

CSD-16 (2008) Report of the Netherlands

Sustainable development in agriculture, land and rural development,
drought and desertification and Africa



NATIONAL REPORT FOR CSD-16 (2008)

THE NETHERLANDS

A review of sustainable development in agriculture, land and rural development, drought and desertification, and Africa.

A study commissioned by the Netherlands' Ministry of Agriculture, Nature and Food Quality,
on behalf of the Netherlands' Interministerial Task Force on Sustainable Development.

This report forms the Netherlands' contribution to the bi-annual meeting of the UN Commission on Sustainable Development in May 2008, in New York.

The report has been compiled by an interdisciplinary team of staff of Wageningen University and Research Centre and provides an overview of the Netherlands' policies, priorities and activities with regard to sustainable development in the fields of agriculture, land and rural development, drought and desertification, and Africa.

The compilation of the report was done in close interaction with members of the Netherlands' Interdepartmental Task Force on Sustainable Development. This Task Force is responsible, amongst other things, for the coordination of the Netherlands' contribution to the CSD.

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Executive Summary

This report forms the Netherlands' contribution to CSD-16 (2008) of the UN Commission on Sustainable Development. It comprises an overview of the Netherlands' policies, priorities and activities with regard to sustainable development in the fields of agriculture, land and rural development, drought and desertification, and Africa. The main findings are:

Agriculture and sustainable development in the Netherlands

The Netherlands has a highly productive and competitive agro-sector. This is the result of a number of favourable geographical and bio-physical conditions, good entrepreneurial skills, key roles of agricultural research and education and pro-active and stimulating governmental policies. Over the past three decades the policy has changed in order to counter the negative environmental impacts of the highly-intensive production systems. The introduction of the new measures and regulations was difficult as farmers were opposed -the costs of implementation being too high- and many changes were made during the implementation process. In addition to the environmental issues, societal concern in the Netherlands is growing on animal welfare, animal diseases and food safety. Policy development has shown to be most effective when done in close interaction between governmental authorities, the private sector including farmer organizations, and representatives of civil society, including environmentalists.

Land and rural development

Agriculture is by far the largest land user in the Netherlands, occupying some 70 percent of the land surface. Land prices are rising steeply, by some 10 percent per year. Along with changing functions of the land in rural areas, also the social status of the Netherlands' countryside is changing. Access to land is well-embedded in the Netherlands' land registration and cadastral system. A number of threats exists to land and soil quality, including the declining quality of peat lands, soil compaction, wind erosion and soil sealing. In many countries in the world peat lands are rapidly disappearing. The knowledge gained in the Netherlands can be used to design programmes to meet the challenge of reducing oxidation of peat land in those countries. Likewise, the Netherlands' lessons learned on soil contamination may be applied in other countries as well. Legislation -and remediation techniques- were established as a result of negative experiences occurring in the Netherlands between 1970 and 1980 mainly. Conversely, in dealing with soil erosion, lessons learned from abroad are being applied in the Netherlands. These include agreements on regulations between local government and farmers. For soil compaction the lessons have yet to be learned.

Drought and desertification

The Netherlands is not a country encountering severe problems with drought and desertification. Meanwhile, the Netherlands addresses these issues at policy level in the European and global context. This is done in the framework of multilateral environmental conventions, agreements and processes and through participation in international research and education programmes.

Africa

The Netherlands supports economic development in Africa through its new policies as formulated in the general policy document 'Our Common Concern' and in the forthcoming document '*Agriculture, Rural Entrepreneurship and Food Security*'. The Netherlands' (renewed) focus on agriculture as a driver of development is in line with that of the international development community (including the World Bank) and that of Africa itself (e.g. the African Union and NEPAD).

The Netherlands' policies are based on the following lessons learned: (i) The sector approach, which was meant to increase the effectiveness of development aid, has resulted in decreased focus on agricultural and rural development, as well as on relevant target groups; (ii) The support to productive sectors has decreased; (iii) Technological innovations have to be adapted to location-specific conditions; (iv) Market incentives are important in steering economic development; (v) Enabling institutional environments are a key requisite for development and (vi) Checks and balances are of major importance in the public domain.

Based on these lessons learned, five priority areas have been identified. These are necessary for sustainable agricultural development in Africa and to make the rural sector prosper. Implementation of the priority areas need to be based on ownership within recipient countries and they need to be further developed within their specific contexts.

The priority areas are:

1. Increased productivity through research and innovation in multi-stakeholder approaches.
2. Creation of enabling environments involving national governments as well as societal stakeholders.
3. Sustainable development of supply chains applying the People, Planet, Profit principle.
4. Improved access to markets, including local, regional and international markets.
5. Attention for food security and re-distribution mechanisms addressing the needs of the most-vulnerable groups in society.

The Netherlands' position on biomass production for the generation of energy includes the development and implementation at the international level of sustainability criteria that specifically address the possible environmental and social effects in biomass producing countries in the South.

1 Introduction

1.1 Background

The United Nations Commission on Sustainable Development (CSD) was established by the UN General Assembly in December 1992 to ensure effective follow-up of the UN Conference on Environment and Development (UNCED), also known as the Earth Summit.

The Commission is responsible for the review of progress in the implementation of Agenda 21 and the Rio Declaration on Environment and Development, as well as providing policy guidance at local, national and international levels to follow up on the Johannesburg Plan of Implementation which was the outcome of the World Summit on Sustainable Development in Johannesburg (2002). The CSD meets annually in New York, in two-year cycles, with each cycle focusing on clusters of specific thematic and cross-sector issues, as outlined in a multi-year programme of work (2003-2017). The CSD sessions -in New York- are open to broad participation from governmental as well as non-governmental actors, and support a number of innovative activities, such as a Partnership Fair, a Learning Centre and a series of panels, roundtables and side events. As a functional commission of the UN Economic and Social Council (ECOSOC), the CSD has 53 Member States.

CSD requests its Member States to report, in two-year cycles, on specific thematic and cross-sector issues. The present report forms the Netherlands' contribution to CSD-16/17 (2008-2009). The thematic focus in this cycle is on agriculture, land and rural development, drought and desertification, and Africa.

1.2 Objective

The objective of this report is to provide an overview of the Netherlands' policies and priorities and -selected- activities with regard to sustainable development in the fields of agriculture, land and rural development, drought and desertification and Africa.

Box 1

The Netherlands' governmental Policy on Sustainable Development (Cabinet Period 2007-2011)

Sustainable development requires a coherent effort in socio-economic development and in dealing carefully with the earth. Sustainable development also implies the consideration of long-term developments, including the way in which our current behaviour impinges on them. Many societal challenges -if not all- require sustainable approaches towards their solution.

The Netherlands' government implements a policy programme with the ambition to take a considerable step on the road of sustainable development. An innovative economy, livelihood- and environmental quality, societal participation and coherence, a well-functioning rule-of-law and public administration in the Netherlands and abroad, all together constitute the pillars of sustainable development. While implementing this policy programme, the Netherlands' Cabinet monitors its coherence and reports regularly on the main results.

In addition to the above policy aims on sustainability, operational management of the Netherlands' public administration needs to become more sustainable. Not only does this imply the procurement of (sustainable) goods and services but also, for instance, savings on energy, a policy on the mobility of employees, sustainable procedures in the construction of infrastructure as well as balanced HRM policies with regards to diversity of staff, discrimination and exclusion on the labour market.

1.3 Readers' assistance

This report comprises 6 chapters. Chapter 1 '*Introduction*', sketches the general background and objectives of this report. In Chapter 2 '*Agriculture and sustainable development in the Netherlands*', general insight is being provided on recent developments in the agricultural sector of the Netherlands. This chapter includes an identification of the main problems in terms of sustainable development that have emerged through the intensification of agriculture in the Netherlands and the growing public awareness of these problems. Examples of these are being highlighted in a number of 'Cases'. Chapter 3 describes '*Land and Rural Development*' issues related to land and rural development in the Netherlands and how these compete with (potential) uses of land. It should be noted that, in this chapter, we have opted to combine the discussion of the two sub-issues 'land' and 'rural development' in their mutual coherence. The main threats to the quality of our soils are described in the chapter. As in Chapter 2, a number of 'Cases' illustrates the issues brought forward in this chapter. Next, in Chapter 4 '*Drought and Desertification*', mainly the Netherlands' involvement in European and international policy platforms, conventions and activities on drought and desertification is being explained. This is due to the virtual non-existence of drought and desertification problems in the Netherlands. In Chapter 5, '*Africa*', the Netherlands' and international policies towards sustainable economic development in Africa are described. Special attention in this chapter is on the new Netherlands policy '*Agriculture, Rural Entrepreneurship and Food Security*'. Chapter 5 also includes a brief description of the Netherlands position on biomass for energy generation with respect to developing countries. A number of case descriptions illustrates in practical terms how the Netherlands addresses sustainable development in Africa. Lastly, in Chapter 6, '*Conclusions and lessons learned*' have been summarized.

2 Agriculture and sustainable development in the Netherlands

2.1 Agriculture in the Netherlands

The Netherlands is a small country (41.528 km², including 7.750 km² of open water) with an average population density of over 400 persons per km². Its geographic position, along the North Sea in the delta of a number of important European rivers, has always been a stimulus for transport and trade to and from the European hinterland. The prevailing natural conditions -a temperate climate with a fair rainfall distribution (total annual average 750 mm/yr), relatively fertile soils in a flat landscape- favour a varied and productive agriculture.

The combination of these two factors, together with a governmental policy that strongly supports a competitive agricultural sector, good entrepreneurial skills, support from a state-of-the-art agricultural research and education system, innovative supply and processing industries, the availability of inexpensive natural gas supporting greenhouse horticulture and floriculture as well as the production of cheap fertilizers, -and since the nineteen fifties- the emergence of the European Union and the associated market enlargement has resulted in a very strong agricultural sector in the Netherlands.

Yields of the main crops (potatoes, sugar beet, vegetables, cereals and flowers) and from dairy production are among the highest in the world. In monetary terms, the Netherlands ranks second, behind the United States, as net exporter of agricultural products. In 2007 total agricultural exports (mainly dairy products, pig- and poultry meat, vegetables, flowers and ornamental plants) amounted to about € 58 billion per year -or some 17 % of the total Netherlands' export of goods and services. Some 10 % of the GDP is earned by the agro-sector, including processing, trade and services, and the sector employs a similar 10 % the total working population of the Netherlands.

In small, densely-populated and highly-industrialised countries with a high per capita income like the Netherlands, agricultural production chains can still be very important and successful as an economic factor.

Agricultural imports amount to some € 34 billion per year (2007) and include cereals, oilseeds, vegetable proteins and fats (soy for instance) mostly as animal feed stuff. These imports originate mainly from countries outside the European Union, the United States, Brazil and Thailand in particular. For many of the imported products the Netherlands has a prime role as processor and distributor to other countries in the European Union.

More key data on the organization and performance of the Netherlands' agricultural sector are available from www.lei.wur.nl/UK/statistics/Binternet/. A brief overview of the development of agriculture in the Netherlands is presented in Annex 1.

2.2 Environmental and social concerns

The high productivity of the Netherlands' agricultural sector came along with levels of external inputs including mineral fertilizer, manure, pesticides and energy, which rank among the highest in the world. The use of these inputs increased (per farm as well as per hectare) mainly in the period 1950-1980. Starting from around 1980, public and political awareness emerged on the environmental and social impacts of these high-input farming systems. Henceforth, agricultural and horticultural development in the Netherlands has been placed under social and environmental conditions and restrictions that aim to promote environment-friendly agricultural production. Even with these conditions and restrictions in place, an intensive, dynamic and internationally-oriented agricultural sector has shown to be economically viable.

In the Netherlands, main environmental impacts from agriculture are caused by emissions of:

- *Nutrients (nitrogen, phosphorus, etc.)* in areas with high concentrations of pig- and poultry farms and dairy farms with high stocking-densities. Here, the production of manure is higher than required to maintain inherent soil fertility levels. The oversupply of nutrients endangers soils as well as ground- and surface waters. In the Netherlands, quite commonly, ground water is being extracted for domestic use, after purification. (See Case 1).
- *Ammonia* especially from animal manure is affecting the quality of forests (acid deposition) or, for that matter, the natural environment at large. High emissions of ammonia into the atmosphere occur in the same areas as enrichment of the environment with nutrients.
- *Other gasses*, including CO₂, CH₄ and N₂O, that are being emitted from, in particular, greenhouses and livestock farms, endanger the earth in the long run mainly through their effects on climate (See Cases 3 and 4).
- *Pesticides and other agro-chemicals* as used in plant and animal protection, imply not only the risks of water- and air pollution but also the risks of unsafe food and of the health of farm workers. (see Case 2).

In addition to the environmental issues listed above, societal concern in the Netherlands is growing on:

- *Animal welfare*, especially in the intensive livestock production sector, where animals often have restricted space only to live-in and roam around. Also, many live-animals (pigs, piglets, calves) are being transported over long distances within Europe.
- *Animal diseases*. Given the intensifying international contacts and high animal densities, the Netherlands' livestock sector is under increasing risk of outbreaks of contagious diseases including Foot and Mouth Disease, Swine Fever and Avian Influenza. Such outbreaks have enormous consequences for individual farmers and their animals, as well as for the sector as a whole, including cross-border impacts.
- *Food safety*. Netherlands' authorities are well-aware of the health risks of specific ingredients, dioxins or antibiotics for instance, in food for humans. Such risks are large, and difficult to manage, in particular given the complexity of the current food production-chains as they encompass a continuum from farm inputs, farm production, (value-adding) processing, trade and transport and retail trade through to consumption.
- *Landscape and biodiversity*. The numerical and acreage growth of intensive agricultural production systems affects the quality of landscapes in the Netherlands -which become less varied- as well as the diversity of floral and faunal habitats in rural areas. Also, there is growing public demand for recreational space (see Sections 2.3 and 3.4).
- *Labour*. The Netherlands' agricultural sector -horticulture in particular- is facing difficulties with respect to availability of labour, especially during harvesting periods. Labour shortages draw many workers -mainly from new EU member states like Poland- to the Netherlands. The conditions of their work and accommodation are subject of discussion.
- *Energy*. Greenhouse cultivation in the Netherlands -in total some 5,000 holdings of about 2 hectares each- accounts for more than 80 % of the total energy consumption by the agricultural sector. Based on new physiological insights in conjunction with state-of-the-art technology, transitions are now being made from energy-consuming to energy-producing systems (see Case 4).
- *Organic farming*. Consumers in the Netherlands -as elsewhere- increasingly demand food products from organic origin, both for reasons of health as for reasons of environmental concern and animal welfare. Rather than supporting the sector by subsidies, the Netherlands' government policy on organic agriculture focuses on market development, knowledge generation and multiple-stakeholder approaches (see Cases 5 and 6).

