Breaking boundaries for biodiversity

Expanding the policy agenda to halt biodiversity loss

Netherlands Environmental Assessment Agency

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The Netherlands Environmental Assessment Agency (PBL) is the national institute for strategic policy analysis in the field of environment, nature and spatial planning. We contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount. Policy relevance is the prime concern in all our studies. We conduct solicited and unsolicited research that is always independent and scientifically sound.

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Preface

Biodiversity policy is at a crossroads. Stocktaking at the level of the countries that are parties to the CBD shows that the targets set for 2010 have not been met. This gives the Year of Biodiversity a different dimension: we have to think of other strategies to halt biodiversity loss.

The Netherlands Environmental Assessment Agency (PBL) contributes to the global debate on biodiversity by way of analysis and evaluation of environmental and biodiversity policies, pointing out the main issues in the range from problems to solutions, and assessing the impacts of economic and societal development on nature and the environment. Our analysis uncovers three lines of action that may help to improve biodiversity policy. First, national biodiversity policies surpass country borders. Countries are connected by trade relations and leave their footprint in other countries. Second, biodiversity policy goes beyond biodiversity policy itself, as the biodiversity in intensively used areas is decreasing the fastest. Third, enhancing linkages with economic development may open opportunities for effective biodiversity protection together with local economic progress.

We hope at PBL that this assessment will prove to be a source of inspiration for governments and institutions in the dialogue on their efforts to improve information on biodiversity with links to the economy and policies.

Prof. Dr. Maarten Hajer

Director, PBL - Netherlands Environmental Assessment Agency

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Executive summary

Biodiversity loss occurs all over the World, particularly in the tropics. The efforts of the past decade were not successful to slow down its loss and we have to think about other strategies to halt the loss. Expanding the biodiversity policy agenda to include sustainable trade relations between north and south, to include sustainable use of land and water and to include local economic development may reinforce our efforts. It is only when biodiversity is provided a sufficient place within the space used by humans that we can expect to stop its loss.

Our assessment from the perspective of the Netherlands, a country in the temperate zone, showed a slightly positive picture, in line with the overall results for this zone. The loss of biodiversity in the Netherlands has been slowed down, but the European target – halting the loss of biodiversity – could not be met. The picture in the Netherlands is less positive if the average low quality of the remaining Dutch biodiversity is taken into account. If the impacts on biodiversity abroad of imports into the Netherlands are also included, we conclude that the Netherlands is not succeeding in slowing down the loss of biodiversity.

Biodiversity stocktaking alone tells us little about the underlying causes of biodiversity loss. The question that arises is how countries can obtain more effective information about biodiversity impacts to support decision-making on the new post-2010 goals and related policies. This report highlights the results of integrated biodiversity assessments by the Netherlands Environmental Assessment Agency (PBL) and proposes a broader approach to combating biodiversity loss by crossing three traditional frontiers of biodiversity stocktaking:

1. looking beyond national borders: from national actions towards including the impacts of consumption and economic activities on biodiversity outside national territories;
2. looking beyond biodiversity policies: integrating biodiversity conservation policies into economic sectors, spatial planning, transport and urban development, including the use of ecosystem services in these sectors;
3. looking beyond the impacts of development and economic growth: enhancing the positive outcomes of biodiversity policies for distributing wealth and reducing poverty.

Looking beyond national borders

The spatial claim arising from national consumption and economic activities causes biodiversity loss beyond the national borders. Biodiversity policies therefore have a national component – how to reduce domestic biodiversity loss – an international component – how to reduce the loss from imports – and a third component

that addresses the linkage between the first two. Integrated assessment can stimulate countries to quantify and account for international trade-offs and take responsibility for biodiversity impacts outside their national territories. It is estimated that a large part of the biodiversity loss due to Dutch production and consumption occurs abroad. From the national ecological footprint it is estimated that the Netherlands uses about two times the area of its national territory in other production countries. In addition, the spatial claims for the production of commodities imported into the Netherlands for Dutch production for export are estimated to approach this amount, although quantification proved difficult.

Four instruments for reducing biodiversity loss abroad are the certification of trade chains, measures to ban illegal trade, ecoregional investments to combine biodiversity conservation with local economic development, and compensating for biodiversity loss. Certification of sustainable production systems is increasing, but not all sectors and products are involved and the market shares of some certificated products seem to be reaching an upper limit. Achieving the desired market share depends on government policies. Certification proceeds to go beyond the voluntary approach for niche markets and bring sustainable production practices into the mainstream. This requires stimulating policies and level-playing-field regulations. Biodiversity loss in the future seems inevitable, given the growing population and economic growth. Only when conservation is not possible, compensation for future biodiversity losses aims to improve biodiversity protection or restoration elsewhere.

Looking beyond biodiversity conservation policies

Biodiversity loss cannot be stopped if biodiversity policies are implemented in isolation from economic sectors, urban and infrastructure development, climate change policies, etc. Biodiversity is not unique to natural ecosystems; extensively used areas harbour many species. In the Netherlands, the increasingly intensive use and high productivity of land is one of the main drivers of biodiversity loss, as is overexploitation of marine and freshwater bodies. The assessment concludes that halting the loss implies finding room for landscape elements and wildlife habitat in agricultural and urban landscapes and stopping overexploitation.

Integrating biodiversity policies into other sectors is one of the options for making the use of land and water compatible with biodiversity goals. Attention needs to be given to how the policy tools of spatial planning and land use planning can be employed to this end. Besides the traditional set-aside policy for protected areas, four strategies for biodiversity-friendly planning can be identified: connecting biodiversity in ecological networks; exploiting opportunities for combining biodiversity conservation with new urban developments; integrating biodiversity conservation into multifunctional rural development; and the development of ‘new nature’. The effective use of spatial planning to combat biodiversity loss depends on government policies. For example, the spatial planning process needs clear outlines, clear biodiversity targets, a clear vision shared by many stakeholders and guaranteed budgets to carry out the plans.

Enhancing positive linkages with economic development

Historically, increasing economic growth and human wellbeing caused biodiversity loss. This relationship shows a consistent pattern: initially, increased human wellbeing causes biodiversity loss, but if biodiversity falls below a critical level, human wellbeing starts to decline as well. To reduce the rate of biodiversity loss in future, economic growth must be decoupled from environmental pressures, expanding land use and biodiversity loss.

Poor people in particular suffer from biodiversity depletion because it is an essential condition for their livelihoods. Policies can combine rural economic development with the conservation and management of biodiversity. It is possible for rural economic developmentto go hand in hand with biodiversity restoration in local situations, but this often depends on external support. To deal with this problem, effective policy arrangements are required at a higher level of governance.

When designing strategies to link economic development with biodiversity conservation, it is useful to distinguish between three poverty–biodiversity mechanisms:

1. Capital-driven: Agricultural exports do not always stimulate local development. The decline in quality and access to biodiversity is not compensated by an expected increase in human wellbeing, which lags behind the agro-export growth. This is especially the case in frontier areas with booming commodity development.
2. Policy-driven: For many poor people biodiversity is a safety net against environmental shocks, climate change or market failures. Guaranteed access to biodiversity is important for the poor and they should benefit from adequate policies.
3. Poverty-driven: Local people become vulnerable if the quality of ecosystem services is degraded by overexploitation of ecosystems. Instead, positive linkages can be forged where local people are given co-management responsibilities for the resources upon which they depend and where new technology makes production more sustainable.

Concluding remarks

In view of the post-2010 target, and especially the planning, monitoring and evaluation process, we need a better understanding of how biodiversity relates to economic and social development, backed by quantitative data. Stocktaking on biodiversity only will not be sufficient to prevent future loss. Integrated assessments that focus on the linkages between biodiversity and communities, economies, trade flows and policies will provide insights to support decision-making on sustainable development with minimised trade-offs. Strategies for halting the loss of biodiversity must encompass three important linkages: the development of sustainable production–trade–consumption chains; integrating biodiversity into land use planning for multifunctional and multistakeholder landscapes; and biodiversity-inclusive poverty strategies. These interlinkages operate at multiple geographical scales between the periphery of rural areas and the urban centres in a single country and between countries through international trade. Countries are invited to accept the challenge of pushing back traditional frontiers to support the post-2010 international biodiversity policies.

1 Introduction

Evaluation reports on the worldwide agreement to reduce the rate of biodiversity loss by 2010 show that the rate of loss has not been reduced, especially in the tropics (CBD 2010; Butchart et al. 2010; Vié et al. 2009). These reports are based on information on the state of and trends in biodiversity. What these studies do not do is help us to understand the underlying causes of biodiversity loss and what can be done to prevent it (CBD-MNP 2007). Integrated assessments, however, may help us to understand the underlying dynamics and to use this knowledge to realise positive benefits for biodiversity and for people (PBL 2008). These assessments do link biodiversity to economic sectors and other countries by examining stocks and flows of ecosystem goods and trade-offs between ecosystem goods and services (PBL 2010b). Integrated assessments place countries in a worldwide context and can be used to generate positive synergy with other policy objectives, such as food security, climate mitigation and poverty reduction (PBL 2009e). They help to broaden the policy arena for biodiversity.

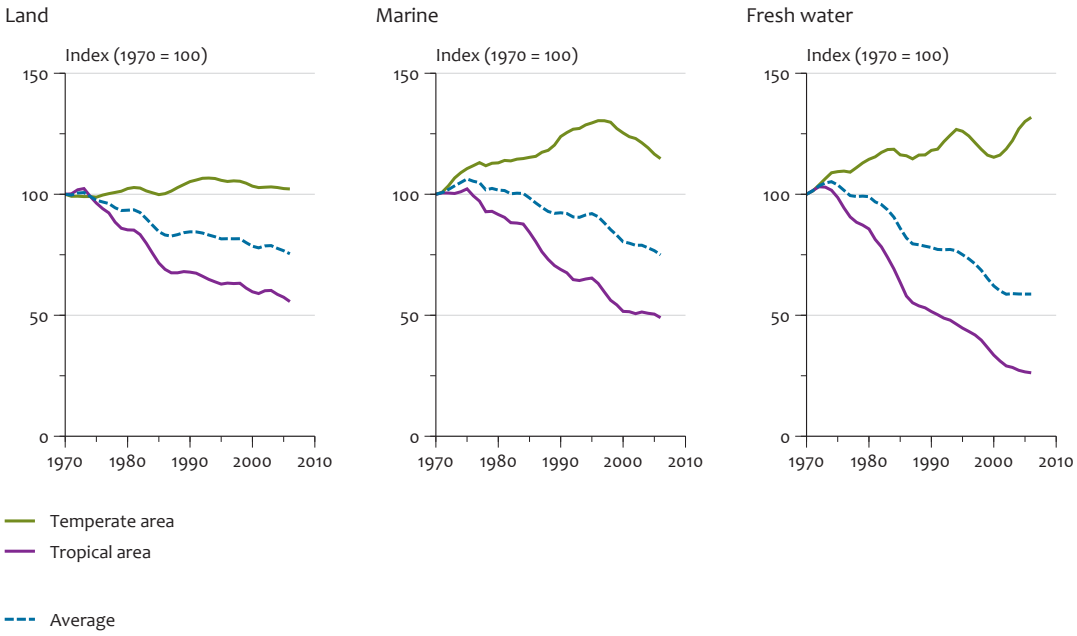
This report highlights the results of experiences with integrated biodiversity assessment obtained at the Netherlands Environmental Assessment Agency (PBL). It looks beyond three boundaries to support the worldwide agreement to slow down or halt the loss of biodiversity:

1. looking beyond national borders: from national reporting towards accounting for the impacts on biodiversity abroad of production and imports for domestic consumption and export (Rood et al 2004; Kessler et al. 2007);
2. looking beyond sector policies: from biodiversity conservation policies towards the integration of biodiversity policies into economic sectors, spatial planning, transport and urban development, and ecosystem services (PBL 2009a);
3. looking beyond a defensive approach: from preventing the negative impacts of development on biodiversity towards forging positive outcomes for vulnerable societies and poor people (PBL 2009c).

