the environmental vision local authorities can bring together all rules that concern the physical environment. Integration of all aspects of the physical environment of a municipality in the form of the environmental vision provides a set of information for the actors involved in spatial planning at the municipal level.

The information about the physical environment in the current planning system is divided into sometimes up to 100 urban zoning plans, under the Environment and Planning Act there is only one plan: the Omgevingsplan. In the future, an Omgevingsplan is easily accessible online in the DSO.

4.1.8 Payoff rule

"Payoff rules affect the benefits and costs that will be assigned to particular combinations of actions and outcomes, and they establish the incentives and deterrents for action" (Ostrom, 2011, p.13). The document analysis did not reveal any payoff rules. It remains unclear how the payoff rules change under the new system.

4.2 The expected influence of the new rules of the game on the outcome of area development processes

This chapter focuses on the expected influence of the new rules of the game on the outcome of area development processes. The last chapter summarised the changes in rules of the game for the parties that are involved in spatial planning at the municipal level. The last chapter has also indicated that currently there are three bottlenecks of Dutch Planning law:
First, there are "too many complex and fragmented regulations that are ordered per sector that lead to less clarity, predictability and coherence" (Tweede Kamer, 2014, p.14).
Secondly, an "imbalance between certainty and dynamism, which leads to lingering decision-making processes, high research burdens, detailed plans and to norms with little room for political direction, ownership, regional differentiation, and innovation" (Tweede Kamer, 2014, p.14).
Thirdly, a bottleneck in "governance culture and quality of implementation, as a result of insufficient cooperation, coordination and knowledge, and skills" (Tweede Kamer, 2014, p.14).
Based on the three bottlenecks, three hypotheses can be extracted:

1. The new rules of the game combine fragmented regulations and policies which leads to more clarity, predictability, and coherence.
2. The new rules of the game enable planners to make less detailed plans that speed up decision-making and offer room for innovation.
3. The new rules of the game encourage cooperation and coordination of knowledge and skills strengthening the quality of implementation.

This chapter discusses the expected influence of the new rules of the game on the outcome of area development processes at the hand of the three hypotheses.

The new rules of the game combine fragmented regulations and policies which leads to more clarity, predictability and coherence.

The Environment and Planning Act provides a foundation for bundling environment and planning laws into one single law. It integrates the current spatial laws into one single law with a single coherent system of planning, decision-making, and procedures. It is expected that the Environment and Planning Act will lead directly to better options for integrated policy, better usability, and a substantial simplification of environment and planning law. Plans and permits are bundled as much as possible,

procedures are faster. An estimated 50,000 zoning plans and management regulations in the Netherlands will become approximately 400 Omgevingsplans. Thanks to this bundling, costs are saved, research costs are limited and there are better possibilities for digital determination and availability of plans, decisions, and investigations (Tweede Kamer, 2014, p.6).

The basic principle of the Environment and Planning Act is that local and regional authorities should bring together their rules that concern the physical environment in a single area-wide regulation. This promotes transparency, coherence, and compliance with regulations. Municipalities have an important role to play in rules that regulate the activities of citizens and businesses in the physical environment (Tweede Kamer, 2014, p.52).

As stated in the last chapter, the environmental vision is an integrated and area-wide policy document. The environmental vision is self-binding which means that it only binds the municipality that has adopted the document. Legal binding only arises through the establishment of general rules, such as in the Omgevingsplan. An environmental vision, therefore, does not contain any rules for citizens, companies, or other authorities. When using the instruments of the Environment and Planning Act, the municipality must take into account the policy in the environmental vision (IPLO, n.d., c).

For the municipalities, this is done via the single area-wide regulation, the Omgevingsplan.

The Omgevingsplan contains various types of rules. In addition to rules for activities in the physical environment, the Omgevingsplan may also contain other rules that are not aimed directly at citizens and businesses. For example, environmental values or assessment rules for environmental permits. At the moment, these rules are spread over a large number of different publications. This is disadvantageous from the point of view of recognizability and harmonization of those rules (Tweede Kamer, 2014, p.52).

The last chapter has revealed that the environmental vision as an information rule provides a set of information for the actors that are involved in spatial planning at the municipal level. Therefore, it is expected that the environmental vision influences the action situation and therefore the crafting of legally binding rules which should lead to more clarity, predictability, and coherence.

One way by achieving this would be to establish environmental values which are clear, predictable, and measurable values that determine the actions needed to achieve a specific value or policy goal. This was indicated as a choice rule.

Another aspect that was identified as an information rule is the digital system of the Act, the DSO.

The Omgevingsplan will be easily accessible online in the DSO. Different rules can be established per location (for example a plot, area, or district) (Tweede Kamer, 2014, p.52).

The fully digital setup of the Omgevingsplan makes it very easy in this way to fine-tune rules per location and apply them exclusively to a location (Tweede Kamer, 2014, p.89).

This means that every user on the internet can find the rules of the municipality per plot, geocoordinate, or address. A resident who for example wants to demolish a garage and realise a large extension elsewhere in his or her garden, for which a tree has to be felled, can click on the (map of the) Omgevingsplan and immediately see which rules apply to demolition, felling, and building (Tweede Kamer, 2014, p.92). This should also lead to more clarity, predictability, and coherence.

The new rules of the game enable planners to make less detailed plans that speed up decision-making and offer room for innovation.

An important category of rules within the Omgevingsplan is the function- and location-specific rules, which are aimed directly at citizens and businesses and strongly determine the possible developments within a location (Tweede Kamer, 2014, p.52).

Function and location rules are rules by which functions are assigned to locations. These rules are set with a focus on their corresponding locations. By doing this, the Omgevingsplan replaces the current zoning plans (bestemmingsplannen). However, the Omgevingsplan is not only limited to *good spatial planning* (een goede ruimtelijke ordening) as the current zoning plans are, but can include all aspects of the physical environment (Tweede Kamer, 2014, p.52).

Thus, due to this change in scope, it is expected that the Omgevingsplan strengthens rules about good spatial planning (such as currently regulated in existing zoning plans and management regulations) and integrates them with broader rules about the environment, nature, cultural heritage, trees, or well-being. The integration of all these rules for each government in a single regulation is expected to provide more clarity for initiatives from citizens and companies, in addition to a significant reorganisation of documents. Merging into one regulation stimulates the coordination of individual rules. Inconsistency between rules becomes more visible in the preparation stage and can therefore be avoided before adoption (Tweede Kamer, 2014, p.88-89).

The integration also enables a truly integrated approach to the physical environment. Thanks to the broadening of the scope, a municipality can integrate many more aspects in the Omgevingsplan than in the current zoning plan *(bestemmingsplan*). This should make the Omgevingsplan much more suitable for achieving an integrated area-oriented environmental policy. For example, it will be possible to include environmental values and, with a view to this, to set rules in the Omgevingsplan that sufficiently protect a certain environmental aspect in an area (Tweede Kamer, 2014, p.88-89).

In the case of this research, the main environmental aspect is climate change (adaptation).

There is a transitional period in the proposal for the Environment and Planning Act that stipulates that all existing zoning plans and management regulations will be regarded as part of a 'temporary Omgevingsplan'. This means that immediately upon the entry into force of the Environment and Planning Act, municipalities formally have one area-wide Omgevingsplan with a large part of the rules that currently apply within the municipality (Tweede Kamer, 2014, p.93). Municipalities must, until the end of 2029, convert the temporary Omgevingsplan and other rules about the physical environment into a new Omgevingsplan (IPLO, n.d., a).

This process can be designed in various ways. Within the Omgevingsplan, a start can be made with the integral arrangement of certain topics. It is also possible to start with sub-areas that are increasingly expanded in an area-oriented manner into a single Omgevingsplan for the entire territory. Given this, the Environment and Planning Act contains the option of splitting the Omgevingsplan for different areas. The starting point of integrity can be shaped from the entire territory or customization per sub-area (Tweede Kamer, 2014, p.93). This allows the plan to be less detailed than the current urban zoning plans as the rules in the Omgevingsplan apply to the whole sub-area.

The new rules of the game encourage cooperation and coordination of knowledge and skills strengthening the quality of implementation.

As stated in chapter 4.1, under the current planning system plans are developed from one specific perspective. The integration of all aspects of the physical environment of a municipality in the form of the environmental vision provides a set of information for the actors who are involved in spatial planning at the municipal level and can be a starting point to encourage cooperation and coordination between the different policy areas.

The aim of the environmental vision and the integral approach is to achieve a better balance by enabling a more coherent assessment of interests at the area level by cooperating (Tweede Kamer, 2014, p.20-21).

In theory, the environmental vision should provide enough information to encourage cooperation and coordination of knowledge and skills and strengthen the quality of implementation when actors come together to effectuate the non-binding environmental vision into concrete rules in the Omgevingsplan.

The next chapter focuses on the third research question, whether the expected effects can be demonstrated in simulation gaming on the subject of climate change adaptation or not.

Chapter 5 Simulation gaming design

This chapter focuses on the third research question, whether the expected effects can be demonstrated in simulation gaming on the subject of climate change adaptation or not. It starts with an introduction and summary of the hypothesis of the research.

The last chapter has indicated that there are three hypotheses about the expected influence of the new rules of the game on the outcome of area development processes. These hypotheses are:

1. The new rules of the game combine fragmented regulations and policies which leads to more clarity, predictability, and coherence.
2. The new rules of the game enable planners to make less detailed plans that speed up decision-making and offer room for innovation.
3. The new rules of the game encourage cooperation and coordination of knowledge and skills strengthening the quality of implementation.

The last chapter has also indicated that there are three key instruments of the Act: the environmental vision (omgevingsvisie), environmental values (omgevingswaardes), and the Omgevingsplan.
Many municipalities have already published environmental visions but there are few examples of Omgevingsplans that effectuate the policies that are stated in the environmental vision at the moment. It is unclear whether the expected influence of the new rules of the game on area development processes works out in real life. In real life, these processes will take some time, which is acknowledged by the legislator.
For the simulation gaming, two sub-areas in the Dutch municipality Alphen aan den Rijn, and the real environmental vision of the municipality were used. It is expected that the environmental vision of Alphen aan den Rijn contains enough information sets for parties that are involved in spatial planning at the municipal level to demonstrate at the hand of the two sub-areas whether the hypotheses can be demonstrated in simulation gaming or not. As mentioned above this can either be done by starting with a thematic approach by integrally arranging certain topics (such as climate change adaptation) and/ or by starting with sub-areas in an area-oriented manner. For the simulation gaming, both approaches were combined as they can be integrated into the conceptual model as variables (Fig. 4).

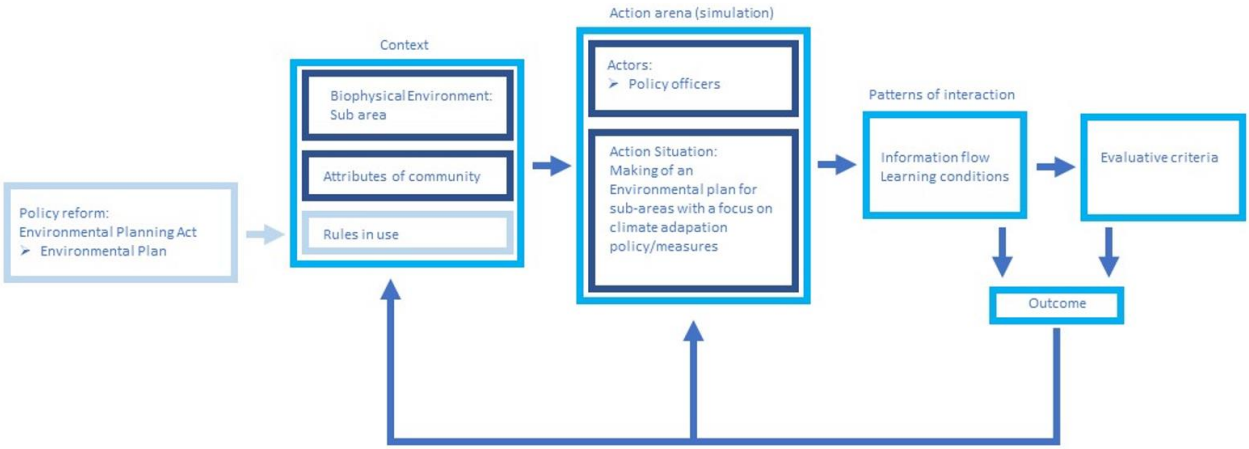

Fig. 4. The adapted IAD Framework. Own work author.

