Assessment of the Living Environment 2010

Summary and Findings

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The Hague/Bilthoven, 2010

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This publication is a translation of the summary and findings of the Dutch full report 'Balans van de Leefomgeving' and can be downloaded from: www.pbl.nl/en.

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Summary

This first Assessment of the Living Environment evaluates government policy on the physical environment in the Netherlands and indicates the extent to which policy targets for the environment, nature and spatial planning have been achieved. In cases where targets were not achieved, we analysed the causes. In addition, we determined whether the policy was coherent, where undesired side effects occurred and what options are available for taking action to eliminate the policy shortfalls.

General conclusions

The quality of the living environment is improving due to policy, but serious problems persist

Since 1990, thanks to policy, the quality of the environment in the Netherlands has improved. For example, air and surface waters are cleaner, deprived urban areas have been renewed and there has been additional housing development within cities and villages. However, dealing with major problems, such as climate change and biodiversity loss, requires additional policy effort. Solutions will be based primarily on an international approach. In addition, from a national perspective, government policies could be made more coherent and efforts in specific areas intensified.

The coherence of environmental policy could be improved

The sector-based national policies on environment, nature and spatial planning have been generally successful, but the various policy tracks sometimes work at cross purposes. For example, climate policy promotes the construction of wind turbines, but their accompanying spatial claims present difficulties for spatial planning, both on land and at sea. In addition, spatial separation of agriculture and nature only solves some of the undesirable side effects of their mutual influences. Sometimes, solutions can be found in the improved alignment of existing policy targets; at other times, it will be necessary to choose between policy targets in order to implement effective and efficient policy. Spatial planning can provide an important institutional framework for the further integration of policy targets. Examples include climate and energy policy and the expansion of the Multi-annual Programme for Infrastructure, Spatial Planning and Transport (*Meerjarenprogramma Infrastructuur, Ruimte en Transport – MIRT*). In addition, as part of the European Common Agricultural Policy, more funding is available for improving nature and landscape.

Budget cuts require reconsideration of policy approach and role allocation

Over the short term, the environment has benefited from the recession. This is because the pressure on scarce land has been temporarily alleviated and the environmental pressure is demonstrably lower, because of fewer activities that require space and generate pollution. However, the recession can also delay the essential development of clean technologies. Environmental investments are falling because the government and private parties have less money due to the recession. It is very likely that private and public investments in urban development and nature and landscape will also decline. This is putting pressure on city liveability as well as on nature and landscape qualities. The government could look for new ways to award private parties more responsibility for improving the quality of the living environment. To this end, the government would need to formulate a framework containing clear rules and more attention paid to enforcement.

Conclusions concerning the Environment, Nature and Spatial Planning

The Kyoto target will probably be achieved, but additional emission credits may be required

The Netherlands can probably comply with its Kyoto obligation for a reduction in emissions of carbon dioxide (CO_2). However, there is still a chance that this target will be exceeded. If emissions increase due to economic growth, or the yield from foreign emission credits is lower than expected, the government could compensate through the timely purchase of additional foreign emission credits.

National climate target for 2020 out of reach

Despite the planned climate policy from the Dutch policy programme Clean and Efficient (*Schoon en Zuinig*), the national climate target of a 30% reduction in CO_2 emissions by 2020 will not be achieved. However, the current EU target of 20% would be attainable. To achieve this, the new Dutch Cabinet will need to implement the proposed measures, such as road pricing. Possible cutbacks in government spending in climate and energy policies are not necessarily disadvantageous for emission reduction, but would require businesses and the general public to carry more of the associated costs.

Current generation of biofuels unlikely to alleviate climate change

Biofuels that are currently sold at petrol stations probably cause a net increase in global CO_2 emissions. This is due to emissions from the direct and indirect conversion of natural habitats into farmlands for biofuel production. By means of sustainability criteria, the EU is attempting to prevent the direct conversion of tropical forests into biofuel plantations. To ensure that net emissions decrease substantially, it is also necessary to counteract any indirect land conversion resulting from biofuel production. Presently, the EU is determining whether additional regulations are required to prevent indirect land conversion, so that the current agricultural production that is displaced by biofuel production no longer shifts to natural habitats.

Fewer traffic jams and a cleaner environment are more feasible with road pricing

Policy efforts have been inadequate for achieving targets of accessibility and reduction in CO_2 emissions from road traffic. A road pricing scheme would significantly improve traffic flows and also reduce CO_2 emissions, but it has elicited a great deal of public resistance. In addition, the implementation of such a technically complex system also carries certain risks. Another option for the government to improve traffic flows is the building of more infrastructure than is currently provided for in the Dutch Mobility Policy Document (*Nota Mobiliteit*). However, an additional investment of tens of billions of euros in new infrastructure would be required to achieve a reduction in traffic jams that is equal to what could be achieved with road pricing. Moreover, additional infrastructure leads to more CO_2 emissions from increased road traffic.

Liveability and urban vitality are under pressure due to the economic recession

Urbanisation strategies of clustering, densification and renewal have contributed to the liveability and vitality of the Dutch cities. However, the recession could cause these results to come under pressure. We have ascertained two risks. First, some cities or districts could become less attractive because investments in renewal are lagging. This could lead to an above average depreciation of real estate, which would reduce municipal incomes even further. Second, there could be increased pressure to build large-scale developments around the big cities. Such developments would negatively affect cultural landscapes (such as the National Landscapes) and would make the countryside less accessible to city dwellers.

Spatial functionalities: separate when necessary, combine where possible

In a densely populated country such as the Netherlands, where high demands are placed on the living environment, many functions compete over the available space. The spatial separation of agriculture, nature and urbanisation has enabled a highly productive economy and a safer living environment. During the past two decades, this policy has also slowed the loss of biodiversity. However, not all options for spatial optimisation of functions have been utilised. For example, the government could improve on recreation, landscape and biodiversity in the countryside by properly combining functions. But such an approach would succeed only if farmers were to receive reimbursement for their efforts in this regard, and if the government would enforce corresponding agreements. The vitality of cities could continue to increase and the growth in mobility could be slowed if housing and jobs were combined more effectively. This especially concerns the development of new living-working environments through the implementation of clean, safe and smaller-scale activities in residential areas.

Biodiversity decline in the Netherlands has slowed, but not stopped

With respect to biodiversity, there are divergent developments. Plant and animal species and ecosystems that are relatively undemanding are doing well. This is because the size of nature areas is increasing and environmental quality is improving. However, species and ecosystems that are susceptible to fragmentation and environmental pressures are still having a difficult time. To achieve the nature policy targets, the national government could further increase nature areas, improve connections between these areas, and reduce environmental pressures. Because of possible cuts in the funding for nature development, it will become more difficult to reach these targets on schedule. However, there are options for making the policy more efficient. One promising option is that of shifting resources from agricultural nature management to the

strengthening of the National Ecological Network. This would enable a more effective use of already acquired land (from land swaps).

Improving the sustainability of supply chains is the key to conserving biodiversity in other countries
The relatively high quality of the living environment in the Netherlands is partly due to the intensive use of land and raw materials in other countries. Improving the sustainability of supply chains for wood, soya and other agricultural products that are imported into the Netherlands, therefore, is inseparable from the pursuit of sustainability policy. This attention paid to the sustainability of supply chains could contribute to the protection of biodiversity in the supplying countries. Unfortunately, voluntary certification of supply chains to ensure compliance with sustainability criteria is proceeding slowly, and these criteria offer no guarantee for success. Living environments in supplying countries would benefit if the regulating ecosystem services are preserved, preventing problems such as landslides. By stimulating both the economy and biodiversity as part of regional development in developing countries, the involved actors could reduce or prevent adverse effects on biodiversity and economic welfare. In the near future, the government could seek new policy strategies in these areas.

1. Introduction: The Assessment of the Living Environment analyses policy coherence

This first edition of the Assessment of the Living Environment evaluates government policy in the fields of environment, nature and spatial planning and pays special attention to the relationships between these independent policy domains. By emphasising coherence, the assessment adds a dimension to the analyses that were included in its preceding publications (Environmental Balance, Nature Balance and the evaluation of the National Spatial Strategy (*Monitor Nota Ruimte*). In this report, the living environment is primarily defined as the physical environment in which people live, anywhere in the world. The living environment, among other things, is comprised of the urban environment, rural areas, water, nature and the biological environment. For this first edition of the Assessment of the Living Environment, not all of these elements of the living environment have been fully analysed. For example, water management is addressed only to a limited extent.

The assessment, first and foremost, is an evaluation of national government policy. That policy has an impact not only in the Netherlands, but also abroad. The latter applies especially to the effects of policy on air pollution and global biodiversity. The assessment not only indicates the extent to which current targets are attainable with established and proposed policy on nature, environment and spatial planning, but it also analyses the causes of current circumstances, where policies from various domains counteract each other, and which options would be available to eliminate policy shortfalls. But there is more. During the next few years, policy will be dominated by the necessity to make reconsiderations. New cuts in government spending are bound to affect the living environment. To support the political-administrative evaluation of these proposed funding cuts, the assessment report provides indications of their consequences for the living environment. In addition, options are identified that -- in this new era of shrinking budgets -- could still lead to maximum effectiveness of policies related to the living environment.

2. Results achieved and policy tasks remaining

The overall quality of the living environment is improving
Since 1990, the net quality of the living environment in the Netherlands has improved. The policy pursued has contributed substantially to this improvement; without policies on environment, nature and spatial planning, the quality of the living environment would have continued to decline due to increased anthropogenic activities.

However, the results vary greatly according to policy area.

- Partly due to spatial policy, cities have again become popular residential locations for people with high and middle incomes, problem neighbourhoods have been renewed, and less development is taking place in protected open areas near large cities and in valuable natural and cultural landscapes. Mobility has increased sharply without a proportional increase in congestion and environmental pollution. This is partly due to investments in more and quieter infrastructure, the development of cleaner and quieter cars and the clustering and densification of the urbanisation process.

- Environmental policy has led to major improvements, especially in terms of air quality. Nationally, greenhouse gas emissions, which were still increasing until 1990, have stabilised. Surface waters are cleaner and exposure to contaminated soils has been drastically reduced.
- Nature policy has realised the expansion of nature areas in the Netherlands, and improved protection of threatened animal and plant species. In particular, the acidification of nature reserves has been drastically reduced. Although the conditions for nature are still declining due to the continuous pressure on the environment, the rate of decline is now much slower than would have been the case without environmental policy.

To reach the established targets, additional policy is required in some areas

In short, the policies that affect the living environment have been undeniably successful in some areas. However, this does not mean that all societal wishes regarding the living environment have been met. According to our analyses, some components of current and proposed environmental policies will be inadequate for achieving the established targets on time. Intensification of policy is sometimes enough to bring aims and needs together, but sometimes it is necessary to fundamentally alter the approach. Appendix 1 of the Dutch full report contains an extensive overview of the extent to which operational policy targets are expected to be achieved. We have listed the most important policy shortfalls below. Table 1 provides a summary of the main results. The following policy targets could be achieved by strengthening the current approach (colour-coded orange in Table 1):

- Environmental pressure on nature, especially from fertilisation, desiccation and the use of herbicides and pesticides;
- land acquisition for the National Ecological Network (EHS) and the creation of spatial coherence;
- certification of supply chains for soya, fish, wood and coffee;
- protection and development of the key qualities of the national landscapes;

The following policy targets require a fundamental revision of the current approach, either by the implementation of other policy instruments or adaptation of the targets (colour-coded red in Table 1):

- reduction in greenhouse gas emissions, down to the national target level for 2020;
- production of renewable energy and the energy conservation, up to 2020;
- noise from traffic and the traffic noise levels affecting housing;
- clustering, intensification and renewal of employment locations;
- satisfaction with and availability of greenery in and around cities;
- accessibility of housing, employment and amenities;
- halting the decline in biodiversity;
- appreciation of the landscape;
- ecological quality of surface water.