Biodiversity loss is unevenly distributed

The loss of biodiversity is most serious in the tropics (Figure 1.1) (WWF 2008). Tropical zones still contain large biodiversity hotspots of good quality, but these are under severe pressure (CBD 2010). Large parts of the temperate zones contain biodiversity of low quality owing to land clearances in the past and historically high levels of human activity, but the rate of further loss in these areas is either decreasing, is already low or has even stopped. In recent decades, agricultural development has become concentrated in the remaining thinly populated areas in the world where biodiversity is still high. Although further biodiversity loss in the temperate zone is relatively low, international trade in commodities involves the

Living Planet Index of global species **Figure 1.1**



Source: CBD 2010; WWF 2008

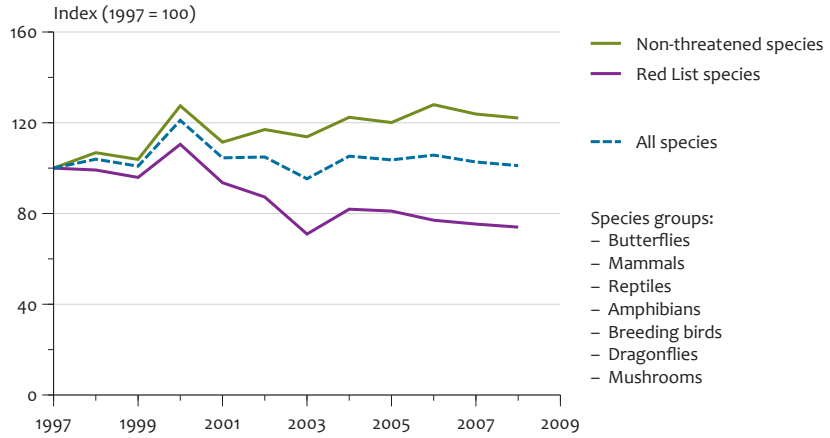
Average global species trends (Living Planet Index) on land, in the oceans and in fresh water has declined, with no decrease in the rate of loss. The rate of loss in the tropics is significantly higher than the world average. In temperate climatic zones progress is being made in fresh water, biodiversity on land is stable, and the species abundance in the marine environment is again falling after an improvement between 1970 and 1995

transfer of land use claims from the temperate to the tropical zone, which is driving biodiversity loss (Kessler et al. 2007).

The situation in the Netherlands

The national evaluation for the Netherlands shows that the global CBD target has been attained. However, the European target of halting the loss of biodiversity has not been met (PBL 2010b). The biodiversity in the Netherlands is low because it is a densely populated country with large urban areas and intensive agricultural production. Protected nature areas cover about 10 per cent of the land surface. The country lies in the delta of the rivers Rhine, Meuse, Ems and Scheldt in north-western Europe and contains a considerable area of riverine ecosystems and coastal ecosystems such as shallow tidal waters, dunes and salt marsh. These areas are particularly important for migrating birds, which forage in the wetlands (Zwarts et al. 2009). The country also has landscapes that contain the remnants of old agricultural systems with heaths and hay meadows. Dutch nature policy focuses on conserving these areas by designating protected areas and nature reserves, some of which have been incorporated into the European Natura 2000 network.

Figure 1.2 **Trends in species abundance in the Netherlands**



Source: PBL, NEM, CBS

The trends in species abundance in the Netherlands, which is located in the temperate zone, is stable on average, but this hides the decline of the more demanding Red List species. Species adapted to the human environment or species that respond well to habitat restoration show positive trends. (Source: PBL, NEM, CBS)

The loss of biodiversity has not been halted because environmental and land use pressures remain high. Poor environmental conditions, habitat fragmentation and a lack of ecosystem connectivity continue to exert high pressures on biodiversity (PBL 2009a). Red List species and habitats are still in decline (Figure 1.2) because they are affected by environmental pressures and fragmented landscapes (PBL 2010b). In areas under intensive agricultural use and in marine areas subject to intense fishing activity, biodiversity is declining at a rapid pace. Although biodiversity in areas of intensive production is declining, species adapted to the human environment and pioneer species that respond well to habitat restoration are doing well.

The Netherlands is a trading country and it imports and exports many commodities and products. Imports support both national consumption and production for export purposes. When the impacts abroad of Dutch production and consumption are taken into account, the loss of biodiversity caused by the Netherlands has not slowed down at all. This is because imported agricultural commodities lay claim to arable land and grasslands elsewhere. Moreover, the expansion of production abroad to meet demand in the Netherlands causes further loss of biodiversity in those countries. The ecological footprint indicator gives an insight into the impact of imports for domestic consumption. According to this footprint, the Netherlands uses about two times its land surface area abroad (PBL 2009a). Moreover, a proportion of national production, of meat for example, is exported, but the imports required for this production are not included in the ecological footprint, even though their production uses land in other countries (PBL 2009b). No figures

are available on the biodiversity impacts elsewhere of exported products, but they are estimated to be about half as much again as the calculated national ecological footprint.

2 Biodiversity loss is transferred across national borders

Countries that are parties to the Convention on Biological Diversity are working to achieve the 2010 Biodiversity Target: 'a significant reduction of the current rate of biodiversity loss'. Each is taking measures autonomously, but impacts on biodiversity have no political borders. The question that needs to be addressed is how trade relations have an impact on biodiversity elsewhere in the world. This is especially relevant for agricultural importing countries, such as the Netherlands. Conversely, impacts on biodiversity within countries producing for the world market may be high, but the underlying drivers – the demand on the market – may come from abroad. These countries includes agricultural exporting countries in the tropical belt (PBL 2010b).

In this chapter we examine this shift in impacts from one country to another, starting from the perspective of sustainable production within national borders (section 2.1). We then turn to the impact of the trade in agricultural commodities between countries (section 2.2) and the impact of biodiversity conservation response measures in one country on biodiversity abroad (section 2.3). Furthermore, we evaluate the use of product and trade certification schemes (section 2.4), the consumers role (section 2.5) and biodiversity compensation measures (section 2.6) as instruments to support the development of sustainable production and trade systems.

2.1 Sustainable production within national borders as the first step

Analysis of biodiversity loss shows that the main drivers are habitat loss, habitat fragmentation, pollution (such as eutrophication of land and water) and overexploitation (Alkemade et al. 2009; EEA 2007). Land use, such as agriculture and forestry, and fisheries are the primary causes of the decline of wild species. Biodiversity loss cannot be stopped if these pressures on biodiversity are not reduced. On the supply side, the key to this is increasing the sustainability of production sectors, while maintaining productivity. Productive and stable production systems that do not harm the environment and that offer a reasonable income, offer a pathway towards sustainability (PBL 2010c). On the demand side,

International trade connects countries in a global market. The consumption of food and use of goods in one country depend in many cases on imports from elsewhere.

improving sustainability implies changing consumption patterns so that the global demand for food, fibres and wood can continue to be met, and raising public awareness of the impacts of non-sustainably produced products (PBL 2009d; Gielissen 2010).

Fisheries sector moving in the right direction but still far from sustainable

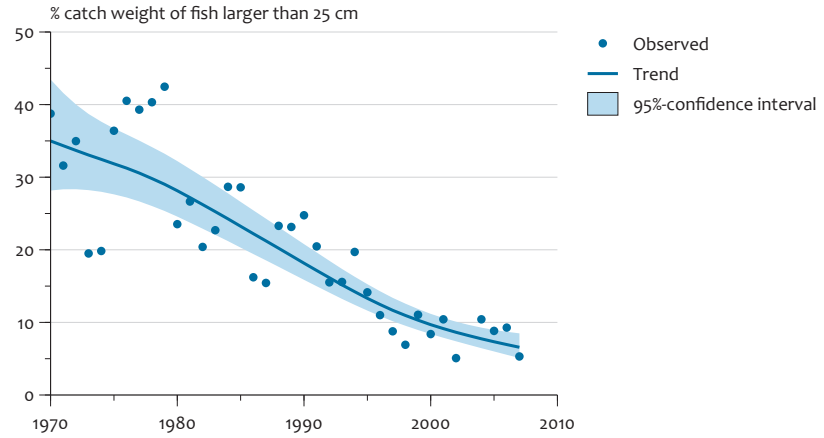
Two-thirds of the commercial fish stocks in the North Sea are overexploited (PBL 2010b; Wortelboer 2010). The 'total allowable catch' for almost all fish stocks exceeds the levels advised by scientists (Piet 2010). When fish stocks are overexploited, population sizes eventually fall below the safe biological limits. Another consequence is that the numbers of big mature fish brought ashore declines year on year (Figure 2.1). The selection of big fish by fisheries leads to the fish maturing younger and at a smaller size than before as a result of genetic selection (Grift et al. 2003; Mollet 2010; Rijnsdorp et al. 2010). These developments lead to a smaller catch and finally have an economic impact on the fisheries.

The methods use to catch sole and plaice damage the seabed and its benthos because cables are towed through the seabed to disturb the fish (Hiddink et al. 2006). These methods also have discard rates up to 75% of the catch (Aarts & van Helmond 2007; Catchpole et al. 2005; van Helmond & van Overzee 2008, 2010). This collateral damage to the ecosystem makes these fisheries unsustainable even if the fish stocks are fished above their biological limits.

Sustainable fisheries have the following features (LNV 2008; LNV 2009):

- fish stocks above safe biological limits;

Figure 2.1 **Share of big fish in total catch**



Source: CLO-IMARES, processed by PBL

Overexploitation of fish stocks leads to a decreasing proportion of big fish in the total catch and fish maturing at a smaller size.

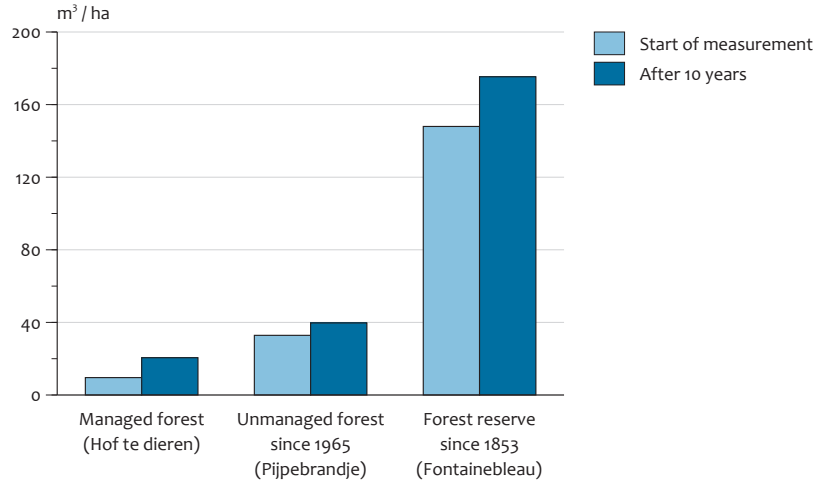
- an economically feasible fishery sector with prospects for the future and public support;
- discards and damage to the seabed are avoided.

Public awareness of sustainably harvested fish is growing and is promoted by ecolabelling. For example, Dutch supermarkets have stated that in 2011 they plan to source all their wild caught fish from fisheries certified by the Marine Stewardship Council (MSC) (CBL 2010). The Marine Stewardship Council (MSC) is a global certification and ecolabelling programme for sustainable seafood. In March 2009, the annual catch of all MSC-certified fisheries and the seafood still under evaluation together amounted to 7% of the world's total wild capture production (MSC 2009). The Netherlands government has set a policy target of an 85% share of MSC-certified sustainable fish catch in 2015 (Marine Stewardship Council). On the demand side, consumption of fish in the Netherlands is much lower than the total amount of imported and exported fish (Figure 2.4). The consumption in other countries of exported Dutch fish adds to their ecological footprint.

Integrated forest management is common practice in the temperate zone

During the last few decades integrated forest management has become increasingly common practice in the Netherlands (LNV 1986; LNV 2000; PHN & LNV 2005; van den Bos 2004). Forests have become more diverse in terms of tree species and horizontal stratification; the trees are older and the amount of dead wood has increased to 9% (Jagers op Akkerhuis et al. 2005, MCPFE 2007). Dead wood is considered one of the indicators of sustainable forest management because it provides a habitat for many plants and animals. For example, integrated forest management has led to increases in the populations of typical forest species,

Volume of dead wood in three forests **Figure 2.2**



Source: Jagers op Akkerhuis et al. 2005
The amount of dead wood is the best indicator for forest biodiversity. In a ten-year period, the amount increases for a Dutch forest with integrated management (Hof te dieren), a Dutch unmanaged forest (Pijpebrandje) and, as a reference situation, an old forest reserve elsewhere in Europe (Fontainebleau). The difference in the amount of deadwood between the Dutch forests and the foreign reference reserve remains high.

such as mosses and mushrooms typical for dead wood, and birds like woodpeckers and the Eurasian nuthatch. However, in comparison with unmanaged foreign forest reserves, the amount of dead wood in Dutch forests with integrated management is still low (Jagers op Akkerhuis et al. 2005; MCPFE 2007) (Figure 2.2).

