

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.