In terms of the IAD framework, the sub-area(s) as biophysical environments can be exogenous, constant variables of the 'context' whereas the thematical focus on climate change adaptation in combination with the sub-area form the action situation within the action arena.

By using two sub-areas instead of one, it can be examined whether patterns of interaction (see Fig. 4), thus the information flow creates learning conditions that can be evaluated whether simulation gaming can demonstrate the expected effects or not.

5.1 Context

Simulation gaming functions as a replacement for an action arena that does not exist yet. As the Environment and Planning Act has not yet been introduced, it was not possible to test the hypotheses in real life. Before the simulation gaming began, a presentation of about half an hour was given by the researcher (see appendix 7.3) where the context of the simulation gaming was explained.

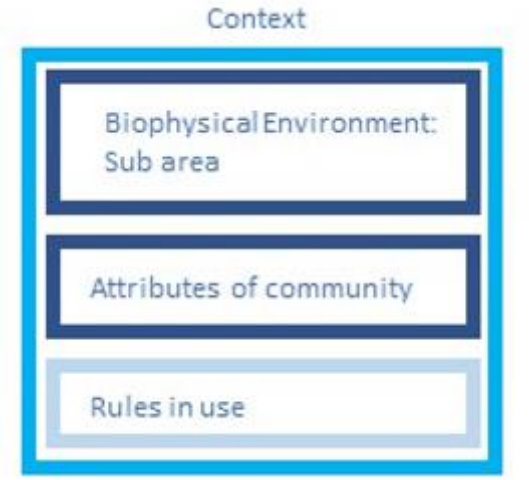

Fig. 7. Exempt context from adapted IAD Framework. Own work author.

5.1.1 Attributes of community

The attributes of community in the conceptual model and this research refer to a task group of a municipality that explores the Omgevingsplan during the transitional phase. This is one of the preconditions for the action arena. Two weeks before the simulation gaming the participants received an invitation stating the purpose of the session. They were informed that in the session they will act as employees of the municipality Alphen aan den Rijn and that together they make an Omgevingsplan with a focus on effectuating climate change adaptation policy and measures within the municipality. The exact climate change adaptation measures that can be taken were revealed during the gaming presentation given by the researcher (see Fig. 8). Possible climate change adaptive measures that were discussed were the planting of trees that provide shade, green facades, canvases that can be placed horizontally across a street to provide shade, wadis and green roofs.

Fig. 8. Climate change adaptive measures. Exempt from the presentation. Own work author.

5.1.2 Biophysical environment

The biophysical environment is the sub-areas for which the task group is making an Omgevingsplan. Originally, three sub-areas were incorporated but due to time limitations, it was decided to only focus on two of the three sub-areas.

As discussed above starting with a sub-area is a valid choice to explore the Omgevingsplan. In this case, the biophysical environment is the sub-areas that simulation gaming focuses on. The sub-areas were revealed during the presentation given by the researcher before the simulation gaming. This was done to prevent bias as the participants could look up information about the sub-areas beforehand that could influence their decisions. It was also done to limit the preparation time of the participants so that they could focus on their specific roles and factsheet.

Fig. 9. Sub-area 1 existing residential area. Exempt from presentation. Own work author.

In Fig. 9, the first sub-area 'existing residential area' is shown. On the top left, the current zoning plan (bestemmingsplan) is shown. During the presentation, it helped to explain the current functions of the area to the participants and to sketch an overview. On the top right, a picture of the main street of the area is shown. As one can see, a lot of the space is used for traffic and parking spaces. Only a few small trees are visible which is an indicator that the sub-area lacks climate adaptive measures to counter heat stress. On the bottom left, a heat stress map indicates that there are indeed problems with climate change adaptivity in the sub-area (how redder, how warmer the surfaces are on average during a heat wave).

Fig. 10. Sub-area 2 industrial area – development area'. Exempt from the presentation. Own work author.

The second sub-area is called the 'industrial area – development area' (Fig. 10). The distinction between existing and developing areas was made to analyse what rules the participants would come up with under different circumstances. In the first sub-area, they had to deal with an area that already existed and where no future (re)developments will take place. In this second case, the area will be redeveloped which means that in theory, if wanted, more climate change adaptive measures could be implemented from the start. The redevelopment was indicated in the environmental vision of Alphen aan de Rijn and was therefore suitable as a fictional case that represents a real-life case.

5.1.3 Rules in use

The rules in use are summarised in chapter 4.1.1. During the simulation gaming, the rules in use were simulated in different ways.

Some of the rules in use such as the information, boundary, and position rules especially can and need to be simulated by the design of the simulation gaming. The environmental vision of the municipality of Alphen aan den Rijn as an information rule was summarised in factsheets that the participants received beforehand (see appendix 7.2) and categorised into different policy areas. From these different policy areas, the boundary and position rules were simulated (see chapter 5.2.1). In this simulation, the boundary (the number of participants) was limited to the participants that were available for participating in the simulation gaming.

The other rules in use such as the choice, aggregation, and scope rules could not be simulated beforehand as they were simulated during the action situation. The document analysis did not reveal what the payoff rules are and it did not indicate if the position rules change.

5.2. Action arena

Fig. 11. Exempt context from adapted IAD Framework. Own work author.

The previous subchapter sketched the context of the research. In this subchapter, the action arena (Fig. 11) which consists of the variables actors and action situation is elaborated on. The goal of the simulation gaming was to fill in a simplified Omgevingsplan which is based on the standard model of the Dutch Municipality Association (VNG, 2022).

5.2.1 Actors

During the simulation gaming, the participants acted as employees of the Dutch municipality Alphen aan den Rijn. The different positions are based on insights that the researcher gained during his work

experience. The researcher observed that usually several policy officers *(beleidsmedewerkers)* and spatial lawyers are involved in making an Omgevingsplan. Different policy officers are invited to the process as they are experts on different subjects.

The different subjects were extracted from the environmental vision of the municipality Alphen aan den Rijn (2022) "Omgevingsvisie 1.0 Alphen aan den Rijn: "Groene gemeente met lef!" (Fig. 12). An environmental vision is highly useful as information for simulation gaming as it simplifies integral policy for a municipality. The environmental vision of Alphen aan den Rijn is an example of an integral vision in the sense of the Environment and Planning Act.

Figure 12. Cover page environmental vision Alphen aan den Rijn. (2022).

The Environment and Planning Act obliges each municipality to draw up one environmental vision for its entire territory. After the entry into force of the Act, this is formally an environmental vision. Until it enters into force, however, this environmental vision has the legal status of a structural vision within the meaning of Article 2.1 of the Spatial Planning Act (Environmental vision Alphen aan den Rijn, 2022, p.10).

The environmental vision of Alphen aan den Rijn includes the main features of the quality of the physical environment. The outlines of the proposed development, use, management, protection, and

conservation of the territory, and the main issues of policy in all relevant areas of the physical environment (Environmental vision Alphen aan den Rijn, 2022, p.10).

To limit preparation time and as a means of simplification, each actor received a factsheet. The factsheets are based on the environmental vision (see chapter 7.2) and summarise the main policies of the municipality.

The following six actors and thus positions were created: participation policy officer, climate adaptation policy officer, nature and biodiversity officer, welfare policy officer, planning economist, and a spatial lawyer. These actors and positions are discussed in the next subchapter.

Participation policy officer

In general, a policy officer is responsible for the development and implementation of a specific policy component of an organization or body. The specific content varies by position and specialization, allowing a policy officer to work for a variety of employers, including ministers, mayors, or private organizations. All these organizations need a clear vision for the future, to be able to continue working from this vision. The policy officer helps to develop and establish this vision for the future (Nationaleberoepengids, n. d., a).

A participation policy officer knows a lot about policy processes and has a good sense of the interests of others, for citizens or companies, and therefore focuses on citizen participation. In this case citizen participation in a certain area or the whole municipality of Alphen aan den Rijn.

Climate adaptation policy officer

A climate adaptation policy officer is responsible for the development and implementation of climate adaptive policy. A climate adaptation policy establishes a climate adaptive vision for the future.

Nature and biodiversity officer

A nature and biodiversity policy officer is responsible for the development and implementation of nature and biodiversity policy.

Welfare policy officer

A welfare policy officer is someone who prepares and implements the welfare policy in a specific area (Nationaleberoepengids, n. d., b).

A welfare policy officer tries to realize the operational, policy, financial, and personnel welfare objectives within the area. This concerns policy on health care, politics, and development cooperation within his area. He or she adopts all policies to the needs of the citizens in the area assigned to him or her. A welfare policy officer does this together with other welfare policy officers (Nationaleberoepengids, n. d., b).

The welfare policy officer also maintains contact with the healthcare institutions or the municipality involved. He is also involved in relationship management. The exact work of a welfare policy officer does differ per region (Nationaleberoepengids, n. d., b).

Planing economist

A planning economist is someone who maps out the financial feasibility of spatial developments, makes budgeting and planning for this, and monitors this. Planning economists are responsible for the financial-economic picture of, for example, new-build plans and zoning plans. In this way, they contribute to the development of an area or municipality. A planning economist is concerned with the financial management and control of plans for spatial and/or real estate development. A planning economist provides advice on land development and policy, risk management, and project feasibility. For this, he or she makes calculations and does feasibility studies usually on a project basis (Vacatures.nl, n.d.).

Planning economists usually work for (semi) government institutions, such as municipalities and housing associations. A planning economist can also be hired externally by such organizations. In that case, he or she is employed by a consultancy for spatial development (Vacatures.nl, n.d.).

A planning economist works independently and often consults with colleagues who are involved in a project from other perspectives, such as project leaders, project developers, area managers, and real estate consultants (Vacatures.nl, n.d.).

Spatial lawyer

A spatial lawyer is a lawyer who specializes in spatial issues. A spatial lawyer draws up zoning plans and brings them into the procedure. A spatial lawyer advises colleagues, the board, and management on legal requirements and procedures regarding spatial regulations and plans. In 2020, many spatial lawyers s are involved in Environment and planning law (Nationaleberoepengids, n. d., c).

For example, a spatial lawyer may also be responsible for handling applications for permits and exemptions. This concerns, for example, environmental permits. Or someone wants to start a café in a place that is not designated as a catering location in the zoning plan. The spatial lawyer checks the application against legal requirements. He then issues advice and writes a report. A spatial lawyer also participates in meetings (Nationaleberoepengids, n. d., c).

5.2.2 Patterns of interaction – Simulation gaming

The simulation gaming took place in a 2.5-hour time frame. It started with a presentation of 30 minutes that sketched the context as discussed above. The end product of the simulation gaming was a simplified Omgevingsplan (translated from Dutch) based on the standard models of the Dutch Municipality Association (VNG, 2022) for two out of the three sub-areas (see appendix 7.4).