Sustainable forestry is based on (LNV 2000; PHN and LNV 2005):
- socially acceptable and economically profitable production;
- protection of biodiversity and management with an emphasis on conserving threatened species.

According to the Forest Stewardship Council (FSC), forest management should conserve biological diversity and its associated values. It is a relatively small step from integrated forestry to FSC labelling. In the Netherlands 42% of the forest area is certified, which is close to the European average of 47% (PROBOS 2004; PROBOS 2009). Certified or not, Dutch forestry is barely profitable without financial support from the government (LEI 2008).

The timber harvest in the Netherlands covers only about 8 % of Dutch consumption. Most of the wood used in the Netherlands is imported from other European countries or from tropical rainforests (PROBOS 2009). This consumption influences land use change and biodiversity in other countries across the world and is an essential part of the Dutch ecological footprint. For this reason, the Netherlands

Where Dutch agriculture hasn't become highly intensive, biodiversity remains, like cornflowers in a corn field.

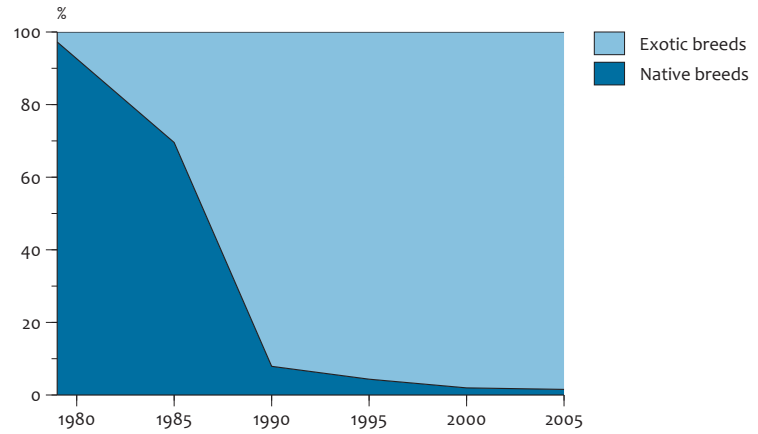
government has set a target of 50% of the national consumption of wood to be certified timber. The timber sector has made significant progress in the supply of certified timber, paper and other products, but the differences between individual product chains are high. The share of certified timber increased from 13% in 2005 to 34% in 2008. The share of certified paper was only 6% in 2008, whereas 35% of the raw material used in the paper industry was certified (PROBOS 2009). This is because most of the certified paper was exported. In 2008, 46% of timber from European coniferous forests was certified. The certification of tropical hardwood is still far off the target at 15% and has not increased in the last five years (PBL 2010b).

The drawback of high agricultural productivity is low biodiversity

During the last hundred years or so Dutch agriculture has become increasingly intensive and the previously small-scale heterogeneous agricultural landscapes have been transformed into highly productive, monocultural landscapes (PBL 2009a). This transformation has resulted in a loss of wild plant and animal diversity, as well as a loss of genetic resources in agricultural crops and native cattle breeds (Figure 2.3) (Buiteveld et al. 2009). The drawback of high productivity, therefore, is low biodiversity. This process still continues despite the efforts of the government to slow down and halt the downward spiral (Wiertz et al. 2007). Most of the traditional low-productivity 'high nature value' farmland has been included in protected nature areas (PBL 2009a).

Intensive agricultural production systems put pressure on biodiversity through alterations to field systems and water tables and emissions beyond production sites, especially from applications of nitrogen and phosphorus. Dutch farmland soils have a high nitrogen surplus: around 225 kg/ha/yr; the highest level in Europe (OECD

Origin of cattle breeds in Dutch agriculture **Figure 2.3**



Source NRS/ASG
Native cattle breeds in total female population of breeding animals, have disappeared in favour of a few highly productive foreign breeds.

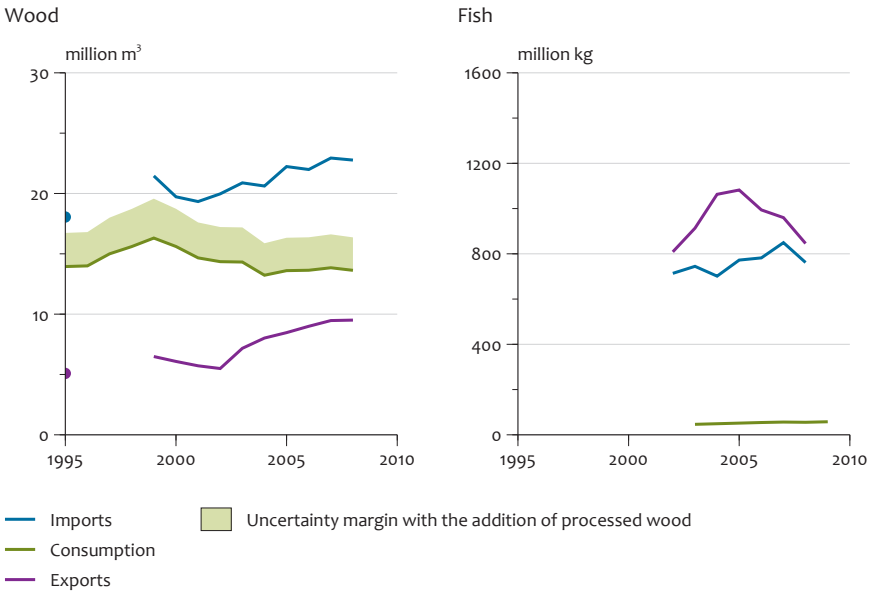
2008a). These emissions and alterations to the water table affect neighbouring protected areas and nature reserves and threaten the biodiversity of these reserves.

Sustainable agricultural production is based on (VROM 2001; LNV 2007, 2008):
- an economically sound agricultural sector with prospects for the future and public support;
- limited transfer of nutrients to the surroundings via air and water;
- limited or no use of pesticides and herbicides;
- integrity and wellbeing of livestock.

Sustainability criteria and certification labels of Dutch arable and livestock production are in their infancy (PBL 2010b). Organic farming is the only certified sustainable agricultural system in the Netherlands (LNV 2007) and although the environmental and biodiversity ambitions of this group of producers are high, they farm just 2% of the Dutch agricultural area, and this area slowly increases (Biomonitor 2010).

The Netherlands is one of the main agricultural exporting countries in the world. Only part of agricultural production in the Netherlands is destined for domestic consumption and production depends on imports of raw produce, such as soy for livestock feed (PBL 2010b). Part of the biodiversity loss related to agricultural production, therefore, is caused by the trade in agricultural commodities produced outside the Netherlands.

Figure 2.4 **Imports, exports and consumption in the Netherlands**



Each country is responsible for the loss of biodiversity caused by the added value generated from the import, processing and export of produce. Consumption of wood in the Netherlands has been stable for years while imports and exports have increased (PROBOS 2010). Fish consumption is low compared to imports and exports (PBL 2010b) .

2.2 Trade brings responsibility for conserving biodiversity abroad

Countries are connected by trade chains in commodities whose production involves the use of natural resources and land. Globally traded commodities include soy, wheat, palm oil, wood, fish and coffee. When demand for these commodities increases, the area of agricultural land used to cultivate them expands at the expense of natural ecosystems. Imports are driven not only by demand for domestic consumption, but also by the demand for raw materials for the manufacture of products for export (PBL 2010b). Although these exports contribute to the footprint of the consuming countries, this does not relieve the Netherlands of the responsibility for its part of the product chain; earnings from added value. In the Netherlands, imports and exports equal (e.g. wood) or exceed (e.g. fish) domestic demand (Figure 2.4). Dutch imports of soy and other crops are also used in the production of meat for export. Two indicators are addressed here: the ecological footprint and imports of commodities used as raw materials in the production of products for export.

Domestic consumption causes an ecological footprint larger than the national territory

Countries that import agricultural commodities to satisfy domestic consumption have an 'ecological footprint': the area of land and water used for production

Deforestation in the Amazon forest is still progressing at a rapid rate and drives the loss of biodiversity and ecosystem services.

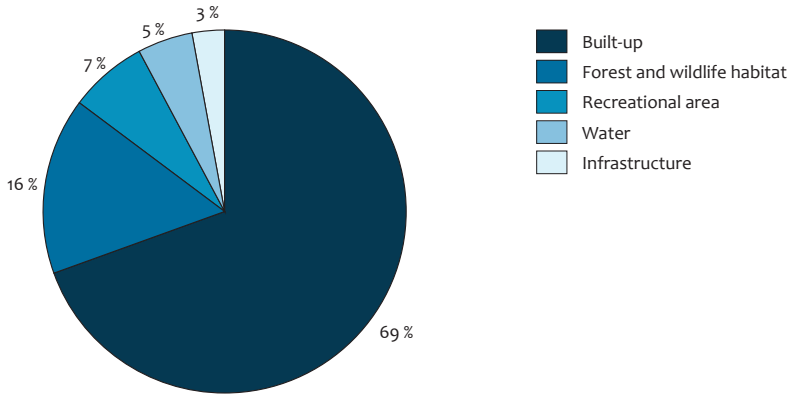
outside the national boundaries, part of which is converted from natural savannah, forest and other ecosystems (Rood et al. 2004; Kessler et al. 2007). Initial calculations by non-governmental organisations indicate that the Dutch share of the responsibility for deforestation worldwide is about 160,000 hectares per year (Grieg-Gran and Kessler 2007), but calculations are difficult and still uncertain.

The ecological footprint of the Netherlands, a densely populated and small country, is three times as large as the national territory (PBL 2009a; PBL 2010b). The Dutch ecological footprint per capita is about 0.6 ha (2005), which is more or less the global average, and has not increased during the last twenty years. Some other countries are making a rapidly growing claim on biodiversity because of an increasing population and/or increasing economic growth and related changes in diets (more animal protein in the diet).

Exports of transformed commodities with added value also affect biodiversity abroad

Production in the Netherlands for export makes an additional claim on land and biodiversity abroad. Commodities are imported, processed and then exported. Statistics show that imports and production are to a large extent destined for export (fish), or exports are increasing while consumption remains stable (wood) (Figure 2.4). The impact on biodiversity beyond the national territory is also directly linked to national policies, including biodiversity policy objectives (conservation and restoration) and agricultural production and trade policies.

Figure 2.5 **Uses of converted agricultural land in the Netherlands, 1996 – 2003**



Source: WUR-LEI

Loss of agricultural land in the Netherlands. Most of the former agricultural land is converted to urban uses. Wildlife habitat, forest and recreational development account for a quarter of the converted land.

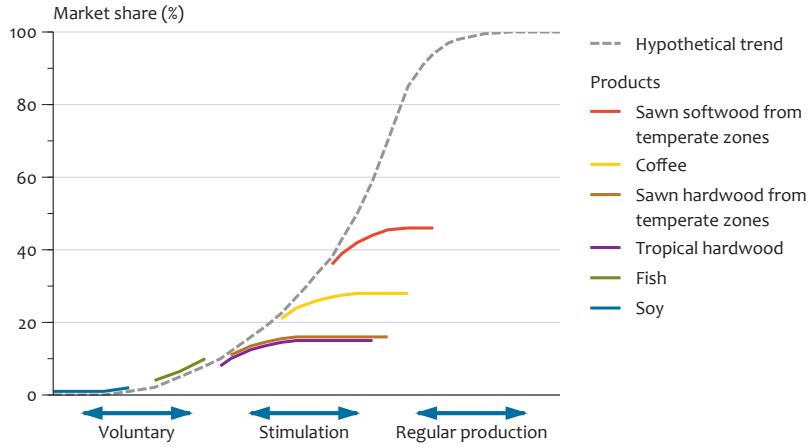
2.3 National developments affect international biodiversity

National decisions on land use may have an impact abroad. Urbanisation, infrastructure, recreation, agriculture and nature conservation compete for land. In the Netherlands, as in many other fertile areas of the world, agriculture is the dominant land use and expansion of other land uses implies a decrease in the agricultural area (PBL 2009a). In the Netherlands about three-quarters of the loss of agricultural land is to urban uses, while conversion to 'green' uses accounts for less than a quarter of the total (Figure 2.5). The simple argument is that taking land from agriculture lowers domestic food production and leads to increases in imports to compensate for this loss, which leads to claims on land elsewhere. However, the relations are far more complex and not fully understood.

