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Scenarios

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Scenarios and enhanced strategies

Case study The Hague Region, the Netherlands

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Workshop participants

Participant	Name	Organisation	Dates 2009
Stakeholders			
1	Kees Miedema	Stadsgewest Haaglanden-Groen	11 May morning 14 December
2	Laura de Puij	Stadsgewest Haaglanden-Milieu	11 May afternoon
3	Tsveta Velinova	Stadsgewest Haaglanden-Groen	23 January 11 and 12 May 14 December
4	Lida Garnier	Stadsgewest Haaglanden-Wonen	12 May
5	Sau Lan van Golberdinge	Gemeente Wassenaar	11 and 12 May
6	Antoine Willemsen	LTO/Noord	11 and 12 May 14 December
7	Kees Boks	Gemeente Midden-Delfland	23 January 11 May afternoon, 12 May
8	Jan van der Linden	Gemeente Midden-Delfland	14 December morning
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17	Judith Westerink	Alterra	22 and 23 January 11 and 12 May 14 December

1 Introduction

Role of scenario work in the case study of The Hague Region
In the PLUREL Analysis report on The Hague Region (Aalbers et al 2009, D 3.3.1), the region is described with respect to history, landuse, planning context, actors and their strategies regarding developments in the urban fringe. Three strategies are described in more depth. In the current phase of the research, these strategies are assessed with respect to their performance in governance. Scenarios are one of the tools that are used in this assessment. Are the strategies useful, in relation to the goal of sustainable land use in the urban fringe, and can they be successfully implemented in the context of different scenarios? Scenarios can be helpful to step out of the current policy paths, developments and trends, and envision unexpected but not unlikely futures, to be able to prepare for situations that may in future become real. In this way, scenarios are means to evaluate the robustness and resilience of policy. They are – in our approach - not so much about desirable developments, but about possible futures, and the discussion about their desirable and undesirable consequences.

The general scenarios from the Scenario Framework developed for PLUREL (Ravetz 2008, based on the IPCC SRES storylines) were used as a starting point for the storyline development for The Hague Region. We refer to that report for the general scenario descriptions. We only summarize them here:

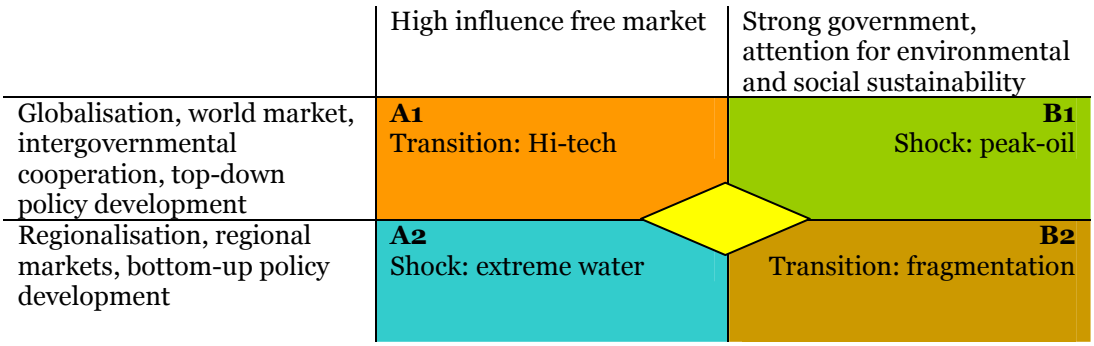
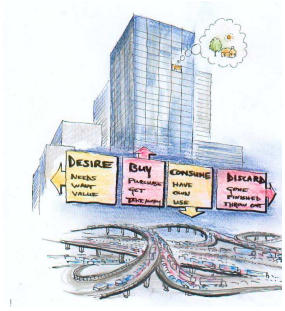


Figure 1: The four PLUREL scenarios summarized

A1 and A2 are scenarios with a high influence of the market and a 'weak' or low-key type of government (drawings by Joe Ravetz). In A1, however, governments do cooperate at the global level, but economic development is their main concern. Fast technological development changes the world. In A2, both markets and governments are more regionalized. Disasters such as floods may have a great impact in such a context.



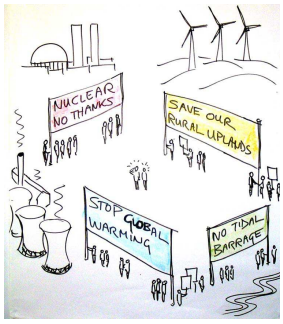
A1 Hi-tech:

- Rapid economic growth,
- Energy prices decline, new renewable energy & nuclear,
- The transition concerns the rapid acceleration of ICT which transforms home and work,
- Peri-urban issues - small 'polycentric' towns and cities - new transport technologies, expansion of commuting distances, peri-urbanisation and 'metropolitanisation' of rural areas on a massive scale.

A2 Extreme water:

- Heterogeneous world of self reliance,
- High population growth, and 'climate migration',
- Shock - 'extreme water' - rapid climate impacts,
- Peri-urban areas are strongly affected; affluent yet vulnerable city-regions spend huge sums on defence and adaptation strategies.

B1 and B2 are scenarios with strong governments that have much attention for environmental and social sustainability issues. The emphasis in B1 is on policy development at the international level, and a top-down governance style. Society needs to deal with an energy crisis. In B2, regional governments have more power. However, society is fragmented and differences between groups are enlarged.



B1 Peak-oil:

- Global approach to sustainable development,
- Resource efficiency, social equity and environmental protection,
- Shock - 'peak oil' - high energy prices,
- For peri-urban areas, high energy prices change spatial structures,
- Tele-working is encouraged, but most people return to larger cities, and more remote rural areas decline.

B2 Fragmentation:

- Fragmentation of society, international distrust.
- Shock – migration, cultural division
- Cities more dispersed with younger migrants dominating
- Peri-urban areas become 'peri- society' areas.

This report describes how two of the above storylines (B1 and B2) were selected by stakeholders to be worked out for The Hague Region. These storylines, together with a Business as Usual storyline, were modelled using MOLAND, a land use model. The modelling was done by the Joint Research Centre (JRC) as reported in Mubareka and Lavalle (2010). For Alterra, the MOLAND projections were input for assessing the appropriateness of the selected strategies in different futures. These insights, together with insights from the storylines themselves, the assessment on governance indicators as described in Westerink et al (2009) and Aalbers et al (2009), and insights from other case studies (Aalbers and Eckerberg 2010), led to recommendations for enhanced strategies.

The structure of the report is as follows. The following chapter explains the research methods. Thereafter, the first chapters (3, 4 and 5) are dedicated to the scenarios: the development of storylines, an interpretation of the MOLAND results and the visualisations. The second part of the report (chapter 6, 7 and 8) deals with the selected strategies: a summary of the strategy, insights about the strategy based on the different methods used, and recommendations for improvement of the strategy. The report is concluded with a discussion (chapter 8) about the research approach, including the use of MOLAND for assessing governance strategies.

2 Research methods

2.1 General approach

In January 2009, the general scenario approach and the outline for a Business as Usual scenario were discussed with representatives of University of Copenhagen, Joint Research Centre (JRC), Alterra and regional stakeholders (see page 5 for an overview of participants of all stakeholder scenario workshops with respect to The Hague Region). In addition, two storylines were developed during a two-day workshop with stakeholders in The Hague Region (May 2009). On request of the stakeholders, the storylines were described first in Dutch. The English translation presented in this report was then used by JRC for modelling land use change with the MOLAND model. The process and results of this modelling exercise are described in D 2.4.2 by Mubareka and Lavalle (2010). In December 2009, a workshop was organized in The Hague with the stakeholders and JRC for feedback on the MOLAND results. These were however not yet ready at the time, so the workshop was used to discuss the possibilities of the model and the land use classes to be used. Graphic designers of DSA used the MOLAND projections as inspiration for visualisations.

2.2 Process design and actual observations on the May workshop

Process design

Most processes that involve stakeholders aim at two separate goals, particularly when stakeholders are involved during participatory workshops (as opposed to in-depth interviews or questionnaires). The first goal is related to the actual products of the workshop. Interactive sessions with stakeholders lead to:

a. a broader representation of different ideas and perspectives as they are manifest among the stakeholders in the end products.
b. a direct interaction between stakeholders and scientists on issues of feasibility, usefulness, and credibility of the end products.

In other words, participatory workshops ensure that the end products are more integrated, represent a broader consensus view, and are more acceptable both for stakeholders and for scientists.

At the same time, there is a second goal that relates to the process itself. Stakeholder workshops might ensure:

c. an enhanced interaction between stakeholders, which in turn might lead to long-term participation and social learning between stakeholders.
d. a larger acceptance of the end products by all stakeholders involved

In other words, the added value of workshops over questionnaires is the buy-in of stakeholders and the dialogue among stakeholders and between stakeholders and scientists.

The program for the workshop in May 2009 was as follows:

- Introduction to scenario development
- Introduction to PLUREL scenarios – Choice of two storylines
- Discussion about indicators
- Development of B1 Peak Oil storyline
- Evaluation of strategies in B1 situation
- Development of B2 Fragmentation storyline
- Evaluation of strategies in B2 situation

The workshop described in this document departed from the concepts described, and consequently aimed at all goals mentioned here. However, the emphasis in the remainder of the report is on the actual products that were developed. Below are some of the most important observations that are related to the process as it unfolded over the two days.

Actual process-related observations

There are a number of observations related to the process that deserve to be discussed shortly:

- Low number of participants. Around 40 stakeholders were invited, out of which 12 participated (including researchers/ facilitators). This turn-up rate of 30% is relatively low. The main reason was probably related to the relatively short notice; invitations were sent about a month before the actual event.

- Missing groups of stakeholders. The low number of participants necessarily translated in an underrepresentation of certain groups of stakeholders. Notably absent were the private sector, especially project developers.
- Only plenary sessions. An advantage of the low number of participants was that instead of working in sub-groups and developing scenarios in parallel, we could now opt for having all sessions in plenary. A large advantage was that both scenarios were developed, discussed and agreed upon by all stakeholders. This led to a group that at least appeared to be more close to each other and with larger respect for other views than before the workshop. Additionally, plenary presentation of work in the other group was not necessary, which lead to more time for discussions of the scenarios.
- Very active participation. Perhaps also because of the convergence of opinions, the participation of practically all stakeholders was very active. No single stakeholder dominated the discussions, people were open for arguments of others, and most of the stakeholders returned for the second day of the workshop (in fact, our proposal to limit the workshop to one day was rejected by the stakeholders). These are a few of the (strong) indications that participation was equal and strong by all stakeholders.
- Active dialogue between stakeholders and PLUREL scientists. We left the choice which two scenarios to develop to the stakeholders. We had a long and vivid discussion that eventually lead to the choice for B1 Peak Oil and B2 Fragmentation (see chapter 2.3). This was not the preferred initial choice of the scientists – who would have preferred the combination A1/B1, for the sake of comparison with the other case studies in PLUREL. Stakeholders, however, had good arguments to opt for the two B-scenarios. Eventually the scientists agreed to develop the B scenarios with the usefulness of the research products for the stakeholders in mind.
- A set of two very contrasting scenarios was developed. On the first day, scenario B1 was developed, which turned out to be very close to a Business-as-Usual scenario. Not many surprising elements were included. The second day, however, stakeholders developed the B2 scenario, and this turned out to be a creative out-of-the-box thinking exercise that yielded a scenario that stimulates thinking about a future that is very different than the present day reality. Particularly the second day showed the added value of having a workshop setting as the product is truly a consensus view with the input of all stakeholders present.

Conclusions

The workshop was very successful from a process point of view. Participants were actively involved, and prepared to work towards a consensus product, taking into account their own opinion and that of others. Stakeholders developed two scenarios that represent both the most likely developments (as perceived by the stakeholders present), and a future that is possible, although B2 was perceived to be less likely. The stakeholders were satisfied with the workshop and with the resulting scenarios, and all indicated their willingness to return if a second workshop would be organised.

On the downside, a relatively large number of stakeholders did not participate. This increases the risk that they will not buy in to the results of this workshop, particularly if it concerns groups that have a distinct perspective on the future of the region. It is recommendable to attempt to involve them in one way or another in subsequent steps.

2.3 Choice of scenarios B1 Peak Oil and B2 Fragmentation

After a vivid discussion among the stakeholders, B1 Peak Oil and B2 Fragmentation were chosen on request of The Hague Region. A1 Hi-tech was seen as less relevant, because a situation with laissez-faire ('weak government') is considered hard to imagine for The Netherlands. Furthermore, the Region preferred to include a 'regional' scenario to investigate its own role as regional authority. Water is indeed an urgent policy issue in the region, but 'extreme water' was not selected because of other large water-related research programs that are already studying the area. 2040 was chosen as time horizon, because of the available vision development at national level (Randstad 2040). The list of indicators that was used during the discussions is included in Annex 1. This list was based on the PLUREL indicator framework.

2.4 Choice of strategies

Four strategies were confronted with both scenarios in the storyline development:

1. Urban densification: 80% of new construction within urban fabric
2. Discourse development ('green space is important')
3. Green and blue services (local agri-environmental schemes)
4. Agrarian land bank

Some of these strategies differ from the selection in the Analysis report for The Hague Region (Aalbers et al 2009). The scenario step in the research process involved land use modelling, which was very hard to accomplish with strategies that were not spatially explicit. Two of the three strategies described in the Analysis report involved a form of discourse development:

- Strategy to develop commitment: combining culture and landscape; and
- Raising political support for the development of green open space in The Hague Region, balancing international competitiveness with local recreational interests.

Discourse development, a strategy to influence the contents of the governance process, is only spatially explicit if a spatial concept is used. And even then the relation between the discourse and actual land use change is very hard to establish. Therefore, for the storyline development, these two strategies were merged into one: discourse development. Urban densification was added as spatially explicit strategy, that was mentioned in the Analysis report but was not elaborated on. On request of the Ministry of Agriculture, land banking was added as strategy, for comparison with Green and Blue Services. Both these strategies are aimed at strengthening agriculture in the urban fringe. Green and Blue Services are described in depth in the Analysis report, but land banking was only mentioned briefly.

In this report, we will report on urban densification (chapter 6.1), discourse development (chapter 6.2) and green and blue services (chapter 6.3). Land banking is mentioned in the storylines and the MOLAND results, but not in depth because other assessment steps were not taken for this strategy.

2.5 Interpretation of MOLAND results

The interpretation of the storylines for modelling with MOLAND, the calibration process and the modelling results, including maps and statistics, are described in depth in Mubareka and Lavalle (2010). In this report we will merely present the output in the form of land use maps and make a qualitative analysis of the results with respect to the scenarios and the strategies. All three scenarios were run with and without three strategy alternatives; therefore results are available for 12 scenario runs (Figure 2). The results of the Business as Usual scenario will be described in the following chapter, B1 Peak Oil in chapter 4, and B2 Fragmentation in chapter 5.

Scenario Strategy	BaU Business as Usual	B1 Peak Oil	B2 Fragmentation
No strategy (baseline)	X	X	X
1 Urban densification	X	X	X
3 Green and Blue Services	X	X	X
4 Land Banking	X	X	X

Figure 2: Scenarios and strategies and model runs

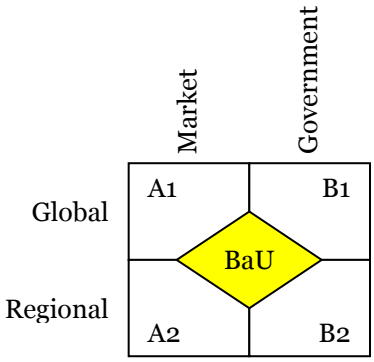
In modelling the strategies, just as modelling the storylines, important assumptions were made. For instance, for Green and Blue Services and Land banking, assumptions were made regarding the 'chance of staying above normal' (see Table 2 at page 45), in other words: to what extend would the strategy improve the situation of farmers, resulting in less farmers having to sell their farm. In this way, less land would become available to urbanisation. These and other assumptions are explained in more depth in Mubareka and Lavalle (2010).

2.6 Other methods for assessment and comparison

In chapter 6, the insights from the MOLAND output is combined with the insights from the other methods for assessment and comparison of strategies. Aalbers and Van Dijk (2009) describe the joint assessment framework that was used for the assessment of strategies in the PLUREL case studies. The assessment involved a number of qualitative criteria regarding governance aspects, designed to be complementary to the assessment with iIAT (the integrated impact analysis tool developed in PLUREL). The assessment of the strategies of the case study of The Hague Region was reported in Westerink et al (2009), but summarized in this report. Additional to insights from the governance assessment and the use of scenarios, experiences from the other case studies (Aalbers and Eckerberg, 2010) were inspiring for the case of The Hague Region.

