Spatial Scenarios As A Tool For Future-Proof Spatial Planning In The Netherlands

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Abstract
In spring 2023, the PBL Netherlands Environmental Assessment Agency published the research project *Spatial Outlook 2023* with four spatial scenarios for the Netherlands in 2050. In this multidisciplinary scenario study, a combination of story lines, maps and other forms of visualisations is used to explore and describe how the country could look like after the transition towards a climate-neutral and circular society. This paper describes the method of how the scenario story lines and the related land use maps were developed by applying a new mixed methods approach that combines participatory and multidisciplinary scenario development, GIS-based land use modelling and creative tools of research by design. Moreover, the paper discusses the use of spatial scenarios in the context of regional and national spatial planning.

Keywords:

Spatial planning; Scenario method; Sustainable land use; Research by design; Multidisciplinary research

1. Introduction

The Netherlands faces a number of major challenges in the fields of spatial and environmental planning. Social, political and economic changes and unpredicted events, such as the COVID-19 pandemic and the war in Ukraine, are contributing to increased levels of complexity and uncertainty. In order to help policymakers and planners deal with a growing level of uncertainty and to shed light on possible spatial interventions, the PBL Netherlands Environmental Assessment Agency (PBL) has developed four spatial scenarios for the Netherlands in 2050 (see Figure 1) in the project *Spatial Outlook 2023* (PBL, 2023). In this multidisciplinary scenario study, a combination of story lines, maps and other visualizations was used to explore and describe how the country could look like after the transition towards a climate-neutral and circular society.

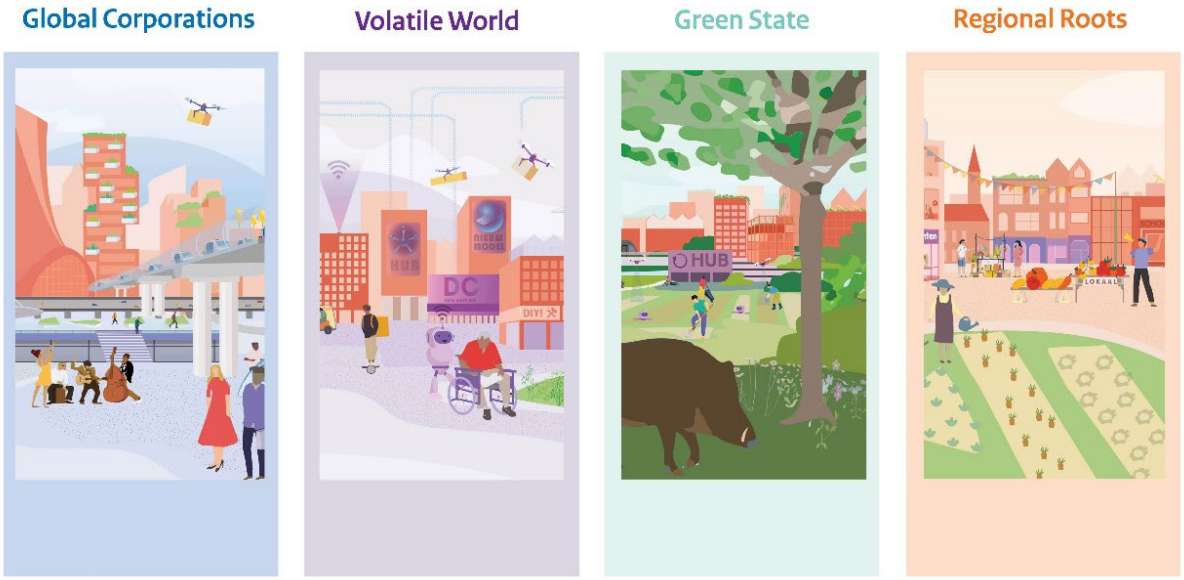

Figure 1: Impressions of the four spatial scenarios, source: PBL.

The four scenarios of the study show how land use in the Netherlands might look like in the year 2050, specifically looking at the following questions: Where do spatial conflicts arise? Where do opportunities lie? Who will take the lead? Policymakers can use these scenarios to respond to the uncertainty inherent in long-term policymaking. Using the scenarios, policymakers can explore robust strategies: which approaches fit into multiple scenarios? They can also explore the possibilities for adaptive policies: what adaptation options are available and conversely, how can 'lock-in' situations be avoided? These scenarios of the *Spatial Outlook 2023* enable policymakers and planners to understand, explore and discuss advantages, disadvantages and possible conflicts of spatial choices related to the scenarios.