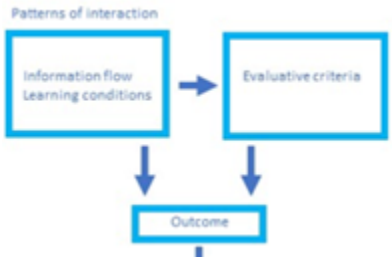

Fig. 13. Exempt patterns of interaction from adapted IAD Framework. Own work author.

The simulation gaming was played per sub-area in three different rounds. The aim was to observe whether patterns of interaction (see Fig. 13) can demonstrate the expected influence of the new rules of the game on area development processes. This was done by observing the information flow in both sub-areas and comparing them to see if learning conditions arise that influence decision-making in the second case.

The goal of the first round was to establish objectives for the sub-area.

The goal of the second round was to establish environmental values for the sub-area based on the objectives of round one.

The goal of the third round was to make rules for the sub-area based on the objectives from round one and the environmental values of round two. The goal was to find ways under the new Omgevingsplan system to effectuate the objectives and values of the first two rounds in concrete rules. In short, ways to achieve the values of round two.

Sub-area 1 round 1 Objectives

After the presentation was held, the participants were asked to introduce themselves by stating their position and presenting the main trends and developments that play within their specific policy area in Alphen aan den Rijn. Every participant except for the spatial lawyer had a factsheet. In the terms of Ostrom, the different position rules and information rules were stated.
Afterward, the participants were asked to formulate objectives for the first sub-area, the existing residential area, based on the trends and developments stated in the factsheets that are based on the environmental vision (see Dutch original in the appendix):

1. Wellbeing and a good living climate
2. [to] Protect and improve biodiversity
3. [a] Safe and healthy physical environment
4. Preventing and limiting heat stress
5. Preventing and limiting flooding and drought
6. Buildings are climate adaptive
7. Sustainability

Seven different objectives for the existing residential area were established.
The first objective 'wellbeing and a good living climate' and the third objective '[a] Safe and healthy physical environment' is based on the information provided by the welfare policy officer:

"I think it is very important that the people in our municipality feel safe and that has not only to do with factual safety such as reports of burglaries or violent crimes but also has to do with environmental safety."

The second objective '[to] protect and improve biodiversity is based on the information provided by the nature and biodiversity policy officer. In his factsheet the following trends and developments are identified: 1. Protecting and enhancing biodiversity, 2. Nature policies aimed at embedding them in society by strengthening people's involvement with nature and 3. Restoring lost biodiversity at various locations.

The fourth objective 'Preventing and limiting heat stress' as well as the fifth objective 'Preventing and limiting flooding and drought' and the sixth objective that 'buildings are climate adaptive' is based on the factsheet of the climate adaptation policy officer: 1. Rainwater will have to be secured more within the city and with more shade from trees, the extreme heat in urban areas can decrease, 2. The spatial impact of these measures is less paving and instead unpaved area and more greening in the city using trees and green facades and roofs.

The seventh objective 'Sustainability' is based on the information provided by every participant as it is a general objective that is recurring in almost every factsheet, which has also been noted during the session:

Nature and Biodiversity policy officer: "Several of those things are sustainability, right?

All: "Yes."

Climate adaptation policy officer: "That's right, it is. […] these are all things that are related."

Sub-area 1 round 2 Values

After the objectives for the sub-area were established, the objectives were translated into measurable values. The participants discussed how they could express the qualitative objectives that they formulated in round one in measurable values. In the terms of Ostrom, the objectives are aggregated into choice rules that determine the outcome of the decision tree. The normative, qualitative objectives that the participants established are based on the coherent environmental vision (the factsheets) which set the scope and now influences the effectuation of the policy into measurable goals or values:

1. A minimum number of 3 trees visible from the main living space of each home
2. At least 50% of the total area of uncovered public parking spaces is unpaved […]
3. At least 50% of the total surface of the publicly accessible area is in the shade
4. An infiltration standard of at least 60 mm per m2/hour

Sub-area 1 round 3 Rules

The following rules describe the measures that can be taken to reach the objectives and values that were established in round 1 and round 2 respectively.

First, a duty of care (*zorgplicht*) (section 1.3 of the environment and planning act) was established by the participants. A duty of care means that everyone must take sufficient care of the physical environment. This duty of care builds on the duties of care that are included in various laws (such as Article 1.1a of the Environmental Management Act, Article 6.8 of the Water Act, and Article 1a of the Housing Act) (Tweede Kamer, 2014, p.66-67).

It was stated that (to achieve the objectives and values of round 1 and round 2 respectively) anyone who carries out an activity and knows or can reasonably suspect that his act or omission must adverse consequences for the climate adaptation of this sub-area and therefore is obliged:

a. To refrain from this activity, or if the failure to act cannot reasonably be prevented;
b. to take all measures that limit the adverse effects on climate adaptation as much as possible.

The functions of the duty of care are: making citizens aware of their responsibility for promoting or protecting certain interests, providing guidelines for behaviour when no concrete behavioural provisions are available or these prove insufficient, offering a benchmark for assessing behaviour, and offering a justification for administrative enforcement in cases of unmistakable violation of the duty of care. In practice, the duty of care is expected to fulfil a limited but useful function in guaranteeing a safe and healthy physical environment and good environmental quality. (Tweede Kamer, 2014, p.66-67).

Second, the participants focused on rules for the construction of buildings.

For buildings that already exist in the sub-area, the participants decided that the duty of care stated above is sufficient:

"to take all measures that limit the adverse effects on climate adaptation as much as possible".

It was concluded that it would be difficult and unobtainable to establish construction rules for climate adaptive measures for already existing buildings as it would interfere with the ownership rights of the inhabitants. And as these buildings already exist, they cannot be constructed. Thus, it was chosen to refer to this duty of care so that any possible future construction has to cohere to take all measures that limit the adverse effects on climate adaptation as much as possible. This rule is not detailed and

very broad which is an indicator that the omgevingsplan can include less detailed rules, in line with the second hypothesis.

For new buildings or changes to existing structures, the participants decided to include an article about construction activities that do not require a permit. This means that every construction where no permit is needed:

a. Must comply with the values stated in round one;
b. Must not have drainage that is connected to the sewer;
c. Must be climate-adaptive. This is the case if at least one of the following conditions is met:
    i. A reflectivity of at least 35% albedo for structures and pavement;
    ii. At least 80% of the roof is used for sustainable energy generation; or
    iii. The building has a green roof.

The content of this article is different from articles in the current zoning plans as they legally can only include permit-less construction in a limited way. This article includes some possibilities that could lead to fewer permits which speed up decision-making at the municipal level.
The participants stated that any new construction can be built without a permit if they comply with the values of round one. The drainage of new structures is not connected to the sewer in an attempt to limit the effects of rainfall that could lead to overflooding. This means that as much rainfall as possible has to be absorbed by the building or the land that it will be constructed on.
Lastly, it is stated that new constructions must be climate adaptive which means that at least one of the stated conditions has to be met. A reflectivity of at least 35% albedo was chosen as a criterion. This is based on information that the participants looked up during the session. The second and third condition "at least 80% of the roof is used for sustainable energy generation or the building has a green roof" was chosen to show that there can be a contradiction between different objectives that are stated within the environmental vision. A green roof is a climate change adaptation measure that would help manage rainfall and limit flooding but it would also hamper the sustainability objective as it would clash with, for example, installing photovoltaic panels. As these are both important measures and objectives it was chosen to include both options. The rule is not formulated correctly as it states that climate adaptation is achieved by sustainable energy production (which is climate mitigation) as a condition.

For the construction of new buildings, the participants decided to include the following rule:

"If the climate-adaptive condition (of new buildings) is not met, the Municipal Executive can grant a permit for an equivalent solution that is sufficiently climate-adaptive.
When assessing whether there is sufficient climate adaptability, Policy Rule X or its legal successor is taken into account."

If a new construction does not meet the above-stated climate change adaptive conditions the Municipal Executive can grant a permit for an equivalent solution that is sufficiently climate-adaptive. The assessment of whether there is sufficient climate adaptability can be elaborated in a policy document. This option was chosen to facilitate future developments and innovation concerning climate change adaptation because this rule essentially states that the definition of what is sufficiently climate adaptive is stated in a separate document. So-called policy rules can much easier be changed than the omgevingsplan as the legal procedure to change a policy rule is shorter than the procedure to change an omgevingsplan which can take up to 4 weeks (IPLO, n.d., b). Therefore, this rule offers room for innovation and speeds up decision-making, an indicator of the third hypothesis.

For adding pavement and the felling of trees in the sub-area, the participants established the following rules:

1. For existing pavement:
Within five years after the Omgevingsplan comes into effect, all yards on which there are no buildings must be at least 50% unpaved.
Notwithstanding the foregoing, a surface of a maximum of 7.5 m² may always be paved.
//Municipal note: participate in advance. Create a program and also include a financial incentive for measures.

2. For new pavement:
May not lead to the paving of more than 50% of the yard.
Also a minimum of 7.5 m2.
Pavement has a reflectivity of at least 35% albedo.

3. For the cutting of trees:
A general ban on felling trees.
Licensing obligation:

- *Permit only if necessary for (social) safety;*
- *Replanting obligation at another location is possible, with the use of a tree bank. Possible permit requirements: at least equivalent tree size.*

4. Conservation Obligations

Existing wadis and semi-paved parking spaces will be maintained.
//Municipality note: Measures that the municipality will take will cost money. If there is a sufficient basis for this in the vision/programme, include rules for financial contributions for spatial developments.

The first rules about existing pavement state that within five years after the Omgevingsplan comes into effect, all yards on which there are no buildings must be at least 50% unpaved with the limitation that a surface of a maximum of 7.5 m² may always be paved. The Omgevingsplan can therefore also impact existing structures and set concrete goals for the future. As the municipality note states, participation with citizens in advance is needed if a municipality would apply this rule. Besides that, an environmental program should be established that features a financial incentive for residents to comply with the rule. If a municipality would apply this rule, the property rights of the owners are touched and therefore they need to be compensated by the means of a program that includes a financial incentive.

For new structures, it is easier to make the goal mandatory, as it does not interfere with property rights. The participants established in the second rule about new pavement that new pavement has to adhere to the same requirements as existing pavement with the difference that new pavement has to have an albedo of at least 35%.

The participants also agreed with the third rule that the felling of trees should be banned in the sub-area except if a tree endangers social safety. They also included a rule which makes it mandatory to compensate for the felling of the tree by planting a tree in a different area.

The fourth rule, labelled conservation obligations forms the basis for conservation obligations which legally binds the municipality to maintain, in this case, wadis and semi-paved parking spaces in the future. An indicator of offering room for innovation as the second hypothesis states.

After a 15-minute break, the participants returned to the action arena to discuss the second sub-area, the 'industrial area – development area'. The following objectives, values and activities were concluded for the second sub-area, the industrial area – development area:

Sub-area 2 round 1 Objectives

The rules in this section are set for the 'industrial area – development area' operating area. The following objectives apply to the land within that operating area:

a. ***Transition to a circular economy;***
b. *Wellbeing and a good living climate;*
c. *[to] Protect and improve biodiversity;*
f. *[a] Safe and healthy physical environment;*
e. *Preventing and limiting heat stress;*
f. *Preventing and limiting flooding and drought;*
g. *Buildings are climate adaptive;*
h. *Sustainability.*

The participants quickly concluded that for the second sub-area, the same objectives should apply that were stated for the first sub-area. The planning economist wished to add the objective 'transition to a circular economy'. In her factsheet, this objective was important for industrial areas:

> *"We can also take over part of the objectives for the industrial area – development area. I do want to include the subject of transition to a circular economy".*

Sub-area 2 round 2 Values

Specifically, the following applies in the 'industrial area – development area' operating area:

d. ***Same as the residential area***

Also, the participants concluded that the same values that apply to the first area should apply to the second area.