2.3 Changing functions of agriculture

Over the past three decades, the ever-wealthier Netherlands' society has become more and more critical of the impact of the increasingly-intensified agriculture and horticulture on landscapes, natural habitats and biodiversity. Generally-speaking the Dutch do not only expect the agricultural sector to produce sufficient and healthy food at acceptable prices, but they also expect this to be done in an attractively-looking rural area fit to recreate, enjoy leisure and value nature.

In this respect, farmers tend to cater for these new societal needs but they need incentives to provide balanced combinations of producing farm products and other profitable activities. Markets for these 'non-farm' products and services are rapidly developing and their growth, both in terms of numbers of farms and customers, as well as in terms of financial volume, is expected to continue in the years to come. Examples of such new services are landscape management and nature conservation, recreation, education, health-care and processing and on-farm sales of (organic) farm products. Such multi-functional farms try to re-establish the connection with society: connections between farmer and citizens, food and health, (animal) welfare and well-being, agriculture and the city.

Multi-functional land use is being elaborated in more detail in Chapter 3.4 of this report.

2.4 Policy measures

For the Netherlands, as a member of the European Union, EU policies on agriculture and rural development are leading at national level. As from the nineteen sixties, the EU Common Agriculture Policy (CAP) has been applied in order facilitate a viable agricultural sector. Among other things, this was done through production subsidies and mechanisms for guaranteed prices for agricultural commodities. Ever since, strict rural and environmental policies have become additional major elements of the CAP and for the Netherlands they apply to the following areas in particular:

- *Minerals and manure.* In 1984, the government introduced a temporary ban on the further expansion of intensive livestock farming (i.e. pigs and poultry rearing). This was done in order to reduce emission of minerals and ammonia. Later-on, this ban was replaced by a system of fixed maximum deposition levels of minerals per hectare in combination with tradable production rights ('mineral quota'). Manure production on cattle farms was restricted through the introduction –in 1984– of a dairy quota system at the level of the EU. As from 2006, the Netherlands has introduced new and stricter regulations on manure which correspond with the EU 'Nitrates Directive'.
- *Energy use in greenhouses.* In the early nineteen nineties a long-term agreement was reached between the national government and the horticultural sector (including vegetables, flowers bulbs and mushrooms) to improve efficiency of energy use by 50 % in 2000. Under this agreement growers were stimulated to invest in energy-saving technologies.
- *Pesticide use.* As in the case of energy use, a multi-year agreement stipulates a 50 % reduction of pesticide use by the sector. This was achieved by changing crop rotations, by introduction of pest and disease-resistant crop varieties and by bans on the use of specific pesticides. 'Closed' and 'Circulation' greenhouse systems were introduced to prevent emissions of pesticides and minerals to the open air and to ground and surface waters.

Besides the 'Nitrates Directive' of the European Union, as described above, agriculture in the Netherlands is further being regulated by the 'EU Water Framework Directive' which encompasses both, water quality and water quantity, and by the 'EU Soil Strategy'. In addition, the 'Air Framework Directive', the 'National Emission Ceiling Directive', the 'Integrated Pollution and Prevention Control Directive' and the 'Regulation on Energy' aim at reducing emissions of CO₂, NH₃, N₂O, etc. into the atmosphere, as well as at improving the sustainability of energy use. In this respect the agro-sector is actively involved in the production of bio-energy, not only from crops (cereals, oilseeds, etc.), but

also from manure. Further linkages between agricultural production and sustainability are being enforced by the so-called 'Cross Compliance Principle' of the CAP, since 2003. Under this principle farmers receive payments in compensation for the decreased prices of a number of commodities, including cereals, milk, sugar and beef, conditional to meeting specified standards on environmental quality, animal welfare, veterinary restrictions, etc.

2.5 Changing policies and the private sector

At the turn of the century, the growing societal concern about the environmental impact of agricultural production systems caused the government to reconsider its policy with respect to sustainable agriculture. Hence, in 2001, the 4th National Environmental Policy Plan (NEP-4) was issued, stipulating that system innovations were required to solve the existing -and considerable- environmental problems that had emerged. NEP-4 described the need for a societal transformation process toward sustainable agriculture. It implied interacting and mutually-reinforcing technological, economical, socio-cultural and institutional changes. The process became known as the transition toward sustainable energy balances and sustainable use of the natural resource base and -ultimately- toward a sustainable agriculture sector. The roadmap that was published subsequently ('*Transition Sustainable Agriculture 2003-2006*') defines sustainable agriculture as "a societal-accepted agriculture which meets the ecological, cultural, economic and international standards as required by the community".

Sustainable agriculture is defined as "a societal-accepted agriculture which meets the ecological, cultural, economic and international standards as required by the community".

In 2005, the Ministry of Agriculture, Nature and Food Quality published its vision on the future of the agricultural sector in the report '*Going for Agriculture*'. This report, which was compiled on the basis of intensive interaction between policy makers, researchers and -in particular- private sector representatives including farmer organizations, is clearly positive in its assessment of the future potential of the sector. Major problems, however, including a growing international competition, decreasing governmental support and the need for higher investments in environmental safety measures, remain to be tackled. Bottom line of the report is that the sector is responsible for its own future. Governments' role, and that of the Ministry of Agriculture in particular, was to facilitate the change process from "*taking care of....*" toward "*taking care to....*". Examples of this facilitating role of the government are given in Cases 5 and 6 below.

The multitude of complex and restrictive regulations that has been imposed by the government remains a challenge in the transition process. A level playing-field, implying a strict control of the application of these measures, is essential, both at the national and at the international level. The latter in particular in order to prevent that, by applying high and costly sustainability standards in the Netherlands, the sector can no longer compete in the international market, while pushing unsustainable production methods across the national boundaries.

2.6 Corporate social responsibility

Next to applying governmental rules and regulations, the private sector has a responsibility of its own in terms of sustainable development. This 'Corporate Social Responsibility (CSR)' is about the role of companies and enterprises in making our lives and planet more sustainable and can be described as 'a concept whereby companies integrate social and environmental concerns in a

Corporate Social Responsibility including good environmental stewardship is a must for enterprises in the agricultural sector.

transparent way in their business operations and in the interaction with their stakeholders on a voluntary basis'. As for enterprises in the agricultural sector, next to social considerations, good environmental stewardship is -of course- a specific requirement in terms of sustainable development: natural resources, if not well-managed are finite.

In 2001 the Netherlands' government released the policy brief 'CSR, the perspective from the government', in which the ambition is formulated that all companies should be involved pro-actively in corporate social responsibility: the initiative should come from the businesses. The government, however, has a stimulating and facilitating role which includes, for example, the establishment of a national Knowledge and Information Centre ('MVO Nederland'). Also, in 2004, during the statutory Netherlands' chairmanship of the European Union, a pan-European conference on CSR was organized.

In the current 'Cabinet Vision on CSR, 2008-2011' the words *Inspire*, *Innovate* and *Integrate* are central. *Inspire* implies putting spotlights on outstanding CSR companies. It also implies the provision of good examples by the government itself, for instance in its procurement policy. *Innovate* relates to the crucial role of innovation by companies and *Integrate* means that CSR should be fully incorporated in all processes and activities of companies and be part of its core business.

At present, most of the larger companies in the Netherlands have a CSR policy or are otherwise involved in CSR activities (see Box 2). In 2006, a study carried out among the world's largest companies showed that the 24 Dutch companies that are part of the Amsterdam Stock Index (AEX) performed best. Four of these companies are sector leader in the Dow Jones Sustainability Index.

The Netherlands' Ministry of Agriculture facilitated the development of a 'Sustainability Scorecard' for companies involved in agribusiness. With the Scorecard, which is publicly accessible on the internet (www.duurzaamheidsca.nl) companies can mirror their sustainability performance and this may motivate them to improve their sustainability strategy.

2.7 Knowledge generation, transfer and innovation

Agricultural research is one of the driving forces behind the development of the agricultural sector, in the Netherlands as elsewhere. The effectiveness of agricultural research depends to a large extent on the ways in which the knowledge generated is being transferred to practitioners, farmers and other agricultural entrepreneurs including processors and traders alike. Moreover, outcomes of agricultural research may also be applied to support development of government policies related to sustainable agricultural development, the management of natural resources and international trade close linkages between entrepreneurs, researchers, extension agents, policy makers and partners in agricultural production and in supply and market chains. These have pushed the Netherlands' agricultural sector into a world top position.

Box 2
CSR: Sustainable soy for healthier milk

In 2007, the international cooperative dairy company Campina introduced 'a new kind of milk' that is healthier (it has more-balanced fatty acid contents) and from cows that spend a daily minimum number of hours on our grasslands and that are fed with sustainably-produced soy, mainly from South America. Soy production in South America is putting pressure on tropical rainforests, which are increasingly being converted into farm land. Campina, jointly with a number of NGO's including Solidaridad, Natuur en Milieu and the World Wildlife Fund, developed 'Guidelines for Sustainable Soy Production' and the certified soy so produced is being fed to the cows that deliver the new milk. In 2006, some 10.000 tons of sustainable soy were produced and production is planned to grow to approximately 150.000 tons by 2011 when all Campina farmers in the Netherlands, Germany and Belgium should be feeding their cows sustainable soy.

The Netherlands' Ministry of Agriculture has always supported strong and effective instruments for the generation and transfer of knowledge in close combination with an equally-strong multi-level agricultural education system. This so-called 'OVO Drieluik' (the 'REE Triptych': Research-Extension-Education) implied

Along with the increasing specialisation of the agricultural enterprises and the privatization -in the early nineteen nineties- of both the Netherlands' agricultural extension services and the agricultural research institutes, new mechanisms for research-producer interaction ('innovation') emerged (See Case 6). Such new mechanisms were also required in order to make-up for the decreasing number of students at -mainly- vocational training levels. The latter resulted in lower numbers of skilled young farmers as well as in lower numbers of well-trained teachers. Currently, therefore, new mechanisms are being developed linking knowledge circulation and practical experience in interactive education-research-farm linkages and apprenticeships.

2.8 Lessons learned from practice

The Netherlands has a highly productive and competitive agro-sector. This is the result of a number of favourable geographical and bio-physical conditions, and of a pro-active and stimulating governmental policy in the past. This policy was developed and implemented over the years in good dialogue between the government and farmers organizations. Initially the aim was to strengthen the economic position of farmers by increasing farm productivity levels. More recently, under much societal pressure, this policy had to change in order to counter the negative environmental impacts of the highly intensive production systems. The introduction of new measures and regulations was difficult, however, as farmers were opposed -the costs of implementation being too high- and many changes were made during the implementation process. On hindsight, and given the actual level of know-how available in the Netherlands in dealing with the impacts concerned, it would have been much better if environmental guidelines had been incorporated in the farm policy at a much earlier stage.

Environmental guidelines have to be incorporated in farm policies and operations at a very early stage.

Below a number of practical cases is being described, providing examples of how in the Netherlands we dealt with some of the policy changes and shifting interests of societal stakeholders with respect to agriculture. The cases concerned include: Mineral balances, Sustainable management of pesticides, Greenhouse-gas emissions, Innovative use of energy in greenhouses, Organic livestock farming, and Transition processes.

Case 1: Mineral balances and regulations

The downside of high-input agriculture became visible: accumulation of heavy metals, nitrate leaching into ground water, eutrophication of surface water and soil acidification.

First signals that the rapid intensification of the agricultural sector was not environmentally sustainable date from the end of the 1960's. The public view of the country-side being natural and healthy -as compared to industrialized and urban areas- changed slowly when an increasing number of reports was published about nitrates leaching into the ground water, copper accumulating in soils treated with pig-slurry, phosphorus saturation of

soils, eutrophication of surface waters by nitrogen and phosphates and soil acidification and suggested forest dieback due to ammonia from manure. These reports made environmental action groups to put pressure on the government to change its agricultural policy away from promoting productivity toward environmental stewardship and nature conservation.

Mineral balances have played a key role in understanding the effects of agricultural intensification on the environment. For example, livestock production systems in the Netherlands rely heavily on imported animal feed. The manure produced in the process, along with the nutrients in it, was largely dumped on relatively small areas of arable land. This led to harmful surpluses of nitrogen, phosphorus, potassium, copper and zinc in the soil and in ground water.

The Netherlands' manure policy, which aims to decrease losses of nitrogen and phosphorus to the environment is being constrained by possible impacts on socio-economic strength and viability of the agricultural sector. Measures taken so far include: (i) Limiting nitrogen and phosphorus production at the farm; (ii) Restricting losses at farm level by setting limits on mineral balances based on crop- and soil-type; (iii) Trading manure between farms, e.g. from intensive livestock farms to stockless arable farms; (iv) Gradual lowering the limits of manure use per unit acreage of land; (v) Improving fertilizer and manure use-efficiency and (vi) Stimulating technological solutions such as the drying and export of manure.

The costs of enforcement and monitoring of this manure policy have been high. Partly, this resulted from the exploitation, by farmers, of loopholes in the system, from fraud and from legal counter procedures. In addition, many of the regulations were changed in the course of the process and there was insufficient time for proper implementation and fine-tuning in practice.

Improvement was stepwise, to allow for gradual adaptation by the farmers.

In summary, the Netherlands' manure policy is complicated as it addresses a complex and unruly problem. It has a history of 20 years of changes, successes and failures. The farm-level nitrogen- and phosphorus-accounting system 'MINAS', which was implemented in 1998, has been the core instrument of the policy. It marks the shift from regulation- and measure-oriented policies toward target-oriented policies. MINAS included stimulation mechanisms in terms of economic incentives for the farmers involved, but it was abolished in 2006 under pressure of the European Commission. The current system of soil- and crop-specific application limits for nitrogen and phosphorus is again a measure-oriented policy. As yet it is too early to conclude whether this system will lead to the desired sustainable levels of nutrient use efficiency and nutrient losses.

Case 2: Sustainable management of pesticides

The Netherlands is a main exporting country for high value crops such as vegetables, flowers, seeds and intensive arable crops. The high quality demands for these crops, together with high prices for labour and land, have led to capital-intensive production systems that are highly mechanised and have high inputs in terms of energy, nutrients and

Reducing the impacts of pesticide emissions to the environment was successfully achieved through an innovative combination of policy, research and knowledge circulation in a joint effort of all stakeholders involved.

pesticides. Pollution of water, air and soils with the pesticides (and the fertilizers) applied were among the negative consequences of these high-input systems.

