



PBL Netherlands Environmental
Assessment Agency

CITIZENS' IMAGES AND VALUES OF NATURE IN EUROPE

A survey in nine EU Member States

Policy Study

Citizens' images and values of nature in Europe

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**Citizens' images and values of nature in Europe
A survey in nine EU Member States**

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Contents

MAIN FINDINGS 7

Summary 8

FULL RESULTS 13

1 Introduction 14

1.1 Background 14

1.2 Aim 15

1.3 Approach 15

1.4 Reader 15

2 Conceptions of nature 16

3 How nature is valued 20

3.1 Results for all respondents 22

3.2 Variations between countries 23

3.3 Dynamics of the values of nature 24

4 Objectives for nature management 26

5 Responsibility for protection of nature 28

References 30

Annex 1 The survey in detail 32

Annex 2 Response to each question 38

Annex 3 Factor analyses 44

Annex 4 Empirical evidence from 20 years of NEP studies 48

Annex 5 Glossary of terms 50

MAIN FINDINGS

MAIN FINDINGS

Summary

People have different images of nature and value nature for various reasons. This is relevant for nature policies in the EU as people with different beliefs and motives may prefer different futures for nature and landscape. However, the diversity in images and values is not well known, as only very few Europe-wide surveys have been carried out on this subject.

This report presents the results of a European survey into citizens' images and values regarding nature. The survey was held in nine Member States of the European Union: France, Germany, the Netherlands, Poland, Romania, Slovakia, Spain, Sweden and the United Kingdom. By filling out an online questionnaire, a representative sample of 1,000 respondents per country participated in the survey.

The survey is part of the Nature Outlook project by PBL Netherlands Environmental Assessment Agency (www.pbl.nl/natureoutlook). It explores the multiple ways people view and value nature. The project aims to provide building blocks for a new EU Biodiversity Strategy, as people with different beliefs and motives may prefer different futures for nature.

European citizens have a broad conception of nature

In the first question, people were asked to give their opinion about the degree of naturalness for certain types of nature. A majority of respondents considered all presented examples of nature to be natural to a greater or lesser extent (Figure 1). Although city parks were rated as the least natural, half of the respondents considered them to be natural in some way. Primeval forests were seen as the most natural type of nature by 90% of the respondents. This ranking by citizens closely matches that of experts, whose ranking was used for selecting the types of nature. There was not much difference in ranking between the nine Member States.

The majority of European citizens endorses the intrinsic value of nature

The response to six propositions about moral issues concerning the relationship between nature and humans revealed that attitudes vary widely among European citizens (Figure 2). However, most people (about 60%) agree more with an ecocentric view of nature. They more or less endorse the intrinsic value of nature, which includes biodiversity, wilderness and the integrity of wild animals. There is far less support (around 25%) for the anthropocentric notion that nature should be used for meeting human needs rather than be left in its natural state. This predominance of ecocentric over anthropocentric views was found in all studied Member States, which is in line with the findings of earlier surveys on environmental attitudes and nature values.