The development of the story lines of the scenarios and the related maps was an interactive and participatory process together with experts and stakeholders, including policymakers from national, regional and local level. However, it is important to mention that the scenarios and maps should not be seen as blue prints for future developments. The scenarios can be further developed and adapted for different spatial contexts or serve as an inspiration for policymakers. To support this after the publication of the

scenario study, the PBL project team organised numerous presentations and workshops with municipalities, provinces and different departments of ministries.

This paper describes the method of how the scenario story lines and the related land use maps of the *Spatial Outlook 2023* were developed by applying a new mixed methods approach that combines participatory and multidisciplinary scenario development, GIS-based land use modelling and creative tools of research by design. Moreover, the paper reflects on experiences with using spatial scenarios in the context of regional and national spatial planning.

2. Complex Spatial Challenges In Times Of Uncertainty

2.1 Old And New Planning Tasks Accumulate

In the Netherlands, a range of spatial challenges accumulate on a limited territory. The Netherlands is a relatively small country, which is threatened by rising sea levels and has ambitious national policy goals to become a circular and climate-neutral society by 2050. While there are traditional short-term spatial planning tasks, such as creating and maintaining space for living and working as well as protecting nature and improving the environmental and landscape quality, new planning tasks have emerged concerning long-term transitions related to climate adaptation, energy transition and the circular economy. The accumulation of urban, rural and infrastructural developments on the same relatively small territory contributes to the country's increasing difficulties in achieving all of its goals.

2.2 Growing Uncertainty

In addition to the above-mentioned spatial challenges, there are other developments that have an influence on spatial planning. For instance, rapid technological developments are taking place in information, communication and transport technology. These technological developments influence daily lives as well as institutions (Van Dijck, Poell and Waal, 2016; Crang and Graham, 2007). In addition, social, political and economic changes take place, all of which increase the level of uncertainty facing policymakers and planners.

More recently, the COVID-19 pandemic and the war in Ukraine have shown us that unexpected events on top of the more structural changes and developments contribute to even greater spatial challenges. The war in Ukraine and the related effects on energy prices and security might be a turning point that leads to an acceleration of the energy transition with an increased demand for wind farms, solar farms and energy-related infrastructure. Furthermore, the war in Ukraine has led to increased migration flows and a re-evaluation of military areas in the Netherlands. Whereas in the past decades, military areas were reduced and transformed to other functions, in the future, they might need to be expanded for increasing military activities.

2.3 A Complex Puzzle

Addressing the spatial challenges in times of uncertainty is a complex puzzle for policymakers and planners in the fields of spatial and environmental planning. After all, suitable land has to be found and designed for very diverse functions with often mutual,

and possibly conflicting, interactions. The following questions highlight this: How can residential areas not only be built quickly, but also in such a way that they use less energy and can withstand longer periods of drought, heat and heavier rainfall? How can the transformation of agricultural land contribute to both reducing nitrogen deposition in natural areas and addressing desiccation? And how can wind turbines and solar panels be given a place without damaging landscapes to a certain extent, while simultaneously receiving public support?

An answer to questions such as these will require a balancing act from policymakers in the near future. As the balance has tilted increasingly in the past decades towards the economic use of space, the carrying capacity of the ecosystem (e.g. soil, water, and biodiversity) has come under great pressure. For example, the construction of large suburban residential areas (so-called VINEX-locations), commercial areas and logistic parks has contributed to increased soil sealing and more car use and traffic congestion. Some of the recent urban developments are located in areas below sea level that are vulnerable to soil subsidence. In this respect, the spatial development of the Netherlands is far from being future-proof. In addition, there is too little attention paid to how citizens experience space. Their perspective does not always align with that of policymakers and planning professionals, and their opinions are not necessarily taken into account in spatial decision-making processes. Especially now that the Netherlands is facing major challenges, there is an increasing need to strengthen society's support for major spatial interventions, both in residential and rural areas.

3. Scenarios As A Tool To Deal With Complexity And Uncertainty

Complexity and uncertainty are facts when considering future developments. Acknowledging this can make policymakers and spatial planners feel uncomfortable, as they often argue that their day-to-day planning tasks are complicated enough. Having to take into account the uncertainty of new developments (e.g. working remotely from home), possible discontinuities of trends (such as shifts in mobility patterns), and changes in the outlook on urban and spatial developments (related to migration and uncertain demographic prognosis) make spatial planning processes even more complex. The complexity can make it tempting to ignore uncertainty in the development of spatial planning strategies. However, not exploring possible new challenges, views and policy options will only yield 'present-proof' policies rather than 'future-proof' ones. In this regard, future-proof policies are defined as policies that lead to spatial developments that contribute to a circular and climate-neutral society and are resilient to possible changes and risks in the long term.