In concerted effort, the Netherlands' government, research institutions, private sector (pesticide producers), extension services and farmer organizations have developed effective measures to minimize these detrimental impacts. Among the measures taken were: (i) Legislation –and the

gradual adaptation thereof- to limit pesticide use, including bans on specific highly-polluting compounds; (ii) Development, by means of strategic and applied research, of acceptable and manageable strategies for low-impact pesticide applications and (iii) Optimization and dissemination of these strategies in close collaboration with practitioners (i.e. the farmers, the chemical industry and contract workers).

A covenant made-up between the stakeholders strongly enhanced the adoption of sustainable techniques in the daily agricultural practice. So far these efforts resulted in a reduction of the negative impacts of pesticide use of over 85 % (1997-2005), and gains are still being made.

Case 3: Greenhouse gas emissions, climate change and bio-energy.

Plants play a central role in the carbon cycle, in the energy balance as well as in the generation of greenhouse gasses. The use of plant biomass for energy production, the plant's role in soil organic-matter cycles and in reducing emissions of methane and nitrous gasses from agriculture are all topical issues in the global policy debate and in the international research arena.

As climate change processes do not stop at national borders, the issues listed above have a strong international dimension. Moreover, and increasingly, the biomass used for energy production -and consumption- in (rich) countries in the North, is being produced in (developing) countries in the South. This incites discussions on the desirability to produce fuel rather than food in poor countries that have vulnerable food security situations. Moreover, the growing demand for biomass is causing food prices to rise, the world over. This may be a short-term asset for farmers, but it is a threat for governments and consumers, in particular the poor in developing countries. Quite recently protests on food prices emerged in countries like Mexico, Côte d'Ivoire, Indonesia, Haiti, and others.

Lesson learned of the case: Strategies designed and solutions obtained can be examples for other countries. The case has strong international aspects.

Bio-energy policy of the Netherlands is still being developed including the development and international acceptance of sustainability criteria (see also Section 5.A). Research activities focus on second-generation bio-energy mainly (i.e. energy produced from organic residues from farms and food chains). In the international context much research attention is on energy crops such as *Jatropha curcas* that would thrive on marginal lands.

In attempts to mitigate climate change, new farming strategies are being developed in the Netherlands, which minimize emission of greenhouse gasses, that counteract the reduction of soil organic matter or that reduce methane production from peat soils. High levels of soil organic matter are helpful as well in adaptation to climate change by bringing about higher resilience to extreme weather conditions. In protected cultivation systems ('greenhouses') pilots are being initiated changing energy-consuming into energy-producing systems (see Case 4, below).

Case 4: Energy-producing greenhouses with lower carbon footprints

Greenhouses are like solar panels, but growers presently do not use all the energy collected in their production systems. If only all the capacity of such panels could be used, greenhouse production would make a big step forward toward a lower carbon footprint. In the 'Greenport Greenhouse' a Dutch tomato grower and the Greenhouse Horticulture Institute of Wageningen UR have realized a pilot in which the greenhouse supplies heat to a nearby school for disabled children, a house for elderly people and a swimming pool. In this pilot, rather than optimizing current systems, the concept of semi-closed greenhouses was developed in which growing conditions can be controlled easier and losses of energy and CO₂ are less. The concept combines technical, environmental and social sustainability issues in greenhouse production.

In traditional greenhouses, heat from solar radiation or from a generator can be used only momentarily. New technical solutions now enable the harvesting of heat, in the form of hot water. Already, growers can store heat in tanks, for daily use. It is now possible, however, to store the heat in aquifers for periods of up to several months. This reduces the waste of energy and it allows growers to use summer-heat in winter conditions. Moreover, heat surpluses may be sold to external partners -as is done in the pilot- and, eventually, to formal energy companies. In this transition greenhouses are no longer (huge) energy consumers but they become energy suppliers.

*Thinking out of the box:
Producing energy in
greenhouses.*

The Greenport Greenhouse is a CO₂-efficient growing system allowing for higher primary production than in 'open' greenhouses. Also, the storage of low value heat in aquifers reduced gas consumption in the greenhouse by some 35 %. Besides, the energy partners in the pilot no longer use gas for their heating, and now keep higher budgets for their primary tasks: caring for their clients. The whole system has a much lower carbon footprint than conventional ways of heating.

Case 5: Organic livestock production

Organic agriculture aims at production processes that are marked by the sustainable use of natural resources (soil, water, feed and animals). This implies not using chemical fertilizers and pesticides, limited use of chemical medicines and due respect for the integrity of the animals. In this way, organic agriculture has positive effects on the environment. As a result, the sector is pioneering in the fields of preventive measures, sensible use of natural resources and animal welfare. The latter is high on the political and public agenda in the Netherlands.

The Netherlands' government regards organic agriculture as a good example of sustainable production and it is actively stimulating the growth of a professional organic agriculture sector. Currently, some 10 % of the budget for research and knowledge circulation of the Ministry of Agriculture is earmarked for this area. Besides, a covenant has been made-up between the Ministry, the private sector and a number of civil society organizations to promote organic agriculture. Under the covenant financial support is provided to a task force on 'Market Development Organic Agriculture'. The objective is to increase consumer demand for organic products, in combination with increased production. Other instruments used by the government are (funds for) knowledge generation and innovation aimed at organic entrepreneurs, payment of certification costs and support to regional initiatives.

The legal framework for organic livestock production sustains systems that allow animals to behave more-naturally and socially and at higher comfort levels than in regular livestock systems. Next to behaviour and comfort, health and feeding are elements that affect animal welfare as well. With regard to the latter two, the organic sector does not yet distinguish itself from practices in the regular sector and a number of bottlenecks need to be addressed. As the sector is setting high standards, new dilemmas are encountered

which need societal debate. Amongst these are the delicate balance between animal welfare and environmental impact, and the related issue of consumer prices. In outdoor runs, for example, where animals roam freely, manure cannot be effectively controlled. Also, more roaming space per animal implies higher costs per unit.

As, until very recently, mainstream research in the Netherlands has not paid much attention to the specific research questions from organic agriculture, research so far has been mainly bottom-up in nature. In doing so, the sector itself has accumulated more knowledge and experience than regular research institutions. By joining competences and knowledge the sector and the institutes are currently strengthening their collaboration.

Case 6: Netherlands' agriculture in transition: Developing knowledge and innovation

Over the past few decades, societal demand has grown in the Netherlands for agricultural products that carry fewer risks for human health and natural pollution. A new demand that is being articulated is 'sustainability', aiming for agri-businesses being more environmental-friendly, economically viable and socially acceptable. Many practitioners have argued that understanding sustainability requires new and innovative ways of knowledge production that are socially spread, application oriented, trans-disciplinary and accountable to multiple audiences and stakeholders.

Additionally, in such new approaches there is better appreciation of the role of local knowledge, in particular if applied in agriculture or nature management. Concurrently, innovation is seen as a non-linear process in which many actors are involved and knowledge is related to specific socio-spatial environments, in order to arrive at sustainable solutions. New ideas can originate from practical experience, and the role of science in the innovation process is often limited.

The Netherlands' government has initiated a number of programmes that aim to enhance a new knowledge infrastructure. One example is 'TransForum', a platform in which entrepreneurs, non-governmental organizations, government officials and scientists meet to exchange knowledge and develop innovations for a sustainable agriculture (see Box 3). Another example is the Taskforce Multifunctional Agriculture which argues for more coordination in knowledge exchange between stakeholders in multifunctional agriculture.

Box 3:

TransForum: Linking stakeholders on pathways toward sustainable agriculture

TransForum links stakeholders in order to work on innovative practical projects that are based on 'learning by doing'. Practical problems drive the research and jointly with entrepreneurs TransForum finds new pathways to sustainable agriculture and vital rural areas. Not only is practical knowledge being produced but also the methods to generate that knowledge. Individual TransForum projects are part of one of three innovation strategies:

- *Vital clusters: New combinations of economic chains in spatially-concentrated clusters.*
- *Regional development: New combinations of activities for vital rural areas.*
- *International agro-food networks: New trans-boundary production and trade networks in which the Netherlands can excel.*

Innovation in organic farming

In 1997, on the initiative of the Netherlands' Ministry of Agriculture, a start was made to develop and apply new approaches to knowledge generation, in particular with respect to the potential of organic farming in modern agriculture. Organic farming starts with the inherent qualities of the soil: External growth factors, in particular those related to inputs,

play a minor role, if at all. Emphasis is on the internal growth factors within the specific local ecological conditions or that are otherwise locally available.

Research into organic agriculture considers farmers' knowledge as a valuable resource alongside scientific knowledge. One of the pioneering research institutes in this field is the Louis Bolk Institute in the Netherlands (www.louisbolk.org). The institute's research practice is based on 30 years of mutual learning with farmers in the field of organic animal farming. It argues that organic farming relies much more on management skills than on technical adaptations and that top-down innovations and standardization become less relevant. Development of organic farming therefore should rely on learning situations in which farmers can experience new ways of action. In doing so, organic farming in the Netherlands now forms a sector that has created an alternative to modern agriculture.

Innovation in nutrient management

The Netherlands' government also initiated several projects on nutrient management that aimed at developing sustainable farming practices according to the standards set by the European Commission. These so-called Nitrate Projects included innovative approaches to increase nutrient-use efficiency of manure and fertilizers. The projects were developed and implemented at national and regional level respectively, and involved national demonstration projects. At national level the projects performed research and developed new knowledge. Regional projects aimed to circulate information -in this case information on nutrient management- in the respective regions. The national demonstration projects focused on knowledge circulation throughout the country.

The projects applied a model on knowledge development based on 'diffusion of

'Cows and Opportunities' (Koeien en Kansen) determined the effects of the national targets for ammonia emission and nitrate leaching at farm level. Extensive datasets of mineral balances at dairy farms in different parts of the country and on different soil types were recorded. While monitoring the fate of ammonia and nitrate the project also functioned as a demonstration and study project for the 16 dairy farmers involved. Nine farms focused on knowledge circulation in regional networks ('scaling-out').

innovation', at three scale levels: Innovation development at experimental and pioneer farms (the 'early innovators') takes place at the top level. The next hierarchical level is that of the 'early adopters' at demonstration farms. The latter have an important role in the diffusion of knowledge towards the rest of the agricultural sector at the ground-level.. An example of such a national research and dissemination programmes is 'Koeien en Kansen' (1996-2006; see text box).

3 Land and rural development

3.1 Land use in the Netherlands

Land use in the Netherlands, by category and by areas occupied, is shown in Table 1. Agricultural use is the largest by far, taking-in nearly 70 % (23.260 km²) of the total land area. Buildings, residential areas, semi-built up land and areas for transport (roads and railways) occupy nearly 5000 km², and forests and recreational areas cover some 4800 and 900 km², respectively.

<i>Table 1 Land use in the Netherlands (1977-2000; in km²)</i>						
	1979	1985	1989	1993	1996	2000
Total	37.283	37.334	39.858	41.028	41.526	41.528
Agriculture	24.252	23.974	23.991	23.755	23.508	23.260
Forest and nature	4.543	4.500	4.505	4.517	4.612	4.835
Recreation	675	782	760	809	827	889
Buildings and residential areas	2.674	2.885	2.905	3.027	3.150	3.183
Traffic and transport	1.263	1.328	1.306	1.331	1.340	1.130
Semi built-up land, quarries, etc.	531	452	414	440	436	486
Non-inland waters	1.749	1.737	4.182	4.175	4.174	4.170
Inland Waters	1.595	1.677	1.794	2.973	3.479	3.574

Source: Agricultural Economics Research Institute & Central Bureau of Statistics, The Netherlands

About two-third of the agricultural acreage is used for dairy farming. The remainder is being used for arable crops, horticulture, fruit trees and glasshouse horticulture. Over the past 50 years, a steady decline in the number of farms has occurred in the Netherlands. In 1950 the total number of farms was still about 315.000 but by 2004 this number had declined to some 84.000 only. The biggest changes occurred over the past 10 years, when the number of farms decreased by more than 10 % each year. This is mainly the result of falling farm incomes and rising prices for land and buildings. The pig and poultry sectors showed the steepest decline in numbers of farms. However, the production volumes of outgoing farmers were taken over by those who stayed in business. Dairy farms make up the largest group of farms in the Netherlands, counting over 22.000 in total. Over 15.000 businesses operate in the field-vegetables and greenhouse sectors.

Approximately 70 % of the Netherlands' farmers own their farms and land holdings; the remaining 30 % operate on a tenancy basis. Ownership is on the rise: about thirty years ago the ownership/tenancy ratio was 50/50. The land market in the Netherlands is completely free and anyone can buy land. Land prices, however, have risen by 10 % per year (!) over the last 8 years. The average agricultural land price is currently around € 35,000 per hectare.

In spite of rising land prices (10 % per year), land ownership in the agricultural sector is increasing relative to tenancy arrangements. About 30 years ago the ratio was 50/50. Nowadays it is 70/30.

Whereas pressure on land in the Netherlands is high, both in terms of high population density and in terms of changing needs for land (for example for urban and industrial expansion, nature conservation and recreation purposes), access to land and land registration are well-organised by means of clear legislation in conjunction with a functional land registration and cadastral system (See Case 1). This proved particularly important in the period 1950-1980 when large land consolidation programmes -involving substantial reallocation of (farm) land- were implemented.

Access to land in the Netherlands is institutionally well-embedded - thanks to Napoleon who laid the basis for the Netherlands registration and cadastral system.

The roots of the Netherlands' unified land registration system in which -unlike in many other countries- land registration and the cadastre are combined in one organisation, lay in the early 19th century when France -under Napoleon- had annexed the Netherlands and French legislation was imposed. (see Case 1)

3.2 Social developments in rural areas

Social status of the countryside

A recent report by the Netherlands' Social and Cultural Planning Office, discusses the research program 'Social Status of the Countryside'. This program traced developments and associated changes within the rural population of the Netherlands over the past decades in order to assess their current living situation. A comparison was made with conditions in urban environments.

The report concludes that the Netherlands' country-side shows strong ageing of the population and increasing urbanization. Also, the urban areas in the Netherlands are expanding rapidly while the acreage of the rural area is decreasing. As for the living situation in rural areas there are positive and negative observations. Positive aspects include: (i) The countryside forms a healthy living environment; (ii) Low levels of concern for crime; (iii) High appreciation of the countryside as a residential area; (iv) People's general satisfaction with their incomes; (v) Less work stress than in urban areas and (vi) High social and societal participation.

Negative aspects are: (i) Less-attractive working conditions: (most jobs are physically demanding, at times unhealthy and often of low educational level; (ii) Employment opportunities are decreasing; (iii) Services are often not readily available and decreasing in numbers and (iv) Trailing levels of knowledge and education.