The identified discrepancies between the desired and expected policy effects require an analysis of the causes and of the options for taking action to alleviate the discrepancies. This is the subject of the following sections.

Table 1. Policy targets for which implementation of the policy probably will not lead to attainment. See Appendix 1 of the Dutch full report for a complete overview of policy target evaluations

Targets	Policy	Explanation	Reference to the Dutch full report
The environment	**Current and proposed policy**		
Greenhouse gas emissions, *Clean and Efficient*, national target 2020		National target is difficult to reconcile with the European system of emission trading	Chapter 2
Renewable energy, *Clean and Efficient* 2020		Proposed policy includes reformation of the financing of the Dutch incentive scheme for sustainable energy production (SDE)	Chapter 2
Pace of energy conservation, *Clean and Efficient* 2011-2020		Agreements with sectors are not leading to adequate energy conservation	Chapter 2
Local air quality; PM_{10}, 2011, and NO_2, 2015		The PM_{10} limit value is being exceeded at 150 large livestock sheds Achieving targets for busy urban roads susceptible to setbacks in the effectiveness of measures	Chapter 2, Chapter 3
Noise produced by road traffic 2010		Policy insufficient for pushing back consequences of increased road traffic	Chapter 4
Environmental pressure on nature		Reduction in environmental pressure is stagnating, desiccation management is behind schedule	Chapter 6
Urban networks and cities	**Current policy**		
Clustering, intensification and renewal of housing		There is sufficient planning capacity for new housing, also within cities, but the housing market is surrounded by major uncertainties	Chapter 3
Clustering, intensification and renewal of employment		Targets for clustering of employment and access to public transport nodes have not been achieved	Chapter 3, Chapter 4
Balance between urbanisation and greenery in urban networks		Targets for the amount and accessibility of greenery in and around cities have not been achieved	Chapter 3
Accessibility of housing, employment and amenities by car		Accessibility has declined, congestion has increased substantially	Chapter 4
Nature and rural areas	**Current policy**		
Surface area new National Ecological Network		Target unachievable with current budgets	Chapter 6
Halting biodiversity loss 2010		Vulnerable species and ecosystems are declining	Chapter 6
Supply chain certification		Certification of tropical hardwood is lagging Certification of fish catch is still limited and many species are not fished sustainably The international discussion about sustainability criteria for soya production has not yet been completed	Chapter 6
Key national landscape qualities		Municipal regulations still unclear	Chapter 5
Landscape appreciation		Appreciation is not increasing enough to reach target	Chapter 5
Ecological quality of surface water 2015		Assessment in accordance with the 'one out – all out' principle from the Water Framework Directive (WFD)	Chapter 5

Legend
[green=] Implementation of the policy will probably lead to achievement of the target
[yellow=] Projected development is close to the target
Policy could be made robust to withstand setbacks
[orange=] Projected development will probably not lead to achievement of the target
The target would be achievable under intensified policy
[red=] Projected development will probably not lead to achievement of the target
Achievement would require fundamental revision of the current approach, by implementing other policy instruments or adapting the targets

3. Cause analysis of disappointing policy outcomes

Introduction

In situations where policies did not realise the intended societal objectives, it is important to determine the reasons for the setbacks. Of course, these may not be related to the policies themselves; society is constantly in motion and can change so dramatically or unexpectedly that policymakers are unable to anticipate these changes in a timely fashion. If only for this reason, policies should be reviewed, periodically. In this section, we present an indication of the main causes of disappointing policy results or policy shortfalls. In addition, we offer a conceptual framework for analysing these situations and suggest starting points for dealing with the setbacks.

However, to enable a better understanding, we will first briefly zoom in on the specific circumstances in the Netherlands under which environmental policies are established. The Netherlands is one of the most densely populated countries in the world. As more people live in the same area, and as they produce more and earn more, it becomes more difficult to meet all of their needs. On average, the Dutch are among the richest people in the world. It is a well-known fact that people with rising incomes become more demanding of their physical environment. Typically, they not only want bigger houses and faster transport, but also more beautiful cities, pristine nature reserves and protection of landscapes with cultural-historical value. Many of these demands have been satisfied, because troublesome production processes were shifted to other countries far from the Netherlands. Increasing production and income go hand-in-hand with increasing imports, and consequently with an increasing use of the living environment in other countries. People can realise some of their wishes themselves, through private initiatives, but government intervention is often required to maintain or improve the desired quality of the living environment (also in other countries). Such government interventions are very apparent in the Netherlands.

During the past century, higher incomes and increased mobility have resulted in the spatial dispersion, dilution and separation of amenities and residential and employment locations, and the distinction between city and countryside has begun to fade. This urbanisation process, in turn, has enabled many people to live in spacious, low-cost housing and to work in relatively clean, green and quiet surroundings. However, this process also has disadvantages; it has adverse side effects on accessibility, environmental quality, liveability within cities, support base for urban facilities and on values related to nature, landscape and the cultural-historical heritage. Environmental policies seek to reduce these adverse side effects – bringing them within acceptable, politically determined levels.

Main causes of policy shortfalls

To improve the quality of the living environment and to subsequently maintain it, societal consensus is required about the desired quality level, and about the measures needed to achieve that level. In the Netherlands, this consensus is usually achieved in the political decision-making process, based on policy memoranda. These memoranda – besides the policy targets themselves – contain proposals for policy instruments and an indication of the required financial resources, to encourage actors in society to take the necessary measures for achieving the targets.

From this very general policy theory, we have derived four main causes of disappointing policy results, which are briefly explained below:

1. the chosen target conflicts with other targets;
2. the intended measures are inadequate for achieving the chosen target;
3. the chosen policy instruments are inadequate for eliciting the intended measures (including behavioural changes);

4. the chosen policy instruments are in conflict with other instruments.

First cause: conflicting targets

Policy targets have different functions in the political debate, and these differences are partly linked to specific policy domains. In environmental policy, it has become customary to refer to the expected results of intended measures as policy targets, often expressed in quantitative units. However, the targets of spatial planning policy are generally very comprehensive and complex. Moreover, they do not lend themselves very well to quantification into accountable results. Nature policy targets often portray a beckoning perspective, and political decisions about nature policy efforts are generally based on the degree to which they can bring this perspective closer to reality.

The decision-making process around measures, funding and administrative arrangements needed to achieve these targets, often leads to adaptations. Sometimes, politicians relax proposed measures without adapting the policy targets accordingly. However, if the connection between target and measures is released entirely, it is no longer possible to assess target feasibility. In such cases, politicians could easily reach agreement about new targets that are actually incompatible with those previously established. For example, there are targets for a) improving the quality of nature on farmland, b) retaining an economically viable agricultural sector, and c) limiting government spending. But these cannot all be achieved simultaneously. Conflicting targets are not always detected, but when this does happen, politicians tend to postpone target deadlines (as in the case of fertilisation standards), instead of actually changing target levels.

Second cause: intended measures are inadequate

During the decision-making process about the measures that are required to achieve a target, adaptations are often made to take account of the interests of specific groups of people who would be disadvantaged by these measures. Frequently, such groups believe that the proposed measures are too costly or that the costs and benefits are unfairly shared between the parties concerned. Some measures, such as those moving or limiting activities that harm the physical environment, lead to much more resistance, as they drastically affect the lives of the people concerned. In this way, opposition from interest groups can result in the politically sanctioned relaxation of packages of measures. If, subsequently, the policy targets are not adapted, then the intended measures will no longer be sufficient.

Innovation policy could provide new, affordable technologies, to enable a more efficient land use and cleaner production and consumption

The government could reduce this societal resistance by assuming part of the costs (through subsidising) or by enabling more effective or less costly measures (through innovation policy). With the new technologies that this approach could provide, production could become cleaner or land-use more efficient. In this way, the government could prevent and/or solve liveability problems by timely renewal of residential districts, employment locations, amenities, vehicles, energy generation and infrastructure. The development of clean and energy-efficient transport and production methods will enable increased mobility and production with fewer external effects.

Volume-based policy – such as reductions in livestock, numbers of cars within cities, or the number of aircraft movements to and from airports – is often a means of last resort, which is used only when technical solutions are inadequate.

For that matter, it is not always clear which measures are required to achieve a desired target. This applies, for example, to preserving the competitive position of the Randstad (conurbation in the Netherlands, consisting of the four largest cities of Amsterdam, Rotterdam, The Hague and Utrecht, and their surrounding areas). However, inadequacy of measures often comes to light only after a policy is implemented. In that case, additional research is required to identify more effective measures.

Third cause: policy instruments are inadequate

The government can deploy a wide range of policy instruments to ensure that actors take the necessary measures and change their behaviour, varying from strict regulation to voluntary special-purpose agreements, and from subsidies to administrative consultation. Generally speaking, measures are chosen under the assumption that a proposed instrument (or package of instruments) will effectively achieve the desired target. Unfortunately, the knowledge about the relationships between policy instruments and policy results is often insufficient, and the ultimate policy effects disappointing. Moreover, the relationship between ends and means can change due to the dynamics in society. For example, if the price of agricultural land increases over time, then the budget reserved for land acquisition for the National Ecological Network could turn out to be insufficient.

Established routines can also play a role in the selection of instruments, and preferences of the regulated parties can be different than assumed. For instance, industry is willing to enter into voluntary special-purpose agreements, but rarely agrees to levies and legal obligations. And the cabinet is willing to inform consumers about the effects of meat consumption on global biodiversity, but is reluctant to take measures that increase the price of meat.

Fourth cause: conflicting policy instruments

Until now, policies on the environment, nature and spatial planning have been shaped within essentially separate circuits. Theoretically, every policy dossier takes account of relevant developments in the policy environment. In many situations, policy domains support each other. For example, intensifying the urbanisation process creates space for conserving valuable cultural landscapes and nature reserves, and strengthens the economic support base for city amenities. But there are also situations in which policy domains work against each other. These situations can be divided into two types.

On the one hand, nature policy depends on environmental policy to improve physical and chemical conditions for nature, and on spatial planning policy to set aside sufficient contiguous space for nature reserves at the desired locations. The wishes related to nature areas can thus be transposed into demands on environmental quality and on the area size and location of nature reserves, but this suffers from problems of coordination. For example, current regulations for voluntary land acquisition hamper a decisive restoration of desiccated nature reserves. In the vicinity of Natura 2000 sites, regulations result in a stalemate because owners of nearby livestock operations are unable to expand, even if they take measures to eliminate associated additional ammonia emissions.

On the other hand, environmental policy and spatial planning policy can sometimes replace or supplement each other. When environmental policy is less effective at eliminating polluting activities, other activities that are susceptible to pollution can be moved to locations at a safe distance, by means of spatial planning policy (zoning). For example, this relationship was the basis of the decree on vulnerable locations (*Besluit gevoelige bestemmingen*); according to this decree, no schools or retirement homes may be built within 50 metres of a main road, if the limit values for particulate matter (PM_{10}) and nitrogen oxide (NO_2) are exceeded at that location. This attempt at coherent policy resulted in strong objections from the construction sector, which believed it was severely disadvantaged by this environmental regulation. These objections have led to additional arrangements for calculating the limit value exceedances in the Dutch National Air Quality Cooperation Programme (*Nationaal Samenwerkingsprogramma Luchtkwaliteit* (NSL)).

Policy is becoming increasingly complex

The mutually opposing policy instruments are partly the result of the increasing complexity of environmental policies. This complexity often occurs due to the political desire to take account of the diversity of circumstances, and in this way to account for the divergent interests of specific

groups in society. In spatial planning policy, this takes place under the motto ‘local where possible, central where necessary’. Sometimes environmental policy allows trade-offs, as in the Interim Urban and Environmental Procedures Act (*Wet stad en milieu*) or the calculation of PM10 concentrations in the NSL. Sometimes, the government introduces standards for specific policy areas. For example, the number of fertilisation standards for nitrogen was gradually expanded from 3 to 650 in order to maximise the use of fertilisers without exceeding the nitrate target.