In order to help policymakers and planners to develop future-proof policies and plans, it is necessary to gain insight into and anticipate a diversity of plausible future developments. Therefore, the PBL Netherlands Environmental Assessment Agency has developed four spatial scenarios for the Netherlands (see Figure 1). In these scenarios, we explore what the Netherlands might look like if all planning tasks were to be addressed. Where do spatial conflicts arise? Where do opportunities lie? Who will take the lead?

Policymakers can use these scenarios to respond to the uncertainty inherent in long-term policymaking. Using the scenarios, policymakers can explore robust strategies: which approaches fit into multiple scenarios? They can also explore the possibilities

for adaptive policies: what adaptation options are available and conversely, how can 'lock-in' situations be avoided?

Before we describe the scenarios in more detail in the second part of this paper, we will summarise the characteristics of spatial planning and the main spatial challenges in the Netherlands in the following section.

4. Spatial Planning In The Netherlands

4.1 The Most Planned Country In Europe

The Netherlands has an internationally acclaimed reputation for comprehensive and effective spatial planning, often referred to as 'comprehensive integrated approach'. According to Dutt and Costa (1985), the Netherlands is the 'most planned country in Europe'. The performance of the Dutch planning system has been attributed to a strong national consensus on a set of interrelated and enduring notions on spatial configurations and development strategies, and how they should be implemented. In the synthesising report of the 1990s EU Compendium project, the Dutch system was characterised as "…a very systematic and formal hierarchy of plans from national to local level, which coordinate public sector activity across different sectors…" (Commission of the European Communities, 1997, p. 36).

4.2 Decentralisation Of Spatial Planning …And Back To Stronger National Coordination

However, in the past 25 years, the strategic national spatial planning culture that had emerged in the post-war era gradually came to an end. The coordination of spatial planning and the protection of natural areas were mostly decentralised to regional and local authorities. Besides this, the role of planning in Dutch society also seems to have changed in this period. General trust in government and faith in expert opinion has diminished, not unlike developments in many other countries (Albrechts, 2006). Citizens have become more vocal, and civil society more polarised. And finally, the growing importance of the regional and EU levels has led to an increasing questioning of the national level as the locus of spatial planning (Zonneveld, 2016).

In recent years, however, there has been a resurgence of demands for a more directive national spatial planning. Although some of the issues facing the Netherlands can be tackled regionally, some developments require decisions in conjunction with the national level (PBL, 2019). Advocates point to the complexity and urgency of national spatial issues such as the acceleration of housing programmes, the energy transition, climate adaptation, and environmental protection.

The current national policy for spatial planning is contained in the NOVI: the National Strategy on Spatial Planning and the Environment (BZK, 2020). With the NOVI, the national government wants to give direction to the major tasks that will radically change the face of the country over the next 30 years. This policy document shows a sense of urgency but does not yet make sufficient substantive choices. Decisions on a number of spatial issues are needed, including concrete and coherent implementation strategies. Currently, the NOVI is in the process of being elaborated in collaboration

with the 12 Dutch provinces, with a special focus on 16 designated so-called NOVEX areas where complex spatial challenges accumulate. PBL's spatial scenarios can be used to explore regional options for coherent future-proof developments and can help to develop a comprehensive spatial vision for the Netherlands.

5. An Overview Of Spatial Challenges In The Netherlands

In the first phase of the scenario study, we have analysed and described the spatial challenges concerning five main themes that are mentioned as central themes in the NOVI (PBL, 2021). These central themes are urban development in cities and regions, vibrant rural areas, climate adaptation, energy transition, and sustainable economy (see Figure 2). In the following sections, we address the main challenges for each theme and the implications they have for future spatial developments.