As to the lack of services in rural areas, the number of shops and hospitals, for example, is declining. This causes problems in particular for those without a car or with low mobility, like elderly people. As the decline is likely to continue in the future, local initiatives have started that combine different services (e.g. a post office in a supermarket) and keep them in the neighbourhood.

Trailing knowledge levels are caused mostly by migration of the higher-educated to the city. It is taken as one of the biggest problems the Netherlands' countryside is facing in the coming years as it has undesired consequences for the equality of knowledge levels in different parts of the Netherlands.

Trailing knowledge levels due to migration of the higher-educated to cities form one of the biggest problems for the Netherlands' countryside.

Netherlands Rural Women's Organisation

Many women living and working in the Netherlands' rural areas are organized in the Netherlands Rural Women's Organisation (NBvP), which has over 66.000 members. About one-quarter of the members are directly related to agri-businesses. The objectives of the organisation are: (i) Increasing the involvement and responsibility to society; (ii) Raising the

understanding between agrarian and non-agrarian members; (iii) Representing the organisation in other agrarian organisations.

The NBvP has an important position in society acting, amongst other things, as the main interlocutor with the Ministries of Agriculture, Nature and Food Quality, and of Housing, Spatial Planning and Environment. In these and other positions, the Rural Women's Organisation regularly provides its opinion on issues related to rural development and rural innovation, liabilities and consumers' wishes.

3.3 Multiple-functions of land

Land is not only an economic factor, but it is an ecological and socio-cultural resource as well. Next to agriculture, forestry, fisheries and the supply of natural products and minerals, multiple-functions of land include the provision of urban, industrial and infrastructural space, as well as space for recreational purposes and cultural heritages. In addition, land performs inherent ecological functions including the storage and transfer of water and solids, it acts as a sink for carbon and provides foothold for vegetation. For the Netherlands in particular, having a high population density, the blending and spatial planning of these different and changing uses, including legislation thereof are crucial policy issues involving stakeholders as varied as land and house owners associations, farmers organizations, civil society representatives the private sector and local-level, regional and national planning institutions. Responsibility for spatial planning in the Netherlands is strongly decentralized, requiring adequate capacities at the local level. (see Case 2)

Multi-functional agriculture implies all activities and services on farm land, including mainstream agricultural production, that are based on the values and functions of that land. Such services and activities provide others the possibility to share these values while offering additional income to farmers. Examples are the farmer as landscape manager and nature conservationist; the farm as a resort for (family) recreation (e.g. mini-campings, beds & breakfast, health spa's) and the farm as a space for personal reflection or education (e.g. art workshops and handicrafts, spiritual movements, courses). Other examples are the on-farm sales of farm products (cheese, eggs, fruits, wool) in particular if these originate from organic farming, and the production of energy by windmills and though biogas.

The length and complexity of agricultural supply chains has increased enormously, resulting in a decreased social-regional connection between the sites of production and consumption. Also, where, in the nineteen thirties, some 80 % of the Dutch population was connected to farmers and agriculture in one way or the other, today most people (i.e. over 75 %) are living in cities, disconnected from any agricultural activity. People have become estranged from food production, nature and basic values of rural life, such as tranquillity, darkness and the rhythm of seasons. In response, a growing group of consumers is now actively aiming to re-connect with rural life, driven by the motivations such as consciousness of harmful side effects of intensive agricultural production systems, penchants for tradition and 'old' values, distraction from hectic regular work habits and desire for other forms of justification and relevance than work alone. Also, farmers in The Netherlands have become style icons: they stand for pure, nature, authenticity and usefulness.

The potential of this 'search for reconnection' is recognized by the farmers, for which they cater by developing new products and services at 'multi-functional farms'. Moreover, the Dutch Government is stimulating farmers to switch to multi-functional farming, with the aim to (i) re-involve citizens in agriculture and food in order to change to better nutritional habits, (ii) increase income levels and economic activities in the rural areas, (iii) safeguarding values and functions like nature, landscape, animal welfare, biodiversity and cultural-history. Also, the Netherlands' Ministry of Agriculture, Nature and Food Quality has the ambition to become a 'department for all citizens' instead of for farmers only.

In order to achieve these goals, the Ministry developed the following initiatives: (i) Facilitating of research and innovation activities on multi-functional agriculture; (ii) Putting-up a Taskforce on Multi-functional Agriculture that stimulates and professionalizes multi-functional agriculture with a target turn-over of € 1.2 billion in 2012, the present turn-over (2008) being € 600 million; (iii) Various financial regulations for multifunctional entrepreneurs and (iv) Developing new legislation to cater for the specific needs of multi-functional farms.

Two main strategies apply in the further development process for multi-functional agriculture:

- *Bottom-up*: Depending on the alternative products and services rendered, farmers themselves collaborate in organizing their markets.
- *Top-down*: the Netherlands Agricultural and Horticultural Organization (LTO) of the Netherlands is developing new supply chains jointly with a number of Super Market chains and with Health Insurance organizations.

Connecting the two strategies is a main challenge for the years to come.

3.4 Spatial planning and rural development

The Netherlands is nearly entirely a man-made country and the capacity to adapt soil and land properties to almost any possible human need is an intrinsic part of spatial planning and rural development strategies. Generally speaking, activities associated with these adaptations are expensive, and they may disturb specific soil properties or the soil archive as a whole. In addition, they carry the risk of trade-off to other environmental compartments like the atmosphere or water bodies.

In this respect the Netherlands' government supports a number of projects that aim to create transitions in the planners' ways of thinking. This implies that planners are being made more aware of the positive aspects of soil properties and learn to use them, rather than regarding them as a nuisance. The projects initiated are facing the following challenges:

- How to create a higher awareness among decision makers and (local) governors with respect to the importance of soil? Only then will they take up of the importance of soil in their decision making process.
- How to create a consistent message to the public since many different factions are involved in local planning, each with its own profit regarding the (sub)soil?
- How to provide planners, who often lack any soil knowledge, with relevant and applicable knowledge by soil experts?

3.5 Maintaining soil quality

Functions of the soil, soil threats and policies

Soil is essentially a non-renewable resource, performing many functions and delivering vital services to human activities and to ecosystem survival. Soil has the following main functions: (i) Biomass production, including agriculture and forestry; (ii) Storage, filtering and transporting nutrients, substances and water; (iii) Biodiversity pool, such as habitats, species and genes; (iv) Physical and cultural environment for humans and human activities; (v) Source of raw materials; (vi) Acting as carbon pool, and (vii) Acting as an 'archive' of pedological and archaeological heritage.

Problems of land and soil degradation and the environmental pressure on land and soils are major societal and political issues in the Netherlands and in the European Union as a whole. In this respect the European Commission has defined seven major 'Soil Threats': (i) Soil erosion; (ii) Decline of soil organic matter; (iii) Soil compaction; (iv) Salinization; (v) Landslides; (vi) Soil sealing and (vii) Soil contamination. Quite recently, two additional soil threats have emerged: (viii) Soil acidification, and (ix) Soil biodiversity decline. (see section below and Case 3)

As many EU member states lack legislation on soil protection, the European Commission has proposed to establish a '*European Framework Directive for Soil Protection*' which will cover the soil threats listed above. Where this Framework Directive is under negotiation still, and the outcome thereof is not clear, presently the EU *Soil Strategy* prevails. In the latter the same threats were already defined with the exception of acidification and soil biodiversity decline.

Currently, the Netherlands has its own legislation on soil protection. This legislation, however, does not cover the complete set of soil threats included in the European Soil Strategy. With a history of serious cases of soil contamination in the years 1980-1985, this legislation is particularly strict on soil contamination.

Dealing with soil threats in the Netherlands

Wind erosion is a common -and natural- feature in the dune lands of the Netherlands, which occur along the sea and in some of the main nature reserves. Wind erosion is also a problem in the reclaimed peat lands in the north and northwest of the Netherlands, where arable cropping is the main land use. Wind erosion may cause mechanical damage to crops ('blistering'), loss of seedlings and the filling-up of ditches. Permanent soil cover and other measures may help to face these effects, but they are not yet obligatory.

Soils in the Netherlands are relatively rich in *organic matter*. Restrictions on the application of manure (see Chapter 2), may result in decreasing organic matter contents but, apart from some site-specific cases, there is no general evidence yet. Drainage of peat soils forms a serious threat as it causes the oxidation of the peat and the subsidence of the soil surface. Over centuries, peat deposits in the Netherlands -which were quite common- were used to produce turf blocks for domestic fuel. In the excavation process, many original peat lands have been transformed into sand areas. Most of the remaining peat lands are now being used as pastures. Often, these wet lands are being drained and even though this is done shallowly, the resulting oxidation of organic matter produces substantial emissions of CO₂. These are estimated to amount to some 5 % of the total CO₂ emissions of the Netherlands. So far, there is no governmental policy to deal with this threat. Research efforts focus on practical solutions that allow agricultural use while maintaining high groundwater levels. Conservationists suggest that peat lands should be safeguarded as wetland- and nature reserves, excluding agriculture.

Soil sealing, implying the covering of the soil with impermeable material, is a typical effect of urbanization and infrastructural amenities. In sealed areas water can not drain away naturally and technical interventions are required to dispose of the water. Also, under sealed conditions, with little or no oxygen entering into the soil, biological activity is minimal. As such, land under greenhouses can be considered as being sealed, too. Under the proposed EU Framework Directive, member states are obliged to take appropriate measures to limit soil sealing or to mitigate the effects thereof.

Soil compaction entails the increase of the soil's bulk density ('specific weight') along with decreasing porosity. It is caused mainly by the use of heavy (farm) machinery and by frequent ploughing that may cause 'plough layers' or 'hard pans' to develop. Soil compaction hampers root development, the transmission of water and air and biological activity. Also, soil compaction may increase (rain)water run off along with nutrients. As a result it affects crop productivity. As wheel loads of agricultural machinery are steadily increasing, the phenomenon of soil compaction is likely to increase as well. Heavy machinery is commonly applied in arable cropping in the Netherlands and plough layers do occur. The exact extent of the problem is unknown, however.

Soil contamination can be a local, site-specific phenomenon involving a specific source and contaminant, or it may be spatially disperse resulting from diffuse sources such as (phosphate and nitrate) fertilizers and manure, copper and zinc containing slurries and pesticides. As stated above, the Netherlands avails of extensive legislation with regard to contaminated sites. Leaching of nitrates and pesticides into ground- and surface water is being addressed under the EU Framework Directive on Water.

Soil erosion, by water is not a threat for most of the Netherlands. Exceptions occur in the hilly southernmost province of the country (Limburg) and in small areas in the east, near the German border. In Limburg, erosion control is organized in community-level agreements between farmers and local governments which include restrictions on the kind of land use, on ploughing practices and -on the steepest slopes- preferential changes to permanent grassland away from arable cropping.

Salinization is the accumulation of soluble salts in the soil. In the Netherlands high salt concentrations may occur periodically –during summer- in low-lying polders and in other areas where salty groundwater reaches the surface. When rainfall resumes later in the year, the salts are easily washed away and there is no threat of salt accumulation.

Landslides do not form an evident problem in the Netherlands, where the landscapes are generally flat. Occasional slides in dikes or in other infrastructure have no structural relation to rural development or soil degradation.

3.6 Lessons learned from practice

Case 1: Access to land in the Netherlands: Land registration and cadastre

Legislation and registration

Pressure on land in the Netherlands is high as the country is relatively small and densely populated and land is being used for various functions (agriculture, nature, recreation, living, industry, etc). Land development, therefore, requires careful planning, clear legislation and a functional land registration and cadastral system.

As stated before (Section 3.1) the roots of the Netherlands' land registration system lay in the early 19th century when France, under Napoleon, had annexed the Netherlands and French legislation was imposed. The main concept of the system is the detailed recording of the relationship between the landowner, either being a person or a legal body, and land parcel concerned, which is uniquely identified by parcel number and boundary survey. The Netherlands' Cadastral and Land Registration Agency extracts and registers essential elements from deeds and land parcels into the cadastral registers and maps, providing data on name, parcel (both administrative and cartographic) and physical address. The registers and maps are kept in analogue format: books with paper deeds, copied to micro fiches. The data are, however, also digitally accessible, the maps revealing the national grid, cadastral boundaries, parcel-identifiers, street addresses, buildings, house numbers and geodetic reference points. In total some 300 million coordinate-pairs are available in the cadastral database.

A major revision in 1992 enabled a multi-purpose registration system that provides legal security of tenure, safeguarding (equal) access to land, while facilitating the land market. The revised system also provides principles of 'good governance' in physical planning, rural development, public acquisition of land, land taxation, management of natural resources and land consolidation.

New developments

For citizens and professionals alike, easy access to all cadastral data in the Netherlands is now provided by the web-based 'kadaster-on-line' (www.kadaster.nl). Citizens extracting information from the database may pay for this service by credit card; professionals may have an account.

In another recent development, electronic submission of notarial deeds has been made possible. The notary involved keeps the authentic paper deed in her/his office, and sends a certified true copy to the Agency, electronically. The Agency records the document in a digital public register.

As per January 2004, the Netherlands' Cadastre and Land Registry Agency has been merged with the Topographical Service of the Ministry of Defence, providing further opportunities for innovations in land information.

Case 2: Sustainable use of soils in rural areas

Policy and research

In 2003, The Netherlands' governmental policy on soils changed substantially. Besides recognizing the soils' ecological quality, as was the historical perspective, the policy now also recognizes the socio-economic value of soils. Starting point in the new policy is the capacity of soils to deliver so-called 'social services', and this applies equally to the soil's current status as well as to service delivery in the future. In this context, a high(er) responsibility has been placed on soil users who now have, not only the *right* to use it but also the *duty* to do so in a careful way.

As from the introduction of the new policy, studies have been performed on the sustainability of different soil uses (e.g. agriculture, nature conservation and planning and recreational uses) in rural areas. These studies included assessments of social and environmental soil functions and their application in spatial planning strategies. Central elements in this respect were:

- Socio-cultural functions (the soil as an archaeological and pedological 'archive' and as a fundament to build on).
- Ecosystem functions (the soil as buffer and filter for water, minerals, pollutants, the soil as a carbon sink and habitat for organisms)
- Economic functions (the soil as basis for production of food, feed and biomass and mining).

Sustainable soil use implies the optimum utilization of all these soil functions *inclusive of* their maintenance in the long term.