Figure 1

Opinions about the degree of naturalness for certain types of nature, 2014

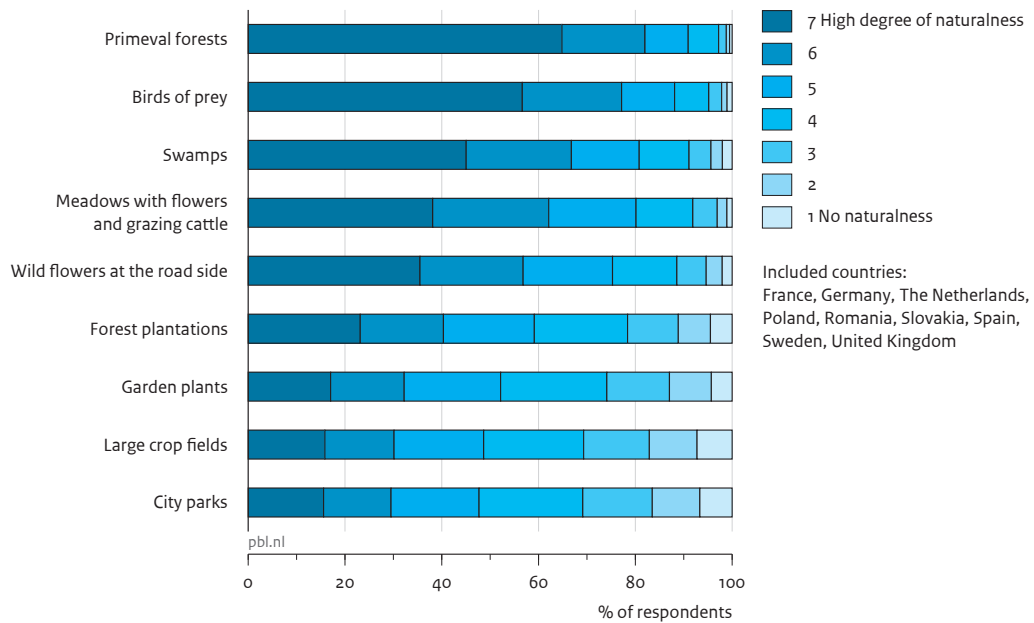


Figure 2

Opinions about the values of nature, 2014

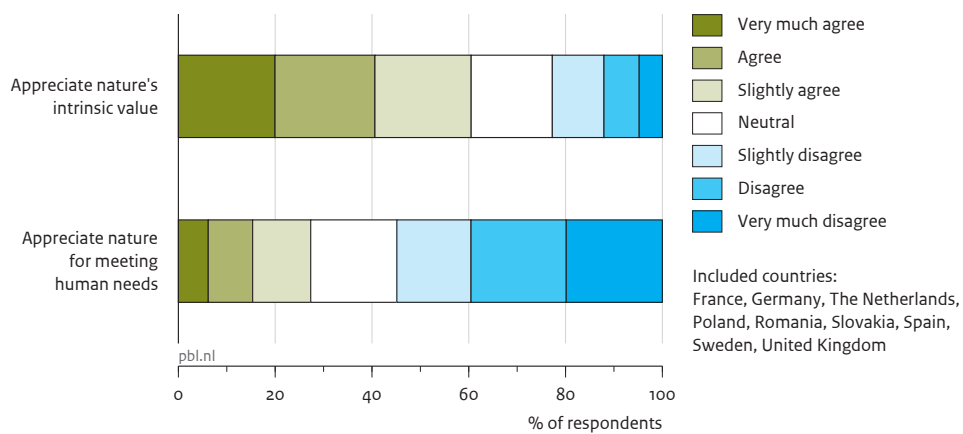
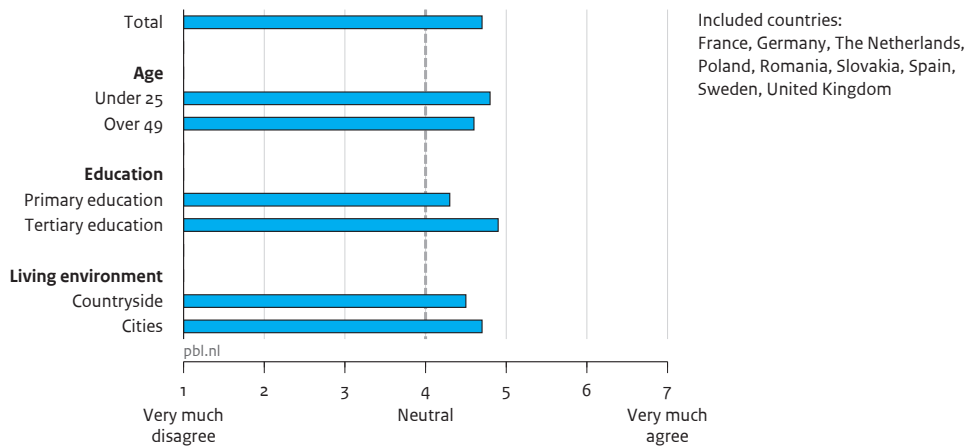


Figure 3
Opinions about the intrinsic values of nature, 2014



Source: GfK; analysis by Wageningen UR

However, it should be noted that about half of the respondents to our survey did not show a strong preference. Possible explanations for this fact could be that people have no strong feelings on the issues, do not consider themselves knowledgeable enough, or are simply very pragmatic.

Young people agree more with the intrinsic value of nature than do older people

The survey shows that young people, people with a tertiary education and city dwellers agree more with nature's intrinsic values, compared to older people, those who have had only a primary education and those who live in the countryside. The differences between these groups (Figure 3) are statistically significant. The reverse is also true; young, highly educated and urban members of the population agree less with anthropocentric values.

A review of other studies about shifts in cultural values and environmental attitudes showed that this difference in valuing nature between generations does not automatically imply that the ecocentric view of nature will become a more important motive for nature policies in the future. However, it is most likely that the current majority having an ecocentric view will not decline.

Broad agreement exists on the need to preserve nature

Two thirds of all respondents disagreed with the proposition that too much emphasis is being placed on nature conservation. This implies there is broad agreement on the need to preserve nature (Figure 4).