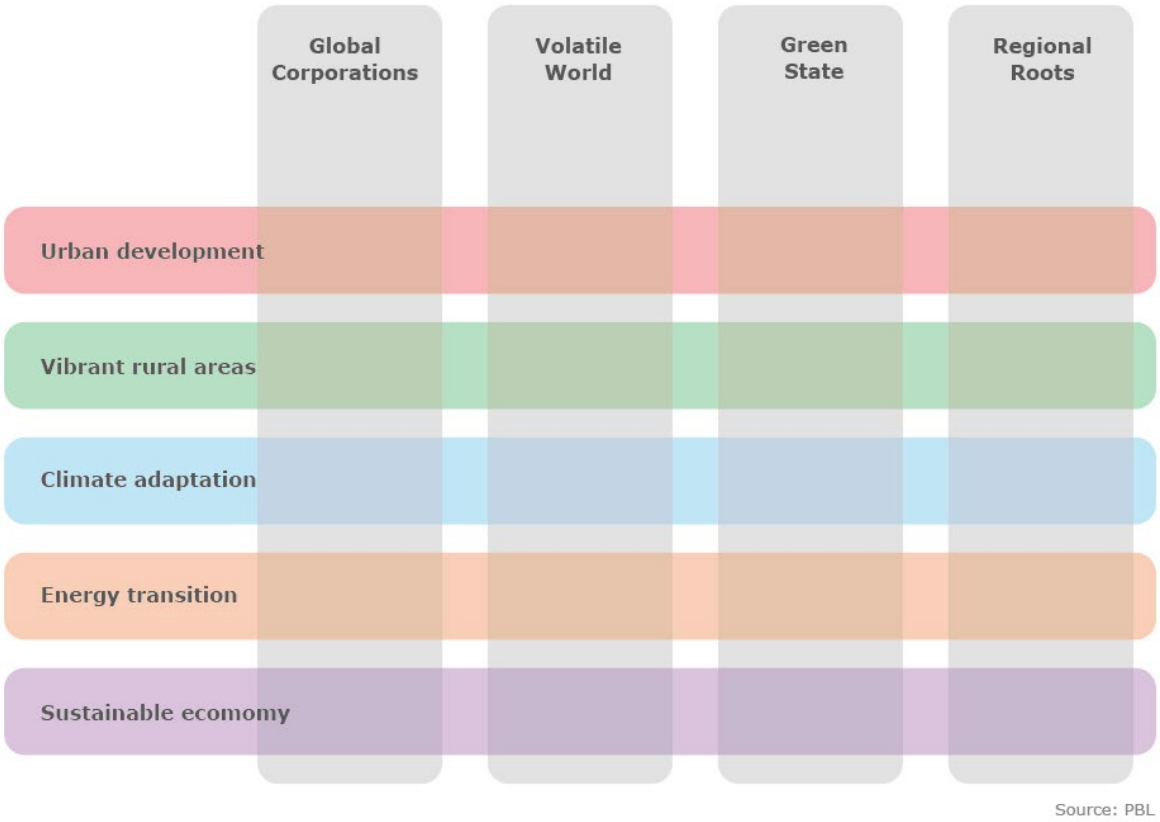

Figure 2: Four scenarios and five themes, source: PBL.

5.1 Urban Development

The Netherlands has a major urbanisation challenge. The affordability of houses is under pressure and the government wants to increase housing production. However, there is limited suitable land, a lack of skilled workers and construction prices are rising. Yet increasing the housing production in urban areas – linked to urbanisation – raises other issues, including those concerning the nature of economic development, soil conditions, rainwater and river water use, traffic congestion, the relationship between urban and rural areas and various social themes. For example, in order to create a future-proof spatial development, the limited available land must simultaneously

accommodate economic activities apart from housing, without neglecting soil conditions and traffic congestions.

Not surprisingly, the spatial distribution of housing and economic activities is a central spatial topic here, both across as well as within regions in the Netherlands. This involves, for example, a decision to concentrate living and working in existing urban areas in the western part of the country or, on the contrary, their dispersion in and around smaller towns throughout the country. The distribution of living and working also has consequences for the required infrastructure. Currently, there is discussion about possible plans for new large-scale suburban residential areas, some of which are located on vulnerable soil conditions.

5.2 Climate Adaptation

Climate change is accompanied by rising sea levels, more extreme rainfall and longer droughts. The layout of cities and rural areas has not yet been designed to cope with the effects of climate change. Further climate change will increase the need to adapt spatial planning in the country and the various areas within it. One issue that arises with climate adaptation is where and to what extent soil and water conditions should act as guiding principles in the spatial planning of cities and rural areas. The extent of climate change is uncertain but climate adaptation measurements such as higher dyke systems and larger flood protection areas might require a lot of extra space.

5.3 Energy Transition

As a result of the global climate agreements of Paris and Glasgow, the Dutch government is aiming for a climate-neutral society by 2050. Energy transition is an important part of this. The transition involves fundamental changes in energy generation, energy storage, transmission networks and energy consumption. These will include: local electricity storage (batteries), regional generation of clean electricity (wind and solar parks), large-scale, national electricity generation (offshore wind) and international connections of transport networks. Conflicting spatial interests on a limited territory, however, make the realisation of such goals more complex. For example, local residents might oppose the construction of wind parks in spatial proximity to their homes for reasons that concern the surrounding landscape aesthetics.

Recently, the war in Ukraine has put the Dutch planning of the energy transition under extra pressure. In the short run, there is the risk of a setback as a result of an increase in the use of coal for electricity production. In the long run, however, higher (fossil) energy prices can make renewable energy production more attractive. The spatial effects of the energy transition will vary depending on the prioritisation of the main goals of energy supply and the scale at which energy systems are optimised.