Complex policy can lead to ambiguities in the allocation of responsibilities, tasks and competencies. It also makes it more difficult to monitor compliance with the rules. Increasing complexity is therefore in conflict with the instruments for enforcement and compliance. In recent years, enforcement budgets have been reduced. In this context, the increasing complexity of regulations undermines the effectiveness of policy.

Knowledge of the causes leads to options for solutions

The general picture of the possible causes of disappointing policy results enables identification of options with which the government can reduce these disappointments. These options, bulleted below, are elaborated in Section IV, as part of the analysis of a number of concrete policy shortfalls.

In general terms, there are five ways of applying environmental policies to improve the linkage between the allocated means and the desired ends (see Figure 1):

1. Relax the quality demands on nature, the environment and land use (adapt policy targets) in order to reduce societal resistance to measures.
2. Promote innovations in technology and spatial structure that are less demanding on the environment, land and nature.
3. Reduce or terminate activities that adversely affect the living environment, in order to achieve the targets (volume-based policy). Charging all external costs of such activities to the parties responsible, could limit these undesired activities or make innovation financially more attractive.
4. Develop consistent and adequate regulations that are simple to implement and comply with, to reduce the above-named complexity and adverse effects from other policy areas.
5. Adapt spatial planning for different types of designated land uses by increasing their spatial separation, or by in fact combining, concentrating or interweaving them, always in keeping with nature and environmental policy.

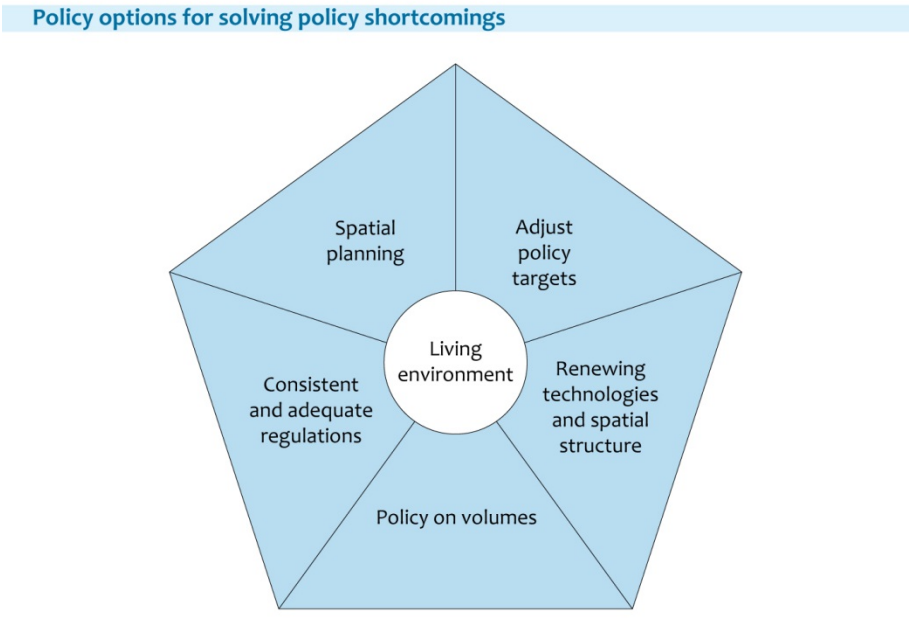

Figure 1. Broadly speaking, there are five policy options for connecting means and objectives

IV Policies on environment, nature and spatial planning, in actual practice

This assessment report presents an evaluation of national government policies on the environment, nature and spatial planning, with respect to the sectors individually as well as in conjunction. First, the developments in policies on greenhouse gas emissions, energy conservation and renewable energy are addressed (Sections IV.1 and IV.2). Subsequently, the effects of the policies on accessibility, liveability and vitality of cities are discussed (Sections IV.3 and IV.4). Followed by an assessment of the policies on nature and rural areas (Sections IV.5 and IV.6). Finally, in Section IV.7, the policy impact on the Netherlands and other countries is described.

There are positive developments within each policy domain – and between the various domains – but there are also targets for which policy has drifted off course. This report presents an examination of the causes of a number of persistent policy shortfalls by using the policy framework from Section III. This framework is also used for finding options to eliminate or alleviate these policy shortfalls.

IV.1 Climate policy must be intensified to achieve the targets

The greenhouse gas emission targets for 2020 will not be achieved without additional policy

Current and proposed climate policy, as set down in the Dutch policy programme Clean and Efficient will not be sufficient to achieve the national emission target for 2020 (Cause 2 from Section III). Implementation of current climate policy will lead to policy shortfall in 2020 of 19 to 35 Mt in CO_2 equivalents. Implementation of the proposed policy, which has not yet been decided by the cabinet, will reduce that shortfall to between 12 and 29 Mt.

The EU has imposed a 2020 emission target on the Netherlands, with a maximum of 99 Mt CO_2 eq from non-ETS sectors (sectors that do not participate in the European Union Emission Trading Scheme (EU ETS) such as those related to households, traffic and transport, agriculture, and services). Under current policy, this target might be attainable, but with a probability of less than 50%. However, including proposed policy would cause emissions from non-ETS sectors to fall to between 87 and 104 Mt by 2020.

The new Dutch Cabinet could either take additional measures or relax targets

The new Dutch Cabinet has various options for aligning targets and measures.

- It may uphold the national target of a 30% emission reduction between 1990 and 2020. In that case, the cabinet will have to actually implement the proposed measures and expand the previous cabinet's Clean and Efficient policy programme with a number of additional measures.
- The cabinet could also make the national reduction target equivalent to the (currently less ambitious) European target of 20% emission reduction. In that case, it appears that only the proposed measures from the policy programme would have to be implemented. This would make climate policy less costly for the time being, but it would also make it more difficult for the Netherlands to achieve the required emission reduction of 80 to 90% by 2050. Moreover, the EU continues to strive for a more stringent reduction target for 2020.
- Dutch climate policy could be limited to the non-ETS sectors. As policy focusing on additional emission reductions for Dutch ETS companies would only create opportunity for additional emissions from foreign ETS companies and does not lead to global emission reduction.

Climate and energy policies could be implemented at lower cost

Because of the financial crisis, the new Dutch Cabinet will be faced with severe budget deficits. To limit government spending, the working group on Energy and Climate (part of the Broad Reconsideration reports by the Dutch Ministry of Finance '*Brede Heroverwegingen*') has looked at options for budget cuts in policies on climate and energy. It has described the situation up to and beyond 2015.

- The working group expects that, by no later than 2015, it will be possible to save 370 million euros annually, without effecting reductions in greenhouse gases. Although the proposed measures generally do involve a shifting of financial burdens from the government to the general public and/or companies, as most of the proposals involve the abolishment of energy subsidies, and the set up of a number of regulations for mandatory energy conservation or for renewable energy production.
- According to the working group, the rising costs related to the policy on renewable energy could also be held in check after 2015. With a hybrid system of statutory obligations for energy producers, combined with subsidies for costly, innovative technologies, the working group believes that 1 billion euros could be saved, annually. Moreover, the working group

estimated that, by 2020, 500 million euros could be saved through cooperation with other EU Member States in the production of renewable energy. However, to realise these savings, complex regulations are required with high implementation costs and a significant risk of undesirable side effects.

Use of foreign emission credits does not contribute to policies on energy and air quality

To comply with its Kyoto obligation, the Dutch Government is purchasing approximately 40 to 50 Mt in foreign emission credits. The Kyoto obligation involves an average emission reduction of 6%, between 2008 and 2012, relative to 1990 emission levels. Based on the most recent insights, even more emission credits may be required if the economy were to recover quickly. The purchase of foreign emission credits is a low-cost measure to reduce global emissions, but does not contribute to achieving the targets for renewable energy, energy conservation, air quality, and energy independence for the Netherlands. Within the Netherlands, emission reduction measures are often more expensive, but generally have a positive effect on results from energy and air quality policy.

Rate of energy conservation not fast enough

In recent years, the annual energy conservation rate has fluctuated around 1.1%. The government wants to increase this to an average annual 2%, beginning in 2011. Under current policy, which consists primarily of voluntary agreements with companies and housing associations, the energy saved amounts to between 1 and 1.5% annually (see Figure 2). With current policy instruments, therefore, the 2% target will not be achieved. This is especially true, because of the less than effective outcome of the Meer met Minder (More with Less) agreement, which focuses on energy conservation in office buildings and residential housing (Cause 3 in Section III). According to current estimates, this agreement will lead to an energy conservation of between 12 and 44 PJ (petajoule = 1015 joules), by 2020, instead of the intended 100 PJ. This shortfall is due primarily to practical impediments (nuisance caused by construction and organisational and financial red tape). In addition, there are institutional impediments. For example, the investments and returns involve different parties (split incentive) in the sectors of residential and commercial rental properties.

Energy conservation in buildings requires stronger policy instruments

To better utilise the energy conservation potential for existing housing, the government could choose different – more compulsory – policy instruments. An important policy option is to compel property owners to improve the energy performance of a building at the time of sale or purchase. Another option is to impose a mandatory energy conservation target on energy suppliers. However, these suppliers could not take energy conservation measures in residential housing without permission of the owner. As a result, real estate owners must be enticed to install energy conserving installations. A combination of both options would also be a possibility. In addition, the Meer met Minder agreements could be made more effective if converted into binding agreements with individual housing associations.

Other instruments could also support the required investments, such as linking the rates for property tax, home ownership value and transfer tax to the energy performance of a residential property, or establishing a fund that pre-finances required investments. However, mandatory energy conservation could have negative financial consequences for low-income groups living in housing with relatively low energy performance levels.

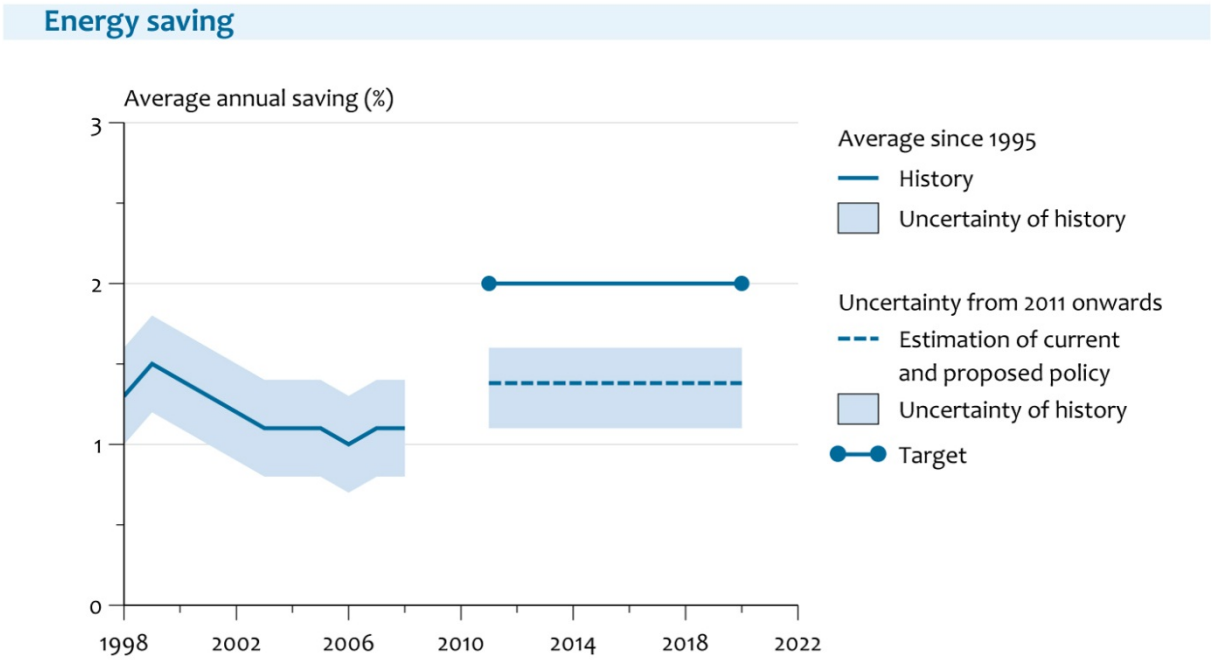

Figure 2. The energy conservation target for the Netherlands is unlikely to be achieved. The proposed policy, however, is expected to lead to an increase in energy conservation, compared with that of recent years.