Decision-making about the second sub-area was notably sped up. This was expected and one of the assumptions of the second hypothesis: "The Omgevingsplan enables planners to make less detailed plans that speed up decision-making […]".

In terms of the conceptual model (see Fig. 14), decision-making was sped up due to the patterns of interaction. The flow of information that took place during the making of the plan for the first sub-area led to learning conditions, namely that the participants could evaluate which objectives and values should apply to the second sub-area. This evaluative criterion led to a quicker and more efficient outcome.

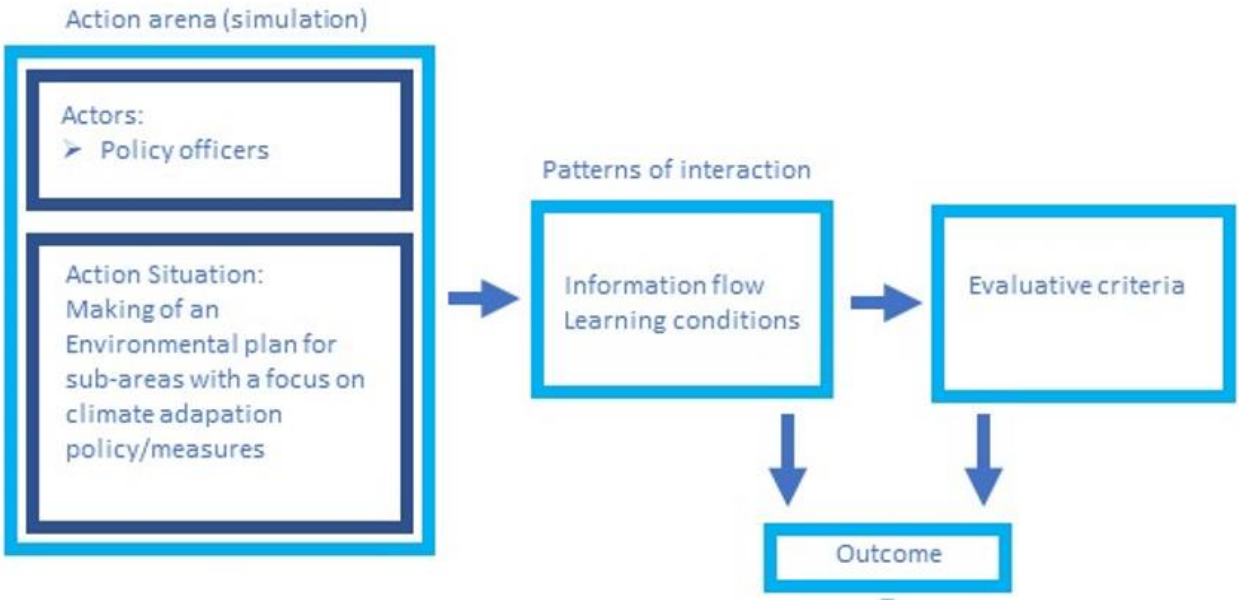

Fig. 14. Exempt context from adapted IAD Framework. Own work author.

Sub-area 2 round 3 Rules

In this round, the rules that are allowed in the sub-area were discussed:

1. Only the following activities are allowed, subject to compliance with the associated rules:

a. New establishment of companies – and change of business activities (must be defined – attention to when granting permits)

It is prohibited to use or change the use of land without a permit. Grant a permit if:
Sufficiently contribute to sustainability. When assessing, the Board takes into account the circular quality plan.
//Municipality note: existing environmental safety should not be diminished. Research beforehand and otherwise take measures for new activity.

2. Building – new construction

A permit is a requirement and granted under the same conditions as a).

It was decided that for the new establishment of companies and a change of business activity in the area, a permit is required at all times. New establishments and changes are granted a permit if they sufficiently contribute to sustainability. This is an open norm. The plan does not specify what sufficiently contributing to sustainability means. It was decided to refer to the circular quality plan of the municipality instead. This was done to prevent that planners have to change the plan every time the municipality's definition of what a contribution to sustainability is, changes. Instead, the definition that is stated in the circular quality plan could be changed. By doing this, future developments in the field of sustainable development can easily be applied to the plan without having to change the plan at all. The same conditions apply to new construction in the area.

5.2.3 Results

This subchapter summarises the results of the simulation gaming.

Hypothesis	Sub-area and Round	Indicated by
Hypothesis 1: The new rules of the game combine fragmented regulations and policies which leads to more clarity, predictability, and coherence.	Sub-area 1 Round 1	Fragmented policies are combined in the environmental vision and were used in the first round to establish objectives. This lead to clarity about which objectives should be achieved per sub-area.
	Sub-area 1 Round 2	Based on the qualitative objectives, the participants established clear and predictable quantitative values for the sub-area.
	Sub-area 1 Round 3	To achieve the objectives and values that were stated in round 1 and round 2 respectively, rules or regulations for the sub-area were established.
Hypothesis 2 The new rules of the game enable planners to make less detailed plans that speed up decision-making and offer room for innovation.	Sub-area 1 and 2 Round 1	The objectives, values, and rules that the participants stated in the omgevingsplan for both sub-areas applied to all locations within the sub-area. It is not possible to do so in the current bestemmingsplan zoning plans as they can only establish rules on the level of plots, not on global areas.
	Sub-area 1 Round 3	The duty of care that was established for existing buildings in the first sub-area is a broad rule that makes the plan less detailed.
	Sub-area 1 Round 3	Rules about buildings that can be built without permits speed up decision-making as they lead to less bureaucracy.

Hypothesis 3 The new rules of the game encourage cooperation and coordination of knowledge and skills strengthening the quality of implementation.	In all rounds	Actors cooperated and shared their knowledge on their policy areas and issues that play within the municipality. The quality of implementation could not be simulated, observed, or tested.

Table 4. Results simulation gaming. Own work author

Chapter 6 Conclusion, discussion and recommendations

The last chapter of the thesis summarises the main findings of the research. It answers the main research question "How does the new Environment and Planning Act influence the outcome of area development processes?" by discussing the conclusions for the sub-questions of the research. Afterward, a reflection on the research design and the research process is given. At last, recommendations for further research and praxis are given.

6.1 How does the new Environment and Planning Act affect the rules of the game for the parties involved in spatial planning at the municipal level?

The document analysis has indicated several institutional changes. Institutions, as "the rules of the game in a society, or more formally, […] the humanly devised constraints that shape human interaction" (North 1990, p.3) for the parties involved in spatial planning at the municipal level under the Environment and Planning Act were altered on five different dimensions.

In terms of the boundary rules, it was indicated that the Environment and Planning Act aims to break the fragmented legal context and bring parties that are involved in urban planning together.

In terms of the information rules, it was indicated that under the current system, the regulations about the physical environment are divided into up to 100 different urban zoning plans. Under the Environment and Planning Act, there is only one single area-wide plan: the Omgevingsplan.

When these actors come together to work on regulations they make use of the information sets that are available to the actors. In Dutch urban planning, these are usually policy documents that state the vision of the municipality on certain spatial issues. It was indicated that under the Environment and Planning Act, the information about the physical environment is bundled as much as possible within the environmental vision. It was also indicated that (in the future) citizens, policymakers, and urban planners can make use of the digital system of the Environment and Planning Act (DSO) to publish and access information about the physical environment. This information is bundled and consists of the policies and regulations that apply to a certain area within the municipality.

The actors that are involved in spatial planning under the Environment and Planning Act can and should make plans that aim to effectuate the policies stated in the environmental vision. Under the Environmental Planning act this plan is the single, area-wide Omgevingsplan. The document analysis has indicated that the legislator designed a policy cycle to ensure that the different instruments of the Act are aligned to guide effectuation. Actors that make an Omgevingsplan can set Environmental values that are measurable values (which were indicated as choice rules) that determine the actions needed to achieve a specific value or (policy) goal.

The document analysis has also indicated that the aggregation rules will change due to this integration. When different actors come together in an action situation to make an Omgevingsplan, they can make use of the bundled policies so the level of control that a participant in a position exercises should increase. It was indicated that current development goals unintentionally disappear into the background. Due to this bundling, the development goals should, under the Environment and Planning Act, not disappear in the background.

In terms of the scope rules, it was indicated that currently, the knowledge of the legal options is insufficient. Administrative bodies, such as municipalities are slowed down by this lack of knowledge. The Environment and Planning Act aims to set clear standards which determine the scope and thus the outcome.

6.2 What is the expected influence of these new rules on the outcomes of area development processes?

The document analysis has indicated that currently there are three institutional bottlenecks of Dutch urban planning:

First, there are "too many complex and fragmented regulations that are ordered per sector that lead to less clarity, predictability and coherence" (Tweede Kamer, 2014, p.14).

Secondly, an "imbalance between certainty and dynamism, which leads to lingering decision-making processes, high research burdens, detailed plans and to norms with little room for political direction, ownership, regional differentiation, and innovation" (Tweede Kamer, 2014, p.14).

Thirdly, a bottleneck in "governance culture and quality of implementation, as a result of insufficient cooperation, coordination and knowledge, and skills" (Tweede Kamer, 2014, p.14).

Based on these three bottlenecks, three hypotheses about the expected influence of the new rules of the game were extracted:

1. The new rules of the game combine fragmented regulations and policies which leads to more clarity, predictability, and coherence.
2. The new rules of the game enable planners to make less detailed plans that speed up decision-making and offer room for innovation.
3. The new rules of the game encourage cooperation and coordination of knowledge and skills strengthening the quality of implementation.

The first hypothesis states that the new rules of the game aim to combine fragmented regulations and policies which leads to more clarity, predictability, and coherence.

According to the second hypothesis, under the Environment and Planning Act and because of the new rules of the game planners are enabled to make less detailed plans that speed up decision-making and offer room for innovation.

Thirdly, It is expected that the new rules of the game encourage cooperation and coordination of knowledge and skills which strengthens the quality of implementation.

6.3 Can these expected effects be demonstrated in simulation gaming on the subject of climate change adaptation?

Hypothesis 1: The new rules of the game combine fragmented regulations and policies which leads to more clarity, predictability, and coherence.

The simulation gaming was played in three different rounds, the goal of the first round was to establish objectives for the sub-area(s). The objectives were based on the factsheets which were based on the environmental vision. Even though the non-binding environmental vision already combines fragmented policies within one single document, it was the co-creation process of the participants that manifested the policies as legally binding regulations for the sub-areas. The objectives were then, in the second round, translated into clear and predictable quantitative values for the sub-area(s). This process thus lead to more clarity about the objectives and values that need to be achieved within the sub-area(s) and could potentially in real life lead to more coherence between policies and rules within municipalities.

The aspect of predictability cannot be completely answered yet. Environmental visions and plans will later be published within one coherent digital system, the DSO. This digital system can combine and be used to access many special data about a certain area. As the scope of the law is about the physical living environment and wider than under current legislation, much more information can be coherently accessed to increase the predictability of certain projects within the physical living environment. As the digital system does not exist yet, it was also not possible to simulate it.

Hypothesis 2: The new rules of the game enable planners to make less detailed plans that speed up decision-making and offer room for innovation.