Sustainable agriculture: problems, policies and actions

Recently, a study initiated jointly by the Netherlands' Ministries of Spatial Planning (VROM) and of Agriculture (LNV) resulted in a number of actions aimed at improving sustainable soil use under agriculture. One of these actions, the National Stimulation Programme on Agro-biodiversity and Sustainable Soil Use (SPADE) has started recently to collect scientific knowledge on biodiversity, soil organic matter and soil compaction, and the practical application thereof by farmers. In other action programmes shallow drainage of soils is addressed in order to prevent peat oxidation. Projects like these are accompanied by field-level awareness-raising campaigns on sustainable soil use. Key element of these campaigns is to address measures to improve soil biodiversity and water quality while concurrently maintaining high levels of productivity.

Development and sustainable management of nature reserves: research and future actions

The aim of many measures in existing or new nature reserves in the Netherlands is to counteract the negative effects of over-fertilization and of drought resulting from deep drainage. Mowing, grazing and (partial) removal of top soils are among the measures that are commonly being taken in existing nature areas, whereas the complete top soil may be removed in nature reserves 'under construction'. Such measures, meant to reduce nutrient levels, result in a rapid decline in soil organic matter content. This, however conflicts with the aim to increase carbon sequestration. Moreover, geological or pedological features are threatened by such practices. Higher water table levels, artificial flooding and even the entire removal of upper soil layers are measures to prevent drought. Possible risks associated with such measures include increased N₂O emissions,

increased mobility of heavy metals and unexpected and unwanted changes of the soil habitat.

Assessment of such risks, prior to any action, will at least help to become aware of possible unwanted effects. It will also support balanced decision-making on the options involved. Alternatives may emerge in the process or, otherwise, adaptation of the ambition levels may be required. Invariably, however, the initial a-biotic conditions need to comply with the natural area being planned. Slight adaptations only to the initial situation are allowed. If not, a change of plans, or a different location, is needed.

A recent analysis of soil use sustainability in nature reserves in the Netherlands (Smit et al, 2007) has identified the need for a number of actions, including:

- Increasing the awareness of local natural area managers of any positive and negative effects of their activities regarding development and management of such areas.
- Developing a systematic approach to relate soil properties with different types of nature development.
- Creating check lists of elements in risk assessment prior to development

Case 3: Lessons learned on soil threats:

In dealing with erosion, the Netherlands has learned from other countries where water erosion is a much more prominent feature. The success of agreements on regulations by local government and farmers is also a lesson learned from abroad and from other issues.

In various countries in the world peat lands are rapidly disappearing. In this process the causal relation with changing land use practices, including drainage, is evident. This knowledge can be used to design programmes to meet the challenge of reducing oxidation of peat and the resulting emission of CO₂ and NH₄.

For soil compaction, the lessons have yet to be learned. In many other countries research is more advanced and there is more awareness of the negative effects of compaction than in the Netherlands.

A number of European countries have adapted the Netherlands' legislation on contaminated sites, mainly because the advanced –but negative- experiences with these, in the period 1970-1980.

4 Drought and desertification

4.1 General

Desertification is the degradation of land in arid, semi-arid and dry sub-humid areas, mainly as a result of climatic variations –decreasing rainfall, higher evaporation- and human activities -increasing demands for human consumption, irrigation and industrial purposes- .

Thanks to favourable climatic and topographical conditions, the Netherlands does not experience severe desertification and drought problems. According to the national survey on water deficits, water supply in The Netherlands is secure in the near future. Climate scenarios, however, suggest that water deficits may become an issue after 2015.

Drought problems, however, do exist in some of the Netherlands' nature protection areas due to drainage of nearby agricultural lands, and as a result of ground water extraction for domestic and industrial use. Management policies addressing drought problems are the joint responsibility of the Ministries of Agriculture, Nature and Food Quality, Housing, Spatial Planning and the Environment, and Transport, Public Works and Water Management. These policies include the National Environmental Policy Plan, the Nature Policy Plan and the Water Management Note (www.verdroging.nl). These policies must comport with the EU Water Framework Directive and the Habitats Directive. They are further specified at the levels of provinces, water boards and municipalities. The Dutch approach to combat drought problems in nature protection areas focuses on regions and integrates multiple functions of land.

At the European level, desertification appears in the form of soil erosion by water and wind in south-east and eastern Europe and in the Mediterranean region and, in the form of salinization, degradation of vegetation and forest fires in the Mediterranean region. Recent droughts have caused economic problems in Bulgaria (1996 and 2000), in Romania (2000) and in Portugal and Spain (2005-2006). Over the coming decades, the frequency of droughts is expected to increase and their effects may be further exacerbated by temperatures increasing the demand for water.

The Netherlands addresses the issue of desertification and drought in the European context and world wide, through multilateral environmental conventions, agreements and processes, through participation in international research and education programmes and through activities jointly with the private sector.

4.2 Multilateral environmental agreements and processes

The Netherlands is a Party to the United Nations Convention to Combat Desertification (UNCCD, See www.unccd.int). UNCCD's main objectives are to combat desertification and mitigate the effects of drought, and to achieve sustainable development in drought-affected areas. The Netherlands' Ministries of Foreign Affairs/DGIS, Agriculture, Nature and Food Quality (LNV) and Economic Affairs (EZ) contribute to the implementation of the UNCCD through multi- and bi-lateral financing mechanisms. Six major Dutch NGO's cooperate with the UNCCD: Both Ends, Friends of the Earth, ISRIC World Soil Information, NOVIB, the Platform for Sustainable Development and Youth for Development and Cooperation. Other multi-lateral environmental agreements (MEA) and processes (MEP) in which the Netherlands is involved are listed in Table 2.

In the framework of the European Union, Netherlands' authorities, NGO's and research institutes address desertification and drought as part of the following standards, policies and regulations: (i) The 6th Environment Action Programme of the EC (2002-2012); (ii) The European Water Framework Directive; (iii) The EU Thematic Strategy for Soil Protection; (iv) The Common Agricultural Policy of the EU; (v) The Sustainable Development Strategy; (vi) The Environmental Impact Assessment Directive; (vii) The Strategic Environmental

Assessment Directive; (viii) The Directive of Public Participation and (ix) The European Research Area

4.3 Science and education

Research institutes, universities and enterprises in the Netherlands are involved in international, multi-institute research initiatives on desertification and drought world wide. These research initiatives include large programmes, networks, databases on desertification and drought and research projects on different aspects of desertification. A selection of leading research initiatives on desertification and drought, in which the Netherlands is, or has been, involved, is given in Box 6 and in Annex 2. The Annex in particular shows that the Netherlands is active in all research orientations, from policy-oriented research to the development of fundamental knowledge and instruments. A main challenge is to ensure that stakeholders may continue to access and use the developed knowledge and tools upon completion of the projects.

<i>Table 2 Netherlands' involvement in multilateral environmental agreements (MEA) and processes (MEP)</i>	
MEA/MEP	Reference to desertification and drought
Agenda 21	Options to combat land degradation
World Summit on Sustainable Development (WSSD)	Priority on agriculture: The natural resource base in the Johannesburg Plan of Implementation
Rio Declaration	Principles 7 and 8: <ul style="list-style-type: none"> - "...conserve, protect and restore the health and integrity of the Earth's ecosystem..."; - "...responsibility ... in the international pursuit to sustainable development..."; - "...reduce and eliminate unsustainable patterns of production and consumption..."
Millennium Development Goals (MDG)	MDG 7: 'Ensure environmental sustainability'
Convention on Biological Diversity (CBD)	Sustainable use of biodiversity components
UNEP: Combating Land Degradation (Global Environment Facility, GEF)	Funding of projects on focal area 'Land Degradation'
UNEP Governing Council Decisions (Land)	Decisions 20/10 and ss.V/7: Land Degradation <ul style="list-style-type: none"> - Arid and semi-arid land ecosystems and desertification control - Desertification in Africa
UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol (KP)	<ul style="list-style-type: none"> - Activities to limit greenhouse gas emissions; - Activities to sequester and store carbon in agricultural soils
Water for Life Decade 2005-2015	Themes: scarcity, capacity-building, financing, valuation, Integrated Water Resources Management, environment and biodiversity, food and agriculture
United Nations Forum on Forests (UNFF)	Conservation and sustainable development of forests

Several universities and institutes for professional education in the Netherlands offer post-academic, scientific, higher and secondary education in the field of natural resources, in which the problems of desertification and drought are being addressed. Examples are the MSc Course 'International Land and Water Management' at Wageningen University, the MSc Course 'Environment and Resource Management' at the VU University, Amsterdam, the MSc Degree Course 'Water resources and environmental management' at the International Institute for Geo-Information Science and Earth Observation (ITC, Enschede) and professional secondary education in cultivation techniques and water management at institutions for higher agricultural education. Furthermore, the Netherlands hosts the UNESCO-IHE Institute for Water Education. This institute carries out research, education and capacity building activities in the fields of water and environment.

5 Africa

5.1 Global policy developments

The international development community is currently bestowing renewed attention on agriculture and its role in economic development and putting special emphasis on Africa. Over the last number of years, along with new African (e.g. by the African Union and by NEPAD, the New Partnership for African Development; see Section 5.2) and global initiatives (e.g. by the G7 and the European Commission) on Africa, several multilateral and bilateral development agencies (including OECD, DFID, FAO and the UN millennium Project,) have published reports on the role of agriculture in pro-poor growth and reducing hunger. Perhaps most important among these reports is the World Development Report 2008 'Agriculture for development' of the World Bank. There is now general recognition that the decline in donor investments in agriculture over the last two decades has had significant negative consequences for the sector's capacity to contribute to development, as well as to the realization of the Millennium Development Goals, MDG 1 (eradicating extreme poverty and hunger) in particular. This observation applies, even in spite of growing economic performance of (African) states at the macro level (see Table 3). Such growth is being attained mainly in the industrial and trade sectors and in the ever-expanding cities and metropolises. In Africa, so far, the rural populations hardly share in their country's macro-level gains.

Sub-region	1997-2003	2004	2005	2006	2007
North Africa	4,4	4,7	4,8	6,3	5,6
West Africa	3,8	4,9	4,4	5,3	5,5
Central Africa	4,2	5,1	4,8	5,0	3,6
Eastern Africa	3,5	7,0	5,6	5,3	5,6
South Africa	2,8	4,6	5,0	6,0	5,7
Total Africa	3,7	5,3	4,9	5,8	5,5

Source: AfDB/OECD, 2007

In summary, the new international policies on agricultural development, as mentioned above, argue for:

- *Increased agricultural productivity*, mainly through technological innovation, higher investments in agriculture and in agricultural research and pro-active involvement of the private sector. Priority investments are needed in soil, water and planting and breeding material. Restoration of soil fertility is a must, as is water management.
- *Access to resources and services*. There can be no agricultural growth without improved access to resources, including natural resources, and services which range from supply-side interventions to safety provisions.. Farmers need access to local, regional and international markets. This requires empowerment of farmers through capacity development and institutional reforms. Agricultural research and innovation plays a pivotal role provided the new knowledge can be circulated efficiently amongst stakeholders.
- *Market development*. Markets are deemed essential in attaining food security and economic growth. Markets should not be looked at in isolation but be integrated in chain approaches. Improved infrastructures and financial services as well as sound legal and regulatory frameworks and market information systems are needed.
- *Institutions* are critical in reshaping agricultural development. This reflects a shift away from the historical focus on increasing agricultural productivity toward a much broader agenda for sustainable agricultural development.. The latter includes the recognition that the poor are often excluded from entrepreneurial activities and from

accessing resources and (new) opportunities. Also, market externalities, inefficiencies and failures have negative impacts on the poor in particular.

5.2 Africa's response

Africa's own role in turning the global developments in terms of today's processes of economic, social and environmental change in the world into challenges for its agricultural sector is being articulated in the 'Comprehensive African Agriculture Development Programme (CAADP)' and in 'Framework for African Agricultural Productivity (FAAP)' of NEPAD and FARA (Forum for Agricultural Research in Africa) respectively. CAADP's four pillars include: (i) Extending the area under sustainable land management and reliable water control systems, (ii) Improving rural infrastructure and trade-related capacities for improved market access, (iii) Increasing food supply and reducing hunger and (iv) Agricultural research, technology dissemination and adoption. Each of these pillars incorporates policy, institutional reform and capacity building actions. CAADP's fourth's pillar constitutes NEPAD's strategy for strengthened agricultural knowledge systems by revitalizing, expanding and reforming agricultural innovation systems in Africa. FAAP underscores the need to address three shortcomings in order to facilitate innovation: capacity development, farmer empowerment and improving the effectiveness of research and advisory services. Implementation of both the CAADP and the FAAP programmes takes place in the larger framework of achieving the Millennium Development Goals.

5.3 The Netherlands' policy on Africa

General

As from its start in the 1950's, the Netherlands' policy on development cooperation, like that of the Nordic countries, has been among the more generous and –more importantly– among the more innovative policies applied globally. The Netherlands' financial commitment of 0.8% of the GDP (€ 11.7 billion in 2007) to be allocated on international development is among the highest in the world. Moreover, the Netherlands' development programmes and activities have been explicitly pro-poor and demand- and problem driven.

This is not to say that the Netherlands' programmes and activities have always, and in equal measure, addressed sustainability issues in the forefront of policy inception and implementation. Orientation on the three main interacting components of sustainable development, i.e. its social, ecological and economic dimensions, has grown mainly since the nineteen nineties, along with increasing global recognition of their importance. In particular such events as the publication of the Brundtland Report ('Our Common Future', in 1987), the UNCED Conference in Rio de Janeiro (1992) and its ensuing Agenda 21, the World Summit on Sustainable Development (WSSD) in Johannesburg (2002), the launch by the UN of the Millennium Development Goals, and the Global Fora on Water and on Climate Change have spurred political and public interest as well as policy action on sustainable development.

Box 5
IOB Evaluation of the Netherlands' Africa Policy

The Policy and Operations Evaluation Department (IOB) of the Netherlands' Ministry of Foreign Affairs recently completed an extensive evaluation of the Netherlands' Africa Policy over the period 1998 – 2006. On the results in the areas of Rural Development and Agriculture, the evaluation is generally negative. Although these were two key areas of the Netherlands' approach in the 1980's and early 1990's, most of the support dwindled when sector policies were introduced. In that context, some of the agriculture-related development activities did continue under the headings 'private sector development' or 'environmental sector development. The main conclusions of the IOB study are:

- *The Netherlands' government should set more priorities.*
- *The sector policy made poor people increasingly go unnoticed.*
- *Funds for cancellation of export debts should not be ODA-earmarked.*
- *Be more reticent with general budget-support in countries where human rights are violated.*
- *Productive sectors need more-focused attention.*
- *When developing sector programmes through policy dialogues, little more than lip service was paid to (African) ownership.*
- *Applying blends of different forms of aid is more effective than budget support only.*
- *Focused attention on women has decreased and more attention is needed for women in conflict areas.*
- *Coordination between Netherlands' ministries has been a positive development.*

Our common concern: The new Netherlands' policy on development

In 2007, the Netherlands' Minister for Development Cooperation formulated a new strategy in the policy document 'Een zaak van iedereen': *'Our common concern: The new Netherlands' aid policy'* (www.minbuza.nl/en/developmentcooperation). The document analyses four main changes that have occurred in recent years:

- Changing aid structures: different sources and more players are now present.
- The Paris Agenda for effective aid, points at the need for political leadership and less bureaucracy.
- There is increasing demand for results and accountability.
- More emphasis is being put on modesty and the consideration of differences between countries and situations.