3 Business as Usual (BaU)

3.1 Interpretation of MOLAND results



Baseline scenario

As described in Mubareka and Lavalle (2010), a Business as Usual scenario was worked out as reference for the other scenarios for The Hague Region. Projections from the Dutch Statistical Bureau (CBS) were used as input for this scenario. Especially the population development was and important indicator (see Figure 3).

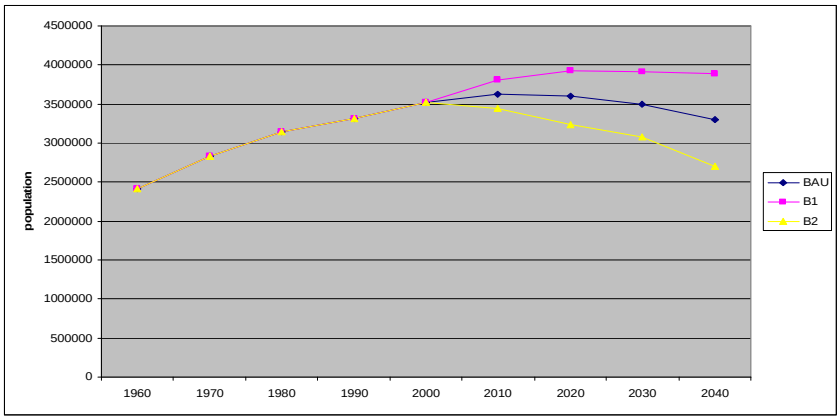


Figure 3: The trends in population for South Holland Province used to configure the three baseline scenarios.

The land use map for 2040 according to the BaU scenario is presented in Figure 4. BaU shows a limited extent of urbanisation. Residential development takes place at the expense of greenhouses, business sites and the Eastern part of Rotterdam harbour. The harbour grows further into the sea, in line with current policy. Delft grows a little to the Northwest, there is infill in The Hague, and middle-sized towns like Berkel and Rodenrijs, Bergsenhoek and Bleiswijk grow. The model projects densification of Wassenaar and a growth of business sites Southeast of Zoetermeer and Leiden. Valkenburg airport starts vacant, but is soon taken over by low density housing and greenhouses, and to the end of the period the greenhouses start making way for residential development (urban land use class).

In BaU, all vacant land is filled in towards 2040. There is little loss of pasture and arable land (resp. 1.408 and 294 ha for the whole of South Holland Province). The urban land use class grows with 1.455 ha (3,21%) and work locations with 344 ha (4,63%). One of the important assumptions behind this limited change is that current legal restrictions in the form of zoning plans will stay in place until and after 2040.

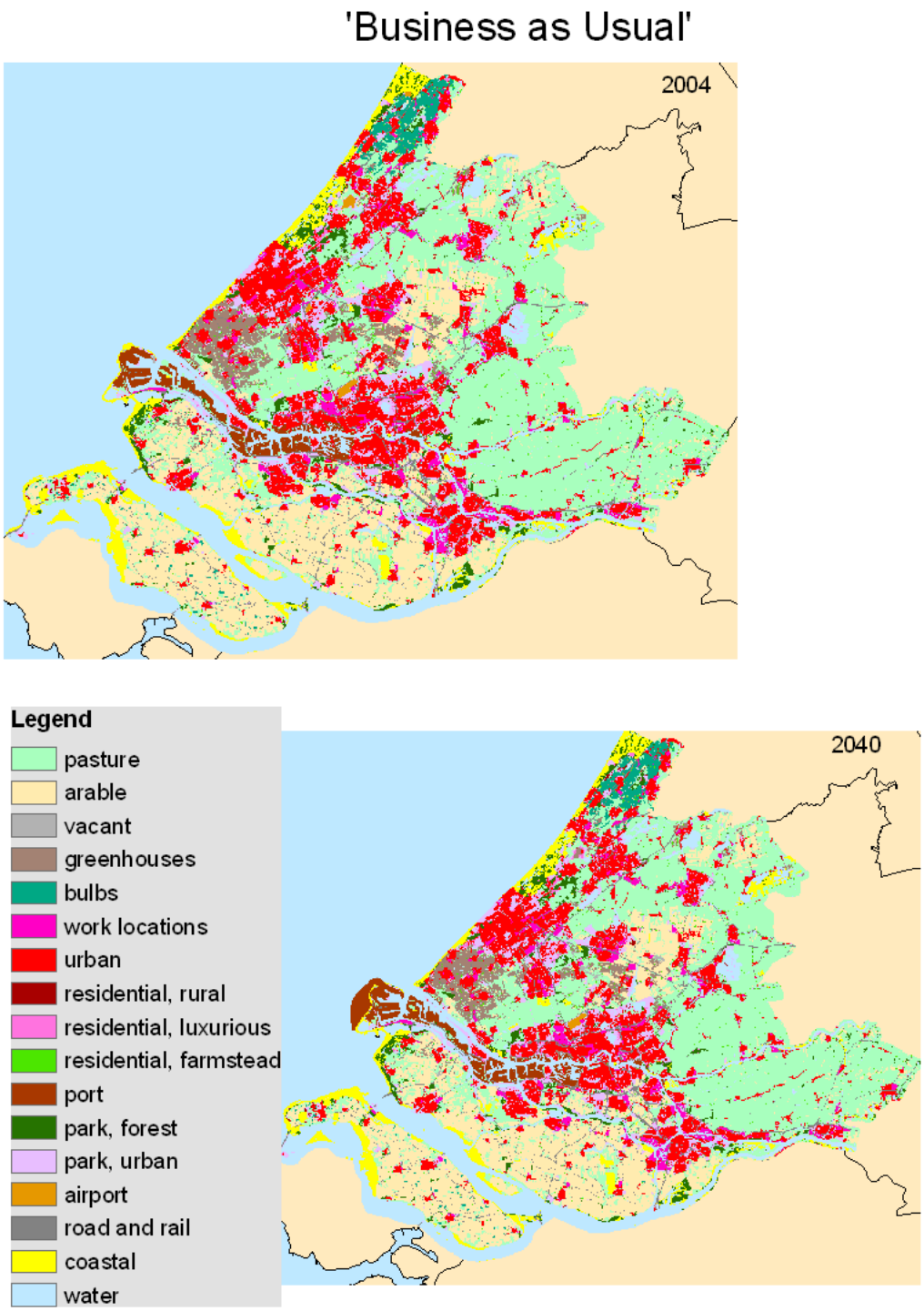


Figure 4: Land use projections for 2040 according to Business as Usual compared to the land use map of 2004. Source: JRC.

Strategy alternatives

Figure 5 illustrates the influence of the strategies in the BaU scenario. All strategies lead in the case of BaU to a decrease in urbanisation. Urban densification (strategy 1) has no influence on greenhouses and bulbs, but leads to lower growth in the urban and luxury

residential class and even a decrease in the rural residential class. Land banking (strategy 4) seems in this scenario most effective in 'freezing' land use. For the land banking strategy, parcels were selected in Midden Delfland only, but the higher chance of the farmers to stay as a result of the strategy was applied to the whole area. For this reason, the effect of the strategy is seen in the whole region. The only major land use change because of land banking is a decrease in farmsteads (as a result of the interpretation of the modeller that farmers would move more easily away from the farm in the situation of public land ownership). Green and Blue Services (strategy 3) seems slightly more effective in protecting farmland from urbanisation than urban densification. Compared to baseline and the other strategies, strategy 3 leads to an increase of farmsteads. Strategy 3 AND 4 prevent growth of bulbs and greenhouses.

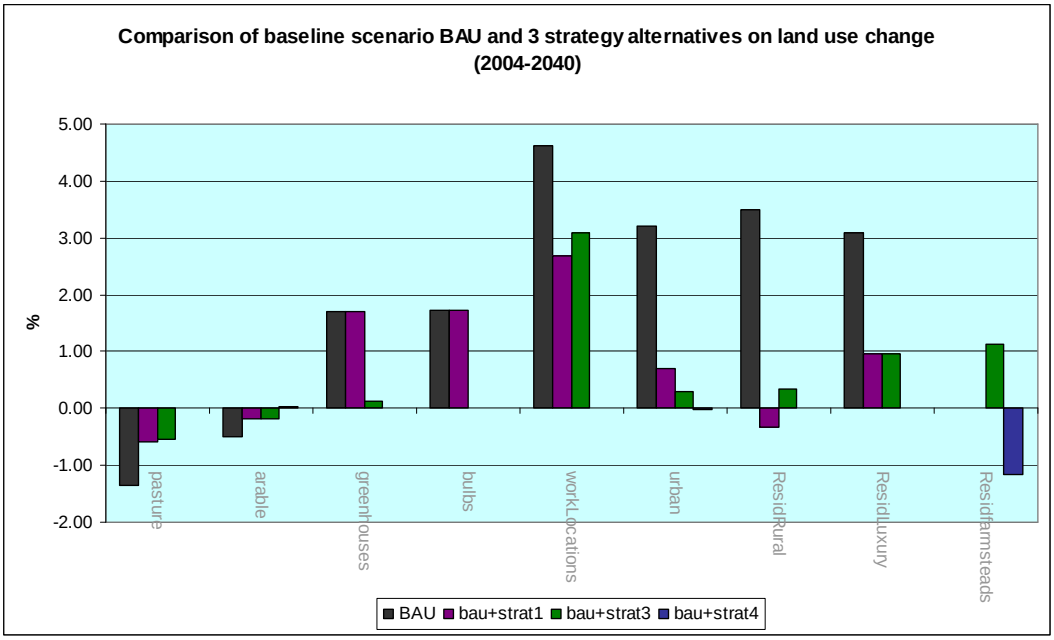


Figure 5: Comparison of baseline scenario BAU and three strategy alternatives on land use change (2004-2040). Source: JRC.

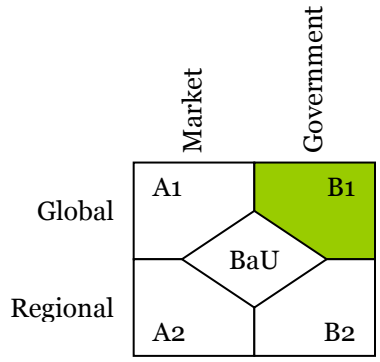
3.2 Insights from the scenario

Striking is the limited growth of built-up area in the BaU scenario (and the other scenarios as well). In the latest Structure Plan of South Holland Province (2010), the stabilizing and then shrinking population is acknowledged and translated into a (much) lower housing programme than the previous decades. However, for Randstad 2040 (VROM 2008), a strategic document compiled by the national government, moderate to strong growth scenarios were followed. Residential classes in the Southern part of Randstad Holland were expected to grow between 2010 and 2040 from 46.000 to 53.900 ha or from 47.100 to 58.900 ha (an increase of 7.900 to 11.800 ha respectively). Working locations were expected to grow in the same period from 15.300 to 16.300 ha or 15.900 to 18.300 ha (an increase of 1.000 to 2.400 ha, respectively). These huge differences between these projections and the MOLAND output reveal the relativity and also the risk of using scenarios for defining housing policies. Randstad 2040 states in Annex 1 (translation by the authors): '*these scenarios were used because the government wants*

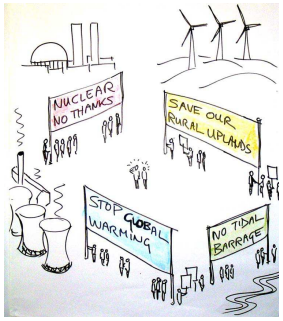
Randstad Holland to develop into a sustainable and competing top region in Europe. Because the future is uncertain and all kinds of trend changes can occur, these two scenarios deliver the most robust policy options. If the demand for space for housing, working and leisure increases strongly in case of strong growth, it will not be necessary to take less optimal measures at the last moment'. In other words, policy makers would not take the risk of building too little. However, the risk and consequences of building too much was not considered. The quote illustrates the misunderstanding that this type of scenarios can be *chosen* because they are politically desirable. In contrast, explorative scenarios should be used the other way around: scenarios (including and maybe especially the undesirable ones) can help to make robust policies.

4 Scenario B1 ´Peak Oil´

4.1 Storyline as developed with stakeholders



In the case of the Peak Oil scenario, The Hague Region has a relatively favourable competitive position because of the international institutes in The Hague and the technology cluster in Delft. Traditionally there is little industry in The Hague Region (so an energy crisis will hit less hard) and the trend of globalization and intergovernmental cooperation will lead to a growing importance of the institutes in the Hague and a strengthening of the economy related to this sector. According to the stakeholders, a combination of climate change and energy scarcity will lead to a growing demand for the technological knowledge of the institutes in Delft and therefore they will continue to grow. However, Rotterdam will shrink economically because of the declining harbour economy due to the energy crisis. The greenhouse sector in Westland and around Pijnacker will suffer from the rising transportation cost, but will have developed into a net producer of energy and a CO2 consumer, due to advanced and efficient technology. From the current export-driven strategy, the emphasis will shift towards closer markets, but the Greenport Westland/Oostland will not collapse. Summarizing, the expectation of the stakeholders is that the economy of The Hague Region will continue to grow moderately.



More than half of the population in The Hague region will be of foreign origin. The proportion of elderly people grows, with maybe 30-40% elderly in 2040. Many of them will want to return to the city because of the service level. However, a strong movement to the cities from the peri-urban parts of The Hague Region is not expected, because of the short distances.

Energy will be expensive. Transportation will be expensive, including public transport, but the latter will be subsidized significantly. The government steers strongly towards a sustainable energy transition. The land prices will remain high. This combination leads to restructuring existing urban areas into more intensive and multifunctional, energy-efficient land use. Urban land use functions that need a lot of space will be moved to the Rotterdam harbour, because space will become available here. In a situation of strongly cooperating governments, it seems logical that the housing problem of The Hague Region will be solved together with Rotterdam.

The Rotterdam harbour will not collapse completely. Among other things, there will be a shift of transportation of fossil fuels to transportation of biomass. New developments in the Rotterdam harbour will be done at the side of Maasvlakte, extending into the sea. The coastline will be broadened with extra sand. This new land will not be used for housing (risk of flooding), but for nature development and recreation.

The production costs of land-based agriculture will increase (land, energy, feed). After a difficult period, agriculture will recover, because B1 also offers opportunities after some

time. For instance, dairy farmers will produce energy through fermentation of manure. The competitive disadvantage of local production to production for the world market diminishes. Alternative production and consumption chains will emerge, but the world market will remain influential.

In spite of the high pressure on land, strong planning ensures that the green open areas, including the meadow areas remain more or less intact. Conservation and development of the green-blue network will be an explicit policy goal. Land use will be planned 'up to the last mm²'. The Regional Structure Plan (RSP) will be implemented, including intensification/ densification and high-rise development around public transportation nodes. The public transportation network will improve, including its image. Densifying the city urges to take measures with respect to the quality of life and public space, among others by creating green meeting places, green roofs and walls and balconies. Multifunctional and multi-layered land use will be growing in importance. Building 80% of new houses and offices in the current urban fabric (a goal in RSP) still means that 20% will have to be built outside. Further urbanization will be done small-scale, in the urban fringe next to the current built-up area, spread across the region. Even in the situation of energy crisis, construction in existing urban space will be more expensive than in the fringe because of the difference in urban and peri-urban land prices. It is uncertain whether the economy will be strong enough for that. High-rise apartment buildings will be constructed at the edge of Westland, with a view on Midden-Delfland. Rising house prices lead to housing subsidies for lower income groups. 'A house with a garden is for the rich'.

In B1 a strong government is needed to effectuate policy, but The Hague Region does not have much power (Aalbers et al, 2009). Instead, as government tier it is designed to work through concertation. In B1 there will be cooperation between governments, but at higher tiers and more top-down. It seems logical in B1 to upscale The Hague Region to the level of Randstad South Wing to become a more influential actor in the policy arena ('South Wing Authority').

4.2 Confrontation of strategies with Peak Oil storyline during May stakeholder workshop

Strategy 1: urban densification

In the South Wing administrative cooperation, the ambition was agreed to realise 80% of new construction inside the urban fabric. This leads to a higher density, as a result of which accessibility can become problematic. Therefore, the densification will be concentrated around the public transport stations (see chapter 6).

This strategy is compatible with a situation of strong planning and high energy prices. It will be necessary to look outside The Hague Region in the search for construction sites, because the cities in the region are already very dense and the peri-urban areas are to be spared. Social justice is a point of concern, because the poor will have fewer options in choosing their living environment. Strong policy is needed to be able to cater for different groups in dense cities, such as families with children. Development inside the city

demands reconstruction of impoverished areas and redevelopment of 'brownfields'. Coordinating and funding these projects demands cooperation between municipalities and regions. Maintenance of public space needs attention.