Part of this complexity arises because the availability of land is not the only factor in productivity. For example, agricultural practices, and the varieties and breeds used are also determinants of production. Intensive stock breeding and milk production are more loosely linked to land, although fodders need to be produced. Part of the loss of agricultural land may be compensated by increases in productivity.

Organic farming is seen as one of the ways to make agricultural production more sustainable. It has a positive effect on farmland biodiversity, depending on the productivity per unit area of land (Reidsma et al. 2006; Frieben & Köpke 1995). Furthermore, organic farming has less impact on neighbouring wildlife habitats because of the low nitrogen surplus and absence of pesticides. However, production per unit area is on average 20% less than conventional agriculture (CBS 2010).

Trends in certification of products, 2000 – 2008 **Figure 2.6**



Certification schemes are in defferent phases of their life cycle. The market share of certified produce depends on government policy. In the Netherlands additional policies are needed when the growth in product certification evens off, for example at around 25% for coffee and 46% for European coniferous timber

2.4 Certification of trade chains is reaching upper limits

An important instrument for making trade chains sustainable is certification. Certified production must meet certain minimum standards and criteria, one of which is biodiversity protection. The Netherlands supports sustainable trade chains, but certification alone is not a complete solution. It cannot reduce pressures on biodiversity, because it places no restrictions on demand (PBL 2010b; Kamphorst 2009).

Rapid expansion of certification

In recent years the market shares of certified products have rapidly expanded and some product certificates, such as those for coffee (Fairtrade) and wood (FSC), are now well known. New certification systems have been launched for products with a major market share that do not incur an increase in the price of the certified produce (examples include Rainforest Alliance and UTZ for coffee). The introduction of UTZ-certified coffee rapidly brought the market share of certified coffee above 25% (Coffee Coalition 2007; Vermeulen et al. 2010).

Certification schemes are in different phases of their life cycle (Figure 2.6). Some sectors are still negotiating the criteria (soy), others have recently increased their market share (fish at 10%) (Productschap Vis 2009) or are stabilising (at 15% for tropical hardwood and 46% for European coniferous timber) (PROBOS 2010).

The role of government in expanding certification

Certification often starts without any government action. However, studies show that without government influence certification cannot achieve a complete market share (Vermeulen et al. 2010). Governments can start to stimulate certification when the growth rate of the market share for certified products evens off. In view of the complexity of international trade relations and to effectively support and stimulate further certification, governments can follow a network approach to bring all countries and organisations together within worldwide trade chains. National stimulation measures can be made effective by forging private and social partnerships in the international trade arena.

Certification of market chains offers opportunities, but also has limits:

- The willingness to pay for certified products has its limits. Studies show that customers are willing to pay up to 10% more for sustainable products when they are well informed (Gielissen 2010).
- Certification has no additional value for biodiversity conservation if the current production system already meets the criteria for certification (PBL 2010b).
- Free riders and illegal trade may exist alongside certified produce because production is cheaper, especially if law enforcement by governments is weak (Vermeulen et al. 2010).

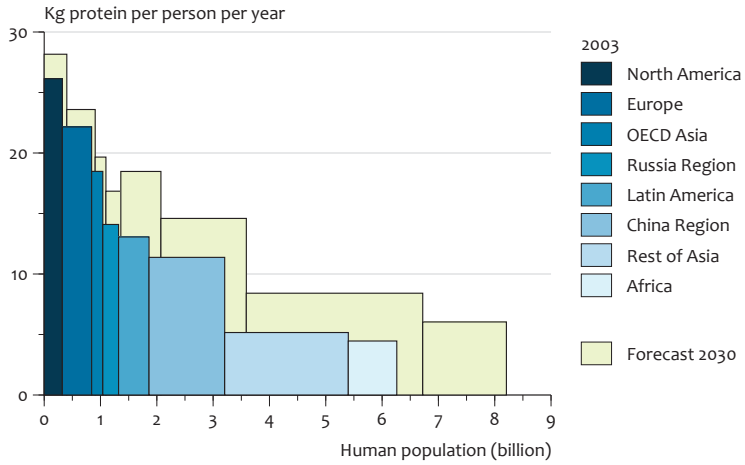
Finally, to make the full production sustainable, the objective is to mainstream certification throughout sectors. Mainstreaming involves raising the minimum standards for production to guarantee sustainable production over the whole sector and create a level playing field. Mainstreaming excludes free riders from the market (Vermeulen et al. 2010; Arts & Buizer 2009).

Banning illegal trade can only be based on voluntary agreements

Illegal trade can disrupt the mainstreaming of certification. By circumventing sustainability criteria, illegal trade is cheaper and may force sustainably produced products from the market (Tacconi 2007). The European Union tackles illegal trade through the participation of local stakeholders and by supporting poverty reduction programmes in the exporting countries. This keeps stakeholders at the negotiation table and provides alternative livelihoods for poor people, who might otherwise be driven to illegal trade out of necessity (van Bodegom et al. 2008).

In 2003 the EU presented an action plan to stop the import of illegal timber: the Action Plan for Forest Law Enforcement, Governance and Trade (FLEGT). This action plan is now high on the political agenda because the EU has reached a provisional agreement on draft legislation prohibiting the importation of illegal timber. At the core of the FLEGT programme are the Voluntary Partnership Agreements (VPA) between the EU and timber producing and exporting countries, in which the timber exporting countries agree to stop the trade in illegal timber to Europe. These VPAs bring FLEGT in line with the General Agreement on Tariffs and Trade (GATT) and present no technical barriers to trade (Humphreys 2006). Any agreement has to comply with the Agreement on Technical Barriers to Trade, otherwise the World Trade Organization (WTO) will obstruct any non-voluntary measurements to stop the trade in illegal timber (Hoogeveen and Verkooijen 2010). As governments are not free to set their own minimum standards for the ‘quality’

Consumption of animal protein per region **Figure 2.7**



Source: PBL 2009e

Biodiversity on land will have decrease by 10% in 2030, despite efficiency improvements in agriculture and livestock production.

of timber, the European ban on the import of illegal timber must be accompanied by voluntary agreements.

2.5 Demands of consumers part of the solution

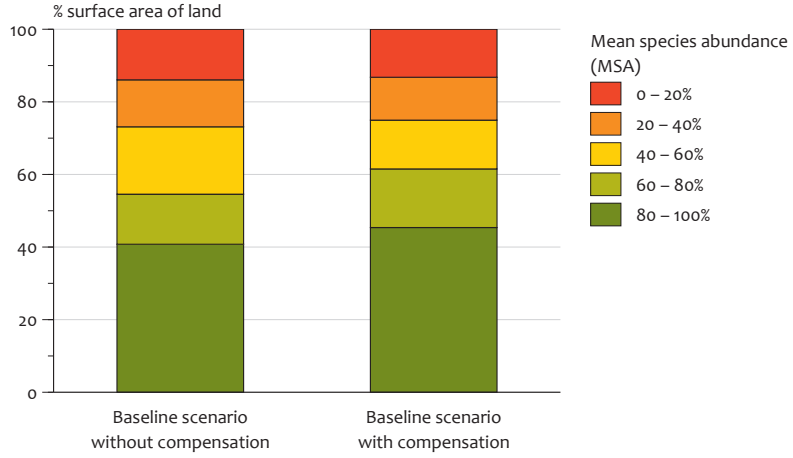
Sustainable development of the agro-sector cannot be achieved without looking carefully at the consumptive demand, because the human population is growing fast and consumption patterns include more and more animal protein as an effect of increasing human wellbeing. The demand for animal protein will increase by 60% in the next 20 years (Figure 2.7) and cannot be leveled by increasing yields per area of land. Livestock production already occupies already 80% of all agricultural lands, causes 30% of biodiversity loss worldwide and accounts for 12% of global warming emissions (PBL 2009e). Consumption of meat, milk derivates, pork and chicken conflicts with the conservation and sustainable use of biodiversity and reduction of greenhouse gasses. Simple technological solutions are not available. Decreasing the consumption of animal protein is likely to be more effective, but needs a broad societal debate at national and international levels.

2.6 Compensating for biodiversity loss

An important driver of biodiversity loss is the conversion of natural ecosystems into agricultural land for the production of commodities. Sustainability criteria in certified trade systems aim to minimise these effects. However, a growing global population and increasing human wellbeing are pushing up the demand

Figure 2.8 **Estimated effect from compensation on global biodiversity, 2050**

OECD Environmental outlook baseline scenario



Source: PLB 2009b

The additional biodiversity gains of improved protection with compensation can be obtained through the smart allocation of natural ecosystems of high biodiversity value for protection from degradation or land clearance.

for agricultural products, which is not only driving higher productivity but also the expansion of the agricultural area (CBD-MNP 2007; MEA 2005). The protection of natural ecosystems (see also Chapter 3) may safeguard areas of high biodiversity from conversion. Where protection fails, compensation may be an instrument to mitigate the loss. In the United States, especially in California, legislation has led to the creation of 'biodiversity banks' or 'threatened species banks' which 'store' protected areas where the ecosystems or species can be conserved.

A model study by the Netherlands Environmental Assessment Agency (PBL 2009b) estimates that the area with high biodiversity is larger in a baseline scenario for 2050 with compensation than in the same scenario without compensation (Figure 2.7). This is due to both a better protection of areas with high biodiversity and an extension of natural ecosystems. The area with biodiversity losses of 20–60% is reduced. Compensation is only possible if the same ecosystem exists elsewhere and can be protected and/or extended there. At the level of worldwide biomes, PBL (2009b) showed that it is not possible at the moment to save at least 50% of the original area of each biome. Many have already fallen below this level. For example, forests in Central America (excluding Mexico), Europe, Turkey, Ukraine and India had contracted to less than 50% of their original area by 2001.

The drawbacks of compensation are that the global effects are small, variations within ecosystems cannot easily be compensated for, and future protection cannot be guaranteed. First, compensation has only a small positive effect at the global scale (Figure 2.8), with the largest effect on ecosystems that contain 60–80% of

their original biodiversity of its pristine state. Second, compensation may even reduce the variation within an ecosystem if only subsystems are protected or restored. Third, it is questionable whether protection measures financed now with compensation money will be permanent, or whether they will simply delay the loss of biodiversity (Metcalfe & Vorhies 2010).

3 Spatial planning across policy boundaries

Slowing down or halting the loss of biodiversity has an important spatial dimension, simply because plants, animals and ecosystems occur in certain places. Other activities and functions compete for this space, such as agriculture, forestry and urban development. In the competition for space, biodiversity conservation policies must seek to integrate biodiversity policies into economic sectors, spatial planning, transport and urban development, and ecosystem services.

The underlying idea of integrating biodiversity and land use planning is that in a densely populated country the mere conservation of nature is not enough. If we seriously want to halt the decrease in biodiversity, or even strive to increase it, we need to create wildlife habitats or incorporate nature conservation into the design of new developments. Careful land use and development planning can have a positive influence on the conservation of biodiversity.

In the mid-twentieth century, the better examples of road building in the Netherlands made clear that ecologically designed motorway verges could act as refuges for a variety of species, because the surrounding agricultural land was becoming too intensively used. More recent examples of nature-conscious planning and design have delivered a variety of natural values in rural, suburban and even urban settings. Large-scale examples can be found in rural land development plans. While for most of the twentieth century these plans were designed almost exclusively to improve agricultural conditions, they have now become an important tool in the creation of ecological structures and wildlife habitats in rural areas. This change did not come easily. It took years before it was widely realised and accepted that the common practice of rural land consolidation was detrimental to nature and the landscape. From the last quarter of the 20th century, supported by a new law adopted in 1974, rural land development plans in the Netherlands now routinely contain new wildlife habitats and newly laid out landscape elements designed to enhance biodiversity in predominantly agricultural areas.