The analysis resulted in four policy priorities, with a special geographic focus on Sub-Saharan Africa:

- A focus on *'fragile states'* as these in particular are lagging behind on the MDG's. In applying this focus, however, The Netherlands' government, continues to emphasize the importance of Good Governance for sustainable poverty reduction. To achieve sustainable development, a state must be stable and safe. This requires an integrated approach that combines Defence, Diplomacy and Development ('Triple D) in (post-) conflict situations. In this regard, respecting human rights is important as well, as it contributes to stability and development around the world. This respect, in combination with strengthening the constitutional state with a strong judiciary, is a priority of the foreign and development policies in the coming years.
- A greater focus on *'equal rights and opportunities for women'* and on *'sexual and reproductive health rights'* as, so far, virtually no progress has been made in terms of MDG's 3 and 5 ('Promoting gender equality and empowering women' and 'Improving maternal health', respectively).
- Greater emphasis on *'growth and equity'* issues. Sustainable economic development must move-up on the agenda. At country level, the focus must be on promoting

pro-poor growth in the private sector and on growth in the agricultural and informal sectors.

- Better recognition for the importance of *'environment and energy'* in achieving the MDG's, as well as for the impact that climate change will have.

Next to these four policy priorities in the Netherlands' development policy, attention will be given also to social development and environmental governance. Focus in social development is on health care -especially prevention of HIV/AIDS- and development of, and access to, good health care systems -including insurance schemes-, and education. As to the latter, most attention goes to access and quality of basic and secondary education opportunities. In that way developing countries create their own skilled workforce.

With regard to environmental governance, the Netherlands tries to counteract environmental degradation, loss of biodiversity and ecosystems and the impact these have on livelihoods the world over, but in Sub-Sahara Africa in particular. Special focus is on environmental governance. By stimulating (local) governments to create rules concerning the environment, -especially the exploitation thereof-, and by enabling them to monitor degradation and the violation of rules, environmental degradation can be slowed down or even halted.

Development Cooperation/LNV New policy on Agriculture, Rural Entrepreneurship and Food Security

In line with the recent re-emerging recognition of the important role that agriculture plays in furthering economic development in countries in the south (see Sections 5.1 and 5.2 above) also the Netherlands is re-formulating its strategy on *'Agriculture, Rural Entrepreneurship and Food Security'* (DGIS, 2008). This policy document is a joint statement of the Netherlands' Ministry of Foreign Affairs/Development Cooperation and the Ministry of Agriculture, Nature and Food Quality (LNV). The document elaborates on the general Netherlands' policy to achieve the MDG's by 2015 and makes the following observations:

- The sector approach, which was meant to increase the effectiveness of development aid, resulted in an increased focus on health and education and in a decreased focus on agricultural and rural development, as well as on relevant societal target groups. Also, it came along with cut backs in (Netherlands') technical assistance.
- The support to productive sectors has decreased, among other things because of uncertainties about the role governments should play. Also, the potential of having quick and visible successes by supporting the social sectors played a role.
- Technological innovations, which form the basis of increased productivity -also in the agricultural sector-, have to be adapted to location-specific conditions.
- Market incentives are important in steering economic development.
- An enabling institutional environment is a key requisite for development. A clear policy vision, public investments and effective institutions enable national governments to create the conditions and frameworks that make markets to function and that allow different stakeholders to take their shares in economic and social development.
- Checks and balances are of major importance in the public domain. Political institutions and strengthening of accountability structures require continuous attention. This may be done through capacity strengthening, organizational development and institutional change.

Based on these lessons learned, five priority areas have been identified now, which are necessary for sustainable agricultural development and to make the rural private sector prosper. These priorities, which have a main focus on Sub-Sahara Africa, need to be based on ownership within the recipient countries and require to be further identified and developed within their specific contexts. The five priorities are:

1. *Increased productivity.* Research and local innovations remain necessary to increase productivity in developing countries, especially in Africa (see Cases 6 and 7). They enable producers and rural entrepreneurs, men and women, to meet the increased demand with a higher production. In the new agenda for agricultural development

central roles are given to diversity, sustainability, adaptation and risk management. The challenge is how to strengthen local institutions and networks, in order to enable them to articulate relevant knowledge requirements from producers and absorb, generate and apply the new knowledge. The Netherlands' experience with capacity building and the development of innovations in small-scale, knowledge intensive forms of agriculture as well as the integral start of new chains, will be available when requested (see Case 1 and 3)). The Netherlands will strengthen regional centres and networks of excellence and link to African initiatives such as the Comprehensive African Agriculture Development Programme (CAADP) of NEPAD.

2. *Enabling environments.* Whereas it is the private sector's task to take care of production, (value-adding) processing, trading, etc., National Governments are responsible for facilitating the right frameworks and effective services and institutions. Developing these, requires the involvement of civil society organisations, including producer organizations, in order to create the necessary checks and balances. The Netherlands is convinced that national governments should not be the sole owner and driver of development processes. Producer and farmers' organizations have to play a key role in the process of policy formulation and priority setting.
3. *Sustainable development of supply chains.* Improving supply chains (including production, processing, trade and consumption) and making them (more) sustainable is key in establishing the required balance between economic equality, ecological sustainability and economic growth: the 'People, Planet, Profit' principle). Initiatives such as Fair Trade and ecologically-sound production are important as they acknowledge both the socio-economic position of producers and the vulnerability of natural resources. Further up-scaling and mainstreaming of these initiatives is currently taking place. The Netherlands will continue to stimulate and facilitate creation of such chains, building on, or extending, Public-Private-Partnerships. Special focus will be on situations where competing claims are being exercised on land for food, feed or biomass production, nature conservation and biodiversity management, urban and industrial expansion, etc. (see Case 6). Often, societal groups -especially those that are vulnerable- see their claims unacknowledged., leading to inequality and social unrest. The further institutional development of bio energy chains (setting standards and creating instruments) will receive specific attention with regard to second generation bio fuels (see Section 5.4).
4. *Improved access to markets.* Economic development will be stimulated through stronger functioning of local and regional markets and by promoting access to international markets and trade. The aim is to have stronger linkages between producers and consumers and to allow small producers to profit from new market opportunities. Transparency in the chain, with collaboration and exchange of knowledge on sustainable production and legal requirements -for instance with regard to food safety- among stakeholders results in stronger capacities and in better access to markets. The Netherlands will continue to support such partnerships (e.g. in horticulture in Ethiopia; See Case 2) and start new ones (e.g. on water for food and ecosystems in South Africa and Mozambique).
5. *Food security and re-distribution mechanisms.* Attention is required for the most-vulnerable groups in society that carry risks of being excluded from development efforts. Climate change, rising food prices, HIV/AIDS, ecological disasters and conflicts are some of the factors that impede access to food and, therefore, food security. Traditional agriculture knowledge practices are under pressure as a result of rural-urban migration. It is anticipated that as a result, poverty and structural hunger will continue to exist, even in regions with considerable economic growth. National governments and civil society organisations need to address this problem. The Netherlands' will actively support the development of employment opportunities through mechanisms such as *payment for environmental services, productive safety nets and cash for work* programmes. In addition, *low-external-input agriculture and skills development* are priorities. In this respect multilateral aid (e.g. through IFAD, WFP and FAO) may be mobilized as well.

5.4 Policy for sustainable production of biomass for energy generation

In order to mitigate climate change, the Netherlands' Government has formulated ambitious targets for the reduction of greenhouse gas emissions. In 2020 these emission need to be reduced, at national level, by 30 % as compared to the levels of 1990. By then also, 20 % of the total energy consumption in the Netherlands is derived from sustainable sources. Biomass is seen as one of the components to reach these targets, also because it decreases dependency on oil.

Biomass for energy is regarded as offering good possibilities for the agricultural sector, for the processing industry and for the logistics sector in the Netherlands and in other countries. Developing countries in particular, having comparative advantages in terms of the production of biomass, may profit from an increasing demand. They are competitive in terms of growing conditions and (low) labour costs. Because of this, the production of biomass for energy purposes may offer opportunities for both economic growth and local energy supply. The Netherlands, however, is aware of the risks associated with unsustainable biomass. Making biomass production for energy purposes sustainable is therefore an absolute priority for the Netherlands' government. It is not acceptable for the use of bio fuels to cause considerable environmental or social problems in producing countries.

Unsustainable production may result in negative CO₂ savings and it may have adverse effects on biodiversity, environmental quality and human well-being and prosperity. At the macro-level biomass production may compete with food production, affect food prices and cause changes in land use leading to loss of biodiversity. Societal and political discussions on the pro's and cons of biomass production are on-going and spreading, in particular given the current rising food prices that are coming along with increasing demand for biomass for energy generation. Given these risks, the Netherlands has commissioned the development of a set of sustainability criteria for biomass production for energy purposes. This National Commission on Sustainable Biomass compiled the set of criteria in the report '*Testing Framework for Sustainable Biomass*'. These criteria form the basis of the Netherlands' policy on energy production from biomass.

The demand and supply of biomass for energy purposes is an international issue. Therefore, approaches towards sustainable production of biomass need to be developed at the international level, including the biomass-producing countries. The Netherlands' policy on this follows a three-track approach:

1. Agreement at the international level on how to ensure the sustainable production of biomass for energy purposes. The Netherlands is eager to play a significant role in the international debate on the sustainability of biomass production.
2. Addressing the macro-effects of biomass production for energy purposes. Biomass production may have effects on land use, availability of resources and food prices. As these, in their turn, may impact on food security and on poverty they may also contribute to social unrest and conflicts/ Therefore, it is vital to gain better insight into these effects in order to formulate policy responses.
3. Stimulating the sustainable production of biomass through the development and implementation of testing-frameworks and by stimulating certification. The Netherlands' government is currently cooperating with Indonesia and Mozambique in order to start pilot projects that will test the sustainability framework. In these pilots special attention will be paid to the position of smallholder farmers.

5.5 Lessons learned from practice

Case 1: Capacity building and institutional change: the biogas case

Building capacities for effective institutions

Current understanding of sustainability has a strong focus on building capacities and making institutions more effective. Knowledge still is important, but in addition each country needs individuals and organizations with the competences to apply knowledge in

daily practices, adapt knowledge to local preferences and needs, and have access to resources, which allow them to perform according to their ambitions and visions. In addition, societal development efforts can not be achieved by a single organization, be it the government, private sector, civil society or donor agencies. An example is provided by the results of the biogas sector development approach, as achieved by the SNV Netherlands Development Organisation.

Need, potential and benefits of domestic biogas

About 2.5 billion people in developing countries are increasingly facing problems with energy supply. Their availability of traditional cooking fuels such as wood, agricultural waste, dried dung and charcoal is declining, while commercial fuels are too expensive and their availability unreliable. Collection of traditional fuels devours time, in particular for women and children, which could have been spent otherwise at school or in productive activities. By burning these fuels, particularly women and small children are exposed to smoke and prone to respiratory illnesses and eye ailments. It is estimated that about 1.3 million people die prematurely every year because of respiratory deceases originating from traditional fuel burning. In addition, the collection of traditional fuels and production of charcoal exhausts natural resources and damages the environment on which the people heavily rely. There is –in short- an urgent need for alternative, more sustainable energy sources. Domestic biogas can be one solution by making use of manure produced by animals like cattle, pigs and poultry as well as human excreta. The biogas sector programmes facilitated by SNV in for instance Nepal and Vietnam managed to become successful and have met with international appreciation and recognition

Careful development of capacities among actors and making stronger institutions

The five interlinked components or features of the SNV biogas approach are: (i) building ownership in the institutional context; (ii) designing a vision for a sustainable sector with agreed upon production targets, institutional mandates and necessary capacities; (iii) intertwining quantitative targets (number of biogas

Biogas sparks new institutional capacities and initiatives.

plants) with qualitative capacity development (setting quality standards with feedback on performance); (iv) promoting a market-oriented approach with private sector carrying out the key-functions on construction and micro-finance, whereas institutional arrangements for other required functions like training, quality control and coordination of the program have been carefully grounded in the national context ; and (v) agreeing on the required sector functions amongst government, private and civil society sector at different levels. These components explain the success of the SNV approach, especially in Asia, where biogas technological innovation has resulted in tangible economic, social and environmental results. SNV facilitated the process through which biogas sector partners formulated their vision of the sector and agreed on the required capacities and institutions necessary to materialize that vision.

Case 2: Ethiopian-Netherlands' Horticulture Partnership

Background and results

Horticultural exports from Ethiopia are growing very rapidly and are an important element in the country's efforts to diversify exports and to contribute directly to poverty reduction. All stakeholders – growers, the Ethiopian Horticulture Producers and Exporters Association and the Ministry of Trade and Industry – agree that joint efforts are needed in order to secure continuing well-balanced growth of the sector and increase societal benefits in terms of employment and foreign exchange earnings, as well as minimizing possible negative impacts on the natural resource base.

The Dutch Government has committed itself to strengthening an enabling environment for the horticulture sector in Ethiopia through a public-private partnership program in line with those of the World Summit on Sustainable Development, in South-east Asia and East

Africa. The mission of this partnership is to contribute to: (i) a competitive, demand-driven, self-sustaining and innovative horticulture cluster well-connected to international networks; (ii) environmentally and socially friendly production; human resource development and enlarging positive spin-offs for local, regional and national social and economic development; (iii) a strong international reputation for the Ethiopian Horticulture Cluster; (iv) an institutional framework that enables the sector to meet (future) market demands and opportunities and to operate in a socially and environmentally friendly and broadly accepted manner; and, (v) strengthening cooperation between Ethiopia and the Netherlands.

In close collaboration with private and public sector organisations, the partnership has developed an activity programme. To date, the main outputs include: (i) a full fledged capacity building programme; (ii) broadly supported a code of practice; (iii) capacity and institution building in phyto-sanitary issues; (iv) testing and introducing Integrated Pest Management programme, including an institutional framework; and, (v) Designing and start up of a Market Information System.