Will people be willing to live in a city with such densities? The attraction of urbaneness has to do with culture, time, lifestyle and income. The cities of The Hague Region need to work on their metropolitan image. Icons are needed: what is typically The Hague, for instance?

Strategy 2: Making green space important (discourse development)
This strategy links green space to subjects that are economically and politically important, such as the international competitive position of the region and attraction to expats, and to subjects that appeal to a large public, such as art, cultural history and identity. Green space is made important in this way, with the objective of raising support in the discourses of public and politics for the conservation of green space (see chapter 6.2).

Discourse development is a governance strategy, looking for ways to reach consensus. In the B1 world, however, there is a strong government with a top-down style of planning. It is not enough to have public support; action strength must be developed. In the context of the development of political vision, discourse development may be suitable, but only in combination with other ('stronger') strategies.

This leads to a discussion about the position of The Hague Region and city regions in general. The current niche of The Hague Region is organizing cooperation between the municipalities, while in B1 a strong government is needed to effectuate policy. In the Peak Oil scenario governments cooperate intensively, but at higher tiers and in a top-down fashion. It seems logical to upscale The Hague Region to the level of the South Wing[1] to become a more influential actor in the B1 policy arena ('South Wing Authority').

Strategy 3: Green and Blue Services
In this strategy, farmers are paid by the (local or regional) government for services that they provide concerning landscape, ecology, water and public access. It is a public contribution to the maintenance of the landscape and provides a second source of farm income, by which the farm is less vulnerable to the instable food market, but, on the other hand, depends more on the government (see chapter 6.3).

Green and Blue Services can be implemented on the short term. They are an alternative to land purchase, lay-out and maintenance by the government, if long term agreements are made and the contribution to farm income is sufficient. Farmers are free to participate or not; therefore it is less controllable. That does not fit well with the strong planning in B1. Green and Blue Services alone will not be sufficient to maintain agricultural landuse under the pressure of urbanization and the threat of high land prices.

[1] South Wing of Randstad Conurbation is an administrative cooperation between The Hague Region, Rotterdam Region, two other city regions, the municipalities of The Hague and Rotterdam and the South Holland Province.

Strategy 4: Agrarian Land Bank
In this strategy, a governmental organisation purchases land that threatens to get lost for agriculture, for instance when a farm is terminated. Goal is to protect agricultural land against urban pressure. The land bank gives out land in lease to farmers against an agrarian lease price. The instrument is a reaction to high land prices, as a result of which farmers are not able to buy land themselves. The interest costs are higher than the agrarian lease price: the difference is covered by the government.

This strategy corresponds with a strong government in the Peak Oil scenario, including public land ownership. Furthermore, in B1, the problem of high land prices is still pressing. The strategy is an alternative for (and cheaper than) lay-out and maintenance of green space by the government. The government can set prerequisites to the landuse, for instance public access or meadow bird protection (similar to Green and Blue Services).

The strategy also has vulnerable aspects: will there still be public support for landscape management by farmers, or will by then 'sectoral' natural or recreational areas be preferred, to be managed by nature organisations or government services? The land bank is, moreover, 'only' an actor on the land market. How much will the land bank be willing to pay, when there are also other bidders? The existence of a land bank is therefore no guarantee that the whole area will remain agrarian.

4.3 Interpretation of MOLAND output

Baseline scenario
The following is an interpretation of the MOLAND modelling as presented in Mubareka and Lavalle (2010). The land use map for 2040 according to the modelling of the Peak Oil baseline scenario is presented in Figure 6.

The projected land use map for the Peak Oil scenario shows limited urbanisation, but slightly more than BaU, mainly because of growth of work locations (see Table 1). Residential development mainly takes place in the form of urban infill, but also in work locations and greenhouses. However, there is some growth in the greenhouses land use class, mainly through infill. In the North of Rotterdam there is urban infill with residential development. The Rotterdam harbour extends further into the sea and derelict land in the harbour area is filled in. There is some housing development in the Eastern part of the harbour, near the city centre, but less than in BaU. Work locations grow South of Zoetermeer, North of Bleiswijk and South of Waddinxveen because of the good accessibility through the A12 highway. Also South of Dordrecht work locations grow. The model projects vacancy in the Alphen aan de Rijn work locations, to be filled in by luxury residences towards the end of the period. Valkenburg airport is slowly taken over by luxury housing and urban residential land use. In Wassenaar, densification takes place in the luxurious neighbourhood.

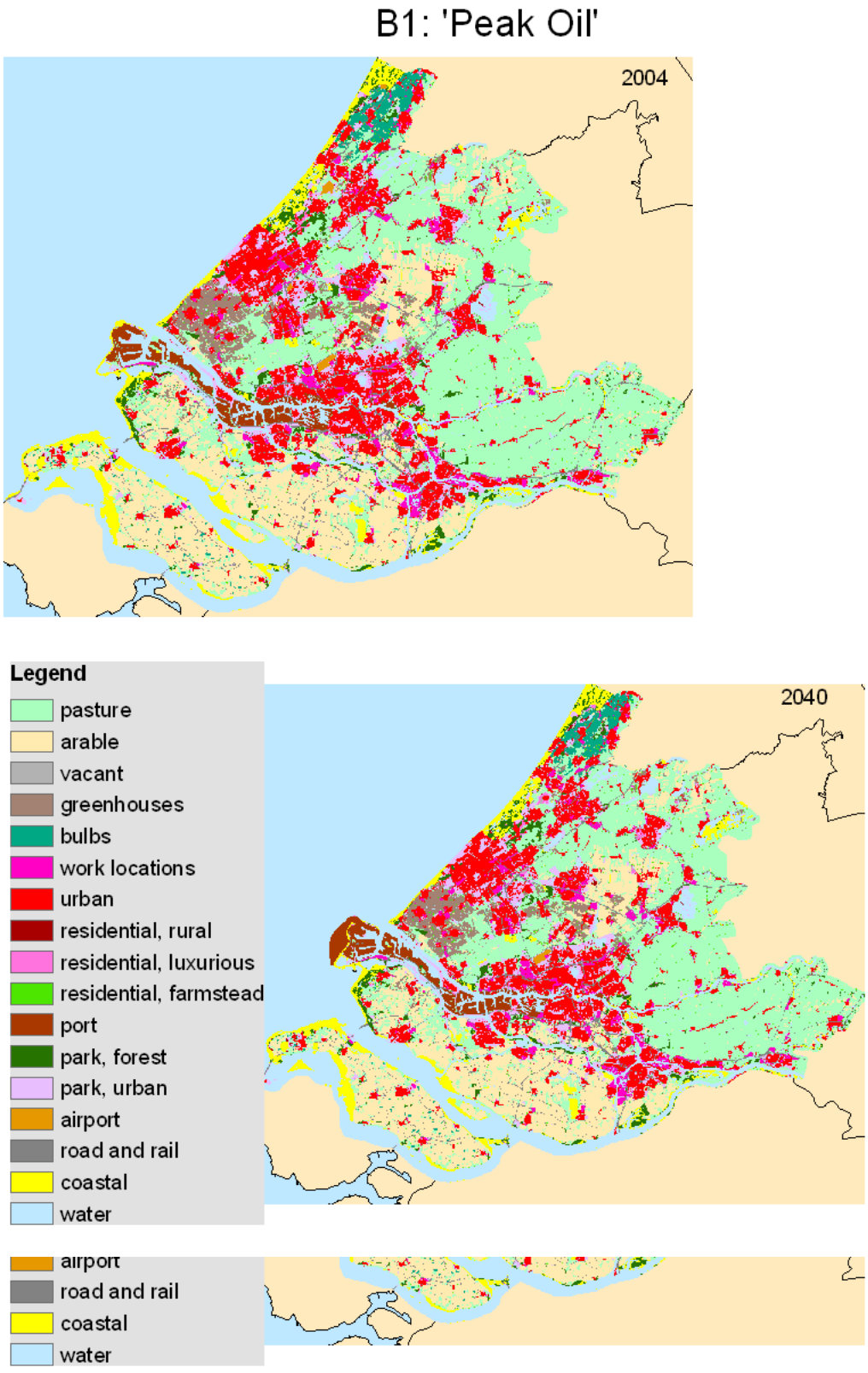

B1: 'Peak Oil'
2004
2040
Legend
pasture
arable
vacant
greenhouses
bulbs
work locations
urban
residential, rural
residential, luxurious
residential, farmstead
port
park, forest
park, urban
airport
road and rail
coastal
water
airport
road and rail
coastal
water

Table 1: Changes in land use classes from 2004 to 2040 (Source: Mubareka and Lavalle 2010)

	2004	Projected change 2004-2040					
		BAU		B1 'Peak Oil'		B2 'Fragmentation'	
Land use class	Ha	Ha	%	Ha	%	Ha	%
Pasture	104,167	-1,408	-1.35	-793	-0.55	-799	-0.77
Arable	60,048	-294	-0.49	-1,528	-2.45	-1,462	-2.43
Vacant	874	-872	-99.77	-513	-90.62	6,477	741.08
Greenhouses	8,950	152	1.70	154	1.70	-4,472	-49.97
Bulbs	4,028	70	1.74	68	1.74	-2,017	-50.07
Work Locations	7,432	344	4.63	587	7.90	143	1.92
Urban	45,309	1,455	3.21	1,442	3.18	1,319	2.91
Residential Rural	600	21	3.50	26	4.33	8	1.33
Residential Luxury	1,555	48	3.09	73	4.69	43	2.77
Residential farmsteads	2,105	0	0.00	0	0.00	276	13.11
Port	5,834	566	9.70	566	9.70	566	9.70
Park Forest	7,513	0	0.00	0	0.00	0	0.00
Park Urban	17,237	-1	-0.01	-1	-0.01	-1	-0.01
Airport	270	0	0.00	0	0.00	0	0.00
Roads/ Rail	10,078	0	0.00	0	0.00	0	0.00
Nature (reeds/ sand/ marsh)	14,688	-75	-0.51	-75	-0.51	-75	-0.51
Water	50,087	-6	-0.01	-6	-0.01	-6	-0.01

In the Peak Oil scenario, MOLAND projects that more than half of the vacant urban land is filled in towards 2040. There is little loss of pasture and arable land: compared to BaU there is less loss of pasture and more loss of arable land. The urban land use class grows to an extent that is comparable to BaU, but work locations grow most in B1 compared to the other two scenarios. There is a slight growth of greenhouses in B1.

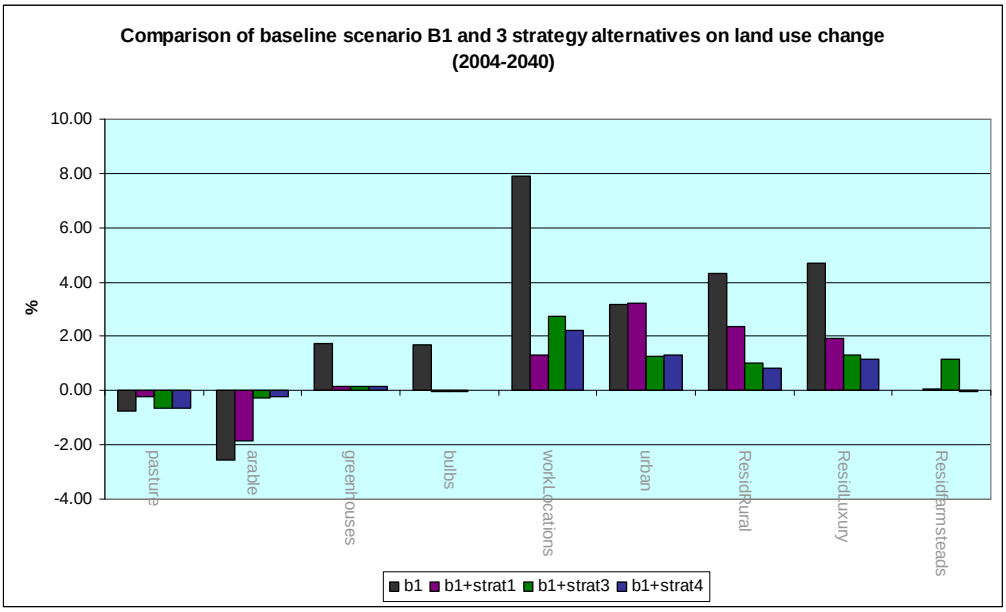


Figure 7: Comparison of baseline scenario B1 and three strategy alternatives on land use change. Source: JRC.

Strategy alternatives

Under the Peak Oil scenario, an urban densification strategy (strategy 1) leads to a lower loss of farmland (Figure 7) compared to the baseline scenario, according to the projections. Work locations grow much less as a result of urban densification. Rural residences and luxurious residences are also constrained by this strategy, which leads to a slight growth of the urban class compared to a B1 baseline. As a result of the urban densification strategy, there is no longer growth in greenhouses and bulbs.

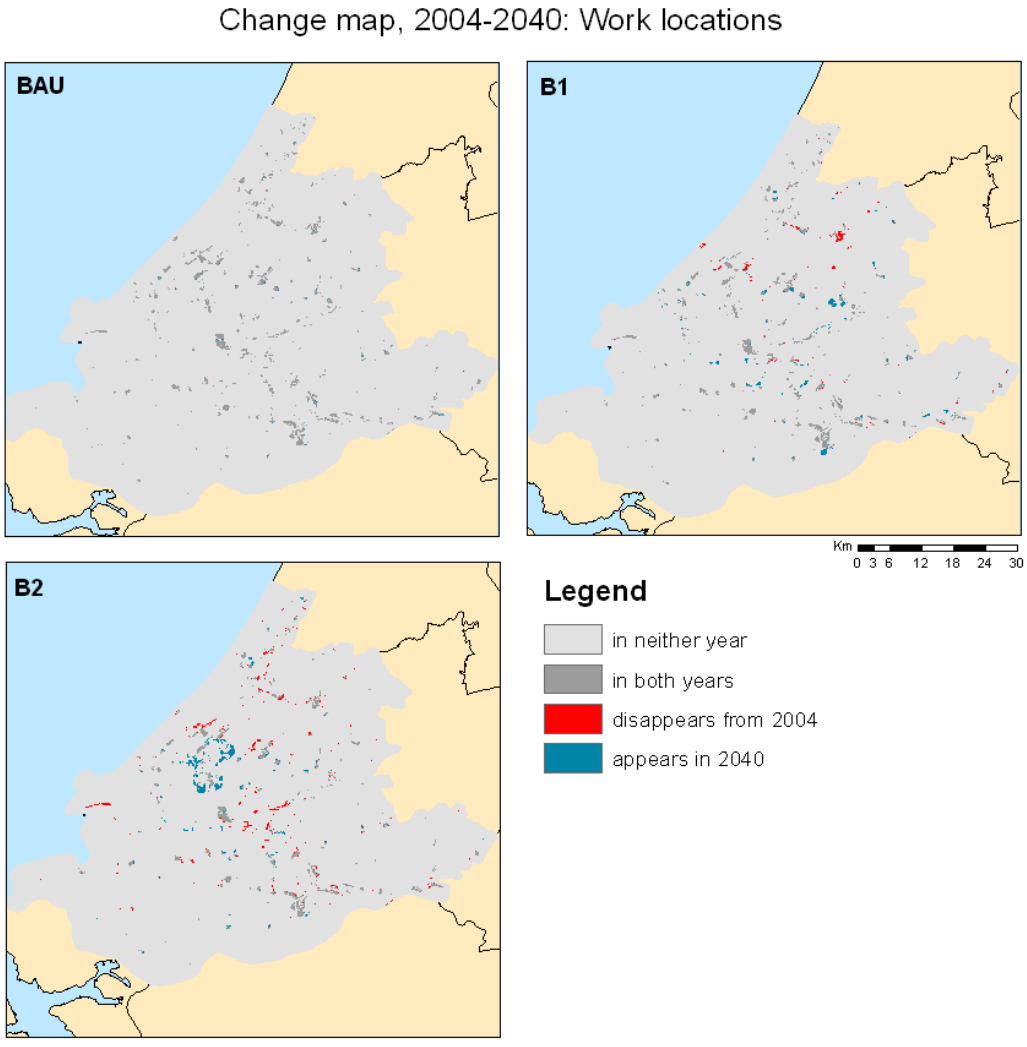


Figure 8: Difference in land use change in work locations for the three baseline scenarios between 2004 and 2040. Source: JRC.