5.4 Sustainable Economy

The Dutch government is striving to create a sustainable economy. An important part of this is the transition from the linear to a circular economy by 2050. The circular economy involves the use of raw materials in production and consumption processes – and the effect the entire life cycle of products has on the living environment, both

inside and outside the Netherlands. In the linear economy, many raw materials are wasted, and pollutants are emitted, leading to mountains of waste, climate change and biodiversity loss. With rising global demand for raw materials, the raw materials problem is becoming increasingly urgent. Moreover, geopolitical supply risks and the risk of price fluctuations are increasing. One issue that arises is what spatial effects the transition to a circular economy will have. It is not only about the spatial effects arising from the transition, but also about which spatial-economic structure policymakers are aiming for, as well as the spatial scales (from regional to global) of the life cycles of products. What is important is which priorities policymakers set: reduce waste and emissions, strengthen the competitive position of companies, or reduce supply risks and price volatility.

5.5 Vibrant Rural Areas

There are different kinds of urgent tasks in rural areas. Climate change requires climate adaptation and mitigation, the tense relationship between agriculture and nature requires balanced choices in land use, and ongoing (sub)urbanisation requires additional space. The issues are multiple: greenhouse gas emissions, nitrogen precipitation, increasing drought, biodiversity loss, subsidence, and salinisation. This shows that the limits of the physical system of water, soil and ecology have been reached and sometimes far exceeded. Policymakers face the task of setting new priorities and making choices, including spatial choices. One of the questions that needs to be answered is in what cases and in which areas prioritisation of space use is needed, and in which cases multiple space use (combining functions) is possible, the latter providing opportunities for synergy.
Conflicts and challenges in land use

To summarise, the living environment in the Netherlands is under a lot of pressure. There are all kinds of conflicting spatial interests that often cannot be solved in isolation. This makes it increasingly difficult to find space for traditional land use functions, such as living and working, but also for new functions related to renewable energy and climate adaptation. Intensive use also puts pressure on the resilience of the ecosystem in the Netherlands. In many cases, soil and water conditions were neglected, causing problems such as desiccation and eutrophication. In socio-economic terms, uneven distribution of demographic and economic growth has increased regional disparities. This is also the case within regions, for example, between more and less affluent neighbourhoods. The COVID-19 crisis has shown not only how vulnerable we are in terms of public health, economy and social interaction, but also how important the living environment is to us. For example, the lockdowns and spending more time at home has increased awareness and appreciation for street life, park life and the vibrancy that defines the city with its public, semi-public and private spaces (Sepe, 2021).

5.6 Spatial cohesion

A key topic in discussions on sustainable spatial planning relates to the concept of spatial cohesion. Activities that policymakers can undertake to achieve spatial cohesion include aligning the land use of sectoral functions, aligning interests at different spatial scales and synchronising the allocation of functions (or making them follow each other at logical points in time). These kinds of activities help to resolve

spatial conflicts, exploit spatial synergies, avoid spatial lock-ins, and implement so-called spatial 'no-regret' actions. 'No-regret' actions are actions by institutions and communities that can be justified from economic, and social, and environmental perspectives whether natural hazard events or climate change take place or not (Hallberg, Siegel and Jorgensen, 2009). These actions can be achieved by involving a wide range of actors, including citizens, in the formulation and implementation of spatial and environmental planning processes.

6. Methodological Underpinnings Of The Scenarios

As mentioned in the first section of the paper, PBL has developed four spatial scenarios for the Netherlands in 2050 (see Figure 3). These scenarios enable policymakers and planners to explore possible solutions to the problems mentioned in the previous section and to discuss advantages, disadvantages and possible conflicts of certain spatial choices. The scenarios and the maps of the *Spatial Outlook 2023* have been developed in a two-year long process between 2021 and 2023 with a multidisciplinary team of the PBL in collaboration with experts from Wageningen Environmental Research (WUR), Deltares and other advising offices. The transition to a circular and climate-neutral society plays a central role in all four scenarios. The year 2050 was chosen because there are specific policy ambitions to reduce carbon emissions and the use of natural resources significantly by 2050. Furthermore, the project could make use of existing demographic and economic projections for 2050, which were an important input for the GIS land use modelling that was applied to develop the maps.

6.1 Societal Values

The four scenarios of the *Spatial Outlook 2023* are based on four different sets of societal values, previously published by PBL in the report *Rehearsing The Future* (PBL, 2020). In the research underlying the four scenarios, existing developments were traced back, interpreted and extended into the future. Also, new trends were identified as well as so-called ´weak signals´ to indicate possible changes in trends. The research included expert interviews, a literature review and media analysis from newspapers, magazines, websites and social media. Depending on society's preferences, the transition paths and spatial patterns emerge differently. And because sustainable development does not happen by itself, specific institutional changes were assumed in each of the four scenarios.