On this issue, the differences in opinion between Member States are rather small. Among the Slovaks and the Dutch, about one in five agreed with the proposition, whereas for the Germans and the Swedes this was one in eight, while the other nationalities scored somewhere in between.

The protection and management of nature is mainly the responsibility of the government

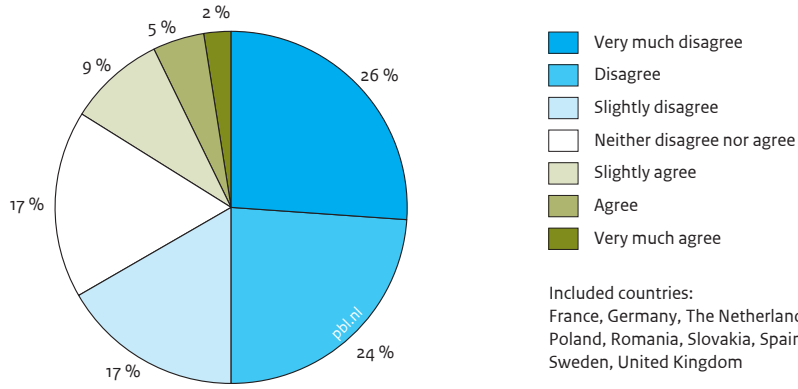
Two thirds of all survey respondents considered the government as the main responsible actor with respect to the protection and management of nature and the environment (Figure 5). Looking at levels of administration, the national governments were indicated as having far more responsibility than the EU government or regional and local governments. However, considerable differences were found between Member States, reflecting the differences in governmental structure between them.

The importance of the French *arrondissements* and German *Länder* in the national government structures of these Member States is reflected in the stronger preferences for the responsibility of regional governments. The overall picture is that a majority of EU citizens considered governments to hold the prime responsibility for the protection and management of nature.

Figure 4

Opinions about nature conservation, 2014

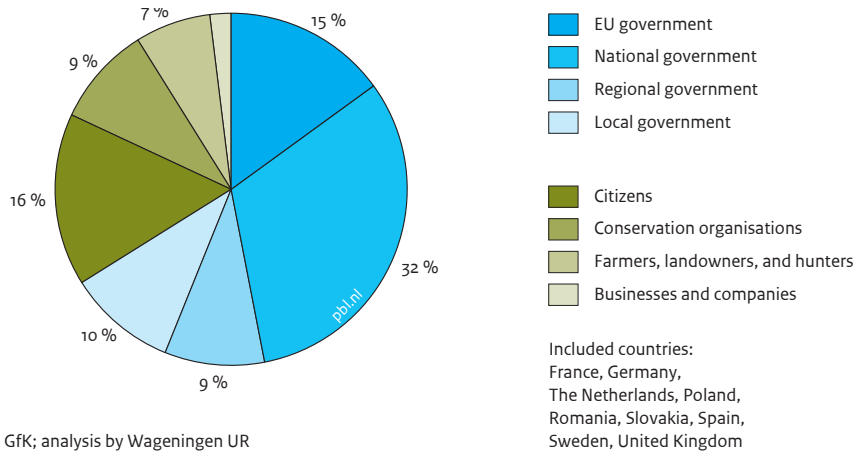
Too much emphasis has been placed on nature conservation



Source: GfK; analysis by Wageningen UR

Figure 5

Opinions about who is mainly responsible for protection and management of nature and the environment, 2014



Source: GfK; analysis by Wageningen UR

FULL RESULTS

FULL RESULTS

Introduction

1.1 Background

People value nature for various reasons. One person is enchanted by nature's beauty while another appreciates nature's ability to produce timber or clean air. How people value nature is partly based on their beliefs and motives. Basic questions are whether one considers humans to be superior to nature or an inseparable part of nature and whether nature is resilient or fragile in the face of human pressure. People's beliefs and motives are dynamic and have changed over the last century. Even though only very few Europe-wide, longitudinal surveys of images and values of nature have been carried out, it is possible to deduce the dynamics of these changes from research into related subjects, such as cultural values (Inglehart, 1997, 2008), environmental attitudes (Dunlap, 2008; Dunlap and York, 2008; Hawcroft and Milfont, 2010) and the awareness of nature policies and their underlying motivations. (Küchler-Krischun, Schell, Erdmann and Mues, 2014; Natural England, 2014; Opačić, 2014; TNS Political and Social, 2013; 2015; Union for Ethical BioTrade, 2014).

People's beliefs and motives concerning nature do, more or less subconsciously, influence how people discuss nature and act in relation to it. Although the relationship between beliefs and behaviour is not straightforward, insights into the connection are relevant for the debate on the future of nature policies.