IV.2 Renewable energy production is growing too slowly

The Netherlands wants to achieve a target of 20% for renewable energy in primary energy consumption by 2020. The Dutch incentive scheme for sustainable energy production (SDE) is the most important instrument for achieving this target. However, under current policy, by 2020, a renewable energy share of only 6 to 7% will be achieved. The government is therefore considering revising the SDE scheme. More funding will then become available, but this will be subsidised by electricity consumption instead of through government funding. With these revisions, which are included in the proposed policy, the contribution of renewable energy could increase to between 13 and 16%, by 2020. Nevertheless, both revisions would still be insufficient to achieve the target of 20% renewable energy (Cause 3 in Section III). In particular, incentives that promote sustainable energy in traffic, 'green' gas and thermal storage are still inadequate, as in both current and proposed policy, the emphasis is on the production of renewable electricity.

Subsidies for renewable energy are being only partially utilised

The interim targets for 2010 (9% renewable electricity and 4% biofuels) will probably be achieved. But this does not apply to the interim targets for 2011 for renewable energy (2,285 MW) and land-based wind energy (2,000 MW); these targets will certainly not be achieved. This is because the SDE scheme has been less effective than expected. For example, funding was approved up to and including 2009 for investments in only 337 MW of renewable energy production, even though the budget was sufficient for 1,660 MW. According to the Ministry of Economic Affairs, this underutilisation of the budget was primarily caused by delays in permits for wind turbines on land. Therefore, in this area, the government appears to have deployed conflicting policy instruments (Cause 4 in Section III). Moreover, potential investors are dubious about the continuity of the schemes, as these frequently have been altered, over the past years. In this area, the chosen policy instruments, therefore, have been insufficient to induce the intended measures (Cause 3 in Section III).

More compulsory instrument considered for promoting renewable energy

The Dutch Cabinet Balkenende IV -- of the current coalition government (caretaker government) -- announced that it would make SDE funding more independent from national government financing

by funding the SDE budget through a surcharge on energy rates. The working group on Energy and Climate (of the *Brede Heroverwegingen*) made a positive evaluation of this proposal. The implementation of other proposals from this working group could increase the production of renewable energy even further. Examples of these proposals include an obligation for power plants to replace part of the fossil fuel with sustainable biomass, and an obligation for energy companies to supply a minimum amount of renewable energy, which increases over time. To limit the costs of these measures, such obligations could be made part of an international trading system. However, the working group believes it would take at least 10 years to introduce such a system.

Reducing CO_2 emissions requires more and more space

The long-term ambitions for CO_2 reduction demand a sharp increase in the production of renewable energy from wind turbines, biomass, solar panels and geothermal heat. The cabinet may grant permission to generate more nuclear energy or to use underground CO_2 sequestration on a large scale. This means that more land will be needed for the installations, land taken away from other functions (Cause 1 in Section III). In addition, there is the indirect land use caused by the many effects these installations have on their immediate surroundings. For example, for safety reasons, wind turbines cannot be built in the immediate vicinity of residential housing, and underground CO_2 sequestration could affect housing prices in the immediate vicinity of its intended locations. In addition, the utilisation of residual heat places new demands on the spatial allocation of heat producing and heat using activities. By means of spatial planning, new CO_2-limiting activities must somehow be incorporated into the already full public space.

Existing procedures are gradually being adapted

Existing procedures for zoning plans and permits often create obstacles for new activities, for example, because there are no applicable criteria to review the applications. Until recently, this applied to bio-digesters and underground thermal storage installations, but these procedures have now been adapted. Consequently, conflicting policy instruments in these areas have been aligned. When the general public and companies make extensive use of participatory procedures, climate projects may incur serious delays that could threaten policy targets. The careful consideration of conflicting interests, thus, unintentionally slows the CO_2 reduction rate. In this area, the chosen instruments of environmental policy and spatial policy still appear to be in conflict with each other (Cause 4 in Section III). The Crisis and Recovery Act provides additional options to the government for accelerating procedures.

Technical improvements are being implemented, but cannot eliminate objections

New emission-limiting technologies are continually being adapted, in part to improve effectiveness and reduce costs. For example, noise from wind turbines has been reduced and developers of nuclear energy and CO_2 sequestration methods are looking for ways to improve the safety of their installations. However, the effects appear only limited; improvements could eliminated some objections made by people who live near wind turbines and nuclear power plants, but they do little to decrease the amount of land required by these installations and have no effect on many of the other objections.

Spatial planning strategy may help to balance conflicting targets

Tensions between policies on climate and spatial planning arise not only from conflicting policy instruments, but also from conflicting targets, such as those for landscape conservation, safety and renewable energy production (Cause 1 of Section III). The government agencies and public bodies concerned could alleviate these tensions, certainly over the long term, by developing a spatial planning strategy concerning the future spatial needs for CO_2-limiting activities and sustainable energy consumption. Such a strategy could be formulated in an 'energy clause' in spatial planning strategy and spatial structure documents. This would provide starting points for streamlining investment plans, improve the communication with interested parties, and shorten participatory procedures for granting permits. However, the strategy development would need to be coordinated (at various levels) with the choice of targets for the magnitude of various types of CO_2-limiting activities. For example, it makes a great deal of difference whether many or only a few wind turbines are required on land.

Biofuels: counteracting indirect land conversion related to biofuel production

The government encourages the production of biofuels as an alternative to fossil fuels in order to reduce emissions of CO_2. New calculations indicate that the biofuels that are currently sold at petrol stations probably cause a net increase in global CO_2 emissions. The net global effect relative to fossil fuels is uncertain and, in 2008, ranged from 40% less CO_2 to 180% more CO_2. Most of the CO_2 is emitted during the conversion of nature areas to farmland, and this also causes most of the

uncertainty in estimating the effects. This is because such land conversion could be both a direct and indirect effect of the production of raw materials for biofuels, such as palm oil and sugar cane.

Although the latest sustainability criteria for biofuels from the EU do address direct land conversion, they do not include any indirect effects. Consequently, it is advisable to look for new measures and corresponding instruments to also prevent indirect land conversion related to biofuel production.

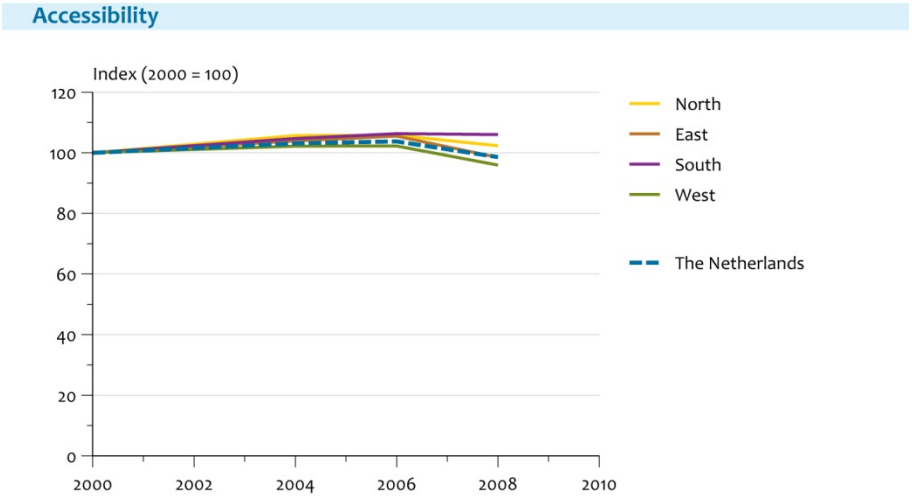

Figure 3. Since 2000, accessibility of employment locations by car during rush hours has decreased by 1.5%

IV.3 Without road pricing, traffic jams and environmental pressures will remain problematic

Adverse effects of the growth in mobility tempered by policy

In recent decades, the distances between residential housing, employment and amenities have increased due to the autonomous processes of dispersal, dilution and separation of living and working. This has led to more motorised mobility. For example, half of the commuter traffic between regions is the result of the spatial separation of homes and jobs. In recent years, government policy has made it possible to have more mobility without proportionally increasing the adverse effects on accessibility and the environment. This is especially due to investments in more and quieter infrastructure (including public transport), promoting the use of cleaner and quieter vehicles and concentrating and intensifying the urbanisation process. As a result, emissions of particulate matter and nitrogen oxides have been sharply reduced.

Policy targets for accessibility and CO_2 emissions from road traffic are not within reach

It has not been possible to achieve the policy targets for accessibility and for reducing the burden on the living environment. For example, time lost in traffic jams increased by 58%, between 2000 and 2008. Due to lower average traffic speeds, the number of employment locations accessible by car during rush hour decreased by 1.5%, although employment opportunities in the vicinity of motorway slip roads increased. Finally, CO_2 emissions from traffic, in 2008, were 10% higher than in 2000, and the level of noise nuisance from traffic remained the same.

To date, additional infrastructure and an improved coordination between housing, employment and infrastructure have generated too few benefits. For example, 6% more motorway capacity has been built, major investments have been made in domestic and international rail connections and transport on water, the supply of public transport has been increased by 10%, and housing, employment and infrastructure have been coordinated more effectively. However, despite all these efforts, this has only achieved a reduction in the loss of accessibility, in recent years, instead of resulting in an overall improvement in accessibility. Figure 3 illustrates this situation.

The most important cause of this mediocre result is that policy has only been partly implemented. A substantial capacity expansion of roads and public transport, which has already been decided, is

still in preparation or development, and is not in use, yet. The decision-making and implementation process around other options for improving accessibility have proved difficult; this is indicated, for example, by the problems around the improvement of the regional road network, a further separation of short- and long-distance traffic, and especially the implementation of the plan Alternative Payment for Mobility (*Anders betalen voor Mobiliteit*) from 2007.

Road pricing, construction and utilisation: especially successful in combination

There are three policy options – used separately or in combination – for improving accessibility and/or reducing the environmental burden of traffic in the Netherlands:

- the implementation of road pricing (volume-based policy);
- the construction of more and better infrastructure (renewal policy);
- the improved coordination of housing, employment and infrastructure (spatial planning policy).

Below we show that results – depending on the combination – vary in terms of accessibility and environmental burden.

Accessibility, the environment, nature and road safety benefit from road pricing

A road pricing scheme reduces traffic congestion, significantly, but the use of this specific instrument has become uncertain due to societal resistance. In addition, the implementation of such a technically complex system is risky, and achieving the intended behavioural change is still uncertain. With this option, traffic congestion could be reduced by a fourth or even halved, depending on the exact details, even if the uncertainty in the actual behavioural responses of drivers and companies is taken into account. The benefits related to travel-time gains could be as high as 1.25 billion euros, annually.

Various types of road pricing are possible. The effects depend on the height of the amounts charged, and the degree to which the amounts vary according to location, time and external effects. However, regardless of the type of road pricing scheme that is chosen, actual road capacity will not increase.

- A flat-rate road-pricing scheme, which does not vary according to location and time, would only leads to more deliberate driving choices for consumers. As a result, car use would decline, especially for social, recreational destinations outside rush hours. Car use during rush hours would also decline, but by less than would be the case under specific rush-hour pricing. This would lead to less CO_2 emissions, less noise nuisance, fewer traffic victims and also to fewer traffic jams. As a result, by 2020, CO_2 emissions from traffic could be reduced by about 5% more than would be the case under current policy. In contrast to this is the loss of prosperity due to the reduced mobility, caused by road-pricing. Although, if road pricing actually would cover the external costs of mobility, there could be a positive net prosperity effect.
- A rush-hour charge that would differ according to time and place would distribute the road network capacity more efficiently and could effectively reduce traffic jams. The income generated by such a charge could be spent elsewhere and, in that sense, would not lead to loss of prosperity. In addition, traffic that is economically more important would thus have more road space, which also increases prosperity.