6.2 Mapping The Scenarios

Whereas the report *Rehearsing The Future* didn't include maps of the possible future spatial land use, the ambition of the *Spatial Outlook 2023* was to create four integral maps of how the land use of the Netherlands could look like in 2050, including all five main themes of the research and also including the Dutch parts of the North Sea which is often neglected in spatial studies of the future. Maps, with their ability to convey spatial relationships and patterns, are powerful tools to develop spatial scenarios and to help to communicate and discuss the content of the scenarios with policymakers, planners and the public (Salewski, 2012).

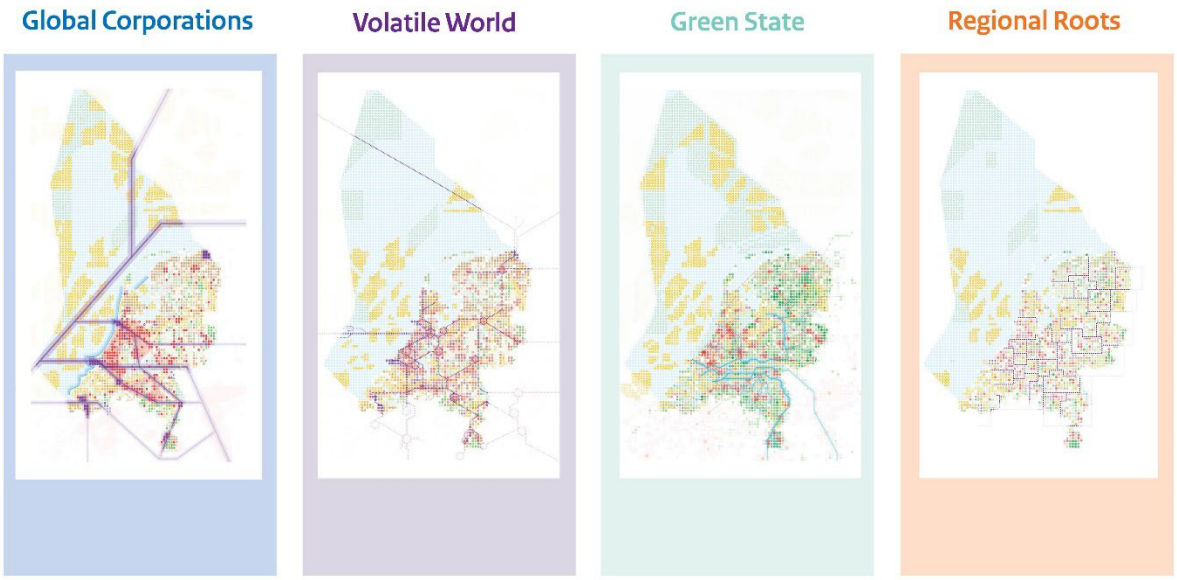

Figure 3: Conceptual maps of the four spatial scenarios, source: PBL.

At an early stage of the research, sketch maps for the four scenarios were drawn with colour pencils on top of printed base maps of the country. These initial rough sketch maps helped to communicate basic spatial developments and features related to the story lines of the scenarios in meetings with the project team and in the national workshops with stakeholders. After the initial phase with the sketch maps, detailed maps were generated based on land use modelling by applying the models Land Use Scanner (PBL)and the Model for Nature Policy (WUR). And finally, the detailed maps derived from the GIS modelling were enriched, edited and graphically stylised by a team of urban designers to create comprehensive and readable maps.

The central ambition for the scenario maps was to give general input for the national spatial and environmental planning strategy as well as more detailed map information for local and regional planning strategies. Therefore, the decision was made to create two types of maps for the publication: detailed maps and conceptual maps (see Figure 3). After the detailed maps were produced by a combination of GIS land use modelling and research by design methods, the designers made a strongly simplified and stylised version of the maps. These conceptual maps have a more iconic character and only show the most important spatial elements. That makes the them more easy to read for policymakers and the general public.

6.3. Participation In The Development Process Of The Scenarios

The development of the story lines of the scenario's and the maps was an interactive and participatory process together with experts and stakeholders, including policymakers from national, regional and local level. In a series of national and regional workshops, preliminary scenario narratives and maps where tested, discussed and refined (see Figure 4). After the workshops, the project team finalised the narratives of the scenarios and the maps for the publication of the project in a book and a website with an interactive map viewer.


Figure 4: A scenario workshop in progress, source: PBL.

7. Characteristics Of The Four Scenarios

In the following paragraphs the main societal, economic and spatial characteristics of the four scenario are described. All four scenarios have advantages and disadvantages, and show possible conflicts and dilemmas.