Again, the land banking strategy (strategy 4) was only applied to Midden Delfland and the Green and Blue Services strategy (strategy 3) to the whole agricultural area in the modelling exercise. Green and Blue services and land banking do not manage to influence the loss of pasture much in the Peak Oil scenario, but in contrast much arable land is spared (this is because the model selected the larger parcels for implementation of the strategy and parcels in the meadow areas are typically smaller because of the wet conditions and the need for ditches). The strategies do manage to contain greenhouses and limit the growth of bulbs. Also the growth of work locations is constrained and in

containing the growth of the urban, luxurious residential and rural residential both strategies are even more effective than urban densification. Green and blue services lead to an extra increase of farmsteads because of the expected positive effect on farm income.

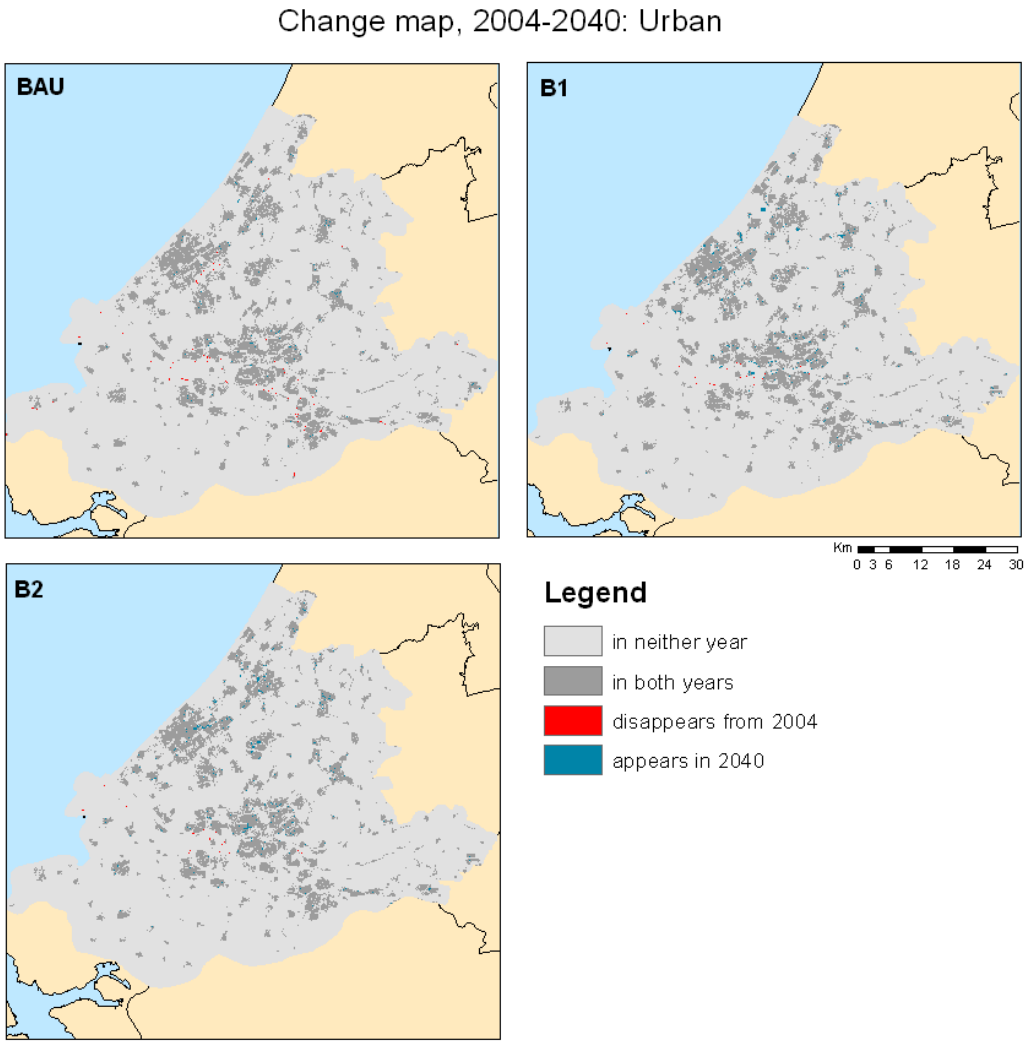


Figure 9: Difference in land use change in the urban class for the three baseline scenarios between 2004 and 2040. Source: JRC.

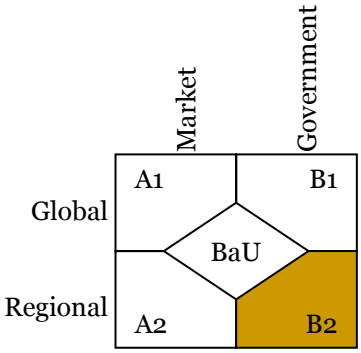
4.4 Insights from this scenario

Compared with the growth of the urban area in the past decades in South Holland, the urban expansion until 2040 will be very moderate in a Peak Oil scenario, according to the model projections. One of the assumptions for the model input was that population growth will be higher in Peak Oil than in BaU and that the population under the Peak Oil scenario will stabilize at some point (see Mubareka and Lavalle 2010). Urban densification is higher in B1 than in BaU because of energy scarcity, based on the storyline. Therefore, the expansion of the built-up area is limited. The net growth of the urban class is comparable to BaU (see Table 1 and Figure 9). Figure 8 shows that B1 has more dynamics in work locations than BaU: the net growth may be limited (though higher

than in BaU), but work locations will disappear at some places and appear in other locations, according to the model's projections. Interestingly, the storyline for Peak Oil did not pay much attention to work locations. However, the modelling resulted in Peak Oil as – compared to the other two scenarios – a business scenario.

5 Scenario B2 'Fragmentation'

5.1 Storyline as developed with stakeholders



According to the stakeholders, a B2 scenario would be disastrous for The Hague Region in economical terms because the regional economy depends on globalization. The diminishing cooperation between countries and governments and the growing distrust in B2 will lead to the termination or shrinkage of international organizations and cooperation bodies. Many of the current institutes in The Hague will be closed down. The international community in The Hague will be decimated. This will have a large impact on the economy in the city. The EU will be dismantled or will at least become less important. The European countries will again start to protect their own markets. The export from Westland/ Oostland horticulture will collapse. Many horticultural companies will go bankrupt: the stakeholders estimate that half of the greenhouse area will get out of use. At first, dairy farming will go down, but it will recover due to re-orientation on the regional market. Delft, however, will flourish because of the growth in demand for clean and efficient technology, as a result of the strive of the government for independency with respect to energy.

There will be less cooperation, less concertation, less understanding, intolerance, more differences in opinion, also between countries. This may lead to conflict situations and even war. In cities, criminal behaviour will grow. City centres will become unattractive for the upper-class and tourists. The population of the region will shrink because of the economic downfall and the limits on immigration ('own people first'). Due to lack of international cooperation with upstream countries, Randstad South Wing will face higher peak flows in the rivers, and floods will occur more often. This will limit the possibilities for land use.

The Hague Region has a strong international orientation and the Dutch trading spirit is not easily gone in B2. People will try to benefit from two sides (hoping for the international market, while protecting the own market), but it is questionable whether this strategy will work. The international market will not disappear completely, but export will shrink. Also in this scenario, the Rotterdam harbour will reduce in size. The share of greenhouse horticulture that survives will aim more for the national and regional market. The land price will not drop dramatically, but will be lower than in B1 because of the shrinking economy and the available space in the greenhouse areas and the Rotterdam harbour. The surviving dairy farmers aim for the national and the regional market. Part of the dairy farmers will change their farming strategy to produce meat. There will be an increase in part-time farmers and care farmers aimed at the elderly. There will be a growing need for allotment gardens.

Tourism and recreation will remain, but the emphasis will shift. People will remain interested in recreation, but international tourism will go down. The Dutch will prefer to spend their holidays in their own country because in B2 they cherish the Dutch identity.

Whether recreation and tourisms can develop into a strong economic sector, is hard to say. There may be a growing demand for cheap forms of recreation, such as small-scale (exclusive) private camp sites. In Midden-Delfland, horse-keeping will change the landscape. Rich people from Delft will purchase old farmhouses to convert them into private houses. These developments can lead to a muddled landscape. The landscape is however appreciated as part of the regional identity. It remains to be seen if the government will be willing to pay for the maintenance of green space. However, the preservation of agrarian land use will be less disputed, because food production will again be important (self-sufficiency).

Delft will become the most important city in the region when it comes to economic power. From the Delft elite and what is left of the Hague elite, there will be a demand for 'gated communities' across the region, but with concentrations in Rijswijk and Vlietzone (the area between Rijswijk, Delft and Nootdorp) and along the coast of Westland. This can be new and fenced neighbourhoods, or reconstruction of embassy buildings. The international zone of The Hague will be changed into luxury dwellings for elderly and educational and religious institutes. At least, if there will be sufficient capital for that. Degradation of this zone is also possible, according to the stakeholders. The real need, in contrast, will be for cheap houses. However, government resources will be low. Because the poor will have to live in impoverished and degraded neighbourhoods, and only the rich can afford new housing and renovation, there will be great differences in quality of life, in spite of the aim of the government for social sustainability.

Half of the greenhouse floor space will get out of use. There will be no money, however, to dismantle them: this leads to a muddled landscape and all kinds of ad-hoc use of empty greenhouses for other purposes. Because the empty greenhouses are spread across the area, the government will try to reconstruct its land use pattern. This asks for strong planning and it is an expensive process. The reconstruction will try to concentrate the glass in the centre of Westland. Local initiatives will come up, for instance for energy production with empty greenhouses and small-scale vegetable growing by civilians. Empty greenhouses will be reconstructed into energy plants. Other greenhouses will be covered with solar panels. Also, windmills will be erected. There will be an innovation subsidy for the reorientation of horticulture. At the Midden-Delfland side and along the coast there will be space for housing. Most likely, the development of luxury houses will have to finance the reconstruction.

The Hague Region as authority will get a central position to represent the regional interests. At supra-regional level, there will be less cooperation between governments. However, on the local level, governance will remain important. Still, the position of The Hague Region will need constant attention, even in B2 Fragmentation.

5.2 Confrontation of strategies with Fragmentation storyline during May stakeholder workshop

Strategy 1: urban densification
This strategy holds up as long as greenhouse horticulture will be considered an urban landuse (among policy makers in the region, greenhouse areas are considered a special type of industrial areas). The massive vacancy in greenhouse areas that appears in the Fragmentation scenario can then give space to development of housing and work locations. In and around the current cities, little new urbanisation will take place according to the storyline. The emphasis will be on renovation and reconstruction of existing areas. The purpose of the strategy becomes to stop degradation and emptying of the urban cores (instead of preventing urbanization of green space in the fringe). The emphasis shifts in the context of this scenario, but the strategy may still work in a Fragmentation scenario and is therefore robust.

Strategy 2: Making green space important (discourse development)
Recreation nearby becomes more important. However, people will look for 'a corner for themselves', from exclusive camp sites to private parks. This can lead to a muddled landscape. The landscape is however appreciated as part of the regional identity. It remains to be seen if the government is willing to pay for the maintenance of green space. Green space remains green, but more extensively managed. Also, food production will again be important (self-sufficiency), so the preservation of agrarian landuse is less disputed. Maintenance of the rules concerned with landuse will most likely be more effective than discourse development, in a fragmented society with little solidarity. The strategy does not seem to fit well into a B2 world.

Strategy 3: Green and Blue Services
Food production will again be important in B2 Fragmentation because of a strive for self-sufficiency (at the national level). Also farm diversification will be important, to accommodate water storage, nearby recreation, because of the interest in cultural history, and a government striving for environmental sustainability. Green and Blue Services suit well into this scenario, but it is questionable if the government has sufficient financial means to support them. New financial arrangements will evolve, with a larger emphasis on private funds. This may lead to exclusivity (areas that are not publicly accessible).

Strategy 4: Agrarian land bank
The land prices in the meadow areas are less of a problem in B2 Fragmentation than in B1 Peak Oil because of a lower urbanization pressure. The land bank will not be needed any more for the meadow areas, but for the greenhouse areas the strategy may work, in another form (aimed at reparcelling and relocation).

5.3 Interpretation of MOLAND output

Baseline scenario
The following is an interpretation of the MOLAND output for B2 Fragmentation (Mubareka and Lavalle 2010). The land use map for 2040 according to the modelling of the Fragmentation baseline scenario is presented in Figure 10.

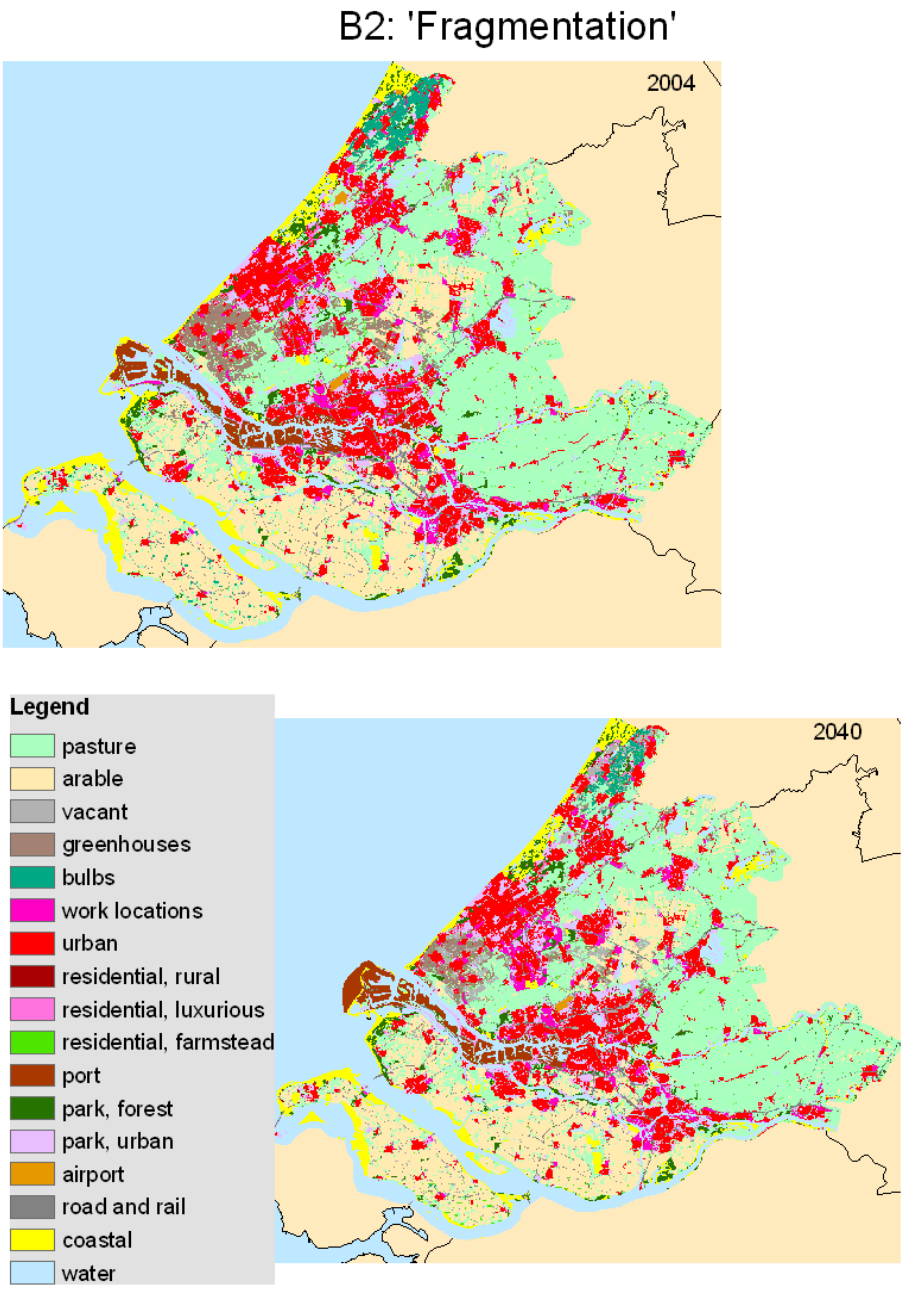


Figure 10: Land use projections for 2040 according to B2 compared to the land use map of 2004. Source: JRC.