Success factors

There are successful and active linkages between private and public partners in the process of demand articulation and the implementation of activities. All activities involve public and private Ethiopian partners as well as Dutch knowledge institutions. Program results have had a direct impact on national government policies. Strong links to the private sector ensure that priorities continue to reflect sector needs. The program is governed by a Partnership Committee, which represents the major public and private stakeholders in the sector.. This ensures that the program is well-embedded in the (development of) Ethiopian horticultural policy.

Case 3: Sustainable bio-fuels: the case of Mali BioCarburant SA.

The Royal Institute for the Tropics (KIT) in the Netherlands aims to introduce a Dutch business model 'Mali Biocarburant SA' in West Africa. In this model bio-fuel is being produced and marketed -supplementing farmers' income and, thus, contributing to poverty alleviation- but that will also be used locally without taking a toll on the environment. The company is jointly financed by the Netherlands through public investments totalling 60 % and KIT, the Pension Fund of the Netherlands Railways (SPF)) and a private company 'FM Flowermachines' are shareholders. Partners in Mali are the Farmers' Association ULSP (Union Locale des Sociétés Cooperatives des Producteurs de Pourghère) and the private company 'Interagro' which purchases and distributes the fuel.

Mali BioCarburant produces biodiesel from *Jatropha curcas*. Small-scale farmers (both female and male) supply the *Jatropha* nuts to ULSP, which extracts the oil. The Association sells the *Jatropha* oil to Mali BioCarburant, adding value to the nuts, whereas the press-cake is used by the farmers to improve the fertility and structure of their soils. In this way they 'supplement' their income. Mali BioCarburant processes the oil into biodiesel that can be directly used in generators and in cars with diesel engines. Glycerol, a by-product, is sold to a women's cooperative to produce high-quality soap.

KIT is dedicated explicitly to small-scale projects with smallholder farmers and it integrates its activities into existing agricultural production systems. Growing *Jatropha* and processing of the nuts does neither affect the regular cultivation of food crops nor the quality of the environment. The plants are grown either in multiple cropping systems with food crops or in kilometres of fences stretching along roadsides.

The main innovative aspect of this enterprise is that the Farmers' Association owns 20 % of the shares of the company: farmers draw direct benefits from the sales of products and gain indirectly through increased share value and

Innovation: Smallholder farmers own shares and draw benefits and dividends from bio- diesel production and trading carbon credits.

dividends. Moreover, Mali BioCarburant is the first company in Africa that has contracted its carbon credits to 'Trees for Travel'. The latter organization has a contract with KIA Motors the Netherlands. These investments allow for up-scaling of the project: In 2008, ULSPP plans to cultivate 1,500,000 Jatropha plants.

With this project, KIT is taking advantage of the global trend to use biomass as an alternative to fossil fuels. Aside from the fact that fossil fuels may dry up, other benefits of bio fuels are that they are cleaner and they reduce dependency on oil from unstable regions. KIT's business model was adopted by African Ambassadors as the 'most promising model contributing to economic growth in Africa' and it has won the 'Egg of Columbus' innovation award of seven Netherlands Ministries. Most recently KIT has been nominated for the 'European Business Award for the Environment'.

Case 4: Natural Resources and Environmental Governance Programme, Ghana

The Natural Resources and Environmental Governance Program in Ghana¹ aims at achieving governance reforms in environmental and natural resource management. Good governance is a priority of the Netherlands' development policy.

The Government of Ghana faces serious challenges if it is to achieve its aims of securing the natural resource base, reducing environmental degradation, protecting communities that depend on natural resources, and increasing revenues from the timber and mining sectors. Recent impressive growth rates cannot be sustained in the face of alarmingly high rates of natural resource depletion, which represent costs of about 10 % per cent of the Ghana's GDP. Moreover, product stocks are decreasing rapidly, while wildlife populations and biodiversity are in serious decline. Over 70 % of the country's population depend on natural resources for their basic food, water and energy requirements. Decreasing environmental quality, notably through nutrient mining, air pollution and inadequate water supply and sanitation, drastically constrains the quality of life and productivity in Ghana. Furthermore, changing patterns of resource exploitation are the cause of social tension. Much of these conflicts can be traced back to poor access to, and poor management of, natural resources, weak environmental protection and limited community involvement.

Mainly, the program addresses governance issues in the forestry and wildlife, mining, and environment sectors. Forestry and wildlife are not only key to Ghana's economy, but they share common challenges, including revenues that are not well-captured. Environmental considerations need to be strengthened to effectively control land degradation and pollution and reduce long-term, negative health and economic impacts. Socio-economic impact of improved governance will be monitored closely. Over time, the scope of the operations may be expanded to include other sectors, such as fisheries and water- and land management.

The program will support policy changes aimed at improving the management of revenues and financial flows and that secure peoples' livelihoods in the forestry, wildlife and mining sectors. By supporting civil society engagement in natural resource governance issues, the program will also reinforce cross-sector linkages and country systems for environmental protection. Expected outcomes include (i) increased revenues and finances from the forestry and mining sectors, (ii) reduced illegal logging, (c) reduced social conflict in forestry and mining communities, and (iv) integration of environmental considerations in policy formulation and implementation.

¹ The NREG Program is supported by the Government of Ghana, the Netherlands' Directorate-General for International Cooperation, the World Bank, L'Agence Française de Développement, the United Kingdom's Department for International Development and the European Commission.

Case 5: Virunga-Bwindi Nature Parks, Democratic Republic of Congo, Uganda, Rwanda

The Virunga-Bwindi Nature Parks lay in the southernmost part of the Central Albertine Rift, of the Great Rift Valley. The parks comprise one of the world's richest ecosystems in terms of biodiversity, including rare species like the Mountain Gorilla. Fog and rain in the mountains form important sources of water for both the Nile and the Congo rivers. The parks stretch from Lake Albert in the South (between the Democratic Republic of Congo and Uganda) toward the north of Rwanda. They border on densely populated areas that are unstable and conflict-ridden. The parks therefore serve as a refuge for rebels, as a source of bush meat and timber for traders and as a source of food, cooking wood, water and medicines for refugees and the local population which poor, mostly.

In 2004, three park authorities (ICCN UWA and ORTPN) signed a Memorandum of Understanding for the collective management of the parks. In 2005, the responsible ministers of Uganda, Rwanda and the DRC signed a Declaration of Regional Cooperation and a 10-year strategic plan was developed. The Netherlands contributes € 4 million to the implementation of this plan. The Virunga-Bwindi Nature Parks Project should be self-financing after 4 years. Out of this total, € 1 million is budgeted for the practical cooperation between the three park authorities whereas € 1 million is earmarked per country to address conflicts of interests between the park and the population. This will be done by consulting the people to provide them with acceptable alternative livelihoods in order to stop over-exploitation of the parks.

In the course of the project, revenues of the parks (e.g. from eco-tourism) will gradually substitute the Netherlands' initial funding. By the end of 2012 external financing will not be required anymore. Mechanisms will be developed and implemented to share park revenues with the local population. In addition, improved cooperation between the three countries involved may come as a sign of hope in a region that is torn by conflicts. Most of all, the project contributes to the conservation of a unique ecosystem that provides the region with water and so much more, as well as the globe with a beautiful and diverse landscape.

Case 6: Partnership Programme 'Globalization and Sustainable Development'

Globalization processes, trade-liberalization, outsourcing, technological change and global conventions increasingly cause competing claims on natural resources in developing countries - and elsewhere. On the one hand these globalization processes offer opportunities for economic development. On the other hand, however, they may have negative effects on food security, poverty, rural livelihoods and environmental quality.

In the context of competing local, national and global interests and drivers of change processes, a partnership programme (2006-2010) between the Netherlands' Directorate-General for International Cooperation (DGIS) and Wageningen University and Research Centre (Wageningen UR) 'Globalisation and Sustainable Rural Development' aims to generate options for the poor to make use of the globalization processes. This will be done by the development of management scenarios for natural resources including biodiversity and for markets for ecosystem products and services. Target groups include small-scale producers and entrepreneurs in the agricultural sector as well as policy makers, knowledge and research institutes, local authorities and civil society. The program, which aims to provide scientific support to the design and implementation of development policies, has a main focus on Sub-Saharan Africa. It aims to contribute to the achievement of the targets of MDG 1 (eradicating extreme poverty and hunger), MDG 7 (ensuring environmental sustainability) and MDG 8 (building capacity for global partnerships).

The programme has three interrelated themes: (i) Sustainable pro-poor agro-supply chains, (ii) Competing claims on natural resources and (iii) Sustainable use and

management of agro-biodiversity. Capacity strengthening and institutional development are cross-cutting issues throughout the programme's activities.

Sustainable pro-poor agro-supply chains

The *agro-supply chain theme* aims at (i) developing capacity and expertise in supply chains in developing countries, (ii) analysing pilot chains and formulating lessons learned on how to facilitate market access, and (iii) evaluating such market-driven developments in terms of their contribution to income generation and improved rural livelihoods. Output of the programme targets the actual implementation level as well as national and international policy levels. A process of co-innovation, involving producer organizations, the private sector and knowledge institutes builds on sustainable and transparent arrangements between the parties. Pilot studies include 'The competitiveness of the Ugandan sunflower sector' and 'Institutional arrangements in sesame export chains in Ethiopia'. These are used to build capacities at all levels and components of the chain. Partners are investing in these pilots and go through a process of joint problem analysis, strategy development and implementation. This process is being implemented in an 'action-research-cum-development mode' and it includes –specifically- stakeholders in the south: traders, processors and retailers, small-holder producers and knowledge institutions. Output from this theme will include:

- Enhanced institutional and entrepreneurial capacities to meet (inter-) national agro-food standards.
- Private-sector driven chain approaches and mechanisms assessed for their impact on economic development.
- Co-innovative pilot projects implemented and evaluated.

Competing claims on natural resources

Increasingly, *competing claims on natural resources* (land, water, natural vegetation, fish-stocks, etc.) lead to conflicts that form obstacles for sustainable development and responsible use of the natural resource base. Yet these resources are the major assets available to sustain the livelihoods of poor rural communities. The main aim of the competing claims theme is the sustainable use of natural resources through building capacity in multi-disciplinary research approaches and analysis of complex systems. Poverty alleviation and development of novel, more equitable, local options for management of natural resources, and avoidance of conflict, are seen as key aspects. A methodological framework will be developed, and tested, to demonstrate the implications of policies on different stakeholders as well as the feedbacks as a consequence of stakeholder responses. The framework will enable the exploration of opportunities to harmonize policies across sectors. Emphasis is on:

- Strengthening local capacity to facilitate multi-stakeholder platforms for negotiation and priority setting.
- Enhancing stakeholders' abilities to innovate and respond to changing pressures.
- Identifying options for sustainable resource use at the local level in relation to differing access to resources, rights and power among stakeholders.
- Understanding the effects of policies at multiple scales and the constraints and opportunities that these create for sustainable development.

Projects currently being implemented include 'Understanding bio-fuel-based development and its impact on rural livelihoods, Mozambique', 'Managing the consequences of timber legality standards on local livelihoods, Ghana', 'Improving livelihoods and resource management in the Central Rift Valley, Ethiopia, and 'Coping with competing claims on water, Mozambique and South Africa'.

Sustainable use and management of agro-biodiversity

The resource base consist of a wide variety of genes, species and ecosystems. *Sustainable use and management of biodiversity* is a matter of cultures, techniques and socio-economic actors and factors. Ecological processes determine the productivity of the resource base as well as its ability to cope with changes (resilience). The poor typically depend on the integrity of the resource base and their rights to access. Food security,

both in quantity and in quality, and health are directly influenced by the status of the resource base, in particular its biodiversity. Globalization processes, population growth and climate change all exert pressure on the biodiversity. Policies and -lack of- institutional capacity are determining the ways in which we can handle these pressures. Research under this theme is taking local socio-economic perspectives as the starting point in developing new approaches that take full account of both the opportunities and the threats related to globalization processes. The main goals of this theme are: (i) Better understanding of the linkages between biodiversity and poverty alleviation, (ii) Developing options for sustainable management of the resource base, (iii) Support small producers in the improved use and marketing of genetic resources, (iii) Up-scaling of viable options, (iv) Developing pro-poor bio-tech applications and IPR regimes, and (v) Contributing to (inter-) national policy development. Output of this theme may include:

- Studies supporting the development of national and global policies which enable sustainable rural development.
- Increased numbers of locally-adapted crop varieties and animal breeds.
- Increased capacity amongst local communities to manage agro-biodiversity and genetic resources.
- Increased market access for local varieties and breeds.
- Better understanding on the interrelationships between natural and agricultural landscapes.

Institutional development and capacity strengthening

The partnerships' cross-cutting issue, 'Institutional Development and Capacity Strengthening' focuses on environmental governance -including the effects of (inter-)national policy changes-, institutional change and capacity building. These are critical elements in fostering and sustaining pro-poor development efforts and sustainable economic growth. This theme will be closely linked to the WSSD Partnership Initiatives and to the Sub-Sahara Africa Challenge Programme. Within the DGIS-WUR partnership programme, institutional development and capacity strengthening will build on and foster the collaborative partnerships that Wageningen UR has established with many strategic partners in Africa and within the international community of donors, research and development organizations and the network of DGIS.

Case 7: Knowledge and Policy for International Cooperation

The 'Policy Support Cluster International Cooperation' is one of the key mechanisms of the Netherlands' Ministry of Agriculture, Nature and Food Quality to generate knowledge in support of policy formulation by the Ministry itself, as well as by partners abroad. The 'Cluster International', having an annual budget of about € 7 million, is being implemented by Wageningen University and Research Centre.

The development of policies on global issues, and the implementation thereof, is complex and highly knowledge-intensive. Inherent to agriculture, nature management and food quality is the issue of sustainable development, including its environmental, economic and social components. These tend to be balanced in complex trade-off mechanisms. Emerging new issues arising in the international policy debate, bio-energy for example or animal welfare, require both a solid foundation in science and a high degree of stakeholder involvement in the preparatory and implementation phases. Building, and effectively utilizing, the required capacities for these tasks in an international setting requires targeted initiatives.

The Cluster International covers collaborative research activities in conjunction with capacity building across five continents. These activities cover an array of themes that are central to the international focus of the Ministry, ranging from markets and trade, sustainable use of biodiversity and integrated water management to the development of knowledge and innovation systems. Important aspects are inter-disciplinarity, close linkages between research and capacity development and creation of effective mechanisms for policy development and implementation using the knowledge

generated. Projects of the Cluster are generally part of existing networks, or new ones, if needed. Policy objectives of the ministry vis-à-vis the Millennium Development Goals play a central role in the programming and priority setting. Both, policy makers in the various Directorates of the Ministry and the Agricultural Counsellors the Netherlands Embassies in target countries and regions are responsible for identifying thematic and geographic priorities. In doing so, the Cluster seeks to accommodate the different agendas and planning cycles of the Counsellors, their in-country networks with governmental, non-governmental and business organizations and other actors who might be involved.