In this chapter we examine the impacts of various land uses, functional demands and spatial policy plans within the Netherlands. All demands and plans come together at the local level where they have to be realised. This is where it is possible to achieve biodiversity targets under the pressure of often conflicting interests and demands by stakeholders. Four main strategies for 'planning for biodiversity' in land use planning are introduced (section 3.1) after which these strategies,

Stakeholders compete for scarce natural resources, land and ecosystem functions. The landscape shows a mix of urban development, industrial sites, greenhouse horticulture, livestock farming, energy production and habitat development.

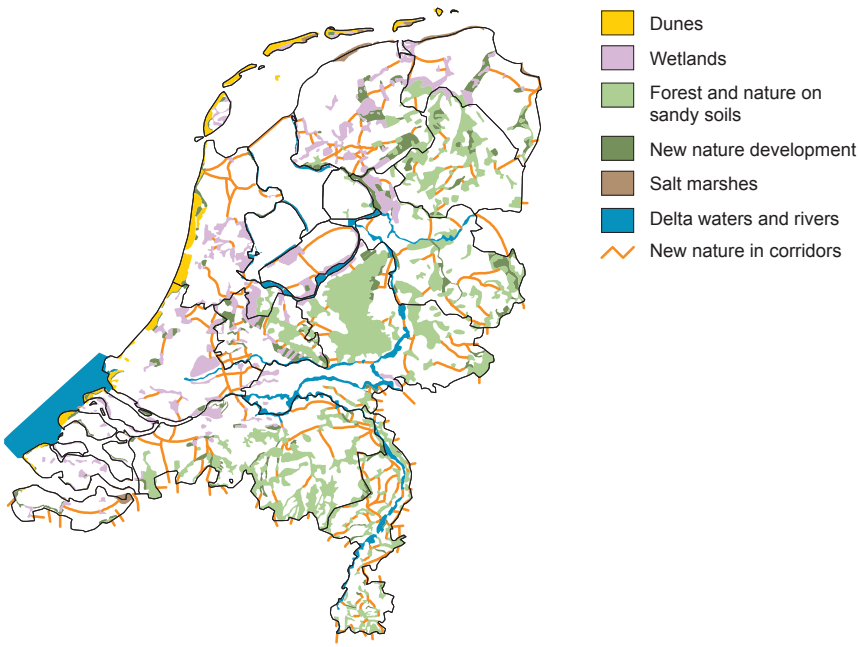
developing new nature (section 3.2), creating ecological networks (section 3.3), multifunctional rural development (section 3.4) and urban planning (section 3.5) are described in more detail.

3.1 Strategies for biodiversity-friendly planning

In the final decades of the 20th century it became clear that in a densely populated country like the Netherlands, merely preserving what we have is not enough if we want to take a step forward and increase ecological quality and biodiversity. Achieving this goal requires new strategies in which land use planning plays an important role. Dutch practice distinguishes between four main strategies for 'planning for biodiversity' in land use planning.

- *Developing 'new nature'*: In an ambitious and offensive strategy, wildlife habitats are being developed as the main type of land use. The underlying motive for this strategy is that ecosystems can only function fully when they cover large areas. When this is not the case, the creation of new nature reserves is the main purpose of the proposed development, although, more often than not, other types of land use (like outdoor recreation) may be integrated into the plan to make the realisation of the new habitats more economically viable and socially acceptable.
- *Creating an ecological network*: Creating an ecological network is important when ecosystem functioning is reduced by fragmented coverage of small reserves situated within intensively used agricultural land or separated by motorways. The provincial and national authorities started planning a nationwide National Ecological Network in the early 1990s (LNV 1990). In this strategy the

Figure 3.1 **National Ecological Network in the Netherlands, 1990**



Source: LNV, 1990

National Ecological Network in the Netherlands contains nature reserves, new nature development areas and wildlife corridors. Tidal waters and large lakes are also part of the network, but not shown in this map.

conservation of existing protected areas is combined with the development of wildlife corridors with landscape elements such as hedgerows and the creation or restoration of areas of habitat (Figure 3.1). The development of the network is further strengthened by building wildlife viaducts and tunnels across motorways and railway lines. These elements will not only link together all the important areas of ecological value in the Netherlands, but also create connections with comparable areas in neighbouring countries in the European network of Natura 2000 areas and a worldwide ecological web.

- *Multifunctional rural development plans:* Another strategy, and one that can be found in many projects in rural areas, is the conservation and creation of natural values and wildlife habitats as an integral part of land use planning. In the more modest examples, this is done by restoring and creating patterns of small landscape elements (like hedgerows and ecological banks) within the plan area. These landscape elements give an area its identity and may fulfil several ecosystem services. In more extensive examples, natural values are deliberately integrated into larger landscape changes and, in such cases, new nature will be developed. This strategy requires a positive attitude among planners

The massive loss of natural areas in the Netherlands made it necessary to adopt habitat creation and restoration measures to convert agricultural land back to natural ecosystems. Fertilised and polluted topsoil is removed and low-lying areas are restored to provide nutrient-poor and wet conditions for natural habitat development.

and policymakers toward biodiversity-conscious development and including biodiversity in their plans. As we have seen, over the last thirty years the mood in Dutch planning has shifted in this direction.

- *Integrating biodiversity into urban planning*: Options for enhancing biodiversity do not stop at the urban edge. Examples of contemporary town planning make clear that urban or suburban development planning and the creation of natural values can go together very well. This strategy is important for urban extensions and the restructuring or redevelopment of urban neighbourhoods.

3.2 Developing new nature as a form of land use

In the 20th century the competition for land in the Netherlands led to the reclamation of natural ecosystems for agricultural purposes. So much was lost that protecting the remaining areas alone will not be enough to conserve biodiversity. Therefore, in 1990 the decision was taken to stop and reverse this process of land reclamation (LNV 1990). Reversing the process implies enlarging natural ecosystems, a strategy in which the main objective is to 'build nature'. These kinds of projects were relatively new, because until then natural values were a byproduct of rural (mostly agricultural) development. Many of these projects have been initiated by governmental or private nature conservation organisations.

Practically none of these projects has been realised without at least a minimal input from stakeholders with interests in other types of land use, in particular

recreational facilities (opening of certain areas to the public, campsites and visitor centres), low-density housing (exclusive residential areas) and extensive farming. These uses are included to secure support for this 'new nature', to raise money to fund the habitat creation and because of the need to combine functions for optimal land use. Implementation of this offensive strategy of developing new nature requires public acceptance and support. Support for nature conservation in the Netherlands is relatively high, as evidenced by the membership of nature and heritage conservation organisations, the largest being *Natuurmonumenten* with over 800,000 paying members (NM 2009), or 5% of the Dutch population. A disadvantage of incorporating public support into the planning is that the protected areas for biodiversity conservation are not completely undisturbed natural areas.

A good example of such a 'nature first' redevelopment scheme is Oostvaarderswold, a 1,800 hectare strip of land in the province of Flevoland. Two large nature reserves in the southernmost part are to be connected to allow large herbivores and smaller animals to migrate between them. One of these existing nature reserves is a 3,600 hectare wetland; the other is a 5,000 hectare forest. The proposals for the Oostvaarderswold ecological corridor contain two kinds of zoning (Flevoland Province 2009). The first makes use of the existing gradations in the height of the land and its hydrological conditions, introducing a transition from the relatively high and dry land in the southeast (near the forest zone) to the lower and wetter land in the northwest (near the wetland zone). The other zoning, perpendicular to the first, is mainly recreational in character, particularly to cater for the recreational demand from the nearby and expanding new town of Almere (current population almost 200,000). A strong coalition of provincial and local authorities, with the national forest service as active participant, will probably ensure that this new nature project will be carried out according to plan. Although an intensive period of public consultation was necessary – in particular because the whole area is currently highly productive farmland and the interests of the local farmers had to be taken into account – much of the land has been acquired and work will soon begin to implement the plans.

3.3 Creating ecological networks in an intensively used landscape

An ecological network is in fact a spatial strategy for enlarging and connecting nature reserves and protected areas to reduce habitat fragmentation and vulnerability to external influences, such as nitrogen deposition and water table drawdown (Reijnen et al. 2007). In 1990 the Netherlands government began planning to create an ecological network in the Netherlands and gain experience and expertise in the process (LNV 2006). The ecological network strategy was a necessary response to the dramatic changes in land use in the Netherlands during the past century, in which the mainly small-scale, diverse agriculture landscapes were transformed into intensively managed, monotonous agricultural landscapes (Figure 3.2). This trend can also be seen worldwide.

These land use changes cause biodiversity loss because they reduce the size of seminatural and natural areas, leaving only small, isolated habitat patches in an intensively used landscape. Biodiversity is related to habitat patch size: the smaller

Change in density of linear landscape elements **Figure 3.2**

Source: Rienks et al. 2008
Alteration of the landscape from a small-scale biodiverse agricultural landscape adapted to local physical conditions to an intensively managed monotonous agricultural landscape with controlled conditions.

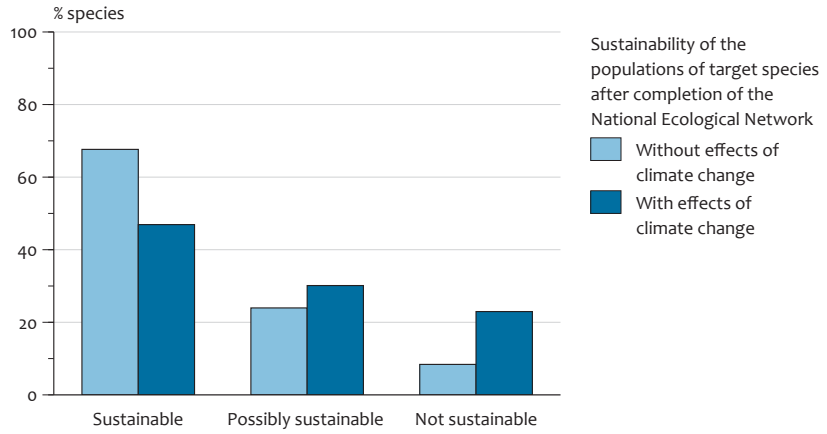
or more isolated an area, the higher the loss of biodiversity. Species can migrate certain distances between the patches, but the maximum distance between patches that can be bridged differs between species. Wildlife corridors reduce the isolation of patches, but they do not reduce their vulnerability to external influences. Landscape ecological science is used to determine how large the patches should be and how corridors can be located to greatest effect.

An ecological network is even more important if the effects of climate change are taken into account (Vonk et al. 2010). As the climate changes, suitable conditions for many species shift towards the poles. The risk of a species becoming locally extinct as the climate changes is greater if its areas of habitat become isolated. For many species an ecological network is important for their survival in a changing climate because it facilitates migration to new areas of suitable habitat (Vonk et al 2010). The area and spatial connection of the planned national Ecological network is sufficient for almost 70 percent of the target species, i.e. selected species as an indicator for biodiversity for Dutch policy evaluation. However, when climate change is taken into account the area and connectivity is sufficient for less then 50% species (Figure 3.3). Therefore, it is important that climate change is taken into account when planning the National Ecological Network.

The Dutch experience in creating an ecological network

The ecological network in the Netherlands consists of the existing nature reserves and protected areas, newly developed nature areas, wildlife corridors and agri-environmental schemes. Government policy is to develop 150,000 hectares of new nature areas and corridors and 100,000 hectares of agri-environmental schemes to

Figure 3.3 **Effects of climate change on animal target species of Dutch biodiversity policies**



Source: Vonk et al. 2010

The amount of sustainable populations of target species after completion of the planned national Ecological network decreases. Climate change amplifies the requirements of spatial connection and area covered by an ecological network.