The most striking land use changes in the B2 Fragmentation scenario occur in the Westland and Oostland (around Pijnacker) greenhouse areas, according to the model projections (see Figure 14). Much vacancy occurs here, which is only occasionally taken over by housing or work locations. Not only the greenhouses suffer; also parts of the bulb area get out of use. Vacancy also occurs in some of the working areas in Rotterdam and

The Hague. These are taken over by housing, or again by work locations. The economic crisis in B2 is illustrated by vacancy in the luxurious residential areas of Wassenaar and the lack of success of developing luxurious housing on Valkenburg airport, which is also left vacant towards the end of the period. Some vacancy appears along the edges of the Rotterdam harbour in the city centre. Some housing appears here, but in most of the area the harbour functions return. Housing and working land use classes grow much less than in the other scenarios. Urban housing takes place mainly in the form of urban infill, in The Hague replacing former work locations. Larger extensions of work locations are projected by the model South of Delft, Northwest of Delft and South of Nootdorp, because of the pulling economy in Delft. Vlietzone will be filled up mainly with work locations. Work locations extend a little bit South of Zoetermeer and South of Bodegraven. Notable is the development of farmstead residences at the edges of the case study area and especially the South Holland islands (Alblasserwaard, Goeree-Overflakkee), as result of the increased interest in rural living in the Fragmentation storyline.

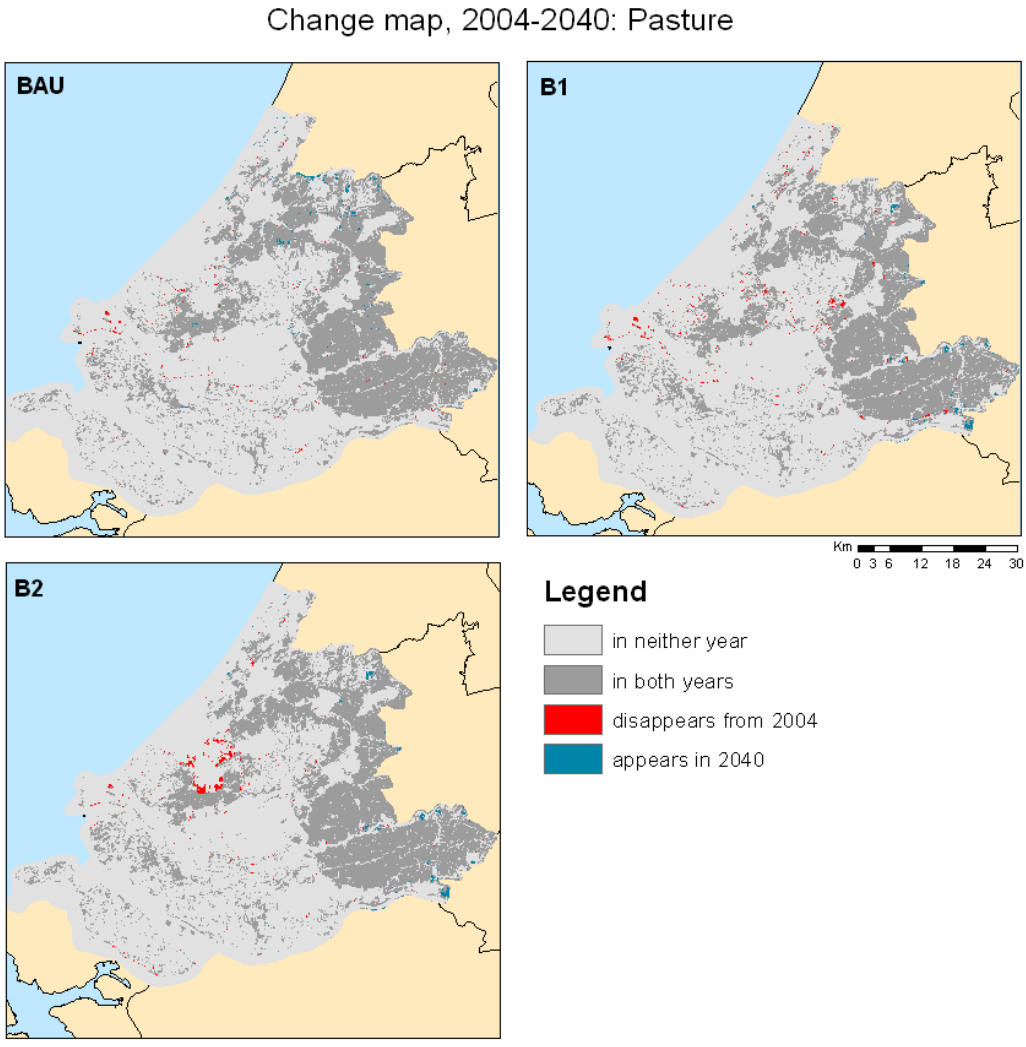


Figure 11: Differences in the pasture class for the three baseline scenarios. Source: JRC.

According to the model projections, that were based on the assumptions in the Fragmentation storyline, the vacant class grows with 6.477 ha to 7.351 ha in 2040. Most of this vacancy is at the cost of greenhouses and bulbs (respectively 3.846 and 1.694 ha). Because greenhouses and bulbs loose also space to other land use classes, the total loss is even bigger than their contribution to vacancy (4.472 and 2.017 ha respectively, that is half of the area in 2004 based on the expectation in the storyline). Other major contributions to vacancy are from work locations (932 ha), luxury residences (413 ha) and the port (171 ha). There is little loss of pasture and arable land (resp. 799 and 1462 ha for the whole of South Holland Province): compared to BaU there is less loss of pasture and more loss of arable land. However, around Delft much pasture is converted to work locations. The low net loss of pasture is due to conversion of arable land to pasture elsewhere in the province (see Figure 11). The urban land use class grows with 1.319 ha and work locations with only 143 ha. Residential farmsteads grow with 276 ha.

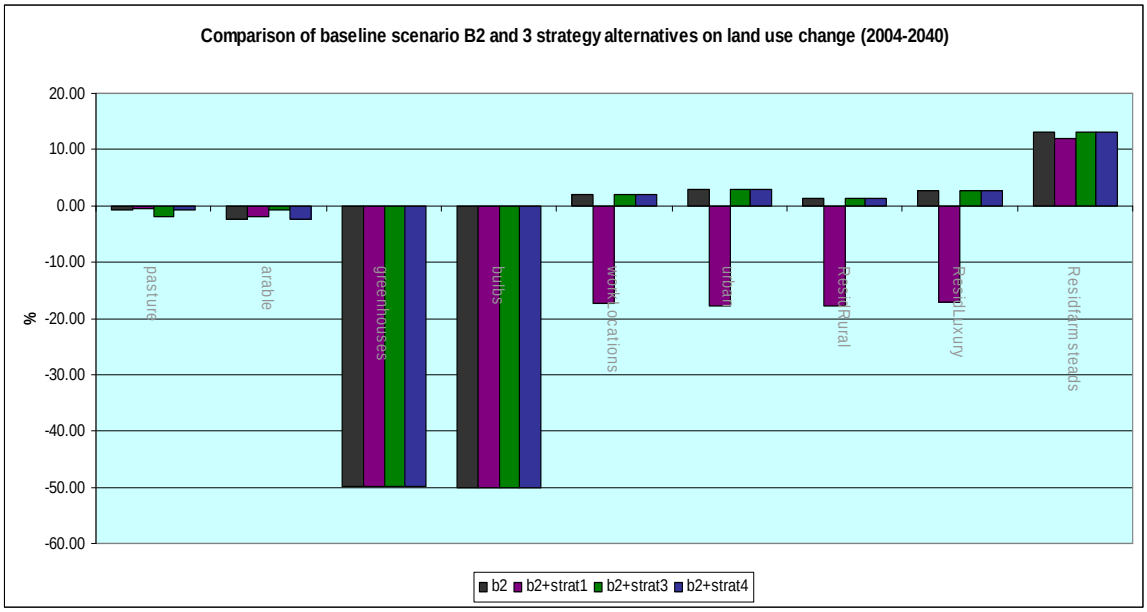


Figure 12: Comparison of baseline scenario B2 and three strategy alternatives on land use change.

Strategy alternatives

It is expected by the researchers that land banking (strategy 4) would not be chosen as a strategy in B2 Fragmentation. Therefore the strategy has no influence on land use change, as shown in Figure 12. In general, land use change is very limited in B2, apart from the vacancy in bulbs and greenhouses. The effect of the strategies is therefore limited as well. Urban densification (strategy 1) and green and blue services (strategy 3) have no influence on greenhouses and bulbs. Urban densification leads to a shrinkage in work locations, urban residential and rural and luxurious residential land use classes. Implementation of urban densification in B2 Fragmentation leads to a total of 17.091 ha vacant land in 2040, or 10.614 ha extra compared to the scenario without this strategy. The reason for this, is that the model was allowed to allocate urban land use to areas that are already urban at the time of land use change. Since vacant land is not considered to be “urban” anymore, it

no longer attracts new urban land. This leads to a vicious cycle whereby vacant land is not transformed into urban for this strategy. However, in reality this is not how the strategy would work. Reconstruction of degraded areas and building on brownfields would be and explicit part of it.

Green and blue services lead to an extra loss in pasture, but manage to limit the loss in arable land compared to the baseline scenario, according to the model projections. The loss of pasture is not a result of conversion to arable: instead, pasture is more vulnerable to urbanisation than arable because of the strategy that in the model settings favours arable. Again, this is caused by the selection of larger parcels by the model for the application of the strategy. Overall, the green and blue services strategy has no effect on the loss of farmland. On the residential and working classes, green and blue services have no influence in B2.

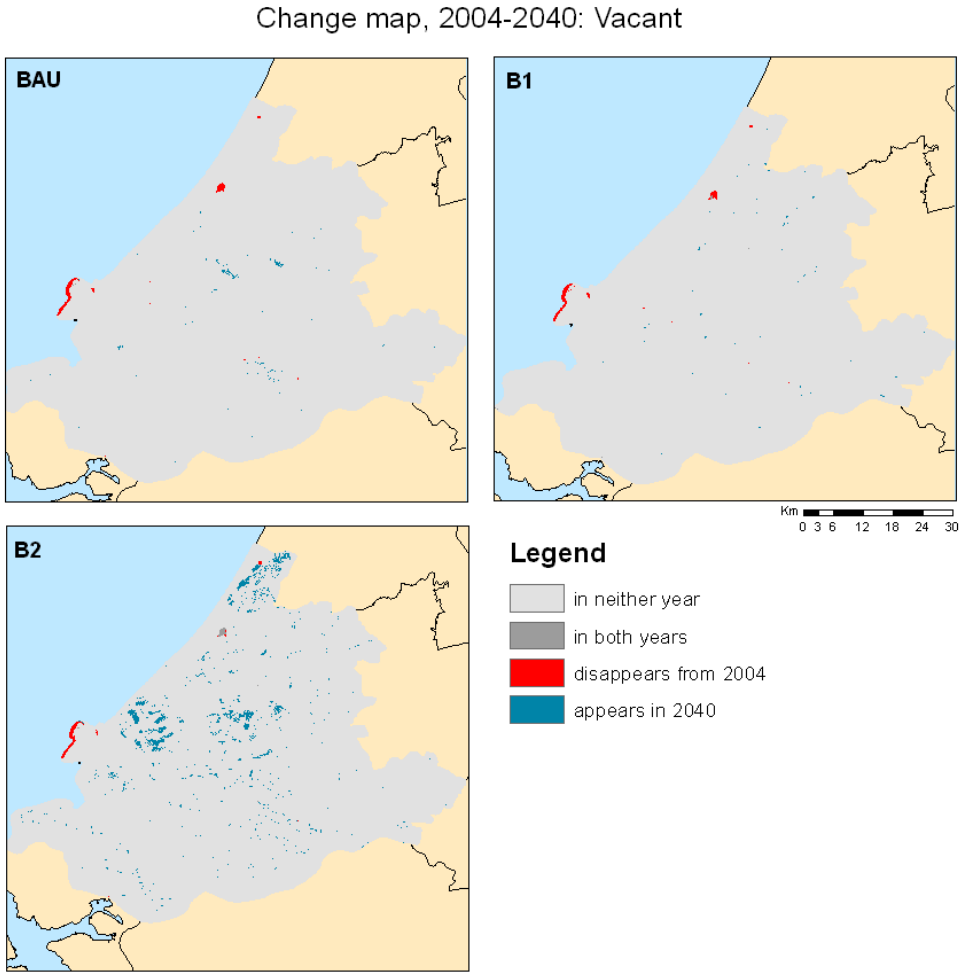


Figure 13: Differences in the vacant land use class for the three baseline scenarios. Source: JRC.

5.4 Insights from this scenario

Currently, the possibility of economic and population shrinkage in the region is hardly taken into consideration in policy development in The Hague Region. A collapse as serious as sketched in the B2 scenario may be unrealistic, but the scenario does illustrate the dependency of the region on globalization and export. The scenario also shows that a boost of Delft will conflict with conservation of the landscapes around this city: the model predicts expansion of work locations on all sides, including Midden Delfland and Biesland (see also Figure 8). Strong planning efforts would be needed to spare these landscapes.

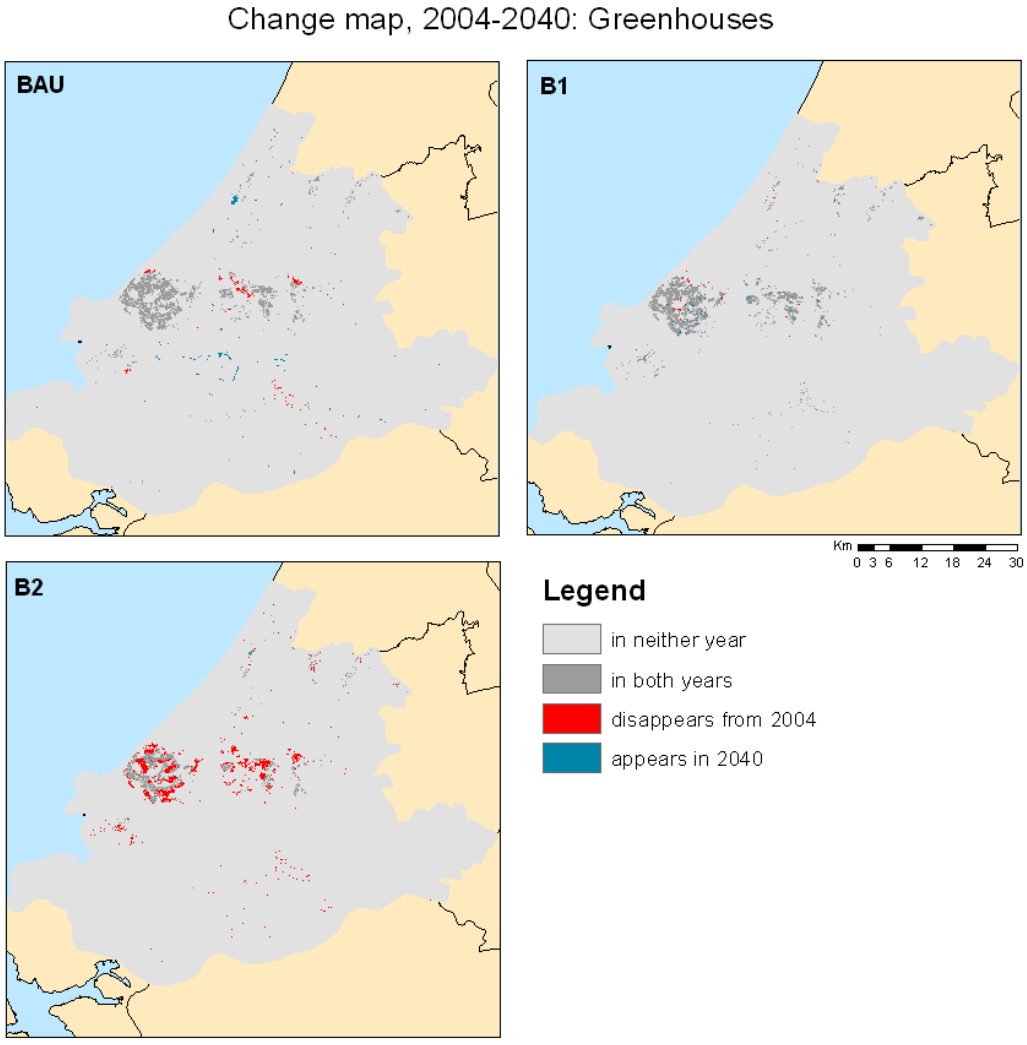


Figure 14: Differences in the greenhouse class for the three baseline scenarios. Source: JRC.

Figure 13 illustrates the fragmentation of the landscape as a result of social and economic fragmentation. Vacancy occurs all over the province, although the Westland, Oostland and Bollenstreek (greenhouses and bulbs) are affected most. For the quality of the landscape, and quality of life as a result of that, a development like this could have a negative effect. The experience in Leipzig (Sinn et al 2009) learns that redevelopment of

brownfields and degraded urban areas is a necessary strategy to prevent a self-enforcing degradation of the city. Urban expansion in times of shrinkage is to be avoided.