Accessibility and the environment benefit from road pricing.

Without road pricing, major additional investments in infrastructure will be required

Investments in more and better infrastructure also improve accessibility. The MIRT foresees a substantial expansion of road capacity in the years up to 2020. However, without road pricing, such expansion would not be sufficient to realise the intended improvement in accessibility and reduction in congestion. Although additional improvements in travel times and accessibility could be realised with extra investments, without road pricing these investments would run into the tens of billions of euros to reach a comparable reduction in congestion. Moreover, the cost to the living environment would be significant; CO_2 emissions from traffic would increase even further (among other things because new roads generate even more mobility), and so would fragmentation and disturbance of nature and the landscape. Especially near Amsterdam and Rotterdam, traffic jams are a persistent problem. Particularly in the vicinity of these cities, other strategies are required to solve this problem. However, more and better public transport would have only a limited effect on traffic congestion. Expanding the supply of public transport will be especially needed to cope with the growing numbers of passengers that could result from implementing a road pricing scheme and/or continuing urban clustering and intensification.

Urbanisation strategies of clustering and densification remain useful

The urbanisation strategies of clustering and densification ensure that more homes and jobs are located in or near existing cities and near public transport nodes and motorway slip roads. This approach reduces average commuter distances, increases road use efficiency and public transport use, and encourages lower traffic speeds. Scenario calculations for 2020 and 2040 have shown that clustering and densification could generate a significant reduction in travel time. Such positive effect depends especially on the rate and the degree of realisation. Reducing commuter traffic appears to be especially feasible if more housing would be developed in regions with the largest growth in employment. Doing the exact opposite – creating more employment in areas with more housing development – would be more difficult.

Clustering and intensification are central elements in governments' spatial planning policies. Without such policy, mobility would increase further and accessibility would be reduced – because of the combination of increased stress on the road network and longer travel distances.

Combining options could be considered

The magnitude of the effects from these three options on reducing congestion and travel time, at the national scale, is sufficiently clear. It is certain that, without a road-pricing scheme, the foreseen expansion of road capacity would be insufficient to reduce congestion to a desired level. In that case, a road pricing scheme would be an additional means for encouraging more deliberate mobility behaviour and for dealing with the bottlenecks in the road system in a smarter fashion. Spatial planning could prevent a sharp increase in car use caused by continual spatial dispersal and the separation of housing and employment. With the foreseen expansion in public transport, it will be possible to deal with the increased numbers of passengers that could be the result of a road pricing scheme and more urban clustering and intensification.

The best combination of policies can only be determined on a regional basis

The consideration and prioritisation of these options requires a decision process, at regional level. During this process, second-order effects and integration costs should also be addressed. For example, little is known about the consequences of road pricing and urban clustering and intensification for income distribution – also across regions. At the same time, little is known about the dynamics of economic activity and the housing market. These questions will be addressed in the spatial planning outlook (*Ruimtelijke Verkenningen*, a report on national spatial developments), which will be published by the Netherlands Environmental Assessment Agency (PBL) around the New Year. However, it is clear that the best combination of policies will vary between regions, because there are large regional differences in integration costs and the dynamics of the housing and labour markets. For example, when comparing costs and benefits, the costs of new infrastructure in parts of the northern Randstad with serious traffic congestion problems are relatively higher than elsewhere in the Netherlands.

The position of the national government is crucial for successful regional development and infrastructure

The complexity of the decision-making process and the implementation of MIRT projects require corresponding governmental decisiveness at national and regional scales. Experiences with the project Randstad Urgent and the recently initiated MIRT, have shown that benefits can be achieved with a regional programme approach which has a clear division of tasks and competencies between the different tiers of government (consistent and adequate regulations -- see Figure 1). However, cooperation and coordination are not self-evident; therefore, the efforts of all parties involved in MIRT are required.

The most important points that require national government attention are listed below.

- The national government is sufficiently present and approachable regarding its framework-setting tasks. It provides clarity about the division of responsibilities within the national government and is actively involved in the formation of regional agendas.
- The national frameworks offer sufficient space for a truly integrated regional approach, especially during the exploration phase. The MIRT framework allows the non-monetary costs to be taken into account more effectively. Moreover, this framework offers room for region-specific differences.
- The limited financial resources will be distributed between the many topics in the programme, in proportion to the expected balance of societal costs and benefits, and not according to origin. The budgets will not be compartmentalised. Integral regional agendas can contribute to this process.

IV.4 Because of the economic recession, liveability and vitality of cities is under pressure

Spatial separation of locations according to function and socio-economic status can put the liveability of neighbourhoods, districts or entire cities under pressure. During the second half of the 20th century, such spatial separation on a regional scale resulted in relatively poor, multicultural and multifunctional central urban areas, which were surrounded by relatively prosperous, indigenously populated and mono-functional areas. This separation can also reduce the support base for urban services and consequently adversely affect the regional, national or even international importance of cities.

Urban renewal and clustering and densification of housing has been successful

Partly due to the policy efforts in urban renewal and more housing development in and near cities, the cities have once again become more attractive locations for living, and the liveability in problem neighbourhoods has improved (see Figure 4). However, the results differ per neighbourhood, district or city; some cities are more successful than others (compare Amsterdam and Rotterdam) and liveability problems are not limited to the older cities. New, 20th century cities, such as Lelystad and Zoetermeer, and even rural villages (Culemborg), also have liveability problems. However, a positive aspect is that, between 1998 and 2009, the number of people living in areas with serious liveability problems declined by nearly 60%. Moreover, the increased development of new housing within cities has slowed down the decreasing support base for services that had resulted from the declining household size. For example, 37% of the expansion of the housing stock between 2002 and 2008 took place within cities (see Figure 5). In addition, between 2000 and 2008, the number of owner-occupied homes and the value of real estate in the urban restructuring areas increased more rapidly than in other areas. Finally, the proportion of high

and middle income households in cities increased by 1.5% during that period, while in the surrounding municipalities this proportion appeared to decline.

Liveability remains a vulnerable factor

Despite these positive developments, maintaining and strengthening the liveability and vitality of cities is still a major challenge (see Figure 4). For example, 5% of the Dutch population still lives in a neighbourhood with liveability problems. Moreover, it is quite possible that a neighbourhood approach to these problems partly shifts the problems to other neighbourhoods. In addition, the intended renewal of outdated employment locations is slowly getting started, but the development is still too recent to evaluate any policy effects. Near busy main roads in cities, the air quality still requires attention. Finally, in some new districts there is less greenery than stipulated in the target figures in the National Spatial Strategy, especially in the Randstad. During the next few years, these issues are also expected to occur in areas with shrinking populations, least economic development and a housing stock from the 1970s and 1980s.

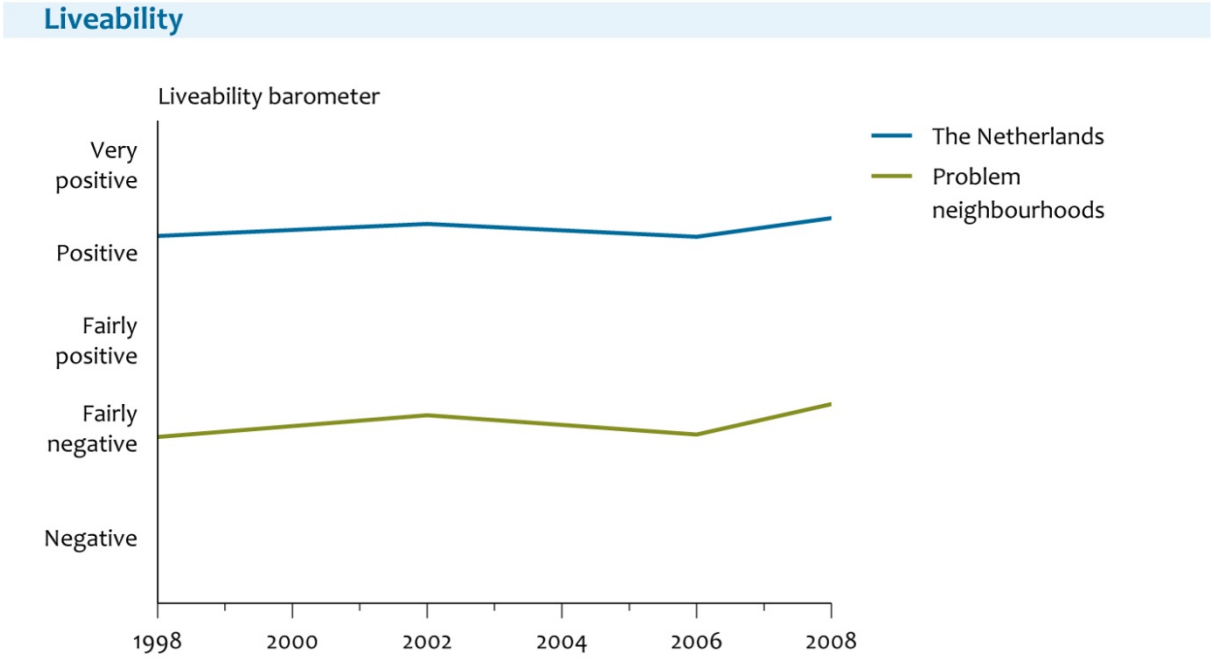

Figure 4. Liveability in problem neighbourhoods has improved

Integral design and balanced urbanisation are required

The current approach to the above problems offers an adequate perspective, but there are three possibilities for strengthening the policy:

- the design and spatial planning process of urbanisation;
- balancing urbanisation at higher levels of scale;
- the design and structure of public space in cities and on the urban fringe.

Integral design and balancing the urbanisation process are desirable to avoid conflicts between the various targets for vital and liveable cities and for the quality of the urban living environment, now and in the future, without governments having made a deliberate choice in this regard. Examples include the competition between housing, employment and landscaping at urban building locations and on urban fringes, and the conflict between construction and air quality targets. In this regard, it is questionable whether good results can be expected everywhere, from the fact that the so-called SER ladder (a programme by the Social and Economic Council of the Netherlands (SER)) promotes more restructuring of old business estates and less construction of new ones. After all, successful restructuring of business estates within built-up areas could mean that the government fails to achieve its target of realising at least a 40% growth in housing stock within existing cities (Cause 1 in Section III). From this perspective, it will be a challenge to combine housing and employment as part of future urban renewal projects.