Even though the Omgevingsplan that was made during the simulation gaming is highly simplified, the hypothesis can be accepted. The plan is less detailed as all the rules that are stated apply to one global sub-area instead of smaller areas as it would under the current planning system. Once the plan for the first sub-area was completed, decision-making about the second sub-area was sped up significantly. In the case of the simulation gaming, it can be concluded that, due to this global level of detail, almost the same objectives and values that applied to the first sub-area can also apply to the second sub-area which speeds up decision-making.

The new rules of the game offer room for innovation. Environmental values and specific objectives for sub-areas are new concepts in Dutch spatial planning. In the current planning system, the objective of a plan is to ensure 'good spatial planning'. The Omgevingsplan aims at ensuring and improving the

state of the physical living environment. The scope of the law is much larger than under the current system. Whereas the current system ensures 'good spatial planning', the new system will ensure and improve the state of the physical living environment by establishing environmental values that aim at certain objectives that are stated in the plan. This ensures that there is room for innovation. Whether it is for dealing with climate change or to deal with other future developments. It can also be concluded that room for innovation has been created for the first sub-area where many activities are allowed to be conducted without a permit as long as they contribute positively to climate change adaptation.

Hypothesis 3 The new rules of the game encourages cooperation and coordination of knowledge and skills strengthening the quality of implementation.

The new rules of the game encourage cooperation and coordination of knowledge and skills. Many actors in the action situation were cooperating to achieve certain objectives that they collectively agreed on. The positions of the actors were limited to policy officers and a spatial lawyer. Many more positions could be included in a real-life action situation. The boundary rule is therefore determined by an organisation's ambition. The information rules are strengthened as they directly influenced the objectives for the sub-areas. The coordination of skills was encouraged within the action situation but its strength is determined by each individual's ambition to contribute to the coherent plan. The main finding is that many different actors are given a chance to directly contribute to results under the new system that they otherwise would not get. Whether by actively participating within the action situation or possibly passively by shaping the environmental vision which is used as input for the plan.

The aspect of "quality of implementation" could not be studied or simulated yet as the introduction of the law is required to confirm or reject this hypothesis. For example, the DSO could not be simulated nor the implementation of the rules that were made during the simulation gaming.

6.4 Discussion

This research provided insights into the Environment and Planning Act and its main instrument the Omgevingsplan. As the Environment and Planning Act has not been introduced yet, the results should be interpreted carefully, as the research design demonstrated some limitations.

This subchapter firstly reflects on the strengths and limitations of the Institutional Analysis and Development Framework of Ostrom. Secondly, the research design and process is discussed and, lastly, several recommendations for further research and recommendations for practical implementations are given.

The Institutional Analysis and Development Framework of Ostrom is rarely used to analyse legislation or the influence of new legislation on the outcome of area development processes. The Institutional Analysis and Development Framework of Ostrom was useful to analyse the institutional changes that the Environment and Planning Act and its main instrument the omgevingsplan introduce. It provided a useful framework for understanding the institutional arrangements that shape human interaction. It identified that there are multiple levels and components of analysis and it helped to tailor complex issues such as climate change adaptation to a biophysical environment and local circumstances. The component 'rules in use' helped to break down the complexity of collective action processes into smaller parts. It helped to examine how the rules of the game change and how these new rules interact and influence human interaction.

The IAD framework was useful to analyse formal institutions but it also identified some limitations.

The framework lacked focus on informal institutions. It did not address the informal norms and values that could influence human interaction or the outcome. The IAD framework primarily focuses on the interaction between actors and the internal factors that play within complex systems. It lacked to include other external factors such as financial incentives or economic aspects.

The document analysis has indicated several changes in rules of the game for the parties involved in spatial planning at the municipal level and it has indicated that currently there are three bottlenecks of Dutch environment and planning law and that the Environment and Planning Act will be introduced to counter these bottlenecks. Many changes in rules in use were identified but not on all dimensions. The document analysis did not reveal whether the position rules change or what the payoff rules are under the Environment and Planning Act. Therefore, the research could not reveal what the expected influence of the new position and payoff rules are on the outcome of area development processes. Based on the document analysis, three hypotheses were extracted.

The environmental vision as a policy document that combines fragmented policies within one single area-wide policy document of a municipality is a useful tool under the Environment and Planning Act to counter the first bottleneck: "too many complex and fragmented regulations that are ordered per sector that lead to less clarity, predictability and coherence" (Tweede Kamer, 2014, p.14). The Omgevingsplan can be an effective tool to effectuate the non-binding environmental vision into binding regulations for the territory of a municipality. It could thus also combine fragmented regulations into one single area-wide regulation to improve the clarity, predictability of regulations, and coherence between policies and regulations.

The document analysis has indicated that currently, there is an "imbalance between certainty and dynamism, which leads to lingering decision-making processes, high research burdens, detailed plans and to norms with little room for political direction, ownership, regional differentiation, and innovation" (Tweede Kamer, 2014, p.14). During the simulation gaming, especially during the first and second rounds, room was given to the participants to express political direction. They were able to express which problems lay at hand in the municipality. Based on the objectives, measurable values were established for the sub-areas. In this stage, room was given for regional differentiation between the sub-areas. The plans that were made were very global as the objectives and values apply to a broad area, making the plan less detailed. The rules that the participants established for the sub-areas, such as the rules about permit-less construction of climate change adaptive constructions or the duty of care gave room for innovation. The rules were established relatively quickly because the participants had sufficient knowledge of the legal system and knowledge about the Omgevingsplan. Therefore it could not be indicated whether the decision-making process was sped up due to the instruments that the Environment and Planning Act offers or if the decision-making process was sped up due to the knowledge that the participants had about the legal system. This limitation or aspect was indicated by North's competitive sports analogy which stated: "Even with a constant set of rules, the games played will differ if they are played between ranked amateurs and professionals or between a team in its first game and the same team in its one hundredth game together" North (1990, p.74). The actors that participated in this research were experienced urban planners and legal advisors and had several years of working experience under the current system. They were also acquainted with the Environment and Planning act, especially with the Omgevingsplan. This research could have also included actors that momentarily work for a municipality. The researcher did not choose to do so because, from the insights gained from his working experience, many policymakers, spatial planners or lawyers that work for

municipalities are not acquainted enough with the Omgevingsplan yet. It was therefore chosen to let experienced co-workers participate in the simulation gaming.

The third hypothesis, that the new rules of the game encourage cooperation and coordination of knowledge and skills and strengthens the quality of implementation cannot be completely accepted. The new rules of the game did encourage cooperation and coordination of knowledge and skills as during the simulation gaming many actors were invited to the table to participate in the crafting of rules. It was not able though to indicate whether the quality of implementation was strengthened. This can only be researched in a real life case study once the Environment and Planning Act has been introduced. Simulation gaming could then be replaced with a real-life action situation once the Environment and Planning Act has been introduced. One should keep in mind though that there is a transitional period until 2029. In 2030, all municipalities should have one coherent Omgevingsplan. This research could therefore also be repeated in 2030 and could make use of alternative approaches.

The data collection consisted of recording the simulation gaming and transcription. The result was an Omgevingsplan for two sub-areas. Unfortunately, there are few digital examples of Omgevingsplans available yet due to inconsistencies in the digital system (DSO). The results could have been presented much clearer if it would be possible to refer to digital examples of an Omgevingsplan. This would also enhance the information rules of each participant as more information could have been used simultaneously during the simulation gaming. An interactive map could have sped up the decision-making process even more. The simulation gaming resulted in a simplified Omgevingsplan for two sub-areas with a focus on climate change adaptation measures. Almost all aspects of the hypotheses were answered. The main aspects that remain unanswered are the aspects of quality of implementation. These are also interesting aspects to study once the Environment and Planning Act has been introduced.

A pragmatic approach was chosen for this research. This was necessary due to the following reasons. The research began in August 2021. At the time not many examples of an Omgevingsplan were available. Recently, in July 2022, the association of Dutch municipalities (VNG) released a basic model of an Omgevingsplan which was used to design the three gaming rounds. At the time of writing this basic structure consists of about 500-600 articles that serve as examples that municipalities can use to start making their Omgevingsplan. An interesting observation is, that only two articles of the almost 600 articles are about climate change adaptation: namely about green roofs for industrial buildings. Therefore, the results of this research are also of societal relevance as they contribute to the realisation of climate change adaptation under the Environment and Planning Act. The Omgevingsplan is a new

managerial tool that offers room for innovation. Climate change adaptation and the Omgevingsplan are highly complex issues.

The limitations of this research show that there are several recommendations for further research and praxis. These will be elaborated on in the next subchapter.

6.5 Recommendations for further research and praxis

This subchapter discusses several recommendations for further research as well as recommendations for praxis.

One aspect that could not be completely studied or simulated in this research is the 3rd hypothesis which focuses on the aspect of 'quality of implementation'. A recommendation for further research could be to assess what the quality of implementation is after the law has been introduced.

Another aspect is the government culture. It would be interesting to study how the government culture has changed after the law has been introduced.

The thematical scope of this research could be broadened. A new study could be conducted that focuses on more general objectives. Instead of only researching climate change adaptation, a study could also include climate mitigation or other aspects.

Future research could focus on the rules in use, such as the boundary rules. For simplicity, several six actors were included in this research. It would be interesting to analyse, once the Environment and Planning Act has been introduced, what the limitations of the boundary rules are. An organisation such as a municipality has many employees in different policy areas. It would be interesting to study what the most efficient number of participants is to work on a single Omgevingsplan.

This research did not indicate how the position rules change. Future research could focus on the aspect of governance culture to see if the position rules change under the Environment and Planning Act.

The research did not indicate what the payoff rules are. This remains unclear and future research could reveal what the payoff rules are and how they change under the Environment and Planning Act.

As for the recommendations for praxis, municipalities could use the simulation gaming in their organisation to build up a library of rules about climate change adaptation measures or in general a library of rules that can be used once the Environment and Planning act has been introduced.

Another recommendation for municipalities could be to specify the goals that are stated in their environmental visions to make it easier for planners to extract concrete objectives and values for the sub-areas of the Omgevingsplan. The environmental vision of Alphen aan den Rijn did indicate what the trends and developments are on the subject of climate change adaptation but it did not precisely indicate where and which climate change adaptive measures are needed to achieve a desired state of the physical environment.

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Chapter 7 Appendix

7.1 Invitation and general model of an Omgevingsplan

Beste X,

Bedankt dat je meedoet aan mijn masterscriptie onderzoek op 3 Juni.

We gaan een werksessie voor de gemeente Alphen aan den Rijn simuleren waar vijf verschillende (beleid)medewerkers (beleidsmedewerker participatie, klimaatadaptatie, natuur en biodiversiteit, gezondheid en welzijn, en een planeconomist) voor het eerst samen komen om een aanzet voor klimaatadaptieve regels te formuleren voor drie gebiedstypes in het fictieve Omgevingsplan van de gemeente Alphen aan den Rijn.

Ter inspiratie van het fictieve Omgevingsplan oriënteren we ons aan het casco van de gemeente Hillegom. Dat ziet er voor een gebiedstype als volgt uit:

Hoofdstuk 4 Aanwijzingen in de fysieke leefomgeving

Titel 4.1 Gebieden

Afdeling 4.1.1 Gebiedstype

Paragraaf 4.1.1.1 Doel

Artikel 4.1 doel functietoedeling

De regels in deze afdeling zijn gesteld voor het werkingsgebied 'XYZ'. Voor de gronden binnen dat werkingsgebied gelden de volgende doelstellingen:

a. X

b. Y

c. Z

Paragraaf 4.1.1.2 Waarden

Artikel 4.2 Waarden

In het werkingsgebied 'XYZ' gelden specifiek:

a. X

b. Y

c. Z

Paragraaf 4.1.1.3 Activiteiten

Artikel 4.3 Activiteiten

Alleen de volgende activiteiten zijn toegestaan, mits voldaan wordt aan de bijbehorende regels:

a. X

b. Y

c. Z

Tijdens de simulatie neem je de rol aan van een Y. In de bijlage vind je informatie in de vorm van een *factsheet* met beleid afkomstig uit de omgevingsvisie van de gemeente Alphen aan den Rijn. De sessie begint met een korte presentatie waar ik verder ga uitleggen wat de doelen voor de sessie zijn en om welke plangebieden het gaat.