6 Conclusions on selected strategies

6.1 Strategy to control urbanisation of the peri-urban: urban densification

6.1.1 Summary of the current strategy

Urban densification is a strategy at Randstad South Wing level. Randstad South Wing is an administrative concertation platform in which The Hague Regions is one of the participating regions and The Hague is one of the participating cities. The parties agreed to strive for realizing urbanization 'as much as possible' within urban fabric. The Hague Region adopted an 80% objective, which is more than the national government's objective of 40% inner city building for Randstad as a whole (VROM 2008). This densification in Randstad South Wing (both offices and housing) is to be concentrated around public transport stations. The public transport system is to be expanded and improved at the same time.

The strategy aims at a number of goals. First and foremost, it aims at improving the international competitiveness of Randstad Holland (and South Wing in particular). Accessibility in Randstad South Wing is considered a major limitation for the competitive position. Also, the quality of the landscape is seen as important for the attractiveness of the region. Space is very scarce and the green peri-urban enclaves are treasured. Quality of life and environmental quality are acknowledged in the concertation platform as 'lagging behind' the economic development as policy themes thus far ('*Motor in de Delta*', 2006). However, quality of life in the city is a bottleneck for urban densification. Urban densification at the cost of for instance parks or other public spaces is a risk. In the Regional Structure Plan of The Hague Region, mixing functions, layered land use and high quality public space are mentioned as strategies to maintain quality of life in the dense areas.

The strategy was derived from the compact city paradigm, but applied to a polycentric region and worked out as a spatial network concept. The strategy links the development of dense, mixed business and housing areas to the improvement of the public transport network (in the sense of Transit Oriented Development). Also, revitalization of residential and industrial areas are to contribute to densification.

Building 80% inside the city still implies a 20% of construction in the peri-urban areas. The strategy for building in the peri-urban areas is very different from building in the city: in the peri-urban the RSP envisions high-quality houses in a green environment: villas, estates, mixtures of housing and green space.

6.1.2 Insights about the strategy

In the scenario development, urban densification appeared to be a strategy that is resilient to fluctuations in the sense of economic growth and shrinkage, according to the developed storylines. In the case of Peak Oil, urban containment helps to manage energy

consumption and leaves space for the high-quality landscape that is needed for the international competitiveness of the region. In the case of Fragmentation, urban renewal is needed to stop deterioration of urban neighbourhoods, and housing is needed to fund the reconstruction of the glasshouse areas. Since glasshouses are considered as 'industrial' in the policy discourse of The Hague Region, building houses or work locations in the glasshouse area could be considered as urban densification.

As a compact city strategy, its aims are geared towards sustainability in all three domains (environmental, social, economic). However, international literature[2] has pointed at risks in compact city thinking, especially with respect to environmental scaling (environment at regional scale may improve, but may deteriorate locally in the city) and to social justice (can people live where they want to live?). The urban densification strategy as described in the Regional Structure Plan acknowledges these risks in the sense that quality solutions are looked for, such as mixed (including green) land use and underground parking. However, dense urban areas will have little opportunity for private green space. The RSP acknowledges the demand for private green space especially by families with children.

Furthermore, the strategy assumes that urbanites will use the peri-urban area in addition to or exchangeable with urban parks. Cycling routes are developed to improve the accessibility of the peri-urban area from the city. Indeed, the peri-urban areas in The Hague Region are used intensively for recreation, but not by all population groups. Especially immigrants do not (yet) visit the peri-urban areas: they mainly depend on urban (neighbourhood) parks for leisure (see section 6.2.2 and Aalbers et al 2009). However, immigrants typically live in neighbourhoods with a relatively poor access to green space (Poptahof, Transvaal, Schilderswijk, Stationsbuurt). The Hague has one of the highest extents of ethnic segregation in The Netherlands (CBS 2001).

For the MOLAND modelling, a number of equations were developed by Mubareka and Lavalle (2010), to be able to allocate urban land use to classes that are already urban, thus increasing density. The strategy has varying impacts for the different scenarios, but was in general quite effective in containing urban growth:

- In BaU, urban densification has no influence on greenhouses and bulbs, but leads to lower growth in the urban and luxury residential class and even a decrease in the rural residential class.
- In B1 Peak Oil, urban densification leads to a lower loss of farmland than in the scenario without strategies. Work locations grow much less as a result of urban densification. Rural residences and luxurious residences are also constrained by this strategy, which leads to a slight growth of the urban class compared to a B1 baseline. There is no growth in greenhouses and bulbs as a result of the urban densification strategy.
- In B2 Fragmentation, urban densification has no influence on greenhouses and bulbs, but the strategy leads to a shrinkage in work locations, urban residential and rural and luxurious residential land use classes. Implementation of urban densification in B2 results in a total of 17.091 ha vacant land in 2040, or 10.614 ha extra compared to the scenario without this strategy.

[2] An overview is given in Westerink et al., in prep.

Unfortunately, population densities as a result of the densification strategy could not be calculated by lack of differentiated data on urban density classes (Mubareka and Lavalle 2010). A debate on the desirability of and limits to urban densities in The Hague Region would be worthwhile, however.

The Greater Manchester case study in PLUREL is particularly interesting for this strategy because of the region's experience with building on 'brownfields' (Ravetz, 2008). Re-use and re-development of urban land is necessary in an efficient land use strategy such as urban densification. However, compared to peri-urban 'greenfields', urban sites are more complicated and more expensive to develop, especially the ones with an industrial history and polluted sites.

6.1.3 Recommendations for improvement of the strategy

Resilient regions need to keep future options open. The resilience principle should be applied to the peri-urban landscape and the urban fabric. In future, in The Hague Region:

- More space may be needed for peak water storage
- Shrinkage of the population may be a realistic scenario by 2030
- The use of the car may become too expensive for many.

In that context, urban containment seems a logical policy goal. In a situation of growth, this would involve an urban densification strategy.

Storm water management, local food production, renewable energy production and public and private green space should be among the issues in urban planning. The urban fabric should be flexible enough for conversion and re-use in future if necessary. Mixing functions, creating flexible spaces and buildings, making gardens on roofs and providing 'quality of place' seems to ask for a shift of tasks from planners to designers. However, the car needs to be tackled. There should be good alternatives for using the car in the city and bringing cars into the city centre should be discouraged. It is recommended to increase the capacity at 'P+R transferia' with large, cheap car parks just inside the urban area and at some distance from the city to facilitate the change from car to public modes of transportation (for instance in Zoetermeer where the railway station is next to the highway).

Densification is typically an issue that could lead to much resistance with citizens. Urban renewal generally increases house prices and drastically changes the area where people have sometimes lived for decades. Citizen participation is necessary to do justice to these emotions and to create place attachment to the new place (see also section 6.2.3). Provision of alternative housing against comparable costs is also a reasonable part of the deal.

Even with a stabilizing or shrinking population, diminishing household size may lead to a demand for extra houses. However, a higher population growth would lead to a higher demand and thus a greater densification task. There is a limit to densification. Densification may be too much of a quantitative approach that may sooner or later damage quality of life and the competitiveness of the region. In this way, economic and population growth as a policy objective may bite in its own tail at the long term. A more

qualitative approach to 'growth', that incorporates the quality of life, environment and social cohesion, my be more sustainable.

Summarizing, the urban densification strategy with its high target of building inside the city (80%) can be improved by:

- Setting targets for urban designers and architects with respect to 'quality of place' including the provision of public and private green space.
- Aiming for flexible and multifunctional design of buildings and open space, that could serve a range of cultural and age groups, including children, and provide a range of atmospheres, including quietness.
- Aiming for 'human scale' in urban design. Exploring possibilities for high density without high-rise (e.g. Uytenhaak and Mensink 2008).
- Reducing the need to enter the city by car through the provision of more and larger transferia at public transport stations.
- Developing a strategy for redevelopment of complicated urban sites.
- Citizen participation in urban renewal projects and provision of alternative housing for a comparable price.
- Adopting alternative growth objectives that include quality of life, environment and social cohesion.

6.2 Strategy to gain support for open landscape preservation: discourse development

6.2.1 Summary of the current strategy

The description of the formal planning system revealed that the city regions in The Netherlands have very limited formal power with respect to land use planning (Aalbers et al 2009). Power and financial resources are with the municipalities, the province and the state. The main task and resource of the city region is concertation, striving for cooperation between the municipalities and gaining support for joint objectives and projects. Discourse development is an important strategy of The Hague Region in these concertations. Discourses are shared lines of thinking, perspectives, ideas and perceptions. Discourse development often includes giving the discourse a name. Discourses are used for persuasion, for gaining support for certain policies, for lobbying and sometimes for branding. Discourses developed or adopted by The Hague Region often connect green space to other issues, in order to make green space more important.

For example, green space is linked by The Hague Region to culture and heritage. In this way, green space is given a place in the 'regional sense of identity', especially when it concerns traditional agrarian landscapes or estates. Cultural history 'adds value' to green space. Addressing landscape from this angle, an attempt is made to gain interest from new target groups, especially the group that is culturally interested. The idea is to gain broader support both with the public and with the municipalities for preservation of and investments in green space. Linking the themes is also done to get access to funds at a provincial or national level. An example of a concrete initiative is an outdoor exhibition of paintings of the internationally famous 'The Hague School' painters at locations where they were made or could have been made (Aalbers et al 2009).

Another example of discourse development is linking green space to expat preferences. The expat community is important for The Hague Region because The Hague strives to be attractive for international institutes and companies to establish offices in The Hague (Aalbers et al 2009). Linking green space to this 'international competitiveness' puts green space into the economic policy arena. According to this discourse, expats prefer to live in cities with abundant green space. Therefore the availability of green space is a factor for international organizations to come or to stay, because of the interests of their employees.

The use of spatial concepts also fits into the use of discourses. For instance the Regional Structure plan many times uses the word 'connection' with respect to green areas and the distance in between, or from the city core to the peri-urban. The connection concept illustrates both the attempt to improve the pleasant accessibility of green space and the attempt to combine or integrate themes (in this case: green space and infrastructure). Another interesting spatial concept is that of the envisioned Regional Park Duin, Horst en Weide. The spatial concept includes a landscape sequence, offering a diverse and interesting landscape to the recreating urbanite. The spatial concept (landscape sequence) is used to support the discourse ('the peri-urban area is a consumption landscape') (Aalbers et al 2009).

6.2.2 Insights about the strategy

The discourse 'the peri-urban enclaves are important as recreational space for the city dweller' takes into consideration some, but not all types of city dwellers. Expats are a group of residents that are of special interest to the regional administrators. Research among expats in different Dutch cities confirms that the availability and the quality of green space are important factors in expat living preferences (Luttik and Veer 2010). The relation between expat preferences and considerations of institutes and companies about the location of offices was not investigated.

Immigrants form almost half of the population of The Hague Region. Research among immigrants in Delft, however, revealed that the peri-urban area of Midden Delfland is of little use to this group. 62% of the interviewed immigrants never visited the area (Aalbers et al., 2009). Delftse Hout, a peri-urban park, attracts more immigrants. Distance is apparently not the biggest issue: Delftse Hout has more to offer to this group, with benches and barbecue and swimming possibilities. Neighbourhood park Poptahof was mainly seen as a 'park for children'.

One of the trends in the Netherlands is the awareness that governance processes are more than only rational processes and therefore require other approaches to the planning process that include emotional and cultural elements. Environmental changes are often hard for people to digest. The situation in peri-urban areas is changing rapidly and the awareness that residents and end users should have their say in a changing environment is growing. The use of paintings as, as was experimented with in The Hague Region, is not a clear-cut instrument to seek local participation. However, initiatives like these can be seen as a first step in more open planning processes. New ways could be looked for, based on public contact moments or 'opinion feelers', using imagination and focussing on a

multilayer value of places, including stories, place of birth, history and the emotional impact of change (Westerink et al 2010b).

To determine the effects of discourse development with respect to land use change is a major challenge. In the course of PLUREL, we did not manage to do this. Discourse development as a strategy could not be processed in MOLAND. Although it is generally believed that discourses precede behaviour, policy making and decision making, discourses are generally not formulated in a measurable way. They are designed to inspire, not to monitor. In future Agent Based Modelling could maybe contribute to a better understanding of such processes.

6.2.3 Recommendations for improvement of the strategy

Discourses are very important in a consensus-seeking governance style as is common in The Netherlands. In The Netherlands, discourses are often 'volatile' in the sense that they are susceptible to 'fashion'. At times, old discourses are given a new name and presented as something new. Discourses can be powerful instruments when they are combined with or lead to other dimensions of policy arrangements, such as coalitions, legislation, financial means (Aalbers and Eckerberg, in prep.).

The discourse 'peri-urban areas are important as recreational space for the city dweller' includes a risk of excluding the group of city dwellers in policy development, for whom the peri-urban areas are not (yet) important. In peri-urban planning, attention should be given to the variety in recreation preferences and future changes in recreational behaviour. The needs of immigrants have not yet sufficiently been recognized.

Discourses can be a strong instrument in communication about planning and area development. Recognizing the value and legitimacy of emotions, place attachment and identity may greatly improve communication processes. In addition, art forms can be considered as alternative communication tools to gather information about people's perception of an area and to start a discussion about the future that is not only limited to the rational domain (Van der Jagt and Stuiver, in prep.).

6.3 Strategy to strengthen agriculture in the urban fringe: green and blue services

6.3.1 Summary of the current strategy

This strategy concerns local agri-environmental schemes, to pay for green and blue services, delivered by farmers. These services include measures to promote on-farm nature, to improve landscape quality, to supply storm water storage and to provide public access to farmland. Green and blue services are considered as a form of multifunctional agriculture. The strategy has two goals: to provide additional sources of income for farmers, and to improve the (multifunctional, ecological, aesthetic and recreational) value of the landscape (Aalbers et al 2009).

Green and blue services belong to the public goods and services delivered by agriculture (see for instance Cooper et al., 2009). Green and blue services have been defined as the provision of efforts aimed at the achievement of public demands about nature, landscape,

water management and recreational use (public access), which go beyond the obligatory measures laid down in laws and regulations, and for which a cost-recovering compensation is given (*Catalogus Groenblauwe Diensten* or Green and Blue Services Catalogue, IPO 2007). Examples include the maintenance of shores and ditches or additional measures for meadow bird protection.

Agriculture in the urban fringe is under pressure in The Hague Region and many other urban regions in Europe. The area of meadowland is diminishing because of urbanization, glasshouse expansion and the establishment of nature and recreational areas. The remaining farmers face increasing land prices, which makes farm enlargement unaffordable. Many farmers do not have successors. The meadow areas have become enclaves which are not easy to reach by car, although they are intersected and surrounded by highways. For suppliers and veterinarians, the areas are increasingly unattractive.

With a growing problem of access storm water in the region, it is likely that space for water storage is sought in the peri-urban areas. Furthermore, the sinking peat is increasingly seen as problematic by policy makers. The only way to diminish the mineralization of peat is to increase the water levels.

In a situation without farmers, other ways would need to be found to manage the landscape. The current experience with publicly managed nature and recreation areas is that maintenance is expensive. The recreational demand in the region surpasses the supply, in terms of parks and recreational areas. The cultural landscape is needed as recreational space. The Hague Region and the municipalities prefer to keep the farmers in the area managing the landscape. Not only because of the high costs of management by the government, but also because of the linkage between the cultural landscape and the dairy farming system.

The Hague Region has yielded several of the earliest green and blue services initiatives in the Netherlands, including the Green Fund for Midden Delfland and the Farming for Nature project in the Biesland polder. These two initiatives were developed in parallel, the Green Fund in 2003-2006 and Farming for Nature in 2003-2007. In addition to these schemes, which are currently operational, a scheme was started in the Land van Wijk en Wouden area, which resulted in the establishment of six walking trails on farmland. Recently (2008) a new pilot project started in this area, in cooperation with the Rijnland water board, to develop ‘ blue’ services aimed at water quality and aquatic ecology.

Green and Blue Services can be considered as a governance strategy, because the concept opens up the normally top-down and centralized agri-environmental policy development to bottom-up initiatives and local differentiation (Aalbers et al 2009). Local stakeholders, such as farmers and environmental cooperatives may design tailor-made subsidy schemes in cooperation with local and national authorities.

6.3.2 Insights about the strategy

When assessing the Green and Blue Services strategy (Westerink et al 2010b), a distinction should be made between the general concept and the specific initiatives in the region. The initiatives differ with respect to setup, funds and the impact of the measures.

In general, far-reaching measures can be expected to have a larger effect on biodiversity and landscape quality. However, far-reaching measures imply higher payments and will need longer-term contracts. The rate of participation of farmers is expected to be higher when the measures are less rigorous (Ruto and Garrod, 2007). Far-reaching measures have a large impact on farm management: many farmers prefer to incorporate green and blue services in their current way of farming without too many adjustments. In two of the initiatives (Green Fund Midden Delfland and Land van Wijk en Wouden), a lack of funds limits the number of measures carried out and hence both the public effect and the effect on farm income (Aalbers et al 2009).