7.1 Global Corporations

According to the Global Corporations scenario, Dutch society in 2050 has a strong performance-oriented, hedonistic and individualistic character. Dominant values are work, success, pleasure, self-development, self-reliance and personal responsibility (PBL, 2020). In terms of sustainability, it is more about ‘prosperity’ than ‘people’ and ‘planet’; the Netherlands is prosperous in a material sense. There is high prosperity and spatial inequality, but there is a minimum level of welfare and quality of life for all. Because of agglomeration effects, large international companies concentrate mainly in central business districts, main ports and green ports, but they operate in extensive global networks. There is a big contrast between the extended Randstad area (the most urbanised part of the Netherlands) and the periphery.

7.2 Volatile World

In the Volatile World scenario, Dutch society is fragmented. Different lifestyle communities live parallel lives. The groups organise themselves digitally. They arise

quickly, but also change and disappear quickly. The communities therefore have not only a dynamic but also a volatile character. Depending on the group, ‘prosperity’, ‘people’ or ‘planet’ is paramount. There is great confidence in technology, also for sustainable solutions. The Netherlands is prosperous, but the differences between digital groups are large and changeable. For many people, the virtual world is more important than the physical world, which has a somewhat messy and ever-changing character.

7.3 Green State

Green State is a scenario in which people see themselves as part of nature and see sustainability challenges as a collective public mission. Ecological boundaries are respected, and the social base is well maintained. ‘Planet’ has priority. Natural solutions dominate. Technology should contribute to ecosystem improvement. Achieving green goals justifies limiting individual freedom of consumption. The Netherlands is prosperous, but not primarily in a material sense. Building is concentrated around major public transport hubs. There is multifunctional use of space here. Due to compact urbanisation and nature-inclusive agriculture, there is plenty of space for nature and recreation. Water and soil have a high priority in this scenario.

7.4 Regional Roots

In the Regional Roots scenario, local and regional communities call the shots. Continuity and security are important. Profits must not come at the expense of community spirit and ecology. The concept of ‘people’ comes before ‘planet’ and ‘prosperity’. Communities take care of nature, primarily understood as beautiful, recreational landscapes in geographical proximity to people’s homes. Society focuses on local and regional self-sufficiency, as far as possible. Urban development takes place throughout the country. Large cities have expanded on a small scale, smaller towns and villages have grown organically and the functions of living and working are mixed as much as possible.

8. Using Scenarios In Long-term Spatial Planning

8.1 Towards A New Balance

The war in Ukraine is having a strong impact on economic developments and migration flows in Europe and the Netherlands. It is unknown how long the war will last and how large the spatial effects will be. However, in the long term, the biggest challenge will be to find a new balance between urbanisation and economic growth and a sustainable and healthy living environment. In the Netherlands, the physical living environment is being used more and more intensively. So intensively that both ecological sustainability and social appreciation of the living environment are under pressure. A new balance is required between the utility value (economic use), amenity value (citizen’s perspective), and future value (ecological sustainability) of space in the Netherlands (PBL, 2021). Policymakers and planners are faced with the task of incorporating new land use in their environmental policy (and coordinating it with existing land use), while at the same time improving the quality of the environment, and increasing citizens’ involvement in the policymaking and planning process.

The major transitions facing the Netherlands are guaranteed to span several legislative periods. By considering the transitions using a scenario approach, administrators and policymakers can seek different paths to robust future-proof policy choices and adaptability. Based on the four perspectives developed in our scenario study, we make recommendations to this end. In the following two sections, we give an example of two recommendations. Firstly, one in respect of the soil and water system and, secondly, one concerning citizen participation.

8.2 Soil And Water System As Structuring Principle For Spatial Planning

The current urban and rural areas in the Netherlands are not designed to cope with climate change. This is already having serious negative economic, ecological and social consequences, and these will increase further without adaptation to worsening conditions. The ever-increasing drought problem, especially in areas with sandy soils, is a case in point. Also, failure to meet internationally agreed targets inhibits economic development, for example the exceeding of the nitrogen limit values in vulnerable, protected natural areas, which has already caused a construction freeze in several sectors, including housing, infrastructure and industrial areas. If more attention is not paid to the carrying capacity of the ecosystem, the risk of ecological and economic damage increases. The carrying capacity of the ecosystem should therefore be more central to future policy. Given that urbanisation, climate change, nature, water management and agriculture share soil and water as a common substrate, the preconditions set by the water and soil system for spatial interventions and the points of leverage from that same system for climate adaptation should be much more central to spatial and environmental policy than it has been in past decades. Indeed, all four scenarios also show a need for this.