Ter voorbereiding kun je de bijlage lezen. Het onderzoek is zo ontworpen dat je ook met weinig voorbereiding kunt deelnemen.

Laat maar weten als je nog vragen hebt!

Met vriendelijke groet,

Lennart Netik

7.2 Factsheets

Participation policy officer factsheet

"Participatie onder de Omgevingswet

Om participatie nog beter in onze organisatie in te bedden is een gemeentebreed participatiebeleid opgesteld. In dit overkoepelende beleid wordt ingegaan op hoe we participatie effectief in kunnen richten. Er wordt ook aandacht besteed aan wat wij verwachten van initiatiefnemers op het gebied van participatie. **Wij willen door middel van participatie, niet alleen vóór, maar ook mét de samenleving komen tot toekomstbestendige plannen voor de gemeente** (Omgevingsvisie Alphen aan den Rijn, 2022, p.145).

Doorwerking in Omgevingsplan, -waarden en -programma's

De algemene uitgangspunten en ontwikkelrichtingen uit deze omgevingsvisie worden verder uitgewerkt in één Omgevingsplan voor de gemeente Alphen aan den Rijn. In het Omgevingsplan werken we onze ambities concreet uit in regels die bindend zijn voor iedereen. Hierbij kan gedacht worden aan een evenwichtige toedeling van functies aan locaties en bijvoorbeeld regels over bepaalde activiteiten. Ook wordt in het Omgevingsplan vastgelegd voor welke activiteiten in de toekomst nog een vergunning moet worden aangevraagd.

Ons uitgangspunt hierbij is om stapsgewijs te komen tot een Omgevingsplan waarin zo weinig mogelijk vergunningplichten zijn opgenomen. De algemene regels vormen de basis waarmee initiatieven ontworpen kunnen worden, **participatie met belanghebbenden moet uiteindelijk leiden tot een door de omgeving gedragen plan** (Omgevingsvisie Alphen aan den Rijn, 2022, p.147).

"In het totstandkomingsproces van de Omgevingsvisie hebben we met een breed scala aan gesprekpartners/doelgroepen te maken. Dit varieert van interne vakspecialisten, andere overheden en belangenorganisaties tot inwoners en bedrijven binnen onze gemeente" (Omgevingsvisie Alphen aan den Rijn, 2022, p.144).

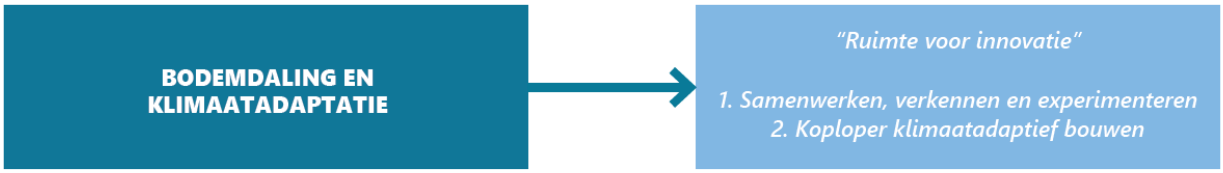
"Trends en ontwikkelingen

Klimaatadaptatie betekent dat er in toenemende mate rekening gehouden zal moeten worden met de directe en indirecte effecten van klimaatverandering" (Omgevingsvisie Alphen aan den Rijn, 2022, p.40).

" Concreet gaat het over de volgende trends:

- het wordt natter (wateroverlast),
- het wordt warmer (hitte),
- het wordt droger (droogte) en
- de zeespiegel en rivierstanden stijgen (overstromingen).

Dorpen, steden en het buitengebied moeten zo ingericht worden dat deze voorbereid zijn op het toekomstige klimaat. **De ondergrond speelt hierbij een belangrijke rol. Middels het convenant klimaatadaptief bouwen koppelen we deze opgave ook aan onze gebouwde omgeving"** (Omgevingsvisie Alphen aan den Rijn, 2022, p.40).



"Aandachtspunt 1. Intense buien en hitte

Om (toekomstige) overlast te beperken, zullen we moeten anticiperen op de gevolgen van klimaatverandering. In de stedelijke gebieden van onze gemeente zal (meer) overlast ontstaan door **hevigere regenbuien en het ontstaan van hitte-eilanden**. **Hemelwater zal meer in de stad geborgd moeten worden en met meer schaduw van bomen kan de extreme hitte in verstedelijkte gebieden afnemen**" (Omgevingsvisie Alphen aan den Rijn, 2022, p.40).

"**De ruimtelijke impact van deze maatregelen is minder verharding en daarvoor in de plaats onverhard gebied en meer vergroening in de stad door middel van bomen en groene gevels en daken.** Ook andere warmtewerende maatregelen voor gebouwen en openbare ruimte kunnen bijdragen aan het verminderen van het hitte-eiland effect. **Hierbij is het van belang de openbare ruimte bewust in te richten zodat sommige delen bij intense neerslag onderlopen om de**

cruciale (kwetsbare) delen veilig te houden. Deze ruimtelijke maatregelen hebben ook effect op andere thema's in een stedelijk gebied. Door meer vergroening en het verminderen van hitte kan ook de leefbaarheid en gezondheid verbeterd worden" (Omgevingsvisie Alphen aan den Rijn, 2022, p.40). "Groene gebieden kunnen namelijk ook ruimte voor beweging en ontspanning bieden alsmede positief bijdragen aan de biodiversiteit in de stad. **Er is beperkte mogelijkheid om hemelwater tijdelijk vast te houden. Om in de toekomst de overlast te voorkomen, zal ruimte gecreëerd moeten worden voor overloopgebieden ten behoeve van waterberging**" (Omgevingsvisie Alphen aan den Rijn, 2022, p.40).

"Aandachtspunt 2. Bodemdaling en verdroging

We zullen ook langdurige(re) droge periodes gaan krijgen. Het zal in de toekomst dus mogelijk zijn dat in een waterrijk land als Nederland zoetwater tekorten ontstaan. **Om voldoende water beschikbaar te hebben binnen ons grondgebied en de bodemdaling te remmen, zal voldoende zoetwater in nattere periodes gebufferd moeten worden.** Voor de omgeving betekent dit dat er onderzocht moet worden of er mogelijkheden zijn zoetwater te bufferen" (Omgevingsvisie Alphen aan den Rijn, 2022, p.41).

"Trends en ontwikkelingen

De gemiddelde kwaliteit van de Nederlandse natuur is jarenlang achteruitgegaan, met verlies van biodiversiteit tot gevolg. Ook al vinden er verbeteringen plaats, er is nog geen sprake van herstel. In het agrarisch gebied is de trend bijvoorbeeld nog negatief. De ruimtelijke, water- en milieucondities zijn nog niet op orde voor duurzaam voortbestaan van soorten en habitattypen van ons ecosysteem. Een derde van de Nederlandse dier- en plantensoorten is momenteel bedreigd. De Rijksoverheid benoemt de volgende algemene ambities:

- **Het beschermen en verbeteren van de biodiversiteit;**
- Het duurzaam benutten en beleven van natuur door natuurlijk kapitaal te houden en versterken;
- **Natuur, en beleid dat erop is gericht, in de samenleving te verankeren door de betrokkenheid van mensen bij de natuur te versterken.**
- **Terugbrengen van verloren biodiversiteit op verschillende locaties.**

Aandachtspunt 1. Natuur in de stad en buitengebied

De natuurwaarden van het buitengebied staan onder druk, mede door de intensieve landbouw en oprukkende verstedelijking. **De opgave is om een hogere biodiversiteit in** zowel het buitengebied als **het bestaande stedelijk gebied te realiseren en deze onderling met elkaar te verbinden.** We moeten ecosysteemdiensten behouden en versterken. Naast veranderingen in gebruik gaat het ook om de inrichting van de gebieden. Denk hierbij bijvoorbeeld aan bijvriendelijke groenstroken, natuurvriendelijke oevers, **natuurinclusieve wijken** en geriefbosjes. **Het noord-westelijke buitengebied zou**, naast de Wilck, nog meer een ecologische 'stepping stone' kunnen worden tussen de duingebieden en de Nieuwkoopse plassen, met name voor weide- en trekvogels. Ook het Bentwoud kan hier een waardevolle rol in vervullen. **Om het bestaande stedelijk gebied van een hogere biodiversiteit te voorzien zouden meer verharde gebieden moeten veranderen naar groene plekken**. Hier liggen ook kansen voor een gezonder en aantrekkelijker woon- en leefomgeving, klimaatadaptatie en recreatie" (Omgevingsvisie Alphen aan den Rijn, 2022, p.52-53).

"Trends en ontwikkelingen

Veiligheid en milieu zijn twee andere thema's die in het kader van de bredere blik op de fysieke leefomgeving, die in de Omgevingswet centraal staat, een prominentere plaats krijgen in ons omgevingsbeleid. Door normen te stellen is de kwaliteit van onze leefomgeving in de afgelopen decennia flink verbeterd. Dit heeft een gunstig effect gehad op onze gezondheid en veiligheid. Echter, de effecten op de gezondheid als gevolg van bijvoorbeeld de luchtkwaliteit of geluidbelasting zijn nog steeds aanzienlijk. Een veilige samenleving wordt bepaald door een aantal factoren: de fysieke veiligheid, digitale veiligheid en de sociale veiligheid. Bij de fysieke veiligheid gaat het bijvoorbeeld over veiligheid in het verkeer, overstromingen, maar ook om de veiligheid nabij snelwegen (bijvoorbeeld vanwege transport gevaarlijke stoffen) en in de buurt van bedrijvigheid. Op het gebied van sociale veiligheid is er een kloof tussen de feitelijke veiligheid en de veiligheid die mensen ervaren. Steeds meer mensen voelen zich onveiliger terwijl cijfers vaak laten zien dat het niet onveiliger is geworden. Deze aspecten van een veilige samenleving vragen allemaal om een andere aanpak.

Aandachtspunt 1. Omgevingsveiligheid

De inrichting van (en activiteiten in) de fysieke leefomgeving beïnvloedt de veiligheid van inwoners. Denk hierbij aan explosiegevaar, overstromingen, verkeer of milieubelastende uitstoot van bedrijventerreinen. Naast de bedrijventerreinen zijn er in bepaalde gebieden ook risicovolle objecten zoals propaantanks, benzinestations en energie-infrastructuur die de veiligheid in het geding kunnen brengen. Hier gelden ook vaak risicocontouren waarbinnen de gebruiksmogelijkheden van de fysieke leefomgeving beperkter zijn. Een veilige energietransitie, waterveiligheid en -kwaliteit zijn de komende jaren belangrijke aandachtspunten. In onze gemeente is een aantal aandachtsgebieden, bijvoorbeeld langs buisleidingen, rondom bedrijventerreinen en transportroutes gevaarlijke stoffen. Om er voor te zorgen dat deze aandachtsgebieden geen gevaar zijn voor de omgeving is het een goede richtlijn om deze activiteiten te clusteren en op een veilige afstand van woningen en andere verblijfsgebieden te plaatsen en anders voorzorgsmaatregelen te nemen.