6 Conclusions and lessons learned

Agriculture and sustainable development in the Netherlands

The Netherlands has a highly productive and competitive agro-sector. This is the result of a number of favourable geographical and bio-physical conditions, good entrepreneurial skills, key roles of agricultural research and education, and a pro-active and stimulating farm policy in the past. This policy was developed and implemented over the years in good dialogue between government and farmers organizations. Initially the aim was to strengthen the economic position of farmers by increasing farm productivity levels. More recently, under much societal pressure, this policy had to change in order to counter the negative environmental impacts of these high-external input production systems. Among the problems incurred are: oversupply of nutrients from fertilizers and manure, high emissions of ammonia and other gasses (CO₂, CH₄ and N₂O) and high concentrations of agro-chemicals in ground and surface water and in the air. The introduction of the new measures and regulations was difficult as farmers were opposed -the costs of implementation being too high- and many changes were made during the implementation process. On hindsight, and given the actual level of know-how available in the Netherlands in dealing with the impacts concerned, it would have been much better if environmental guidelines had been incorporated in the farm policy at a much earlier stage. In addition to the environmental issues listed above, societal concern in the Netherlands is growing on animal welfare, animal diseases and food safety.

If a lesson were to be drawn, it would be on the need to develop and implement integrated policies and strategies for agricultural and rural development, which incorporate socio-cultural, economic and environmental objectives in a balanced way. Such policy development is most effective if done in close interaction between governmental authorities, the private sector including farmer organizations, and representatives of civil society, including environmentalists.

Land and rural development

Agriculture is by far the largest land user in the Netherlands, occupying some 70 percent of the land surface. Land prices are rising steeply, by some 10 percent per year but land ownership is on the increase relative to tenancy arrangements. Along with changing functions of the land in rural areas, also the social status of the Netherlands' countryside is changing. Access to land is well-embedded in the Netherlands' land registration and cadastral system. A number of threats exists to land and soil quality, including the declining quality of peat lands, soil compaction and soil sealing. In many countries in the world peat lands are rapidly disappearing and the knowledge gained in the Netherlands can be used to design programmes to meet the challenge of reducing oxidation of peat elsewhere. Likewise, some European countries have taken over Netherlands' legislation on soil at contaminated sites. Legislation -and remediation techniques- were established as a result of negative experiences occurring in the Netherlands between 1970 and 1980 mainly. Conversely, in dealing with soil erosion, lessons learned from abroad are being applied. These include agreements on regulations between local government and farmers. For soil compaction the lessons have yet to be learned.

Drought and desertification

Due to favourable climatic conditions, the Netherlands is not encountering severe problems in the areas of drought and desertification. Meanwhile, the country addresses drought and desertification policy issues in the European context and world wide. This is done through participation in multilateral environmental conventions, agreements and processes and by collaboration in international research and education programmes. A particular drought problem in the Netherlands relates to low ground water levels in nature conservation areas caused by artificial drainage of nearby agricultural land.

Africa

In spite of growing macro-level economic performance of African states, rural populations hardly share in their country's economic gains. Africa (e.g. AU, NEPAD) has decided to invest in agriculture by applying the Comprehensive African Agricultural Development Plan (CAADP), and new (international) policies on agricultural development generally argue for increased agricultural productivity, access to resources and services, market development, and reshaping institutions. The Netherlands' will support Africa through its policy as formulated in the forthcoming policy document '*Agriculture, Rural Entrepreneurship and Food Security*'. The document lists the following lessons learned: (i) The sector approach, which was meant to increase the effectiveness of development aid, resulted in an increased focus on health and education and in a decreased focus on agricultural and rural development, as well as on relevant societal target groups. Also, it came along with cut backs in (Netherlands') technical assistance; (ii) The support to productive sectors has decreased; (iii) Technological innovations, which form the basis of increased productivity, have to be adapted to location-specific conditions; (iv) Market incentives are important in steering economic development; (v) Enabling institutional environment are a key requisite for development; (vi) Checks and balances are of major importance in the public domain and can be done through capacity strengthening, organizational development and institutional change.

Based on these observations, five priority areas have been identified, which are necessary for sustainable agricultural development with a prospering rural private sector. These five priority areas constitute the basis for the Netherlands' support towards a stronger sustainable growth in rural Africa:

- Increased productivity: Research and local innovations remain necessary to increase agricultural productivity in developing countries. They enable producers and rural entrepreneurs, women and men, to meet the increased demand with a higher production.
- Enabling environments: Whereas it is the private sector's task to take care of production, (value-adding) processing, trading, etc., national governments are responsible for facilitating the right frameworks and effective services and institutions. Developing these, requires the involvement of civil society organizations, including producer organizations, in order to create the necessary checks and balances.
- Sustainable development of supply chains: Improving supply chains and making them more sustainable is key in establishing the required balance between economic equality, ecological sustainability and economic growth.
- Improved access to markets: Economic development will be stimulated through stronger functioning of local and regional markets and by promoting access to international markets and trade.
- Food security and re-distribution mechanisms: Attention is required for the most-vulnerable groups in society that carry risks of being excluded from development efforts.

The Netherlands' position on biomass production for the generation of energy includes the development and implementation –at the international level- of sustainability criteria that specifically address the possible environmental and social effects in biomass producing countries in the South.

Annex 1 Agriculture in the Netherlands: A brief overview of its development

1. General

International trade and agriculture have always been important pillars of the Netherlands' economy. Starting from about the 17th century, the Netherlands' agricultural sector increasingly targeted markets in neighbouring countries and countries farther away in Europe. Dairy products (butter, cheese), pig meat and flower bulbs were the specialties.

This international orientation helped the Netherlands' agricultural sector to overcome the effects of surging imports –at very low prices- of cereals from the United States and Eastern European countries at the end of the 19th century. Rather than just protecting its market, the Netherlands' government introduced instruments and services that stimulated farmers to improve their production systems. Agricultural research, education and extension became major elements to assist farmers in achieving higher yields and productivity gains to arrive at stronger competing positions. Other elements of this governmental policy were the introduction of quality control systems to provide guarantees for the Netherlands' products on the international markets, as well as land reclamation projects and other infrastructural improvements, including marketing facilities. Simultaneously, farmers developed their own production organizations and cooperatives at local and national level to better present their interest to the authorities and to have countervailing power in the markets. Dutch farmer cooperatives indeed, became very successful in trade and processing of agricultural products as well as in relevant services including credit facilities, insurances and administrative support.

In response to the global economic crisis of the nineteen thirties, the Netherlands' government introduced instruments to protect farmers against the then very low prices of products as well as to stabilize the markets of food for the consumers. For selected main commodities (milk and dairy, meat, cereals, flour and sugar) minimum prices were decreed as well as regulations to guarantee market provision. Other European countries acted more or less the same (e.g. France and Belgium) but at farm price level that were higher than the Netherlands' -as a main commodity exporter- could afford.

Growing economic cooperation in Europe after World War II resulted in the creation of a common European market comprising initially 6, and nowadays 27, member countries. This common market neither has restrictions in transition and trade of products, nor of services, labour and capital. Having a strong competitive position on the EU market as well as extensive experience in international trade, this was particularly beneficial for the Netherlands.

2. Present situation

Nowadays, the Netherlands' agricultural exports (dairy products, pig and poultry meat, vegetables, flowers and particularly ornamental plants) amount to about € 58 billion per year (2007) -or some 17 % of the total Netherlands' export of goods and services. Some 10 % of the GDP is earned by the agro-sector (including processing, trade and services) and the sector employs a similar 10 % the total working population of the country.

Agricultural imports, on the other hand, amount to € 34 billion per year and include cereals, oilseeds, vegetable proteins and fats (soy for instance) mostly as animal feed stuff. These originate mainly from countries outside the European Union: the United States, Brazil and Thailand. For many of these imported products the Netherlands has a prime role as processor and exporter to other countries in the European Union.

Agriculture (crop cultivation, animal husbandry and horti-/floriculture) in the Netherlands today comprises some 80,000 farms with some 200,000 persons working on them. Mostly, these are family-farms where the farmer and his/her family own the farm and do most of the work. A relatively small number of the holdings, mostly in the horticultural sector, have

non-family paid labourers. With a total area of about 2 million ha of land, the average farm size is less than 25 hectares. In order to obtain acceptable incomes from such restricted acreages, Dutch farmers have specialized and intensified their production systems. Over the last decades this became necessary also because of the rising prices of land and labour. In aggregate, these developments imply that, for instance:

- The production of pigs, poultry meat (broilers) and eggs is concentrated mainly on farms without land. The animals are fed compound feeds derived from imported cereals and other ingredients, e.g. manioc, citrus pulp, soy meal etc. In addition, the animals are being fed by-products from Dutch food manufactories. Both, the composition of the feed and the related transport logistics are highly specialized activities.
- Dairy farmers as well, make extensive use of compound feeds and by-products, mostly in combination with feed stuffs such as grass or silage from green maize. The latter feed stuffs are produced on-farm mainly.
- Vegetables, flowers and ornamental plants are grown almost entirely in 'greenhouses', using cheap (Dutch) natural gas as energy source.
- Arable farmers largely specialize on 'high value crops' such as ware potatoes, seed potatoes and sugar beet. Low value crops like cereals and oilseeds have been brought to the minimum.
- Cultivation of other 'open field crops' such as vegetables, fruits, flower bulbs and nursery plants implies high applications of (mineral) fertilizers and pesticides.

3. Conclusions

As a consequence of this evolution, agriculture in the Netherlands has high input levels in terms of feed stuffs, (mineral) fertilizers, pesticides and energy, in comparison to those in other European countries. These input levels increased (per farm as well as per hectare) mainly in the period 1950-1980. Starting from around 1980-1985, public and political awareness grew on the emergence of a number of agriculture-related environmental and social problems. Henceforth, agricultural and horticultural development in the Netherlands was placed under 'social and environmental' conditions and restrictions. These conditions and restrictions did not really change the character of Dutch agriculture: it is still an intensive, dynamic and internationally oriented sector.

It may be concluded that agricultural production chains in a small, densely-populated and highly industrialized country such as the Netherlands, with a relatively high per capita income, can be very important and successful as an economic factor.

Annex 2 Leading international research initiatives

Leading international research initiatives on desertification and drought with Netherlands' participation (Refer to Chapter 4)	
Research initiative	Aims with reference to desertification/drought
CIAT, World Bank and UNEP	Environmental and sustainability indicators http://www.ciat.cgiar.org/indicators/index.htm
CORINE: Coordination of information on the Environment	Compile information on the state of the environment (i.c. quality and abundance of water resources; land cover structure and the state of the soil), coordinate compilation of data and the organization of information within EU Member States or at international level, ensure consistency and compatibility of data. http://reports.eea.europa.eu/COR0-landcover/en
DESERTWATCH	Developing a user-tailored, standardised, commonly accepted and operational information system based on earth observation technology to support national and regional authorities of Annex IV (Northern Mediterranean) countries in reporting commonly to the UNCCD and assessing and monitoring desertification and its trends over time. http://dup.esrin.esa.it/desertwatch
DESERTLINKS: Combating desertification in Mediterranean Europe: Linking science with stakeholders	Contribute to the work of the UNCCD by developing a desertification indicator system for Mediterranean Europe. http://www.kcl.ac.uk/projects/desertlinks/
DESIRE	Establishment of promising alternative land use and management conservation strategies for hotspots of desertification in the world, based on a closed collaboration of scientists with stakeholder groups http://www.desire-project.eu
DeSurvey: A Surveillance System for Assessing and Monitoring of Desertification	Assessment of desertification status, early warning of risks and vulnerability evaluation of land use systems under desertification www.desurvey.net
CGIAR Challenge Program on Water and Food (CPWF)	Increasing the productivity of water used for agriculture www.waterandfood.org/
EuropeAid	Multi-annual research programmes on natural resources ec.europa.eu/europeaid/index_en.htm
GLASOD: Global Assessment of Human-Induced Soil Degradation	Produce a global map of soil degradation and a soil degradation database www.isric.org/UK/About+ISRIC/Projects/Track+Record/GLASOD.htm
IDDP: Intergrated Drylands Development Programme	Promoting action for rural development and poverty alleviation in the rural drylands on several fronts: legislation, capacity strengthening, water management, gender issues, health provision, education; ensure that policy and legislation favour people in the drylands and help to end their social and economic exclusion; action to help farmers and pastoralists increase their production of crops and livestock. www.undp.org/drylands/iddp.html
LUCC: Land-Use and Land-Cover Change	Improving the understanding of the land use and land cover change dynamics and their relationships with the global environmental change www.geo.ucl.ac.be/LUCC/lucc.html
MAB–Drylands Programme Man and Biosphere Programme – Drylands Programme	<ul style="list-style-type: none"> - On-site dryland field studies; - Sharing of scientific expertise among dryland and desertification-affected countries; - Conservation of dryland ecosystems using the biosphere reserve approach; - Education and capacity-building www.unesco.org/mab/ecosyst/drylands.shtml

MEDALUS I-III: Mediterranean Desertification and Land Use	Understanding, prediction and mitigation of Desertification in the Mediterranean countries of the European Union. www.medalus.demon.co.uk/
PESERA: Pan-European soil erosion risk assessment	Develop a process-based and spatially distributed model to quantify soil erosion by water and assess its risk across Europe. www.eusoils.jrc.it/ESDB_Archive/pesera/pesera_download.html
SENSOR : Sustainability Impact Assessment: Tools for Environmental, Social and Economic Effects of Multi-functional Land Use in European Regions	Develop science based ex-ante Sustainability Impact Assessment Tools (SIAT) to support decision making on policies related to multifunctional land use in European regions. www.sensor-ip.org
UNEP Programme on Success Stories in Land Degradation and Desertification Control	Projects and community-based initiatives which have successfully addressed the problem of dryland degradation. www.unep.org/themes/land/index.asp?page=programmes
WOCAT: World Overview of Conservation Approaches and Technologies	Provide tools that allow Soil and Water Conservation (SWC) specialists to share their valuable knowledge in soil and water management, that assist them in their search for appropriate SWC technologies and approaches, and that support them in making decisions in the field and at the planning level. www.wocat.net
WWAP: World Water Assessment Programme	Develop tools and skills needed to achieve better understanding of basic processes, management practices and policies that will help improve the supply and quality of global freshwater resources. www.unesco.org/water/wwap/

Data partly derived from Baartman et al., 2007.

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Colophon

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