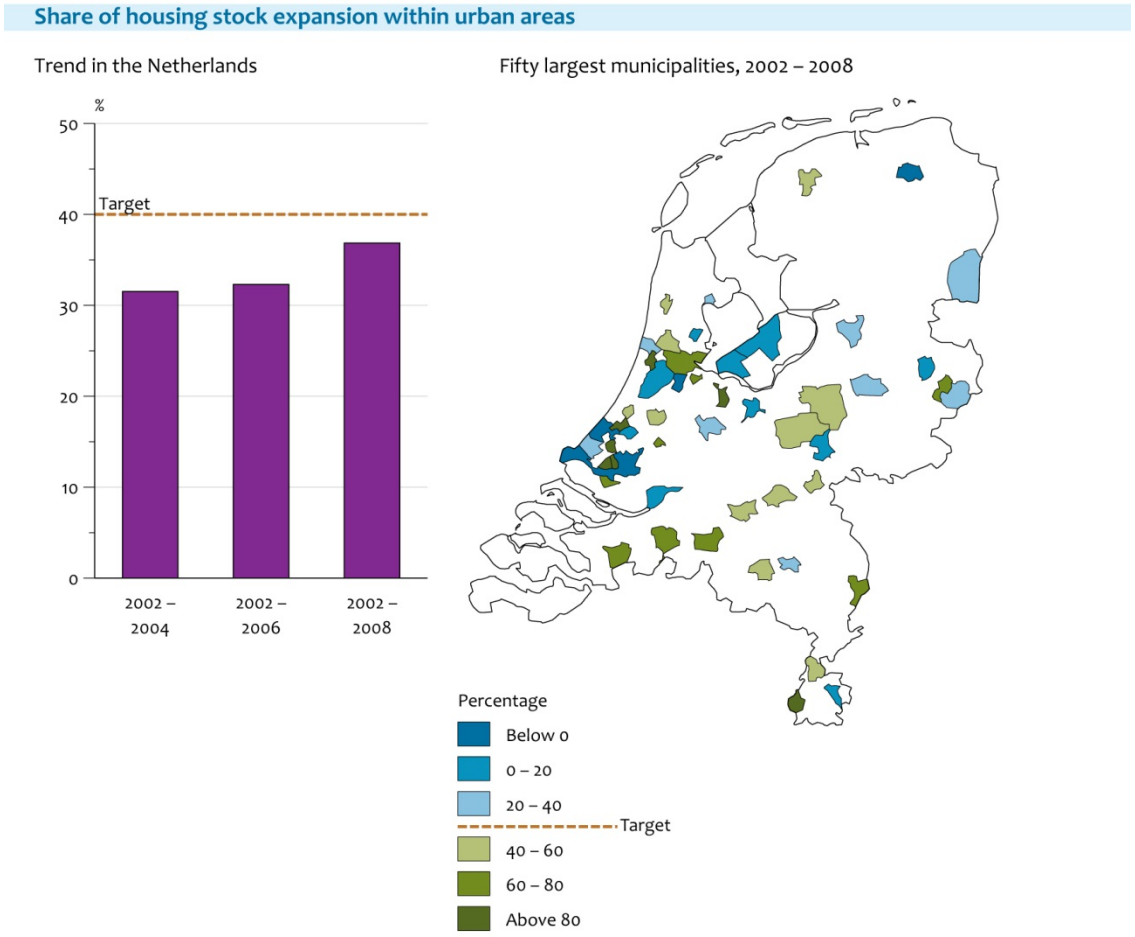

Figure 5. Densification of housing is increasingly successful, especially in the central and southern regions of the Netherlands and the Northern Wing of the Randstad.

Strengthen spatial design and the spatial planning process, especially on a regional scale

Spatial design and planning at higher levels can strengthen the coherence and synergy between locations and projects. An initial step to be considered is enhancing the steering effect of the zoning plan, as intended in the new Spatial Planning Act. The first evaluation of the Spatial Planning Act has shown that the focus has already shifted from the project resolution to the zoning plan, but that these plans tend to respond to spatial developments rather than anticipate them. In addition, the planning process at the supra-municipal, regional level is also important. The recent study on the current state of public space (*Staat van de Ruimte*) shows that new reference points for spatial planners and public administrators are being created by viewing the city has a diversity of strong locations within an urban region, and not as a single centre with a periphery.

More integrated assessments of regional development plans at higher scales

A cost-benefit analysis of urban construction sites, in combination with spatial design and planning at a regional level, can be a good tool for determining the future mix of housing, employment, and amenities (including green areas) that is best suited to regional needs and possibilities. This concerns the assessment of project alternatives at supra-municipal level. By mapping out all aspects of a project, public administrators can make a thorough assessment. For example, one option would be to take an employment location that is due for restructuring and make it suitable for a different function (or combination of functions) and to relocate the current function to elsewhere. However, this is not an option in the new policy on business estates.

In addition, cost-benefit analyses can be applied more at the level of regional planning and provincial spatial structure visions (e.g. the Dutch integrated policy study on urbanisation (*Integraal Beleidsonderzoek Verstedelijking*) from 2005). However, there is a bottleneck in the cost-benefit analyses at project level, which is expected to become even more of a problem when applied on a regional scale, namely the monetary valuation of nature and landscape.

More attention is required for the design and structure of public space

Improving the quality of public space (including green areas) in cities can improve urban liveability and the health of the urban residents. This is most opportune during new construction and restructuring. For instance, during new construction, quiet areas could be created by using buildings as protective barriers. Spatial mobility policy – including designation of low-traffic zones, environmental zoning and parking policy – also improves the quality of the living environment. For example, it creates peace and quiet, reduces exhaust fumes and offers more possibilities for outdoor exercise. Neighbourhoods can also be made attractive for bicyclists and pedestrians by high-density building, especially if there are more amenities within walking distance. Finally, high densities enable the intensive and high-quality use of public space, including well-designed public green areas.

Attention must be paid to the risks of the economic recession

The policy aimed at strengthening and renewing the cities will possibly come under additional pressure due to the recession. It is questionable whether policy can accomplish its current and future tasks in this area. In this regard, the possibilities for financing the strengthening and renewal of cities are far more important than the physical possibilities. This is because the plans for urban construction in most of the Netherlands offer sufficient physical space to accomplish the urban construction task, up to 2020.

The financing of new construction in cities, investments in public space, including green areas, and the restructuring of problem neighbourhoods (existing or potential), is not only a matter for the real estate market; governments also bear an important share of these costs. Private investments in the real estate market (including housing associations) as well as public means are under pressure from the recession and are expected to decline. In addition, the national government wants to transfer more of its responsibility in this area to municipalities and housing associations. Every year, the national government invests approximately 500 million euros in urban renewal and urban housing construction. Consequently, it is responsible for approximately 90% of all government investment in this area.

Schouwburgplein in Rotterdam. More attention for public space increases city appeal

This transfer of responsibilities began before the recession. During the re-evaluations of the national budget, far-reaching options were studied to reduce the national government investments in urban renewal and housing. The success of these options depends largely on the possibilities for

entering into agreements with housing associations and reforming the housing market. The development of new operating models can make it attractive for private parties to once again invest in urban renewal.
The increasing uncertainty about public and private investments in urban renewal and housing entails certain risks that the government should include in its policy considerations. These risks depend on the dynamics of the housing and labour markets and on the spatial restrictions.

Liveability is under pressure, especially in regions with weak housing and labour markets
One major disadvantage of reduced funding for urban renewal and for the design and structure of public space (including green areas) could be that existing or future liveability problems and local environmental problems in some districts could become unsolvable. After all, there would be insufficient investment in the quality of public space and the housing stock. As a result, these districts could become less attractive for residents, and real estate values here could decline even more than elsewhere. This risk is expected to be greater in regions where housing and employment markets are less dynamic, such as near Rotterdam and Almere and in areas with declining populations.

Increasing pressure on valuable cultural landscapes in regions with few non-urban development plans
Less money for urban construction could mean increasing pressure for large-scale construction in protected cultural landscapes (national landscapes). In the current situation, building on farmland is cheaper than building within urban areas. As a result, through equalisation, there is more financing available for investments in public space and for urban renewal. Until now, the loss in prosperity that results from building on open land has played virtually no role in the cost-benefit analysis. The explanation for this would be that, to date, there is no good method available for putting a value on the loss in open space, in such an analysis. However, this can lead to valuable cultural landscapes being sacrificed for housing without a transparent consideration of the social objectives (Cause 1). This risk is greatest in areas where the municipal development plans up to 2020 offer little room for construction outside the city, and where many inflexible spatial restrictions apply to nature, the environment and safety, such as in the southern part of the province of North Holland and the Utrecht region.

IV.5 Limited space for nature, landscape and cultural history in rural areas

In rural areas, water, nature, recreation, housing and agriculture are closely linked, in spatial terms. In the National Spatial Strategy and the Agenda for a Vibrant and Dynamic Countryside, the national government formulated targets to:

- achieve a vital countryside with economically vital agriculture;
- safeguard the development of important national and international nature and landscape features;
- prevent flooding and water shortages;
- improve the quality of water and soil.

This pursuit comprises a multiplicity of ambitions. However, when realising high quality functions at a single location, tensions develop, because each function places different demands on the surroundings. For example, agriculture, nature, recreation and housing make different demands on the location where they are to be realised.

Because of the various demands that each function places on its surroundings, policy targets might also conflict. These policy targets frequently aim to develop only one of the functions. As a result, an economically vital form of agriculture that is competitive on the world market, for instance, conflicts with the safeguarding of vulnerable nature values and realising water storage facilities to prevent flooding. These conflicting targets (Cause 1 in Section III) then transpose themselves into inadequate measures (Cause 2). These inadequate measures result from the compromises that are made to allow the functions to exist together, despite their inherent conflicts.

Policy can deal with these conflicts along the axes of ‘separation’ and ‘mixing’. The axis of separation reflects the vision that conflicting functions exclude each other, and therefore cannot take place at the same location. The government then gives shape to the conservation of collective values, such as landscape quality and nature, by separating these aspects from economic activities. The axis of mixing reflects the vision that space can be used more efficiently by combining functions, and that ancillary functions are actually desirable. Recreation is an example of mixing functions, because it is possible in virtually all nature reserves.

A third axis is that of making production functions cleaner, for example, with environmental measures. This axis reflects the latitude on the 'separation' and 'mixing' axes because it reduces the seriousness of conflicts, in this case meaning fewer adverse effects on the surroundings.

Spatial separation provides order to conflicting functions

Because of the policy that promotes spatial separation of functions in rural areas, natural values are safeguarded – despite the enormous growth in agricultural productivity. This separation of functions has essentially dispersed potentially conflicting aims between various locations in rural areas, thus alleviating these conflicts. By enlarging and protecting nature reserves and protecting a portion of the valuable cultural-historical landscapes, the government agencies and public bodies concerned have been able to conserve valuable parts of rural areas. These areas are better protected against undesired construction, and the spatial imposition of housing, employment and amenities is limited there.

The separation between nature and other functions has also been implemented in European policy through the Natura 2000 sites. These sites form the core of European nature values that are to be protected. The Habitats Directive, which established the sites, prescribes the location of Natura 2000 sites based only on ecological factors.

To create more coherence, the national government and the provinces have developed new nature values with the National Ecological Network, by establishing more nature and recreation areas. For this purpose, farmland was acquired and redesignated. As an illustration, the network of protected nature reserves was expanded by 80,500 hectares between 1990 and 2009. In addition, the coherence was improved and the fragmentation of nature areas was tackled by building wildlife crossings (ecoducts) and fauna tunnels. Moreover, in recent years the building in protected nature reserves and national buffer zones has been kept almost entirely within the limits allowed by policy. The recreational function of areas near the large cities has been strengthened by creating paths and recreation areas. The loss in open space has been reduced by more than one third, because more construction is taking place inside than outside cities. Finally, the appreciation of landscapes outside the national landscapes appears to be increasing.

Despite all these positive developments, the policy targets for nature and recreation areas are not expected to be achieved. The targets for the National Ecological Network and *Recreatie om de Stad* (recreation near the city) will not be achieved on schedule, not even with sufficient financing. This is due to the limited possibilities for land acquisition on a voluntary basis, and because the offered prices are not competitive on the agricultural land market. In this respect, the policy instruments, or at least the conditions under which the land acquisition instrument is deployed, are insufficient to achieve the targets (Cause 3 in Section III). Another example is the separation between agriculture, nature and housing in the reconstruction of sandy areas (*Reconstructie Zandgebieden*).

This policy is making slow progress. The number of animals in the extensification areas is declining more slowly than the number that is increasing in the interweaving and agricultural development areas (see Figure 6).