Aandachtspunt 2. Gezond Milieu

De gezondheid van onze inwoners wordt deels beïnvloed door factoren in de fysieke leefomgeving. Met omgevingsbeleid kunnen wij sturen op het minimaliseren van de negatieve factoren en het verbeteren van ruimtelijke factoren die de gezondheid bevorderen. De (klassieke) milieuthema's zijn luchtkwaliteit, lichtuitstoot, geur, geluidsoverlast, trillingen en bodem- en watervervuiling. Een combinatie hiervan is gevat in de kaart met milieugezondheidsrisico. Het scheiden van

milieubelastende activiteiten en kwetsbare functies, zoals wonen, scholen en kinderdagverblijven kan bijdragen aan een gezonde fysieke leefomgeving. Maar ook door verduurzaming van onze woningvoorraad, mobiliteit en economische activiteiten en met behulp van bijvoorbeeld groenvoorzieningen kunnen we de leefomgeving gezonder en veerkrachtiger maken. Aandachtspunt hierbij is wel dat de energietransitie ook negatieve effecten kan hebben op de veiligheid en op milieuaspecten, bijvoorbeeld geluidsoverlast van windturbines en warmtepompen" (Omgevingsvisie Alphen aan den Rijn, 2022, p.36).

"Trends en ontwikkelingen

Een belangrijke trend is de transitie naar een circulaire economie. Een circulaire economie betekent drie ontwikkelingen:

Bestaande productieprocessen maken efficiënter gebruik van grondstoffen, zodat er minder grondstoffen nodig zijn.

Wanneer nieuwe grondstoffen nodig zijn, wordt zoveel mogelijk gebruikgemaakt van duurzaam geproduceerde, hernieuwbare (onuitputtelijke) en algemeen beschikbare grondstoffen.

De ontwikkeling van nieuwe productiemethodes en nieuwe circulaire producten is nodig.

- meer dan 1/3 van banen in regio Alphen aan den Rijn op bedrijventerreinen

Een groot deel van de circulaire transitie zal plaatsvinden op zowel bedrijfsniveau als bedrijventerreinen. Deze gebieden zijn nu goed voor ongeveer 30 procent van de werkgelegenheid in Nederland. In Alphen aan den Rijn is dit zelfs meer dan een derde. Echter, veel binnenstedelijke locaties zijn ook aantrekkelijk voor woningbouw. In de Randstad is mede hierdoor een daling te zien van het aantal banen en vestigingen op bedrijventerreinen. Dit spanningsveld vormt een bedreiging voor economische groei. Tegelijkertijd zien we door onze mainports, verdere digitalisering en internetwinkelen een toename van de vraag naar grootschalige bedrijventerreinen. Deels voor de groeiende lokale maakindustrie, maar met name voor de logistieke sector. Voor een competitieve economie wordt een leven lang leren een cruciale factor. Verdere digitalisering van onze economie en technologische ontwikkelingen en kansen die daarbij komen kijken hebben tevens onze aandacht. Denk daarbij aan kansen en uitdagingen met betrekking tot 5G en mogelijke 'smart-city' toepassingen.

Aandachtspunt 1. Ruimte voor groei bedrijventerreinen

De (regionale) vraag naar ruimte voor groei en innovatie van het MKB blijft naar verwachting hoog de komende jaren. De uitbreidingslocaties voor het MKB worden gezocht aangrenzend aan de bestaande bedrijventerreinen in de gemeente, in het bijzonder nabij de N11 en de containerterminal. Ook blijft er in de regio Holland Rijnland, en daarbuiten, vraag naar ruimte voor logistieke bedrijvigheid en bedrijvigheid in de hogere milieucategorie. Locaties voor logistiek zijn schaars in Holland Rijnland. Deze bedrijvigheid is van belang voor de lokale en regionale economie in het kader van verstedelijking (o.a. betonindustrie) en circulaire economie (verwerking & recycling). Locaties voor dit type bedrijvigheid zijn zeer schaars in de regio en de Randstad. Ruimte voor nieuwe bedrijvigheid is dus een belangrijke opgave, net als de verduurzaming van bestaande bedrijven en bedrijventerreinen.

Aandachtspunt 2. Kennisontwikkeling en verduurzaming economische activiteiten

We willen onze economische activiteiten verduurzamen en circulair maken. Ook voor Alphen aan den Rijn is de transitie naar een duurzame en circulaire economie een grote opgave. Er zal anders om moeten worden gegaan met grondstoffen en reststromen. Hiervoor zullen bestaande activiteiten moeten worden aangepast en zal er ruimte op de bedrijventerreinen gecreëerd moeten worden voor innovatieve circulaire bedrijven en nieuw ondernemerschap. Belangrijk aandachtspunt hierbij is dat circulaire grondstoffenverwerking een milieubelastende activiteit kan zijn. Het zal van onze producenten en consumenten een nieuwe manier van denken vereisen, waarbij de restproducten niet als afval maar als grondstof gezien worden en minder in termen van eigendommen gedacht wordt, maar in termen van diensten (Omgevingsvisie Alphen aan den Rijn, 2022, p.44-45)".

"Ongeveer een derde van het bebouwd gebied wordt gevormd door bedrijventerreinen en een beperkt aantal kantorenlocaties. Deze gebieden zijn duidelijk anders van schaal en sfeer dan de centrum- en woongebieden (Omgevingsvisie Alphen aan den Rijn, 2022, p.25)".

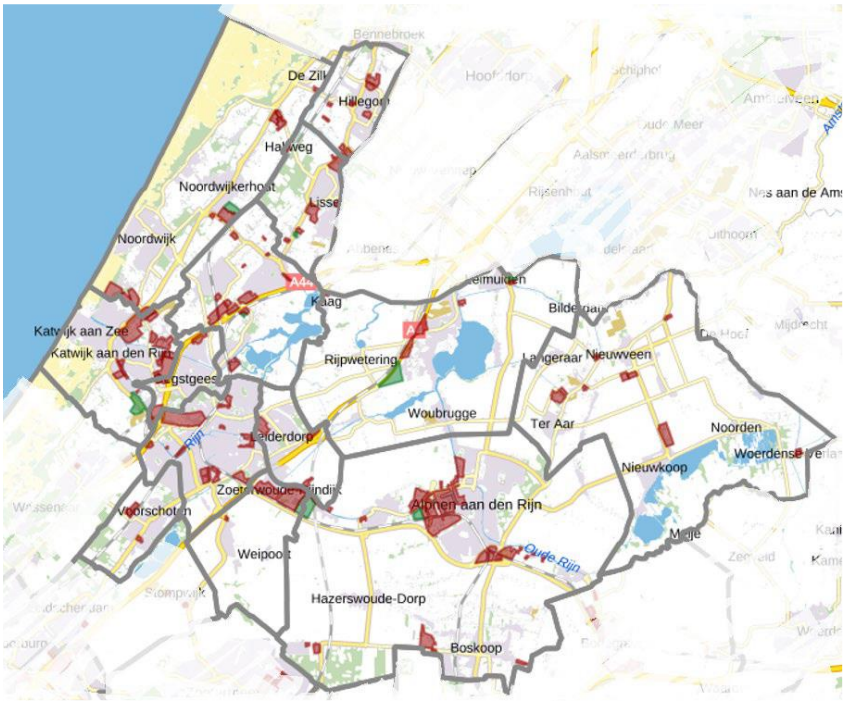


Fig. 1. Hoofdlijnenstrategie bedrijventerreinen Holland- Rijnland (2019)

7.3 Presentation given by the researcher

Context Omgevingsplan

3

Algemeen		Specifiek		
Omgevingswet	→	Omgevingsvisie	→	Omgevingsplan
		Beleid		Effectuering

4

Doelen stelselwijziging

Kansen omgevingsplan

5

Nu
- Bestemmingen
- Als gebruik (en bouwen) past in bestemingsplan moet worden meegewerkt
- Limitatief imperatief stelsel
- Goede ruimtelijke ordening

Straks
- Regels voor activiteiten
- Geen limitatief imperatief stelsel voor vergunningen
- Fysieke leefomgeving

Extra mogelijkheden omgevingsplan

6

Werken met open normen:

De omgevingsvergunning wordt alleen verleend als:

a. het aangevraagde bouwwerk naar het oordeel van het college van burgemeester en wethouders een bijdrage levert aan het verbeteren van de stedenbouwkundige structuur;
b. etc.

Maar ook: vergunningplichten voor activiteiten die in principe wel zijn toegestaan

Casco (1)

7

Hoofdstuk 4 Aanwijzingen in de fysieke leefomgeving

Titel 4.1 Gebieden

Afdeling 4.1.1 Gebiedstype

Paragraaf 4.1.1.1 Doel

Artikel 4.1 doel functietoedeling

De regels in deze afdeling zijn gesteld voor het werkingsgebied 'XYZ'. Voor de gronden binnen dat werkingsgebied gelden de volgende doelstellingen:

a. X

b. Y

c. Z

Casco (2)

8

Paragraaf 4.1.1.2 Waarden

Artikel 4.2 Waarden

In het werkingsgebied 'XYZ' gelden specifiek:

a. X

b. Y

c. Z

Paragraaf 4.1.1.3 Activiteiten

Artikel 4.3 Activiteiten

Alleen de volgende activiteiten zijn toegestaan, mits voldaan wordt aan de bijbehorende regels:

a. X

b. Y

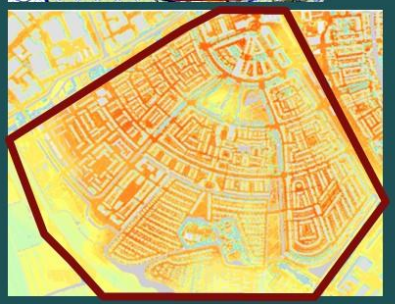
c. Z

9

Verkennen en aanwijzen gebiedstypes

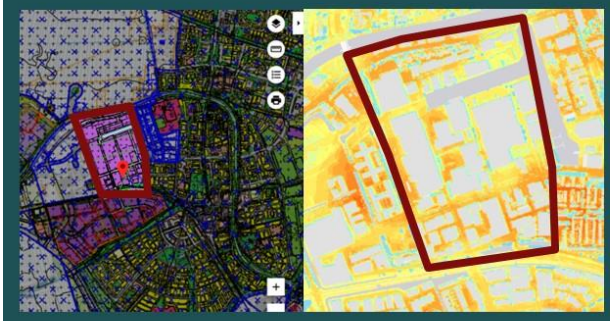
Plangebied 1 Bestaande Woonwijk

9



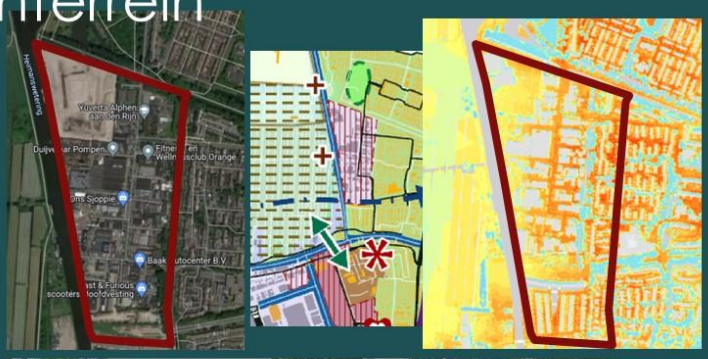
Plangebied 2 Bestaand Bedrijventerrein

10



Plangebied 3 Ontwikkelgebied Bedrijventerrein

11



13

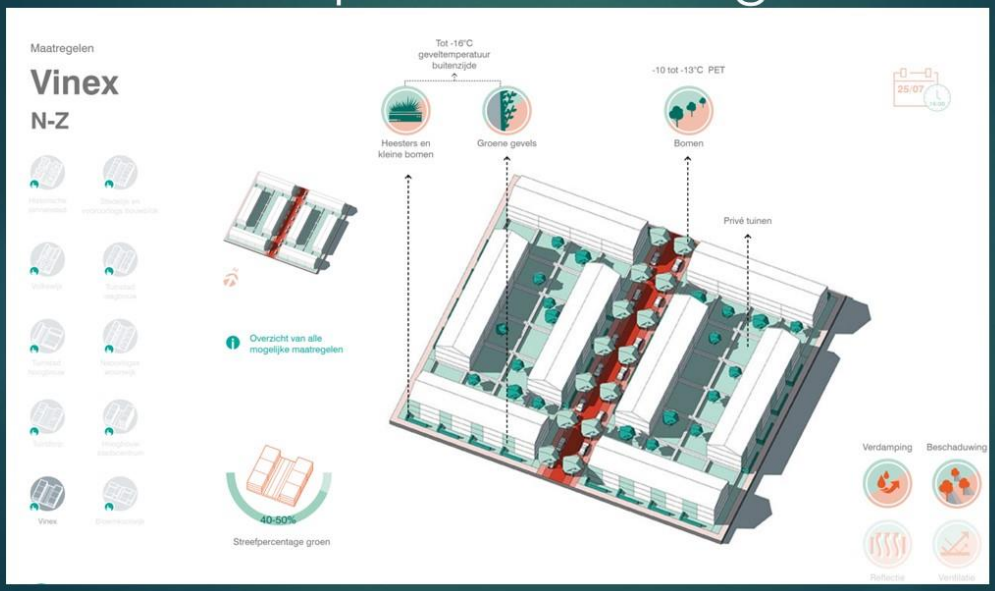
Klimaatadaptieve maatregelen

Klimaatadaptieve maatregelen

14

Klimaatadaptieve maatregelen

15



Klimaatadaptieve maatregelen

16

Maatregelenoverzicht: groen blauw grijs

Soort	Maartregel	Verkoelingsprincipes: verdamping, reflectie, schaduw	Maatregel vooral voor		Schaalniveau waarop maatregel effectief is		Verkoelende effecten gevonden in literatuur			Extra informatie
							Luchttemperatuur [°C]		Gevoels-temperatuur [°C]	
			Dag	Nacht	Stad	Lokaal	Stad	Lokaal	Lokaal	
Groen	Bomen/leibomen		✓		✓	✓	0,2 - 2,7	0,7 - 2,7	3,4 - 19,0	Effect afhankelijk van boomtype en -grootte en het lokale klimaat.
	Gras/Struiken		✓	✓	✓	✓	0,1 - 1,1	0,9 - 1,2	0,4 - 4,9	Effect van een gezond goed verdampend grasveld. Gras heeft ook effect op oppervlakte-temperatuur (tot 20 °C kouder dan beton).
	Grasbetontegels		✓	✓		✓	--	--	--	
	Groene gevels		✓	✓		✓	0 - 1,9	0,2 - 1,5	??	Hoe smaller de straat, hoe groter het effect op de luchttemperatuur. Groter effect voor gevels met meer zonnestraling.
	Groene daken (extensief)			✓	✓		0 - 1,8	0 - 0,8	--	Een met sedum bedekt groen dak geeft weinig verkoeling 's nachts (vergeleken met een wit dak). Effect op stadsniveau is als 100% van alle daken in de stad groen zijn.
	Groene daken (intensief)		✓	✓	✓		0 - 1,7	1,0 - 1,6	--	Effect op stadsniveau is als 100% van alle daken in de stad groen zijn.
	Park of groene wiggen/vingers in de stad		✓	✓	✓		??	1,1 - 2,0	1,9 - 4,2	Effect afhankelijk van vegetatietype (boom versus gras), boomgrootte, grootte van het park en het lokale klimaat. Effect op PET gemeten in schaduw is groter dan hier genoemd.

17

Doelen voor de plangebieden formuleren

18

Aanzet voor regels formuleren

19

Eventueel: aanzet toelichting

7.4 Results Simulation gaming

Hoofdstuk 4 Aanwijzingen in de fysieke leefomgeving

Titel 4.1 Gebieden

Afdeling 4.1.1 Gebiedstype Bestaande woonwijk

Paragraaf 4.1.1.1 Doel

Artikel 4.1 doel functietoedeling

De regels in deze afdeling zijn gesteld voor het werkingsgebied 'Bestaande woonwijk'. Voor de gronden binnen dat werkingsgebied gelden de volgende doelstellingen:

d. *Goed woon- en leefklimaat;*
e. *Beschermen en verbeteren van de biodiversiteit;*
f. *Veilige en gezonde fysieke leefomgeving;*
g. *Voorkomen en beperken van hittestress;*
h. *Voorkomen en beperken van wateroverlast en droogte;*
i. *Gebouwen zijn klimaatadaptief;*
j. *Verduurzaming.*

Paragraaf 4.1.1.2 Waarden

Artikel 4.2 Waarden

In het werkingsgebied 'Bestaande woonwijken' gelden specifiek:

d. Een minimaal aantal van 3 bomen zichtbaar vanuit de belangrijkste verblijfsruimte van iedere woning;
e. Ten minste 50% van de totale oppervlakte aan onoverdekte openbare parkeerplaatsen onverhard – voor openbaar gebied geen regels in Omgevingsplan. Programma gemeente zelf beheerder en eigenaar eventueel als omgevingswaarde opnemen.
f. Ten minste 50% van de totale oppervlakte van het openbaar toegankelijk gebied ligt in de schaduw (omgekeerd aan de lichte TNO norm – bepaalde seizoenen) – in programma deels. Bij inrichting: geen zwarte fietspaden. Gemeente regelt dit zelf.
g. Een infiltratienorm van minimaal 60 mm per m^2/uur.

Paragraaf 4.1.1.3 Activiteiten

Artikel 4.3 Activiteiten

Alleen de volgende activiteiten zijn toegestaan, mits voldaan wordt aan de bijbehorende regels:

Voor alle activiteiten

Zorgplicht klimaatadaptatie

Een ieder die een activiteit verricht en weet of redelijkerwijs kan vermoeden dat zijn handelen of nalaten nadelige gevolgen heeft voor de klimaatadaptatie van gebied @@, is verplicht:

a. *Deze activiteit na te laten, danwel als nalaten redelijkerwijs niet te voorkomen is;*
b. *Alle maatregelen te treffen die de nadelige gevolgen voor de klimaatadaptie zoveel mogelijk beperken.*

Maatwerkvoorschriften

Het college van burgemeester en wethouders kan maatwerkvoorschriften stellen met het oog op de naleving van de zorgplicht in artikel @@. Eventueel nader invullen.

d. *Bouwen*

Bestaande bouwwerken

Volstaan met zorgplicht – bedrijventerrein wel regels voor bestaande gebouwen.

Nieuwe bouwwerken of wijzigen bestaande bouwwerken in de vorm van bouwen – geen vergunningplicht

- *Moeten voldoen aan de waarden die in artikel 4.2 zijn opgenomen;*
- *Afwatering van nieuwe bouwwerken niet op het riool;*
- *Moeten klimaatadaptief zijn. Dat is het geval als wordt voldaan aan minimaal een van de volgende voorwaarden:*
  Een weerkaatsingsvermogen van ten minste 35% albedo voor bouwwerken en verharding;
  Het dak wordt voor minimaal 80% benut voor duurzame energieopwekking; of
  Het gebouw is voorzien van een groen dak.

Nieuwe bouwwerken – met vergunningplicht

Als niet wordt voldaan aan voorwaarde klimaatadaptief kan college van burgemeester en wethouders vergunning verlenen voor een gelijkwaardige oplossing die voldoende klimaatadaptief is.

Bij het beoordelen of er sprake is van voldoende klimaatadaptief wordt rekening gehouden met Beleidsregel @@ of diens rechtsopvolger.

e. *Aanlegactiviteiten – graven, verharding toevoegen, etc.*

Bestaand

Binnen vijf jaar na inwerkingtreding Omgevingsplan moeten alle erven waarop geen bouwwerken staan minimaal voor 50% onverhard zijn.
Onverminderd het voorgaande mag altijd een oppervlakte van maximaal 7,5 m^2 verhard zijn.
Aantekening gemeente: vooraf helder participeren. Programma maken en hierin ook opnemen financiële prikkel voor maatregelen.

Nieuw

Mag niet leiden tot verharding van meer dan 50% van het erf.
Ook minimum van 7,5 m^2.
Verharding heeft een weerkaatsingsvermogen van ten minste 35% albedo.

f. *Kappen van bomen*

Algemeen verbod op kappen van bomen.

Vergunningplicht:

- *Alleen vergunning indien noodzakelijk voor (sociale) veiligheid;*
- *Herplantplicht op andere plaats kan, met gebruik bomenbank. Mogelijke vergunningvoorschriften: minimaal gelijkwaardige boomgrootte.*

g. *Instandhoudingsverplichtingen*

Bestaande wadi's en halfverharde parkeerplaatsen worden in stand gehouden.

Maatregelen die de gemeente gaat doen kosten geld. Als in visie/programma voldoende basis daarvoor is, regels opnemen voor financiële bijdragen ruimtelijke ontwikkelingen – specifieke ontwikkelingen waar geen rechtstreekse koppeling is met nieuwe plannen. Nu kan dat nog niet, straks wel in Omgevingsplan.

Afdeling 4.1.2 Gebiedstype – ontwikkelgebied (of transformatiegebied) bedrijventerrein

Paragraaf 4.1.1.1 Doel

Artikel 4.1 doel functietoedeling

De regels in deze afdeling zijn gesteld voor het werkingsgebied 'XYZ'. Voor de gronden binnen dat werkingsgebied gelden de volgende doelstellingen:

a. *Transitie naar een circulaire economie;*
b. *Beschermen en verbeteren van de biodiversiteit;*
c. *Veilige en gezonde fysieke leefomgeving;*
d. *Voorkomen en beperken van hittestress;*
e. *Voorkomen en beperken van wateroverlast en droogte;*
f. *Gebouwen zijn klimaatadaptief;*
g. *Verduurzaming.*

Paragraaf 4.1.1.2 Waarden

Artikel 4.2 Waarden

In het werkingsgebied 'XYZ' gelden specifiek:

a. *Idem als woongebied*
b. *Y*
c. *Z*

Paragraaf 4.1.1.3 Activiteiten

Artikel 4.3 Activiteiten

Alleen de volgende activiteiten zijn toegestaan, mits voldaan wordt aan de bijbehorende regels:

h. *Nieuwvestiging bedrijven – en wijzigen bedrijfsactiviteiten (moet wel gedefinieerd worden – aandacht voor bij vergunningverlening)*

   Het is verboden om zonder vergunning grond in gebruik te nemen of het gebruik te wijzigen. Vergunning verlenen als:

   Voldoende bijdragen aan duurzaamheid. Bij beoordeling neemt college het circulair kwaliteitsplan in acht.

Minder zware bedrijvigheid niet vestigen voorkeur voor zwaarder en logistiek.

Opmerking: bestaande veiligheid voor de omgeving moet niet minder worden. Vooraf onderzoeken en anders maatregelen aan nieuwe bedrijvigheid.

Bouwen – nieuwbouw

Ook vergunningplicht idem als toets gebruiksactiviteit.