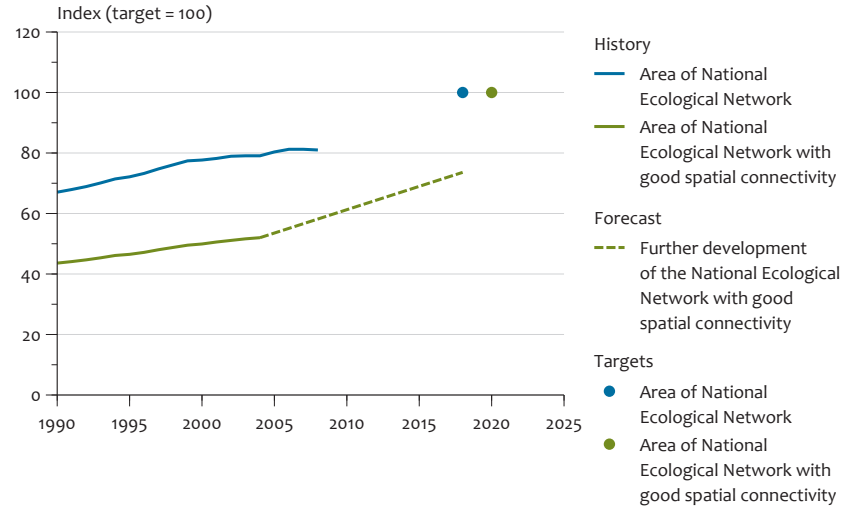
create an ecological network covering 20% of the Dutch countryside in 2018 (LNV 1990, LNV 2006).

The government has now acquired half of the planned area for restoration of the natural or seminatural situation and has transferred these areas into the care of conservation management organisations. The land is purchased on a voluntarily basis and participation in the agri-environmental schemes by landowners is also voluntary. An advantage of voluntary land purchase is support for the development by stakeholders and the public. A disadvantage of voluntary land purchase is that progress with ensuring the spatial connectivity of the network is proceeding at a slower rate than the rate of expansion of the total area of the network. Not all farmers in an area sell their land at once or in an efficient spatial order. The progress made with creating the network is illustrated in Figure 3.4. The spatial connectivity of the network is only slowly increasing as habitat restoration and creation projects are completed. The planned period for completing the network is too ambitious if all the targets are to be met (PBL 2010b).

Ecological networks fulfil many ecosystem services

Many land use functions and claims on land come together at the local level. The ecological network is not monofunctional for biodiversity protection (LNV 2000); about 90% of the area is used for recreation, an important function in a densely populated country. Besides recreation, most forests are used to produce timber, capture carbon and clean polluted air. Many protected areas are used for drinking water abstraction, water storage or flood protection (PBL 2010a). Many seminatural areas have a high cultural heritage value and reflect the Dutch

Surface area and spatial connectivity of the National Ecological Network **Figure 3.4**



Source: WOT-Alterra, DLG, Dienst Regelingen

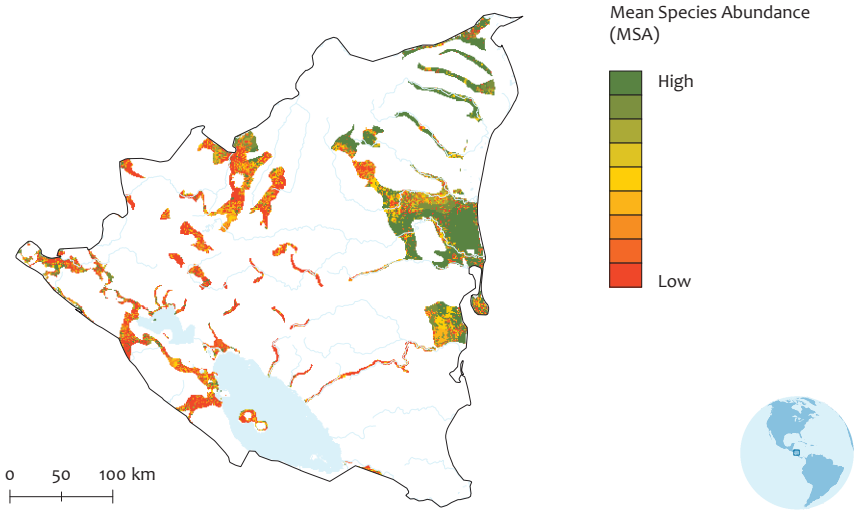
Since 1990 the Netherlands government has been acquiring land and creating new wildlife habitats. It is a spatial strategy that enlarges and connects ecosystems and habitats to reduce fragmentation.

cultural identity. The use of the ecological network is considered sustainable and biodiversity plays an important role in all these functions. Possible adverse impacts of these uses on biodiversity should be minimised or compensated for (LNV 2000). Sustainable use is a key issue and if uses are not monitored and adjusted accordingly they could become a threat to biodiversity.

Ecological networks worldwide

Ecological networks do not end at national borders. The Natura 2000 network of protected areas under the EU Birds and Habitat Directives form a European ecological network across the member states. Worldwide, ecological networks are just beginning to attract attention (Figure 3.5). In many countries the context of biodiversity protection is a nature–culture continuum similar to the situation in the Netherlands, and the solution is found in a mix of sustainable agriculture and forestry, protecting natural areas with high biodiversity and creating or restoring ecological corridors between those areas. Even in developing countries, ecological networks can help to preserve biodiversity (Harvey et al. 2008). In many developing countries poverty is continually driving the agricultural frontier into natural areas and the clearance of virgin forest (see Chapter 4). When poor local farmers are thrown off their land by large-scale export-oriented commodity development, they are forced to take areas of forest into cultivation to survive. Working with local farmers, using local and traditional knowledge, and improving the situation of these farmers appears to be a good mix of tools to create ecological networks (Finley-Brook 2007; GMS-CEP 2008). The Netherlands government supports sustainable

Figure 3.5 **Ecological quality of the Nicaraguan Biodiversity Corridor, 2001**



Source: Tekelenburg and Rios 2009
The Nicaraguan Ecological Corridor: protection of natural areas in reserves (green areas) and restoration of biodiversity in agricultural landscapes (red areas).

regional rural development in buffer zones and corridors (LNV 2010). Much attention is given to cooperation, coordination and consultation.

3.4 Biodiversity in multifunctional rural development

In this strategy, increasing biodiversity is one of many objectives of a rural redevelopment project and new nature is not the main driver for the project. Nevertheless, increasing biodiversity can be the main goal in parts of the plan area. Making connections between the new and existing elements of natural value will be the most common problem. In projects like these, the funds needed to develop new nature is generated by other types of land use. If some areas are set aside for habitat development, or if certain areas are designed with nature conservation as an additional function, agriculture, building projects or recreation will foot the bill. These activities also benefit from nature conservation as the proximity of wildlife areas increases the economic value of houses, the recreational and tourism value of the area is increased and, when properly situated, the value for sustainable agricultural use increases. This is especially true in rural development plans, where the inclusion of elements of landscape and ecological value are usually seen as an integral part of the overall plan. After completion of the project, all new landscape and natural elements are transferred to nature and heritage conservation organisations, which then bear the costs of management and maintenance. However, not all of these elements have high natural values. Furthermore, the biodiversity goals may be eroded to some extent in competition with the other

City parks offer recreational facilities for people and at the same time habitats for plants and animal species within the urban environment.

functions. These biodiversity values must be explicitly formulated, unambiguous defined and jealously guarded during the whole planning process.

An illustration of this strategy is the redevelopment of Lingezegen, a buffer zone between the cities of Arnhem and Nijmegen in the east of the Netherlands. With its 1,500 hectares of open farmland, greenhouses and recreational facilities, bordered by new suburbs and criss-crossed by roads and railroads, Lingezegen is an example of a peri-urban transitional zone where all kinds of land use come together. Increasing biodiversity was not an explicit consideration for the redevelopment plan as a whole. Nevertheless, the design of individual park and water elements will certainly improve ecological conditions. The fact that the different natural parts are connected to suburban and urban park areas with a water storage goal increases their importance. Although biodiversity conservation is only one element in the overall goals for the area, biodiversity values will be increased by the creation of recreational and water features.

3.5 Biodiversity within the urban environment

City parks, or 'metropolitan parks', elaborate on the post-war practice of creating out-of-town parks to compensate for the lack of green spaces in the city. These parks used to be considered part of a 'Randstad Green Belt', but this ambitious scheme was only partially realised. Nevertheless, Rotterdam, The Hague and Amsterdam are surrounded by several thousand hectares of parkland, lakes and forests. The bird populations in these city parks, especially those near the urban edge, are such that they can be considered the equal of more remote bird

sanctuaries. In more recent thinking, metropolitan parks are seen as a basis for a more complete urban environment. This means that planners tend to think in more urban terms about these parks, keeping open the possibility of using them as a basis for scattered residential and commercial developments. Given the fact that the number of visitors to the 'old' parks has been stagnant for decades, a combination with more urban land use may be a good idea to increase the viability of new park plans.

In addition to the obvious ecological advantages, biodiversity turns out to be a positive factor in the appreciation of the urban environment by its residents. In a survey, no less than 95% of the population saw the presence of birds in their residential area as an enrichment of their everyday surroundings (Kooijmans 2009). And urban districts certainly contribute to biodiversity: more than one-third of the populations of twenty species of nesting birds in the Netherlands breed in cities. This is to a large extent due to the heterogeneity of habitats in urban areas, with their stony surfaces, wastelands, parks, gardens and waterways. Residential neighbourhoods from different periods with different architectural styles provide a variety of environments for plants and animals.

4 Biodiversity policies to combat poverty

The Millennium Ecosystem Assessment (MEA 2005) sees biodiversity as a precondition for increasing the quality of life and reducing poverty. This vision is followed by international conventions, such as the CBD. All people, rich or poor, benefit from the goods and services that biodiversity provides. However, increased economic growth and human wellbeing generally causes biodiversity loss (PBL2009c), and continued biodiversity loss may hamper economic development and affects poor people in particular. Poverty is therefore also a threat to biodiversity (DFID 2000). How can poverty reduction and biodiversity conservation be combined? The challenge is to look beyond the impacts of development and economic growth and enhance the positive outcomes of biodiversity policies for distributing wealth and reducing poverty. This chapter presents some insights into the relations between poverty and biodiversity. Section 4.1 presents different correlations between poverty and biodiversity. The rest of the chapter describes the underlying mechanisms of these correlations: capital-driven trade-offs (section 4.2), policy-driven trade-offs (section 4.3) and poverty-driven trade-offs (section 4.4).

4.1 Local win-win situations are possible but cause spatial trade-offs

Relations between poverty and biodiversity follow a pattern

The most common relation between biodiversity and poverty is increasing income at the expense of biodiversity: win-lose trends (PBL 2009c). Biodiversity is needed to support fisheries and agricultural production, which depend on careful exploitation, clean water, soil fertility and energy. An example is the canoe fishery system in Ghana (see Text box 4.1). This system was initially very successful, generating increased income and improving the wellbeing of the local population (the win-lose trend (1) in Figure 4.1). However, better fishing techniques and an increase in the fishing population resulted in overexploitation of the fish resources, a decrease in fish stocks and finally increased poverty (lose-lose trend (2) in Figure 4.1) (UNEP 2007; CSIR 2009; MEA 2005).