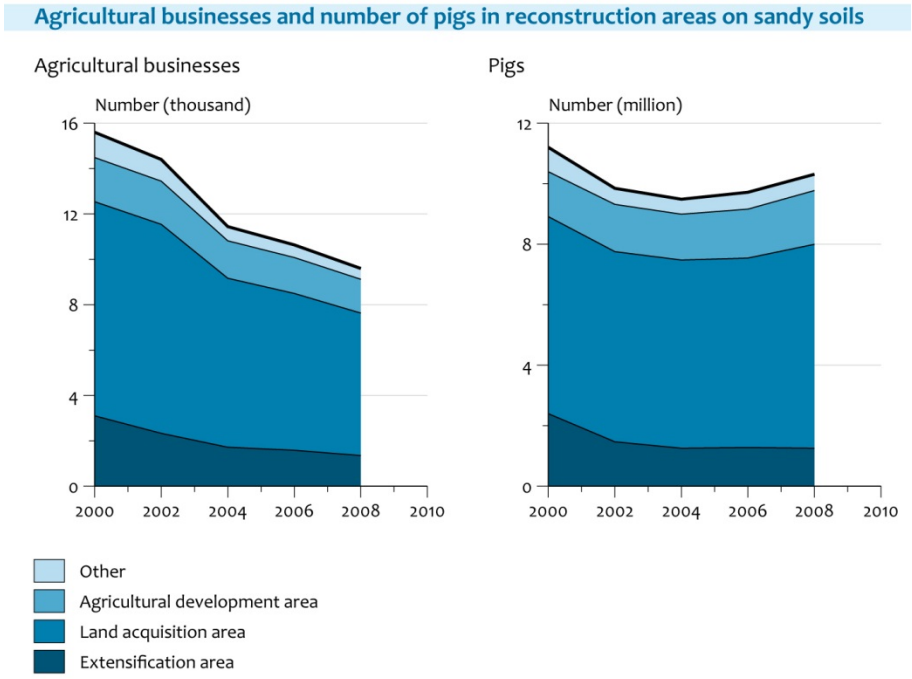

Figure 6. The reconstruction of sandy areas is another instrument for separating nature, urbanisation and intensive agriculture. This happens at a slow pace; the number of pigs in the extensivation areas remains more or less the same, while in other areas it increases.

Mixing functions increases the quality of nature, landscape and recreation

The disadvantage of such spatial separation is that the quality of landscape, nature and recreation in monofunctional landscapes runs the risk of monotony. This monotony is already visible. For example, the biodiversity on intensively farmed parcels is declining continuously; more and more meadow birds and field birds are disappearing. Historical landscape elements are also disappearing and the recreational accessibility of rural areas is under pressure.

Policy tries to avoid these negative consequences of separation of functions by safeguarding the collective importance of good landscape quality. This, among other things, has led to the designation of National Landscapes, where the target is the conservation of core qualities, such as openness and land parcellation patterns. European policy also acknowledges the quality of agricultural areas that contain nature values. These have been placed on the map as 'high nature value farmlands'. In the Netherlands, this primarily concerns meadow bird habitats.

The government is attempting to have owners and users of agricultural parcels supply more than agricultural products alone by offering reimbursements for agricultural nature management and for conserving small landscape elements. But the effect of these measures is currently limited. This is because farmers prefer forms of agricultural management that yield fewer benefits to biodiversity, but are easier to integrate in operational farm management (Cause 3 in Section III). For example, only about 10% of the farm parcels with meadow bird management postpone the spring mowing long enough to give meadow birds an opportunity to properly raise their young. A promising option for making the policy more efficient would be to shift from agricultural nature management to strengthening the National Ecological Network. The funds for agricultural nature management could also be used in a more focused fashion to increase its effectiveness for nature values on farmland.

Perspective: striking a balance between separation and mixing

A promising perspective for structuring rural areas is to strike a good balance between separation and mixing. For realising high-value functions, such as highly productive agriculture or high-value natural habitats, the separation from other functions remains necessary. This spatial separation becomes even more effective if the functions have less impact on each other. Possibilities for this include making production sectors cleaner, for example, by reducing ammonia emissions from agriculture or emissions of nitrogen oxides from traffic, and enlarging nature areas, so that vulnerable habitats come to lie at the centre where they are surrounded by buffer areas.

However, the proposals by the working group on Living Environment and Nature (of the *Brede Heroverwegingen*), limit these possibilities. One of the proposed options for budget cuts is to postpone land acquisition for the National Ecological Network and to concentrate nature more strongly in core areas. Unfortunately, smaller nature areas are more difficult to combine with other functions. In this way, budget cutbacks make it more complicated to strike a spatial balance.

Perspectives for reducing landscape monotony due to monofunctional spatial use lie partly in conserving landscape elements as a 'green-blue' artery (a ribbon of aquatic and terrestrial elements) in the landscape. A problematic aspect here is the financial shortfall for maintaining landscape elements (Cause 3 in Section III); the current national budget finances only one-tenth of the regular management costs. Experience has shown that the market is still not prepared to finance this shortfall, so additional public funding is necessary if the government intends to realise its landscape targets on schedule. Another option is to get people more closely involved in their own landscape. Due to this involvement, they would independently become active in landscape maintenance near their homes. This could expand the current system of voluntary landscape maintenance, a system in which many people are already involved.

As part of the revision of the European Agricultural Policy, there will probably be more attention paid to mixing functions. By paying for 'societal services', money will become available for landscape maintenance and restoration, as well as for the conservation of nature values. This money would motivate farmers to include landscape and biodiversity in their operational management. In addition, there are opportunities for linking nature and landscape development with financially stronger functions, such as recreation and housing. Studies in a model area (Lingezegen) have shown that, for this to work, the planning phase needs to include concrete aspects of nature and landscape.

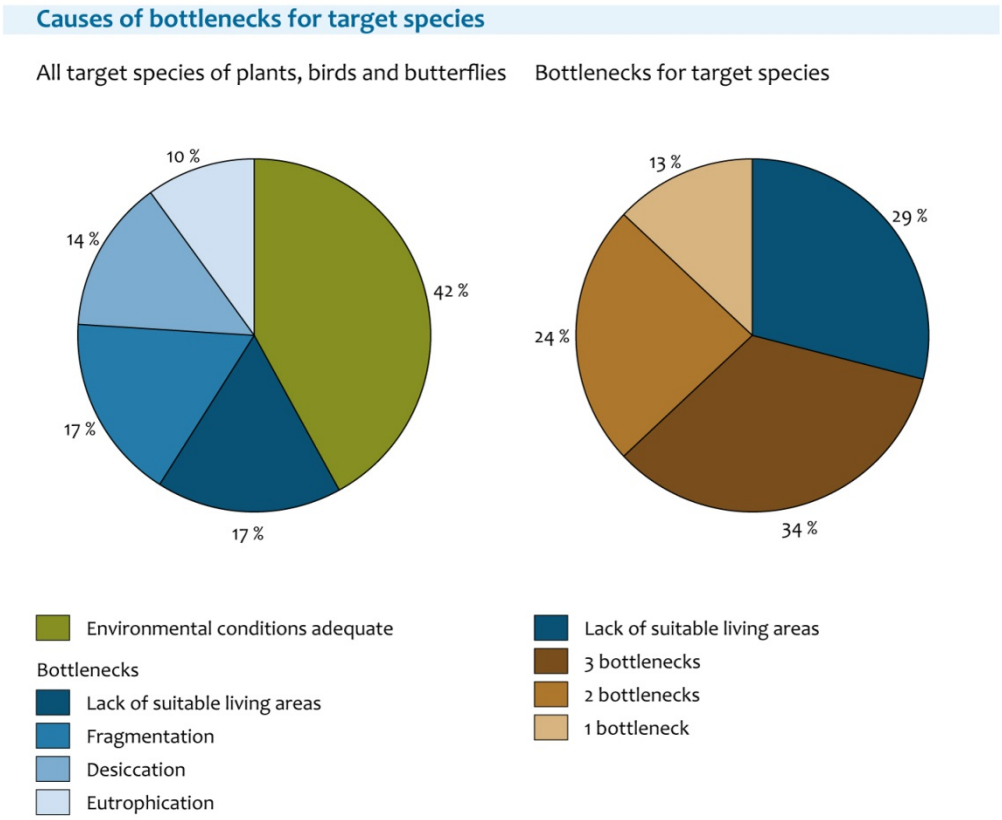

Figure 7. Environmental conditions are sustainable for over one third of the target species (plants and animals) in the Netherlands, while for one tenth of the species such conditions may be created if one of their bottleneck issues (lack of suitable habitat, fragmentation, desiccation or eutrophication) would be solved.

Biodiversity decline in the Netherlands has slowed in 2010, but has not been halted

Biodiversity loss in the Netherlands has slowed, partly due to spatial separation of agriculture, nature and urbanisation. Within the scope of the Convention on Biological Diversity and the European biodiversity agreements, the Netherlands established a target of halting biodiversity decline by 2010. This target has not been achieved. However, the decline in biodiversity has slowed because plants and animals that do not place high demands on their environment are showing a stable recovery trend. In addition, the decline of wetlands, natural grasslands and forests has stopped. This is a result of the expansion of nature areas within the National Ecological Network, nature-oriented forest management and the reduction in environmental pressure.

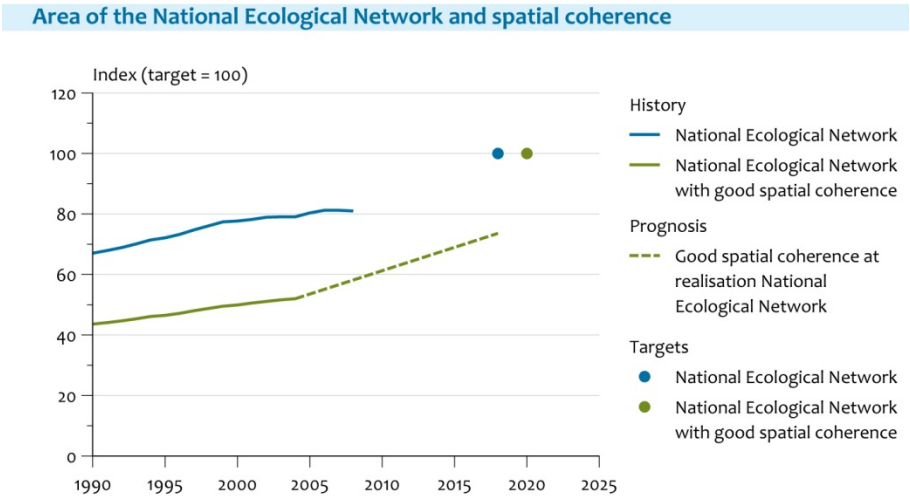

Figure 8. Progress of the National Ecological Network is not on schedule and neither will the desired spatial coherence be achieved by 2020.

However, more demanding plants, animals and ecosystems continue to decline. For example, the vulnerable species on the Red Lists of threatened animals, plants and fungi are doing poorly. These species are becoming less and less prevalent, and some are threatening to disappear from the Netherlands entirely. Improvement measures have not resulted in a demonstrable reversal of the downward trend for these vulnerable species. The number of species of nesting birds, reptiles, amphibians and mammals on the Red List actually increased by 9.5%, between 1990 and 2004. In vulnerable systems such as heaths, heather moors and open dunes, biodiversity is still declining. In the Netherlands, the most important factors causing the continuing loss in biodiversity are the lack of suitable habitat, desiccation, eutrophication, acidification and fragmentation (see Figure 7).

The National Ecological Network and Natura 2000 sites are beginning to take shape

Nature areas are increasing in size, because land acquisition for the National Ecological Network has continued. The growing National Ecological Network is intended to alleviate the shortage of species habitats. At present, species that have a small to medium spatial requirement are benefiting from the Network. However, at the current rate of acquisition, structuring and management, the National Ecological Network will not be fully realised by 2018 (see Figure 8).

The plants, animals and habitats with a European protected status are showing a predominantly negative trend in the Netherlands, or are present only in a small area. The European Union has mandated the Member States, by means of the Birds and Habitats Directives, to restore these species and habitats. Currently, the management plans for Natura 2000 sites are being prepared, although it is still unclear what is and is not permitted in the vicinity of these sites. These uncertainties have led to societal resistance against the plans at some of the sites. At 62 of the 162 sites, management plans are being prepared without problems being reported. In the other cases, the environmental burden caused by nitrogen is by far the most serious bottleneck when preparing management plans. The second-most serious bottlenecks involve water-related matters, such as desiccation, deliberate rise of the water table, and deep extraction of groundwater.