The strategy is aimed at the main actors for sustaining agricultural land use: the farmers. It serves multiple goals (sustaining agriculture, promoting biodiversity etc) and leads to multifunctional land use (food production, biodiversity, public access etc). The strategy leaves in theory much space for locally developed and tailor-made solutions. However, the bureaucratic European context of CAP and state aid regulations may hinder bottom-up initiative (minutes of PLUREL workshop, PLUREL 2008).

Participation in local agri-environmental schemes is voluntary. The government has therefore less control on reaching objectives with subsidies than with for instance zoning regulations or land purchase. The voluntary nature of the strategy is however in line with theories of welfare economy and public choice that state that deliverance of 'positive externalities' can best be steered with positive financial incentives (see for instance Prestegard 2005, Pigou 1912).

A serious problem in preserving the peri-urban enclaves is that the benefits of the green open space are not 'priced'. The economic costs of losing the areas would be considerable, but indirect, e.g. in the form of more health care costs. As a result, the economic value of industry and housing seems higher, leading to urban pressure. Furthermore, those who benefit from the 'ecosystem services' do not pay for the costs of delivering them, and those who deliver the public goods and services (mainly the farmers) are not rewarded for that. This 'market failure' asks for government intervention and agri-environmental schemes are designed to correct this situation (see e.g. Cooper et al. 2009). However, European state aid regulations do not allow public payments according to the value of the service to society. Only one calculation method is allowed: that of costs incurred and income foregone, plus transaction costs (the costs of designing and organizing a scheme, administration and monitoring). In theory, this would not leave any space for green and blue services as a commercial farm strategy: making profit on providing public goods and services is not allowed. For many farmers, being entrepreneurs, this is a discouraging approach. For strengthening agriculture in the urban fringe, the payment levels of agri-environmental schemes have not much to offer. Farm income is not increased and no additional economic weight is created to counter urban pressure. On the other hand, in the case of the Farming for Nature initiative we see that the far-reaching agri-environmental measures lead to extra commercial opportunities such as agrotourism and direct sales of farm products (e.g. Westerink et al 2010c).

From the storyline development, we learnt that different futures could make the strategy less or more appropriate. In a situation with high land prices, other strategies may be

more effective. However, in a situation with much appreciation for cultural values, identity and landscape, more support for the strategy is expected. Also the economic situation is of influence. In times of economic crises, subsidies may be regarded as possible cut back options. At the other hand, urban pressure may be lower in times of economic crisis.

Some assumptions had to be made with respect to the strategies Green and Blue Services and Land Banking to be able to explore their effect in different future contexts with the aid of MOLAND modelling (Table 2). It was expected by the researchers that subsidies would be much higher in BaU than in B1 Peak Oil and B2 Fragmentation. For BaU a subsidy level was chosen that is common practice in The Netherlands. In B1 Peak Oil, the researchers reasoned based on the storyline, that the government would focus on land banking because of the high land prices and the style of governance. In B2 Fragmentation there will be support for the strategy of Green and Blue Services according to the storyline, but there will be less money to spend because of the economic crisis. However, the researchers expect more participating farmers in B2 than in B1 and BaU. The economic situation of farmers would improve less in B2 than in BaU or B1 as a result of the strategy, was the assumption, which was translated into a lower improved 'chance of staying' (a parameter to predict the loss of farmland as a result of farmers having to sell their farm because of their income situation).

Table 2: Assumptions 'agricultural' strategies for MOLAND modelling

Area of implementation	Green and Blue Services South Holland Province			Land Banking Midden Delfland + around Pijnacker		
	BaU	B1	B2	BaU	B1	B2
% of agricultural area	20	20	30	10	20	0
Subsidies €/ha yr	1000	100	100			
% of farmers affected				50	80	0
Chance of staying above normal	1,2	1,2	1,05	1,5	2	-

Both in BaU and in B1 Peak Oil, Green and Blue Services have rather much effect on land use change and are quite effective in protecting farmland from urbanization and the growth of greenhouses and bulbs (see chapters 3.1 and 4.3 and Table 3), in spite of the difference in subsidy level. The 'chance of staying above normal' may be decisive in the behaviour of the model. In B2 Fragmentation, the effect of Green and Blue Services is negligible (see chapter 5.3). The reduced loss to work locations is more than compensated by extra residential farmsteads. The model results differ from the expectations of the stakeholders in the phase of the storyline development. The stakeholders expected Green and Blue Services to suit better in a B2 world than in a B1 world. However, the model results suggest that in a B2 world the strategy would favour residential development in the peri-urban area.

Table 3: Land use change 2004-2040 for agricultural classes and reduction of loss as result of Green and Blue Services strategy (source: JRC).

	BaU		B1		B2	
	baseline	strategy 3	baseline	strategy 3	baseline	strategy 3
Pasture	-1,408	-573	-793	-691	-799	-1,887
Arable	-294	-114	-1,528	-150	-1,462	-398
Total	*-1,702*	*-687*	*-2,321*	*-841*	*-2,261*	*-2,285*
Reduction of loss agricultural classes		60%		64%		-1%

6.3.3 Recommendations for improvement of the strategy

Green and blue services will not solve all the problems of agriculture in the urban fringe of The Hague Region. However, the strategy might contribute more to strengthening agriculture if:

- European state aid regulations would allow profitable payments to farmers for public goods and services.
- Agri-environment payments are classified in the WTO 'Green Box', to avoid lengthy state aid procedures and to foster local initiative;
- More budget is reserved for agri-environmental schemes with national, regional and local governments;
- Farmers groups are encouraged to develop new ideas for green and blue services, stimulating innovation and local embeddedness regarding landscape, farming practice and urban-rural relations;
- Green and blue services are combined with other strategies, such as land banking[3], zoning (which has been quite effective in keeping the land price down) and the development of commercial urban-rural relationships[4].

To improve the public value of the peri-urban enclaves, far-reaching environmental measures and increased public access on farmland should be strived for. A balance should be found between meadow bird protection and welcoming more people on farmland, because of risk of disturbance of meadow birds. However, higher water levels and meadow birds can be a good combination. Higher water levels may be locally desirable for water management and countering subsidence of peat and could be arranged as a 'blue service'.

Strengthening agriculture in the urban fringe can be aimed at the income side of farm economy (such as through farm diversification and agri-environmental payments) or at the cost side (such as through land banking and zoning to control land price). An additional direction is capacity building. The Netherlands has a very well developed infrastructure for education, extension, research, innovation and exchange of knowledge and experience among farmers.

[3] The Montpellier case study offers interesting information on the region's strategy to reduce speculation with farmland. The land market regulation consists of a pre-emption right of local communes for 15 years (Buyck et al., 2008).
[4] Think of sales of local produce, processing organic waste, energy production, on-farm care, offering meeting rooms, organizing events and other forms of farm diversification.

7 Other considerations about planning and governance of the peri-urban area of The Hague Region

Peri-urban areas represent a problem of governance and scaling (Padt and Westerink, in prep.). They are the 'back side' of cities and are intersected by municipal and regional boundaries. The peri-urban enclaves of The Hague Region are no exception to this. Coherent planning in these areas therefore requires cooperation between a large number of local and regional authorities. The Province is the only tier of government that oversees the peri-urban areas of The Hague Region as a whole, since these peri-urban areas extend into neighbouring regions.

Several attempts have been made to match the ('observational') scale of governing the peri-urban areas to the ('operational') scale of landscape types in the region (Padt and Westerink, ibid). As from the late nineteen fifties, the buffer zones and green heart policy surpassed municipal boundaries and were meant to prevent urbanisation by imposing zoning 'from above'. Urbanisation has been much higher in peri-urban areas of The Hague Region that were not part of a buffer zone, such as Ypenburg and the area around Pijnacker. Another clear attempt of scale matching was the municipal rearrangement of 2004. Instead of adding the municipalities between The Hague, Delft, Schiedam and Rotterdam to one of the cities, deliberately one 'glass' and one 'grass' municipality were formed (respectively Westland and Midden Delfland). The area of Westland municipality is almost a complete match with the area with greenhouse horticulture. However, Midden Delfland still covers only part of the meadow landscape between Delft - Pijnacker and Schiedam – Rotterdam - Berkel & Rodenrijs. Although Midden Delfland municipality actively initiates cooperation with its neighbours in governing the area according to a clear 'open landscape' discourse, the ending of the Reconstruction Act Midden Delfland in 2010 (meant for implementation of the buffer zone policy) was seen as a threat. A new attempt for a suitable operational scale is therefore made. Hof van Delfland is a new network governance structure meant for cooperation of the relevant tiers of government, aimed at an area bigger than the buffer zone. Its main instruments are political agreements and joint fund raising. The Hague Region strives for a Regional Park status for this area, but frames the Hof van Delfland area differently (in the Regional Structure Plan 2008 this area is divided into three regional parks: Midden Delfland – Oude Leede, Pijnacker, and part of Delflandse Kust). Similarly, a network governance structure and a regional park status are strived for by The Hague Region for Duin, Horst en Weide, between The Hague and Leiden.

Summarizing, we see attempts to match the observational scale to the operational scale of the peri-urban areas ranging from 'strong' (municipality) via 'relatively strong' (national zoning status) to 'relatively weak' (network governance, or informal cooperation according to Tosics et al., 2009). The network governance structures for Hof van Delfland

and Duin Horst en Weide have limited power and resources, similar to The Hague Region as regional authority (Aalbers et al 2009), and rely heavily on concertation and the cooperation of the municipalities. The municipalities are responsible for zoning. Tosics et al (2009) describe the dilemma as follows:

> *'To achieve area-wide agreements on a joint transport policy, on waste-treatment or on tax-equalization are amongst the most difficult and highly politicised issues, much more difficult than signing agreements on joint policies towards economic competitiveness. While competitiveness is often a "win-win" agenda, 'regulatory' policies are usually not. To achieve such "regulatory" agreements top-down power is needed, or very wise, forward looking behaviour of municipalities, some of which have to bear short-term burdens in order to get long-term advantages.'*

Power and resources are clearly with the cities. The municipality of Midden Delfland may have high autonomy to determine its zoning policy – and therefore power to keep urbanization at bay – its budget is limited because it is largely based on the number of inhabitants. Having the task to keep the area 'open and green', the Midden Delfland municipality has to refrain from possibilities to increase its income by means of selling land for housing or increasing its number of inhabitants. The public goods and services delivered by Midden Delfland to the surrounding cities imply a risk of 'free riding' by the inhabitants of these cities.

A bottleneck in the current network governance is its lack of transparency and democracy. Ideas are developed and negotiated in networks of 'insiders', mainly government officials and administrators. The Hague Region itself has an indirectly elected representation: its board members are politicians from the participating municipalities. Governance structures such as Hof van Delfland or Randstad South Wing lack democratic representation altogether. It is for this reason that the actual decision making is done in the municipal councils. However, these councils have little influence on the development process of the plans in these governance structures and few municipal councils would reject a plan that has 'support within the region'. Some of the governance structures seek cooperation or consultation with non-governmental actors. However, there is no free access to these networks and the actors invited are generally the interest groups with lobbying skills. 'Groups without a voice' are barely heard in network governance.

The effectiveness of the current governance approach to the peri-urban areas is hard to assess. Instead of drawing conclusions, we merely sketch some alternative options. More inspiration can be found in Tosics et al. (2009) and Aalbers and Eckerberg (2010).

Alternative options	**Disadvantages**
1. Power to the Province. The Province is currently not absent in the peri-urban planning debate, but takes a rather modest position. The Province seems to focus on its 'rural' areas more than on the peri-urban enclaves, being responsible for rural development, including agri-environmental schemes. Formally, however, the Province could take an active role in zoning (according to the new	Some of the current efforts for joint policy making could be lost. Provincial boundaries also cross (other) peri-urban areas.

Alternative options	Disadvantages
Planning Act, see Aalbers et al. 2009). Being the nearest tier of government overlooking The Hague Region's peri-urban areas as a whole, the Province could take the lead in their zoning policy and in funding the development of their public value. Another advantage of more power to the Province is its direct democratic representation.	
2. Money to peri-urban municipalities. A municipal rearrangement could assign the peri-urban areas to peri-urban municipalities. The urban municipalities then should pay the peri-urban municipalities for the provision of recreational space and landscape management.	Cities would loose space for urban expansion.
3. Network governance to the city region. Ways could be sought to make network governance more powerful, more efficient and more democratic. One way could be to avoid new structures and to concentrate network governance as much as possible with the city regions, which are a mandatory concertation body in themselves. The municipal cooperation within the city regions is more binding than in other network governance structures, but also the financial contribution to the joint planning effort could have a more binding character. The Hague Region could try to get closer to its inhabitants and actively consult them in policy development. The cooperation should not have disincentives: a method could be worked out for setting off the economic gains of for instance concentrating industrial development in one of the municipalities with the other participants.	Still cooperation between city regions would be necessary for governance of the peri-urban enclaves.
4. Balancing economics of 'red' and 'green'. Currently, construction projects often have to provide budget for development of green space ('red for green'). However, it seems that this principle is more and more turned around, in the sense that housing is seen as a means to finance green space. This could reduce the public funds for green space. However, since green space is a public good, it is part of the government's core-business to ensure its provision. The provision of green space should not be an incentive for allowing more construction. Therefore, a bigger loop in the flow of funds from construction to green space could be considered, for instance by means of taxation. Taxation of construction projects should cover the public costs of providing green space and infrastructure and eventually removing the buildings. The latter would bring more balance in the difference in construction costs between 'brownfields' and 'greenfields'.	Removing the direct link between a construction project and financing its green space may diminish opportunities for local commitment with the project developer.

8 Discussion on methodology

Developing scenarios in the PLUREL case study of The Hague Region has been a learning process. From the start, the role of storylines and strategies was not very clear, since different scenario approaches were proposed within PLUREL, including an approach with the four storylines introduced in chapter 1 and an approach based on a strong growth/baseline/weak growth – strong planning/baseline/weak planning matrix . There was no consensus on the use of a Business as Usual scenario. This is one of the reasons why the process of developing scenarios has been different for all case studies.

In the case study of The Hague Region, the scenario framework as proposed by Ravetz (2008) was taken as a starting point, but a business as usual scenario was included. An important step in the process has been developing storylines with stakeholders. The storylines were in that approach important research material. They are qualitative, imaginative and intuitive rather than evidence based. The developed storylines are based on the expertise of those developing them, not restricted by data or model architecture. They can, in their essence, not be 'true'. Another group of stakeholders could have developed other stories, based on the same basic storylines of Ravetz (2008). However, they represent futures that could happen. The storylines are explorative and should be used in that fashion.

Scenario development at the regional level requires close collaboration between modellers, stakeholders and action researchers. Stakeholders are indispensable in developing future outlooks with a 'grounded' local or regional context. Action researchers are indispensable in bridging the contextual knowledge of stakeholders and the methodological knowledge of modellers, in considering the broader (governance) context and in looking beyond current policy. Therefore, in order to develop a set of consistent products, modellers, action researchers and stakeholders need to closely communicate. Failure to do so endangers the consistency between qualitative scenarios and model output and the stakeholders' feeling of ownership over the final product. The case of The Hague Region learnt that this communication is not easy at a distance and even more so because of the cultural differences between disciplines and between policy and research.

A discussion point has been the scale of the scenarios. The storylines were developed for The Hague Region with some references to Randstad South Wing (especially Rotterdam). The modelling work was for technical reasons done for South Holland Province, which was –by that time in the project – regarded as the Rural Urban Region (Loibl and Köstl, 2010). This explains why cities such as Leiden were not mentioned in the storylines, but the modelling results based on these storylines are available for the whole province.

Another constraint in the scenario work for The Hague Region was the difficulty of modelling governance strategies with a geographical model such as MOLAND. When the understanding grew that testing two of the three strategies selected in the Analysis report with MOLAND would be problematic, the choice was made in the development of storylines to include an extra, spatially more explicit strategy: urban densification. It is important to note that our research methods (MOLAND modelling and visualisations)

tend to narrow down our scope to strategies that imply explicit spatial change. Strategies aimed at governance itself (like discourse development or cooperation between municipalities) cannot be assessed with these methods. For the governance work in PLUREL, it would have been immensely helpful to be able to project the spatial impact of governance strategies that are in many cases about human interaction and behaviour[5].