8.3 Improving Participation Processes

Spatial and environmental policy not only encounter physical boundaries, but social boundaries as well: one only has to think of protests (e.g. against wind farms), inadequate citizen participation (in planning), and the ‘dropping out’ of population groups (e.g. due to distrust in government). In addition, signals from citizens about ‘system failures’ do not always get through to government and policy in time. Examples of this are the stalled consultations with local residents on the noise pollution of Schiphol Airport in the Amsterdam region and the painstaking process of building repair and financial compensation in the wake of the earthquake damage caused by gas extraction in the province of Groningen. Citizens feel unheard or sometimes even misled. There is also an issue of justice here: some citizens experience the distribution of benefits and burdens as skewed. For example, in the case of the benefits and burdens of wind turbines, citizens simply feel that big companies gain, whereas local communities lose.

Involving society in the formulation and implementation of spatial and environmental policy will therefore require extra attention in the future. Public support for the necessary spatial interventions requires a substantial government effort, on all spatial levels. Citizens’ involvement and trust in government policy require long-term goals, clear frameworks, and an in-depth understanding of the living environment from a citizen’s perspective in various policy domains.

9. Conclusions: Spatial Scenarios As A Useful Tool For Spatial Planning

In times of growing uncertainties, working with scenarios helps to create greater awareness the necessity to explore multiple long-term perspectives in spatial policymaking and to develop future-proof spatial strategies that can be adapted in the case of unforeseen developments. In this paper we have discussed the major spatial challenges in the Netherlands and the development of four spatial scenarios and how the scenarios can enable policymakers and planners to take into account future uncertainties. The current Dutch national planning strategy already contains many ambitions and starting points for finding a new balance in spatial and environmental policy. However, some of these ambitions are still quite vague and need to be worked out for specific regions and cities in the Netherlands. In this process, we can expect discussions about spatial options to arise. The spatial scenarios that we have developed in the *Spatial Outlook 2023* enable policymakers, planners and stakeholders to explore and discuss the advantages and disadvantages of a variety of spatial choices, at both the national and the regional scales.

However, it is important to mention that the scenarios and the related scenario maps should not be seen as blue prints or simple solutions for the future developments. The scenarios can and need to be further developed and adapted for different spatial contexts or just serve as an inspiration for policymakers. To support this after the publication of the scenario study, the PBL project team held several lectures and organised numerous workshops with municipalities, provinces and different departments of ministries. In the lectures and workshops, the use of scenario maps had an important function to explain the spatial patterns and to explore the scenarios in different spatial contexts with stakeholders. The maps made complex planning concepts more accessible, fostering greater understanding and transparency about the scenarios and the related spatial patterns.

References

Albrechts, L. (2006) Shifts in strategic spatial planning? Some evidence from Europe and Australia, Environment and Planning A, volume 38 (6): 1149-1170.

BZK Ministry of the Interior and Kingdom Relations (2020) Nationale Omgevingsvisie. Duurzaam perspectief voor onze leefomgeving. The Hague: BZK.

Commission of the European Communities, 1997: The EU Compendium of spatial planning systems and policies. Luxembourg: European Commission.

Crang, M. and S. Graham (2007) Sentient cities: ambient intelligence and the politics of urban space. Information, Communication & Society 10(6): 789-817.

Dutt, A. K. and F. J. Costa (eds) (1985) Public Planning in the Netherlands, Perspectives and changes since the Second World War. Oxford: Oxford University Press.

Heltberg, R.; Siegel, P.B. and S.L. Jorgensen (2009) Addressing Human Vulnerability to Climate Change: Toward a ‘No Regrets' Approach. Global Environmental Change, volume 19(1): 89-99.

PBL Netherlands Environmental Assessment Agency (2019) Nu de koers is bepaald. Ex ante evaluatie Nationale Omgevingsvisie. The Hague: PBL.

PBL Netherlands Environmental Assessment Agency, (2020) Rehearsing The Future. The Hague: PBL.

PBL Netherlands Environmental Assessment Agency (2021) Grote opgaven in een beperkte ruimte, Ruimtelijke keuzes voor een toekomstbestendige leefomgeving. The Hague: PBL.

PBL Netherlands Environmental Assessment Agency (2023) Ruimtelijke Verkenning 2023. Vier scenario’s voor de inrichting van Nederland in 2050. The Hague: PBL.

Salewski, C. (2012) Dutch New Worlds, Scenarios in Physical Planning and Design in the Netherlands, 1970-2000. Rotterdam: 010 publishers.

Sepe, M. (2021) Covid-19 pandemic and public spaces: improving quality and flexibility for healthier places. Urban Design International, volume 38: 159–173.

Van Dijck, J., T. Poell and M. de Waal (2016) De platformsamenleving. Strijd om publieke waarden in een online wereld. Amsterdam: Amsterdam University Press.

Zonneveld, W. (2016) The Changing Face of Dutch National Spatial Planning. 17th IPHS Conference, Delft 2016, volume 6: 21-23.

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