IV.6 Environmental pressure on nature remains high

Making production cleaner or changing the production methods also offers possibilities in the future to allow spatial functions to exist next to each other and to reconcile conflicting targets. Due to cleaner production, conflicting functions can coexist. Moreover, problems can become smaller, such as those discussed above, relating to the Natura 2000 management plans. One example is the reduction in the environmental pressure on nature from agriculture. Beginning in the 1980s, this environmental pressure was reduced by many measures, such as covering manure reservoirs and reducing nutrient surpluses on farmland. Production methods of drinking water extraction have been modified, whereby less shallow groundwater is extracted, which reduces desiccation of nature reserves.

For even cleaner or more adapted production methods, innovations are needed to make these methods usable in practice. These innovations require time and money. Moreover, the purchase of the new technologies is costly for the users. When preparing management plans for Natura 2000 sites, the government requires measures to be feasible and affordable. This means that expensive environmental measures are not taken. As a result, the environmental pressure is only gradually decreasing (see Figure 9).

The negative effects of environmental pressure are most noticeable in nature reserves, such as wet heathland, fens and high peatlands, which are susceptible to nutrient inputs (nitrogen, phosphate) and desiccation. Many plant and animal species that are susceptible to nitrogen are seriously threatened and are on the Red List for the Netherlands. However, locally applied, effect-oriented management measures in susceptible habitats help to reduce problems caused by desiccation and eutrophication.

Nitrogen deposition is declining, but is still too high in the Netherlands

Policy measures have caused emissions of nitrogen and phosphate to declined, since 2005. In addition, emissions of ammonia have been virtually cut in half since 1990, especially due to the mandatory low-emission application of animal manure. After 2005, however, the decline in the nitrogen surplus levelled out, and the average concentrations of nitrogen in the air above nature areas is no longer declining either. Despite the initial positive results, the Netherlands still has the largest nitrogen surplus of all European countries. As a result, the Netherlands is more severely affected by the problem of nitrogen deposition on Natura 2000 sites than the surrounding countries. At present, there is a stalemate with the permit provision and the preparation of a number of management plans for Natura 2000 sites.

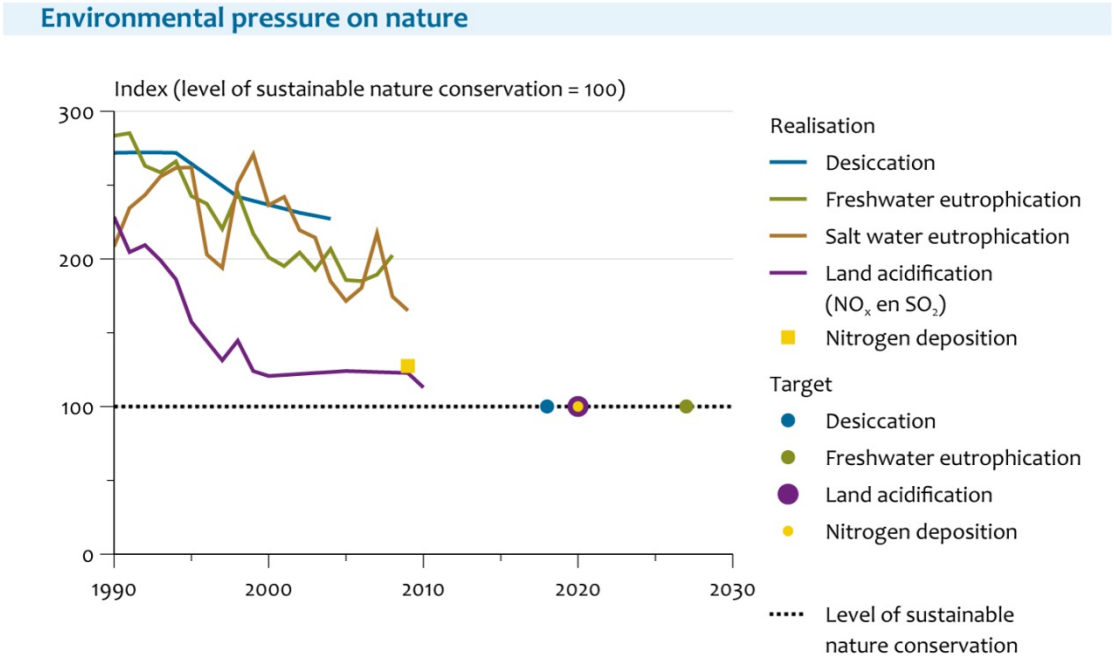

Figure 9. Environmental pressure on nature; the initial decline has not progressed further in recent years

The Dutch PAS nitrogen deposition programme (*Programmatische Aanpak Stikstof (PAS)*) is intended to provide a framework to control regional ammonia emissions. If the PAS focuses on reducing the nitrogen load on nature, it could be a valuable instrument. The disadvantage of the PAS is that it increases the implementation costs of policy and leads to more regulation, consultation and bureaucracy.

Desiccation is a persistent problem

Despite agreements between the national government and the provinces to make substantial progress in their approach of desiccation problems in nature areas, with the aid of the Rural Areas Investment Budget (ILG), the situation is improving only slowly. The size of the desiccated nature area is significant; in 2006, the provinces estimated the size of this area within the National Ecological Network at approximately 222,000 hectares. One solution would be to create new nature areas around the affected areas, in order to limit the adverse effects of agriculture and restore the hydrological system. Land is being steadily acquired to achieve this target, but to effectively counteract the problem, all the land in an affected area must first be acquired. In their progress reports, the provinces have indicated that the actual implementation of the projects will not begin until 2010.

More attention for coherence and structure of the National Ecological Network

By means of larger, contiguous nature areas, the environmental pressure can be dealt with more effectively. The formation of contiguous, larger units of natural habitats could also increase the effectiveness of nature policy. If, during this process, priority were given to the internationally unique nature values in the Netherlands (river delta habitats), then this could also increase the effectiveness of policy.

IV.7 Dutch policy also affects spatial use worldwide

Measures taken in the Netherlands may also have an impact in other countries. For example, if agricultural production in the Netherlands declines, then some of the production could be shifted to other countries. Declining agricultural production, for example, can be the result of removing farmland from production to expand nature areas or of the extensification of agriculture to make it more sustainable, as in organic agriculture. Moreover, the Dutch economy is strongly linked to the world economy. There is a global trade, whereby goods are imported into the Netherlands for own consumption and to be used in the production of exports.

The spatial use abroad resulting from domestic consumption alone – the Dutch ecological footprint – consists of an area approximately three times the size of the Netherlands. Approximately the same area again is required for the production of raw materials to be used in products that are exported from the Netherlands.

The Dutch Cabinet strives to alleviate the burdens related to this use of space and loss of biodiversity abroad. The national government currently places this responsibility in the hands of the business community. The policy programme on biodiversity for 2008 to 2011 by the Dutch Ministry of Agriculture, Nature and Food Quality contains targets for increasing the proportion of sustainably produced goods on the Dutch market in the near future. Hallmarks and certification are instruments in this process that can be used to encourage the consumer to make a deliberate choice, and in this way to promote sustainable production via the market.

What applies to the Netherlands, also applies to the European Union; at the beginning of 2010, the Member States (via the European Environmental Council and the Council of Heads of State or Government Leaders) stated that they wanted to reduce the share of the European Union in global biodiversity loss. Currently, the European Commission is working on a new biodiversity strategy, which is expected at the end of 2010.

Worldwide conservation of biodiversity starts with more sustainable supply chains

Supply chains are an important component in the trade relations between the Netherlands and other countries. Making supply chains more sustainable by means of certification is therefore a priority area of Dutch policy. Hallmarks are used to certify that the production complies with sustainability criteria. However, sustainable supply chains do not necessarily benefit biodiversity. For example, making the production of certain products (such as palm oil) more sustainable does not counteract the adverse effects of the plantations themselves or the deforestation process. Moreover, measures such as counteracting illegal production (fisheries and logging), sustainable

purchasing criteria (for wood products) and certification do not focus directly on preserving biodiversity.

Therefore, to achieve the targets in sustainable production and global conservation of biodiversity, policy is required that goes further than the voluntary certification of supply chains. What policy options are available to make production more sustainable and conserve biodiversity in the producing countries? First, it is important to counteract illegal trade, such as wood products from protected tropical forests. The European Union recently took steps to counteract imports of illegal wood. Second, this would require a change in consumption patterns; in a world with a growing and increasingly prosperous population, more attention on the consumption side is needed for sustainably produced products.

Finally, policy can be used to promote 'eco-regional' development, where there is not only attention paid to protecting biodiversity, but also to developing the local economy. However, the eco-regional approach is difficult, in actual practice, because so many interest groups are involved, at local, national and international levels. In addition, it is difficult for the economy and biodiversity to benefit simultaneously; if biodiversity does not decline further, and the economy continues to grow, then this is often seen as a 'benefit'. However, in many cases, biodiversity simply continues to decline.

Deforestation in the Amazon leads to loss of biodiversity and ecosystem services for the local population

Biofuels have adverse indirect effects

Biofuels are produced from agricultural commodities grown worldwide, such as oilseeds and starch-rich crops. These products are in great demand, because, during the past five years, they have increasingly been used as fuels for traffic and transport. The petrol and diesel that was sold in the Netherlands in 2008 on average contained 3% biofuels. This market came about under the influence of European policy. When working out the details of that policy, the government determined that transport fuels in the Netherlands had to consist of at least 4% in biofuels, from 2010 onwards; this obligation was imposed based on the belief that this would reduce greenhouse gas emissions.

In the meantime, the European Union has formulated sustainability criteria that are intended to guarantee ecologically and socially responsible production of biofuels. These criteria apply to the direct effects from the entire production chain, from the production of energy crops up to their sale at petrol stations. The manufacturers of biofuels are to ensure that their products comply with the criteria.

However, these criteria do not apply to the indirect effects from biofuel production, such as the emissions of CO_2 due to indirect land conversion. The European Commission is studying the magnitude of these indirect emissions and the possibilities of formulating sustainable criteria for

them, as well. This is turning out to be difficult, because the indirect effects are not so much a characteristic of the fuel itself, but of the interaction with other forms of land use and the corresponding socio-economic systems. In this context, some of the land conversion for the production of animal feed can be viewed as an indirect effect of biofuels. The production of animal feed and wood certainly has indirect effects on land use in other countries. However, up to now, these indirect effects have received relatively little attention because their importance was overshadowed by the interests of the buyers of animal feed and wood. With biofuels, the indirect effects are not overshadowed because the interest of society – reducing greenhouse gas emissions by using biofuels – is actually damaged by the indirect effects of the same biofuels.

Local economy abroad is the key to sustainable production

In production areas abroad, the large-scale expansion of agricultural lands and exports generates foreign exchange, but in many cases the people in the production areas initially receive little or no benefit. Quite the contrary; in half of the studied cases, their income, food security and poverty showed a negative development. This is because many production areas are located in relatively undeveloped areas and involve new farmlands (e.g. on the fringes of pristine forests). There appears to be a connection between governance situations in countries; in countries where governance is poor, the risk of lagging development in the production areas is greater. There are possibilities for linking agricultural development to the development of the local economy and to the protection of intact regulating ecosystem services in those areas.

Attention needs to be paid to ecosystem services, because a one-sided focus on the production of goods, in the short term, could lead to the loss of ecosystem services over the longer term. This loss increases the vulnerability of the local population that is dependent on their immediate living environment. For example, deforestation and forest degradation reduces the supply of firewood and food and leads to erosion and landslides. The *Millennium Ecosystem Assessment* concluded that food production is rising, globally, while control of erosion and pests is decreasing, and pollination by wild insect species is declining.