Working with standardized land use classes, such as those of CORINE, limits the monitoring of new or multifunctional land use classes. Policy development may aim for a higher level of integration of land use functions (such as agriculture and nature), mixed land use (such as houses and offices in the same block or building) or layered land use (underground car parks and roof gardens), but data collection is lagging behind the actual development. Modelling the effect of such policy strategies in scenarios based on past land use developments is limited for this reason.

CORINE was not useful for this case study because of the importance in South Holland Province of greenhouse horticulture as land use class, which behaves differently than open air horticulture. However, the LGN data set with more detail in the 'rural' land use classes that was chosen, had less detail in the urban classes. More detail in the urban classes, with different urban densities, would have made the testing of the urban densification strategy more meaningful.

Considering all these difficulties and constraints, which are for a large part inherent with interdisciplinary and international research with stakeholder involvement, the scenario work for The Hague Region is a major accomplishment. Three storylines were developed with stakeholders based on the PLUREL scenario framework; many data were gathered; and model projections were delivered for three scenarios, each with three strategy alternatives. Reports, maps and visualisations offer much material for stakeholders to consider possible futures and policy options. Unfortunately, it was not feasible to reflect on the modelling results together with the stakeholders during the course of the project. Nevertheless, we hope that the research will contribute to the debate on sustainable land use in the region and beyond.

[5] The Agent Based Modelling possibilities of MOLAND have not been explored for this case study.

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Annex 1 Annotated list of indicators used in scenario workshop

Translation by Judith Westerink

Drivers:
Population
Upcoming economies
Energy, oil and alternatives * biomass
Land price, land ownership
Food price/ milk price
Climate: weather, water
Policy (multi-scale; subsidies)
Infrastructure (roads) ←investments in relation to urban form (Public Transport)
Technology
International competitiveness (dependence)
Shrinkage or growh, expansion or not
'we have to grow' as dominant drive
Conservation by development
Reactions of actors, fase of farm transfer
Urban fringe/ green areas
Nature 2000
CAP
Limited influence of city on agriculture (including land price)
Land banks coming up (Rotterdam, Midden-Delfland, Amsterdam, etc), but no support with administrators of The Hague Region
"No space left"

Pressures
Consumption, energy use
Emissions, pollution, garbage
Shortages (a.o. water) and exesses
Recreation pressure
Housing needs (types, numbers) and construction
Need for business sites and construction
Need for green space/ quietness
Economic situation farms
Mobility
Lifestyle → private time → leisure
Ecological Main Structure (becomes general green space, recreative space, no longer ecology als main goal)
Competition with other regions

State
Landuse(change) (housing/ industrial/ business/ greenhouse/ meadow/ arable/ nature/ park/ forest/ infrastructure etc, including cultural history.
Water, nutrients, manure etc
Biodiversity, ecosystems
Multifunctionality (agriculture/nature, nature/recreation etc)
Energy is a factor
Connections
"No space left"
Construction costs

Impact
Landscape
Recreative space
Urban green space
Food

House prices
Employment
Services
Travel time
Quality of life
Social cohesion
International competitiveness

Response
Reactions of people, actors, organisations
(New) strategies
Compensation mechanisms
Re-use of space (for instance industrial areas
Public awareness (→ driver)
Civilian vs living consumer

Annex 2: Flip-overs storylines

(not translated)

B1: Peak oil 2040

D

- Toevoegen: technologie ontwikkelingen duurzame energie
- Willen mensen in de stad wonen?
    - "Platteland" van Haaglanden is dichtbij
- Ouderen willen terug naar de stad, dichtbij voorzieningen
- Sterke vergrijzing 30-40%
- Rotterdam↓ Haaglanden↑? Lichte groei
- Randstad 2040 gaat uit van groei (=A1)
    - Leidt wel tot beleid en # woningen
    - Leidt tot aantrekken van mensen?
    - Of wordt # niet gehaald door economische crisis?
- Wel economische groei (relatief hoog)
- Nu 40.000 expats
  50% allochtonen maar DL op 3e plek
  Meer Oost-Europeanen naar Westland, maar beperkt door automatisering
  Meer expats, Den Haag past met inst. goed in B1

  Voorzieningen: internationale scholen, cultuur
  Veel 'middenklassers'
  Expats waarderen het Hollandse Landschap
- Energie DUUR → herstructureren
- Grond duur → bestaande gebieden
- OV ook duur, maar gesubsidieerd
- Transitie naar duurzame energie
- EU gaat voorwaarden stellen aan voedsel kilometers
- Meer vegetarisme
- Aard van staatssteunbeleid gaat veranderen. Duurzame initiatieven kunnen worden gesteund, maar geen ongelijkheid tussen landen
- 2050 energie neutraal = ambitie Haaglanden
- Havens blijven naar Maasvlakte toegroeien
    - Rotterdam wil graag meer woningen ook wel voor Den haag
    - Samenwerking nodig Den Haag / Rotterdam

- Westland / Oostland gaat energie leveren en CO2 opnemen
- "Ondergrondse leiding voor melk"

P

- Productiekosten grondgeb. Landbouw hoog, maar landbouwbedrijven gaan energie produceren (melk is stuntproduct, bulk, macht van efficiënt georganiseerd melkcoöperaties, wereldprijs is laag)
- Concurrentienadeel lokaal produceren wordt minder
- Er ontstaan alternatieve ketens, maar wereldmarkt blijft invloedrijk
- Transitie in haven: - kolen, + biomassa

State

- Hoge druk op landgebruik vanuit verschillende richtingen
- Verdichting / meer hoogbouw zet door bij OV punten (=RSP)
- Verbetering image OV
- Werken aan groene buitenruimte / balkons
- 1000ha woningbouw nodig in groengebied (=20%) (65.000 woningen in totaal)
  Haalbaar? € voor #?
  + binnenstedelijk is duurder
- Zandmotor
- Landgebruik tot op de mm² gepland
- Multifunctioneel + gestapelde functies
- 20% in kleine uitbreidingen langs randen
  Zuidplaspolder + Valkenburg → Zie RSP
- Typen woningen? Differentiatie (zie woonvisie / RSP)
  Andere soorten woningen nodig?
- Bedrijven intensiveren op huidige terreinen, zie RSP
- RSP past goed bij B1
- Tegengaan verspilling in ruimte / herontwikkeling brownfields / reconstructie is complex. Wat te doen als "makkelijke" plekken op zijn
- Samenwerking nodig, beheer nodig
- Kantoren / woningen combi voor energie efficiëntie
- Kantoren met koude / warmte opslag
- Behoud / ontwikkeling groen – blauw nadrukkelijk beleidsdoel
- Westlandse Zoom / Valkenburg voorzien in behoefte expats
- Zelfregulering glastuinbouw + hogere kosten kunstmest + zuivering + regels leiden tot betere waterkwaliteit
- Wind & zon, windmolenpark, blue energy, warmte uit zeewater, landwinning voor natuur
  → Op zee
  → Op daken en in Sahara

Impact

- Grijze golf wil fietsen
- Jongeren minder geïnteresseerd in groen of in andere activiteiten
  → "sportschool" op 30e – energieproductie
  - Gedifferentieerde behoefte
  - Verlies aan draagvlak?
  - Behoefte aan dynamiek als er voldoende rust is
- Verdiepte snelwegen en geluidsschermen verminderen landschapsbeleving
- Woningen moeten gesubsidieerd worden omdat armere groepen de bouwkasten niet kunnen betalen
- Huis met tuin is voor rijken

80% past goed
Ook buiten Haaglanden kijken
Sociale rechtvaardigheid → huis met tuin voor de rijken
Denk aan kwaliteit, o.a. voor gezinnen met kinderen
Cultuur / tijd / discours
Grootstedelijke uitstraling, visitekaartjes nodig
Wat is typisch Den Haag?

Groen belangrijk maken

- Is erg governance, B1, meer top-down nodig
- Ontwikkelen daadkracht, maatschappelijk draagvlak is niet genoeg
- Als politieke visie wel haalbaar

- Kansrijk in B1
- Opschalen naar Zuidvleugel Authoriteit

Combi van strategieën nodig

GBS
- Maatschappelijke bijdrage aan onderhoud landschap
- Vrijwillig, minder stuurbaar
- 2e inkomstenpoot, daardoor minder kwetsbaar
- Alternatief voor aankoop mits genoeg geld
- Op kortere termijn in te zetten
- Niet voldoende om landbouw in stand te houden tegenover verstedelijking / hoge grondprijzen

Flats op de rand van Westland met uitzicht over MD

4 Grondbank
- Veel grond in overheidsbezit, past in B1
- In 2040 nog steeds draagvlak voor landschapsbeheer door boeren?
- Toegankelijkheid afdwingen
- Goedkoper dan "gewoon" recreatiegebied
- Alternatief voor beheer door overheid
- Wat is de grondbank bereid te betalen?

B2: Fragmentatie 2040

Argumentatie keuze + is voor te stellen (PVV) wens naar meer daadkracht te veel regels negatief sentiment
+1 onder de lijn in schema, 1 boven de lijn, A1 te liberaal

Maar zijn /komen die nog?

DRIVERS:
Gated communities wens experts
Regionaal conservatisme → locale producten / consumptie door protectionisme invoer beperkingen
Halvering Westland (Veehouderij zakt eerst in, later kansen)
Geen immigranten →bevolking krimpt
Ruimte locale initiatieven bijvoorbeeld energie opwekken met kassen
Vakantie in eigen land, ook Duitsers effect recreatie
Minder samenwerking / begrip / overlegvormen
Intolerantie meer tegenstellingen
Instabiel oorlog? Kernbom
Meer criminaliteit
Minder afhankelijk van anderen. Zelfvoorzienend elektriciteit aandacht technologie kansen Delft
Wens om van 2 walletjes te eten, maar vraag of dit lukt
Grondprijs blijft hoog door schaarste grond
Milieu problemen minder / hoog in vaandel
Piekafvoer grote rivieren zorgt voor overstromingen – delta Haaglanden
Internationale handel blijft
We moeten blijven drinken
Haven wordt kleiner

PRESSURES
Consumptie en energiegebruik loopt terug door wegvallen economische pijlers
Meer volkstuinen
Emissies, vervuiling afval minder. Geen tekorten
Internationale recreatie blijft maar beperkt
Misschien Chinezen en Indiërs
Gated communities voor elite
Veel goedkopere bouw nodig
Meer afgesloten natuur recreatie etc
Wie heeft het geld?
Komt er nieuwbouw? Weinig
Vooral herstructurering / sanering

STATE
½ Westland glas → verrommeling, leegstand windmolens
Energie als hoofdproduct
Lege kassen ombouwen tot energiecentrale (met schoorsteen) havenzijde
Volkstuintjes / huisjes
Nieuwe reconstructie (€ ??). Glas in centrum, wonen kust
Innovatiesubsidie voor omschakeling glastuinbouw
Caravanopslag
→versnipperd, sterke planning nodig (kassenbank)
Internationale zone wordt luxe woonmilieu (gated) Of verpaupering?
Opleidingsinstituten / bezinning
Delft wordt voornaamste stad
Vlietzone & Rijswijk worden op Delft gericht

MD
Paarden → veranderen landschap
Delftenaren in boerderijtjes
Aantal boeren blijft, melkveehouderij verdwijnt (1/2) niet, ook vleeskoeien
Volkstuintjes nemen niet teveel plek in
Parttime boeren
Zorgboeren (ouderen)

DHW
Restaurant in de duinen
→wellness
Duinen blijven voor waterwinning
Huizenparkjes / tuinhuisjes voor weekendleven

<u>80%:</u> weinig bouw, maar vooral buiten de stad (glas)
Doel wordt: tegengaan verpaupering
Werkt nog steeds →robuust

<u>DRAAGVLAK</u>
Recreatie dicht bij huis
Stukjes voor jezelf "campings", verrommeling →handhaving nodig discoursontwikkeling zinvol?
Groen blijft groen, maar extensiever
Eigen landschap wordt gewaardeerd

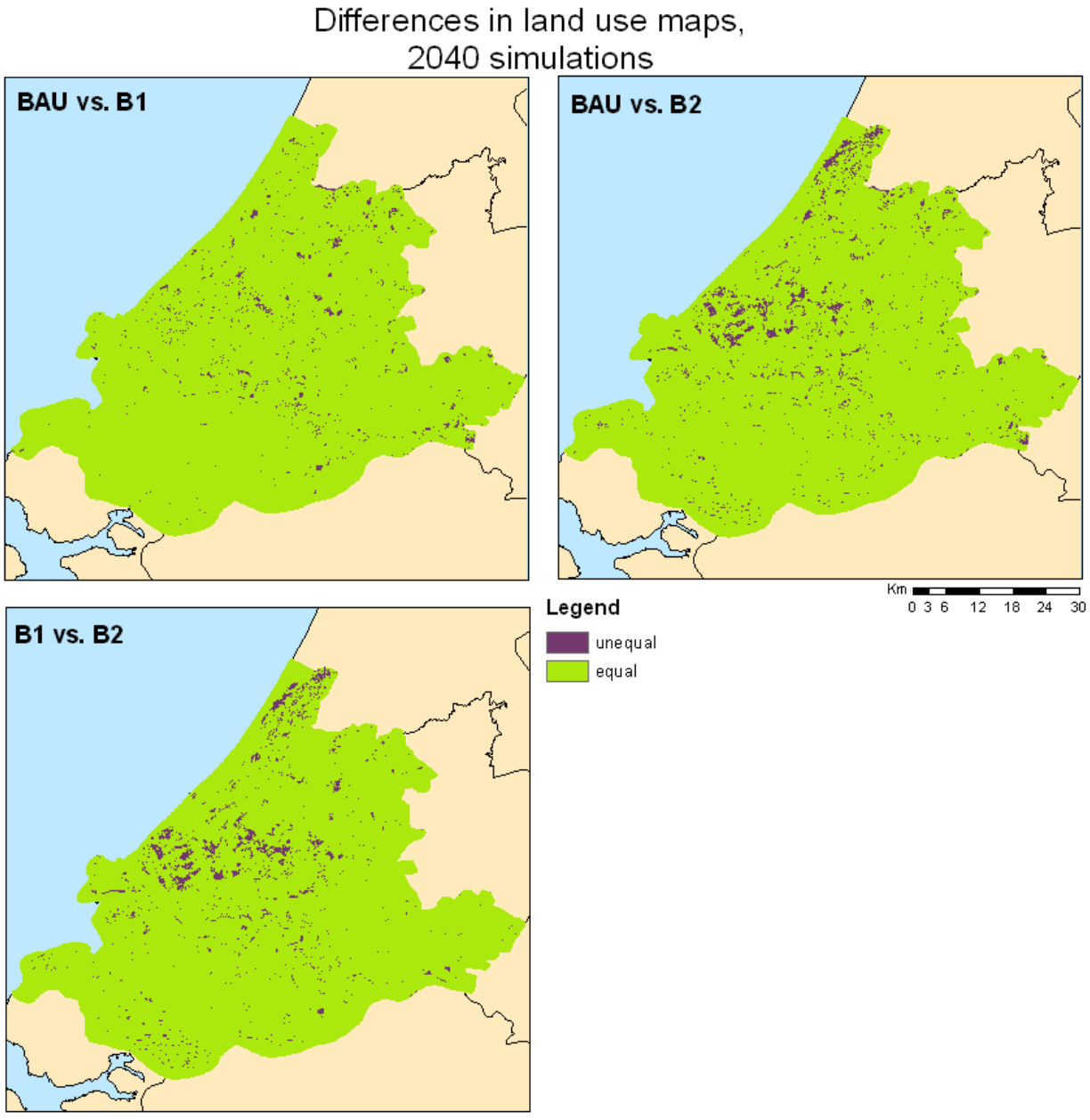
<u>GBD</u>
Voedselproductie wordt belangrijk
Verbreding wordt belangrijk →water, natuur, landschap
Blauwe diensten
Cultuurhistorie

GRONDBANK
Kassenbank
Wordt overbodig voor weidegebied

Haaglanden blijft spilfunctie voor regionale belangen voor juiste schaal
Governance op dit niveau, moest wel aan gewerkt worden, niet vanzelfsprekend
(B1: meer government, meer samenwerking op hoger niveau)

Annex 3: Differences in land use maps three scenarios 2040

Source: Mubareka and Lavalle 2010



	pasture	arable	vacant	greenhouses	bulbs	workLocations	urban	ResidRural	Luxury homes	farmsteads	port	overallKappa
b1 vs b2	0.98	0.99	0.05	0.64	0.66	0.69	0.98	0.99	0.52	0.87	0.95	0.95
bau vs b2	0.97	0.97	0.14	0.65	0.66	0.72	0.98	1.00	0.58	0.88	0.97	0.95
bau vs b1	0.98	0.97	0.02	0.89	0.97	0.86	0.98	0.98	0.61	0.97	0.97	0.97