Win-win situations of poverty reduction and biodiversity restoration can be found

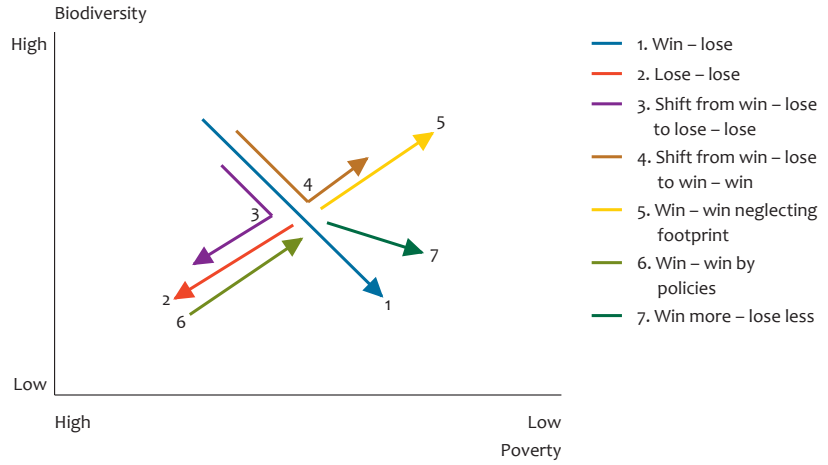
Another relation between biodiversity and poverty is the combination of improved income and biodiversity conservation: win-win trends (PBL 2009c; van Bodegom et al. 2006) or a so called green Kutznets curve (Mc Pherson & Nieswiadomy 2005; Gutman 2008). Several projects run by environment and development

Text box 4.1: The changing poverty–biodiversity relation from win-lose to lose-lose in the traditional small-scale marine coastal fishery sector in Ghana

The coastal communities in Ghana rely on fish as a source of animal protein and income, but poverty is severe in the subsistence-based canoe-fleet fishing community. Two periods can be distinguished: from 1966 to 1988 when the total catch increased, and the more recent period from 1988 to 2003 when the catch diminished. Biodiversity decreased over the entire period. In this area better fishing techniques were introduced which enabled the fishers to profit from an increased catch. Economic development attracted more fishers and the population increased. The catch per capita increased sharply from 4 to 18 tonnes per 1,000 habitants in the first period, but in the second period declined to 12 tonnes in 2003. The total number of fishers doubled over the entire period. The shift from a win-lose to a lose-lose trend is best explained by immigration of poor people from the hinterland, increased catch technology and a fall in fish production in the commons (Alder et al. 2006).

Fishers depend on the successful reproduction of target species in their natural ecosystems. Traditional fishing communities (here in Senegal) are adversely affected by a growing fishing community and competition from the international industrial fishery sector. Overexploitation of natural resources causes biodiversity loss and decreasing catch sizes, making the local community vulnerable to poverty.

Figure 4.1 **Findings on the relations between biodiversity and poverty from the literature**



Source: PBL 2009

Different trends of decreasing or increasing poverty in combination with biodiversity loss or gain.

organisations have reported positive impacts on both biodiversity and incomes at the local scale (REF). Well-known examples are community-based resource management and integrated conservation and development projects. Local people may earn incomes from ecotourism or wildlife management, such as gaming parks and ecotourism in South Africa (CSIR 2009). There are also cases of payment for ecosystem services with benefits for local people, for example for the regeneration of secondary forest in Costa Rica (Vallejo et al. 2006). These projects show that poverty reduction and restoration of biodiversity can go hand in hand at the local scale (trend 5 in Figure 4.1). However, this is not easy to achieve and it depends very much on the socioeconomic and political contexts (van Bodegom et al. 2006; Nature and Poverty 2007).

Local successes cause negative trade-offs

The positive impacts of economic development on poverty reduction and the restoration of biodiversity in one location may cause negative impacts elsewhere or in the future. Local win-win situations cause changes in:

- the production of food, fibres and energy;
- money transfers, such as subsidies from the national government or international donor organisations and payment for environmental services;
- movements of people (in- and out-migration of poor or rich people).

These changes may lead to negative trade-off effects, such as poor people moving to city slums or forest clearance to compensate for the loss of food production. Reforestation and payment for environmental services in Costa Rica were successful (Text box 4.2) thanks to a continuous flow of subsidies and financial support from the national government and inward private investment (Vallejo et al.

2006). This example and other experiences suggest that local win-win situations are generally dependent on external inputs. A local win-win development pathway, in which poverty is reduced and biodiversity is restored, has its costs in terms of initial investments as well as structural maintenance (PBL 2009c).

4.2 Capital-driven trade-offs: agro-export

Integration into global markets can lead to economically profitable sectors because agricultural exports increase (la Vina et al 2005). This generates income for investments in soil and water conservation to improve production capacity, which in turn can create employment and improve incomes. However, large-scale capital-driven commodity development can also result in adverse local impacts on people and biodiversity if commodities for export are produced at minimum standards of sustainable production (Kessler et al. 2007).

Local impacts lag behind the increased economic activity

Large-scale agricultural exports brings foreign currency into a country, but the socioeconomic conditions of local people in thinly populated areas may not improve during the period of strong economic expansion. One would expect local people would benefit from economic development driven by agricultural exports, but there is evidence that the production of large-scale production of agricultural commodities for export has adverse social and biodiversity effects in the areas where production takes place (Kessler et al. 2007). These may include excesses like land grabbling, low salaries, slavery, pollution, deforestation and excessive use of water. In areas where production strongly increased, socioeconomic indicators showed negative trends in more than 50% of the cases studied, especially on income, food security and poverty. The gap between the lower socioeconomic

Text box 4.2: The poverty-biodiversity relationship in a win-win situation in Costa Rica

At the beginning of the last century much of the tropical forest that covered the northwest of Costa Rica was cleared and converted into arable fields and grassland for livestock grazing. The forest cover decreased to below 20% and the human population reached its peak of 30 inhabitants per square kilometre at the end of the 1960s. In the 1970s the international meat market collapsed and many of the inhabitants, especially the poor, migrated from the area, halving its population in a few years. Pastures were abandoned and converted into secondary forest regrowth. The government supported economic development with subsidies for forestry activities, while foreign investments supported mostly teak plantations. By 2005, forests covered 55% of the land surface. The Human Development Index, a measure of human wellbeing, increased from 0.55 in the 1960s to 0.84 in 2003 and poverty declined during this period. The simultaneous positive impacts on biodiversity and poverty would not have been possible without migration of poor people and financial support from the national government (Vallejo et al. 2006).

situations in these areas and the higher national averages increased in 26% of the cases.

There is a correlation between bad governance and the state of deprivation in these production areas. Most of these underdeveloped areas are expansion or 'frontier' zones bordering intact forests (Text box 4.3) and they lack governance, social organisations and wellbeing services. The loss of natural capital is not compensated by economic benefits for local people (Kessler et al. 2006).

Agro-export can affect local food availability

Expansion of the agro-export sector may threaten local food production. Such effects are reported for the development of energy crops for first generation biofuels. Primary bioenergy is produced from energy crops that are grown primarily for energy production. Important energy crops are palm oil, sugarcane and oilseeds like Jatropha. Today the total land claim for energy crops is 1% of the total crop area in the world, but it is estimated that it will rise rapidly to more than 17% when the EU strategy for stimulating biofuels is fully implemented (RFA 2008). In 2006 the price of maize rose by 70% in response to strong demand in the US for biomass production. The expected rise in the prices for soy, cassava and grains are in the order of 20–40% (Runge and Senauer 2007). In the short term, high food prices have

Text box 4.3: The poverty-biodiversity relationship of a large-scale agro-export commodity in Brazil

Soy production in Brazil takes place at the expense of the El Cerrado savannah forest. It is a typical case of a highly international market-oriented business; it is large-scale and capital driven, with a high potential for economic growth. However, this economic growth delivers only a modest increase in human wellbeing and many poor people do not benefit because the profits are exported outside the area, and levels of inequality have increased. The areas where soy cultivation is expanding are among the poorest in the country and access to land is relatively easy. Small-scale farmers are especially affected by expanding soy cultivation. Local landowners, who mainly practice extensive livestock grazing, are displaced to savannah forest, which they clear to create new rangelands, or buy land from subsistence peasants. These small-scale subsistence peasants then move into the forest and clear areas for cultivation (Oxfam 2008). These indirect shifts in agricultural land are estimated to cause 10–50% extra reclaimed forest in addition to the area needed for the soy production (Grieg-Gran and Kessler 2007; Kessler et al. 2007).

If the high global demand for soy can be properly managed, the prospects for a more positive economic development for poor people are moderate. Poverty is not just a question of low incomes, but to a large extent of a low level of empowerment and organisation (Kessler et al. 2006). Recent developments show that positive progress can be made. It is expected that integrating livestock farming with soy cultivation can generate increasing production with lower biodiversity losses. In the future, this may be an example of a 'win more-lose less' trend (PBL 2009).

Global market integration drives imports and exports and agro-export production causes local biodiversity loss. Local communities with traditional forest-based livelihoods suffer the consequences of the resulting lack of access to natural resources.

adverse impacts on poor people in urban slums, but long-term effects are unclear and uncertain (RFA 2008). The adverse effects of expanding cultivation of energy crops can be prevented if they are grown on marginal or abandoned agricultural land in combination with intensification of current land use.
Second generation bioenergy is produced from wood (from plantations), wastes and sugarcane (PBL 2010c). The net impact of secondary biofuels depends on the type of commodities used. The use of waste products has no effect on biodiversity, whereas the use of woody biofuels has an impact on biodiversity because of the claim on land for forest plantations (Dornburg et al. 2010). However, the mitigation of climate change impacts on biodiversity through the production of climate-neutral woody biofuels does not compensate for the biodiversity losses before 2050 (Oxfam international 2008). It is expected that positive effects of bioenergy from wood, including climate mitigation, will overcome the negative impacts on biodiversity later in the 21st century, when the productivity of forest plantations more than compensates for the climate change impacts (van Oorschot et al. 2010).

Certification can turn agro-export into a win-win situation

Fairtrade, organic farming, the Rainforest Alliance and the Forest Stewardship Council (FSC) have set minimum standards and organised control over production conditions according to sustainability criteria: environmental protection, improved working conditions and guaranteed income for local people in production areas (Vermeulen et al. 2010). The focus is on making production more sustainable, but environmental and social standards can differ (Kamphorst 2009). Special attention needs to be given to reducing these differences.

4.3 Policy-driven trade-offs: benefits for local people

Local people may be trapped by nature protection

Restricted access to nature reserves may lead to increased poverty among local people if the former benefits they obtained from these areas are not compensated for by increased productivity of cropland, livestock farming or other income generating activities (OECD 2008b). These products from natural ecosystems contribute to the daily supply of food, energy and income, especially in times of shortages caused by environmental disasters, market failures or social conflicts. The use of biodiversity must be seen as a short-term safety net rather than a structural solution (PBL 2009c). When people have restricted access to natural resources, the effects may be overexploitation of the commons where access is still permitted. For example, a transition from shifting cultivation to gathering non-timber forest products has been reported in the Vietnamese mountains on the border with Laos (Truong Quang et al. 2006). This may result in forest degradation if all suitable plants and animal species for consumption or commerce are harvested (Text box 4.4).

Payments for ecosystem services support common property and natural resource management

If local people are not allowed to clear land or extract timber and other products, one of the strategies for sustainable use of these natural ecosystems is payment for ecosystems services, such as the protection of drinking water sources for urban centres. Payment for ecosystem services can be an alternative to short-term exploitation of the resources and can be integrated into traditional production sectors that exploit natural resources. The production sector then not only produces a specific good, but also becomes the caretaker of the ecosystem services (Metcalfe & Vorhien 2010). The accompanying payments improve the internal rate of return of the 'communal business case' and reduce the financial risks, facilitating investment by the financial sector (OECD 2010). Attention needs to be given to improving investment mechanisms for sustainable forest management (Van Dijk and Savenije 2009).

To make payment for ecosystem services a success – for example under the UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) – international initiatives and local projects should be linked (WWF-CARE consortium 2009). Experiments should be set up to get financial flows between partners moving. Important issues that need further attention include governance, accountability, spatial planning, forest management and assurance that benefits accrue to local livelihoods. REDD is not only an instrument, it is a development and political issue. Its implementation is related to the creation of an enabling environment and political willingness to manage forests and other natural ecosystems in a sustainable way (Kok et al. 2010).

Text box 4.4: The collapse of the shifting cultivation system in Vietnam

In the uplands of Vietnam there is a conflict between ethnic minorities and the government about the establishment of protected areas for biodiversity conservation in the remaining original forests. Land clearance for agricultural production and commercial logging is no longer permitted. This puts pressure on local people to change their livelihood from shifting cultivation on steep hill slopes to legal and illegal exploitation of forests, savannahs and water bodies if out-migration and employment in other sectors do not offer better opportunities. The local economy depended heavily on agriculture and forestry, which accounted for 90% of household income. When the biodiversity protection regime was established, the proportion of total family income provided by forestry and non-timber forest products increased from 10% to 31% in a seven year period. Forests were used for legal logging (an increase of 200–300%), illegal logging, collecting firewood (six times the volume of logging), legal wildlife hunting and poaching. Agricultural productivity decreased by 25%. Food production per capita and human wellbeing increased, but at a lower rate than the national average. Poverty levels have been reduced, but the rate of improvement still lags behind the national trend, widening the gap between urban centres and remote rural areas (Truong Quang et al. 2006).

People who practice shifting cultivation maintain a delicate relationship with tropical soils and forest natural resources. If land becomes overexploited or access to natural resources is restricted by biodiversity protection policies, local people may suffer from reduced income or food supply.

4.4 Poverty-driven trade-offs: biodiversity loss increases the vulnerability of local communities

Resource degradation makes poor people more vulnerable

The Millennium Ecosystem Assessment (MEA 2005) concluded that food production has increased worldwide, but that ecosystem services such as protection against erosion, crop pest control, pollination by wild insects, water purification and coastal protection are decreasing (PBL 2010a; Text box 4.5). These trends affect the vulnerability of local communities (farmers, fishers and gatherers) because they depend for their livelihood on these ecosystem services (PBL2009c; Lucas et al. 2009).

The problem is that the total societal costs of the decreasing ecosystem services are not discounted in market prices (Metcalfe and Vorhies 2010). The production of goods usually falls to the private sector, whereas regulating services is part of the public domain and the responsibility of governments. Their real value cannot be determined easily. Private profits are generally not balanced against public losses.

Agrobiodiversity and market integration are inversely related

Global market integration demands uniformity of commodities, which explains the decline in the genetic diversity of crops and livestock (Buiteveld et al. 2009; FAO 2007). To reverse this decline, market-oriented farmers face the challenge of benefiting from a rich genetic diversity by exploiting niche markets for specific cultivars and breeds. Agrobiodiversity is important for subsistence-oriented peasants because they are dependent on the genetic diversity of cultivated crops and domesticated livestock breeds. This broad genetic basis provides harvest security and stability in the short term and is a risk avoidance strategy against

Text box 4.5: Poverty-driven biodiversity loss in the Cotopaxi Highlands of Ecuador

Poverty-driven biodiversity loss is best illustrated by the imminent end to the moving agricultural frontier and emigration of poor people from the Andes highland in Ecuador. Cotopaxi province is a densely populated mountainous area with a subsistence-oriented smallholder economy. There is little potential for poverty reduction and production factors are unfavourable: very high altitude, too dry, too cold and negative trading relations. In the past, this situation has driven a continuously moving agricultural frontier as virgin land was cleared and occupied by young families. Farmers lived in poverty and had difficulties in accessing markets and technical and social services. Access to new land is now becoming difficult and migrants are forced to occupy land that is less suitable for production. Faced with this situation, a steady flow of poor people are moving to the tropical lowlands and to urban centres throughout the country. Cotopaxi is now a poverty pump generating a continuous source of cheap labour. The remnants of original ecosystems and protected areas for biodiversity conservation are under pressure, with no structural solution to increase human wellbeing and reduce poverty (Saenz 2006).

Large areas of natural ecosystems in the tropics are transformed into low-productivity grassland. Livestock production is not a sustainable pathway to improved human wellbeing, while large areas of original forests are lost.

droughts, pests and diseases. In the long term, it enables crops and livestock to adapt to changing growing conditions, such as the effects of climate change (Lane & Jarvis 2007) and outbreaks of pests and diseases (Biodiversity Fund 2009).

Balancing two pathways towards sustainable production

Sustainable development means stable production over time with a minimum of adverse side-effects and with an optimal combination of external inputs and use of ecosystem services. There are two possible pathways that strike a balance between maintaining a specific level of biodiversity and sufficiently high production levels. One pathway is to intensify land use and obtain high productivity in one area, while setting aside space for natural ecosystems elsewhere (PBL 2010c). A low level of biodiversity in the production areas may be acceptable if the production system is highly productive and stable. The other pathway focuses on more extensive production systems, such as organic farming and Fairtrade, in which the production function must be shared in the same location with social and environmental goals, biodiversity, better living conditions for local people, tourism and the sustainable delivery of regulating and supporting ecosystem services (REF). These pathways have different impacts on biodiversity. In the intensification pathway the remaining biodiversity in the highly productive cropland is low, but in the set-aside natural areas it is high, provided that the trade-offs do not exceed these production areas. This latter assumption is not likely, as we have seen in Chapter 2 that spatial trade-offs are very common. In the extensive production pathway the remaining biodiversity is somewhat higher in the production fields, but the claim on land for production is probably higher and less area is left over for natural ecosystems (Reidsma et al. 2006; Alkemade et al. 2009).

5 Strategies for more effective biodiversity policies

The coming decades will be critical for slowing down the loss of biodiversity. Continuing the package of policies and concerted actions implemented during the last decade, will probably not slow down the loss of biodiversity. Additional strategies for the protection and sustainable use of biodiversity can be of help in the next period. As biodiversity trends are related to human use, such strategy may address the way land and water is used. For example, intensive agriculture creates landscapes in which few species can survive and overexploitation by fisheries reduces fish populations. Biodiversity policies cannot, therefore, be pursued in isolation from other policies (Gerritsen, et al. 2009). Measures to stimulate the protection or restoration of biodiversity are often part of a larger package of policies which have to support many other interests. Governments play an important part in initiating and integrating these policies and have responsibilities in four main topic areas: spatial planning and protection of biodiversity, sustainable production and use, sustainable trade systems, and poverty linked to biodiversity. The role of governments differs per topic. For example, where governments are dominant in spatial planning, they have to negotiate with many partners in seeking to establish sustainable trading systems.

5.1 Spatial planning and biodiversity protection

Protecting areas with high biodiversity is one of the first options to consider for halting biodiversity loss. Spatial planning is an obvious policy instrument to use. A key strategy in spatial planning policy in the Netherlands is to establish a lasting and robust ecological network that protects areas of high biodiversity and is integrated with other types of land use. One option for ensuring this integration is to restore and maintain ecological corridors between protected areas to create ecological networks.

It is argued here that protection alone is insufficient, for two reasons. First, a synergy with economic development maintains the economic prospects for the area, which is important for the local population. Second, a synergy with ecosystem

goods and services maintains the sustainable use of the area and in the long run maintains economic prospects as well.

The government's strategy for establishing the Dutch National Ecological Network is to establish a general level of environmental and ecosystem quality and leave the acquisition of sites and any necessary landscape works to local government and private parties. The advantage is that local problems are solved locally and different sectors, such as nature conservation, agriculture and urban development, are brought together at the local scale where they can generate public support. A disadvantage may be that the coherence with the national or international scale, which is important in structuring ecological networks and setting ecological targets, can be lost during local implementation.

Biodiversity protection schemes depend on the cooperation and participation of local and regional stakeholders. The Netherlands central government has devolved many responsibilities and funds to the provincial authorities, who have the main responsibility for the realisation of the National Ecological Network. Water boards, municipalities, other provincial government departments and national government also make all kind of other policies which have an impact on biodiversity policies. This means that many stakeholders and tiers of government are involved and they all have to incorporate ecological networks into their own spatial plans. The role of the national government is to provide guidance to regional and local stakeholders on finding solutions to regional and local problems. This can be done by providing know-how and funds and by getting the different actors to support the idea of ecological networks. However, top-down mandatory policies may erode societal support, which in turn will slow down or even stop the development of ecological networks. In such cases, national policies need to be changed to make it easier to develop ecological networks in specific locations.

Farmers, businesses, landowners and interest groups have an important role in the formulation and implementation of biodiversity management plans. In the Netherlands it is common that the acquisition of agricultural land for habitat restoration depends on voluntary sales and therefore the views and motivations of farmers are crucial for the successful implementation of ecological networks. Normally, farmers are offered agricultural land with possibilities to expand in return. Although this decision leads to higher transaction costs, it creates better chances for long-term success, because these local stakeholders determine the success of biodiversity initiatives and have important knowledge about their region which is needed to solve local problems.

5.2 Sustainable production and use

Sustainable production involves minimising the adverse effects of production on the environment, conserving biodiversity and using ecosystem services. The adverse effects of conventional production include emissions of nutrients and pesticides from agriculture and aquaculture and overexploitation of marine and forest ecosystems. The quality of the natural ecosystems is reduced because

characteristic species of those ecosystems are replaced by species tolerant of emissions or overexploitation.

Conserving biodiversity in production areas serves two objectives. First, some species find their main habitat in these production areas and conserving their habitat is the key to their survival. Second, the biodiversity itself provides services to production, such as pest reduction and pollination. These two objectives can be combined by setting aside land for nature conservation, for example in the form of field margins, wooded hedges, small woods and ditches. This can also be achieved through the extensive use of farmland, a method used in the Netherlands to provide habitat for farmland birds. Interconnected patterns of these landscape elements and extensively managed farmland are important for biodiversity protection. Governments can support both agri-environmental schemes to increase biodiversity and sustainable production and the usage of ecosystem services at the same time.

The intrinsic value of biodiversity and the sustainable use of biodiversity are two arguments for protecting biodiversity in multifunctional landscapes. Where possible these can be combined to increase the prospects for successful biodiversity conservation with support from society. However, interactions can lead to adverse impacts or friction between use and protection interests. Governments can facilitate combinations of use and protection by generating knowledge on which ecosystems and species can be combined with which types of use, and on new technologies for the sustainable use of biodiversity. They can also finance innovations in land use and bring organisations together.

5.3 Sustainable trade chains

Countries are connected to each other by trade and leave their ecological footprint in the form of used ecosystems and land elsewhere. Options for reducing the rate of biodiversity loss must involve both the exporting and the importing countries. One route is to introduce biodiversity criteria in sustainable trade chains, for example through the certification of commodities and products. These criteria should ensure that parts of the original biodiversity do not disappear from the production landscape, while production per hectare is increased to the highest possible level.

The private sector and markets often introduce certification schemes for trade systems to meet the demand for sustainable production. Governments may support these voluntary initiatives by facilitating their initiatives and by initiating, facilitating or financing cooperation between stakeholders in international trade chains (Vermeulen et al. 2010). For example, the government of the Netherlands supports the Dutch Sustainable Trade Initiative, which aims to mainstream certified products in current markets. Governments can consider coordinating or influencing the introduction of trade labels, because many different labels will confuse customers.

Besides the certification of sustainable production, there is a need to control illegal trade flows. Under the EU FLEGT initiative (Forest Law Enforcement Governance and Trade) the EU enters into voluntary agreements with individual producing countries on tackling on export of illegally sourced timber between the partners.

5.4 Biodiversity and poverty

In recent decades there has been a paradigm shift in the debate on biodiversity and poverty. The two policy fields were initially seen as separate issues, but are now considered to be two sides of the same coin. The important conclusion is that a development pathway in which poverty reduction is realised locally alongside biodiversity restoration (a win-win trend) is possible, but care should be taken to prevent negative trade-offs in space, in time and between people. This win-win possibility is good news for the protection of very rare and threatened ecosystems in areas where people live in poverty. However, governments and donor organisations must be aware of the dependence of local success on outside financial support, out-migration of poor people to urban slums or a reduction in the output of goods and services produced in the project area.

Biodiversity can help people survive under the threat of environmental degradation, social conflicts or market failures in the short term, but it cannot contribute to reducing poverty in a structural way. Biodiversity loss is only one of the many causes of poverty, but poverty is also a driver of biodiversity loss. To be successful, poverty reduction policies must at the very least offer a smart combination of access to natural resources and biodiversity, production technology, market integration and access to social services.

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Colophon

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Breaking Boundaries for Biodiversity

Global Assessments show that biodiversity is continuing to be lost. The rate of loss is high in the tropics. In the temperate zone the loss is smaller and some successes have been achieved. In the Netherlands the loss has slowed down, but has not been halted. The slightly positive picture from this country becomes negative if its biodiversity impacts abroad are taken into account.

Integrated assessments help us to understand the underlying causes of biodiversity loss and support decision-making on post-2010 biodiversity policies. This brochure advocates looking beyond three traditional frontiers of biodiversity stocktaking:

- looking beyond national borders to include the impacts of domestic consumption and economic activities on biodiversity outside national territories;
- looking beyond biodiversity policies by integrating these into economic sectors, spatial planning, transport and urban development;
- looking beyond the impacts of development and economic growth and enhancing the positive outcomes of biodiversity policies for distributing wealth and reducing poverty.

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