This report presents the results of a survey on motives and beliefs regarding nature in nine EU Member States along with a systematic literature review of representative surveys about attitudes towards nature and the environment. In addition, the dynamics of motives and beliefs over time receives special attention, since this is relevant in outlook studies.

This survey is part of the Nature Outlook project by PBL Netherlands Environmental Assessment Agency, which explores the multiple ways people view and value nature. The project aims to provide building blocks for a new EU Biodiversity Strategy, as people with different beliefs and motives may prefer different futures for nature. The Nature Outlook develops pathways that may contribute to realising the 2050 vision of the EU Biodiversity Strategy (European Commission, 2011). The design of these pathways starts with contrasting perspectives on nature. The survey of citizens' nature-related beliefs and motives is one of the tools used in the development of these different perspectives.

This report uses the concept of *images of nature* to describe the *nature-related beliefs and motives of European citizens*. *Images of nature* are cognitive reflections of prior experiences with nature and discourses about nature that direct and structure perception and appreciation (Buijs, 2009; Buijs et al., 2012; Keulartz, Van der Windt and Swart, 2004). The concept not only considers cognitive aspects but also takes into account the normative dimension or values of nature. In the survey, the focus is on

individually held images and values, not on those held by social groups or entire societies.

The survey considers four aspects:

- the cognitive dimension, referring to the way people define or understand nature;
- the normative dimension, referring to the way people value nature in general;
- the objectives for management of nature areas with a specification of values in terms of their functions and ecosystem services;
- the responsibility for nature management, asking who is in charge of nature preservation.

1.2 Aim

The aim is to provide an overview of the diversity of images and values of nature held by EU citizens, including:

- the present-day images and values of nature in the EU;
- the differences and similarities between different Member States with regard to images and values;
- an insight into the characteristics of individuals, such as age, education and living environment, that may influence the dynamics of the images and values of nature.

1.3 Approach

A representative survey was performed in nine Member States: France, Germany, the Netherlands, Poland, Romania, Slovakia, Spain, Sweden and the United Kingdom. This selection is considered to be representative for the diversity in language groups (Germanic, Romance and Slavic), as well as the various spatial planning and governance traditions and cultural values. The international market research bureau GfK executed the survey, inviting members of their internet panels from the nine countries to participate in an online survey from 3 to 16 September 2014. Of all the invited panel members, 15% returned a completed questionnaire. This means a total of 9,021 European citizens, roughly 1,000 in each country, participated in the survey. The sample is representative for age, gender and education and there was sufficient response from rural areas to perform a statistical analysis on differences between environments (cities, towns, villages and countryside). Annex 1 gives a more detailed explanation of the survey approach.

The questions were based on earlier surveys carried out in Germany, the United Kingdom and the Netherlands. The Dutch version was compiled jointly by GfK and the authors of this report. GfK was responsible for the translations, using translators to convert the Dutch questionnaire into English and then into the seven other languages. Subsequently, proofreaders were hired to review the spelling and grammar. Furthermore, PBL consulted native speaking nature experts in each country to check the translation of terms related to nature and the environment. The full questionnaire is reproduced in Annex 1, and Annex 2 details the response to the questions.

1.4 Reader

Section 2 presents and discusses the cognitive dimension of images of nature and Section 3 deals with the value dimension. The preferred functions of nature, and the responsibility for nature preservation follow in Sections 4 and 5, respectively. Each section highlights the overall survey scores, the variations between Member States and between people of similar age, who have a similar educational background and living environment. A glossary of terms can be found in Annex 5.

Conceptions of nature

The cognitive dimension of images of nature reveals what people consider real nature. The respondents had to examine nine examples of nature and indicate the extent to which they considered each example to be 'real' nature (Figure 2.1). The results show that the respondents have a broad image of nature: a majority considers all examples to be real nature, to a greater or lesser extent. Although city parks are rated as the least natural, 30% consider them to be natural or very natural. Primeval forests are seen as the most natural type of nature in the survey, with 82% of respondents rating them as natural or very natural. These results agree closely with the ranking by the authors that was used to choose the nine examples of nature.

The response, both overall and within the individual countries, leads to the following characterisation of two nature groups: (see Annex 3 for a description of the methodology):

- The group of less human-dependent nature includes primeval forests, birds of prey, swamps and wild flowers at the roadside. Experts consider these to be representative of nature which develops with very little human interference.
- The group of very human-dependent nature includes city parks, large crop fields, garden plants and timber forests. These types are referred to as human-dependent nature since they are intensively used and managed by humans.

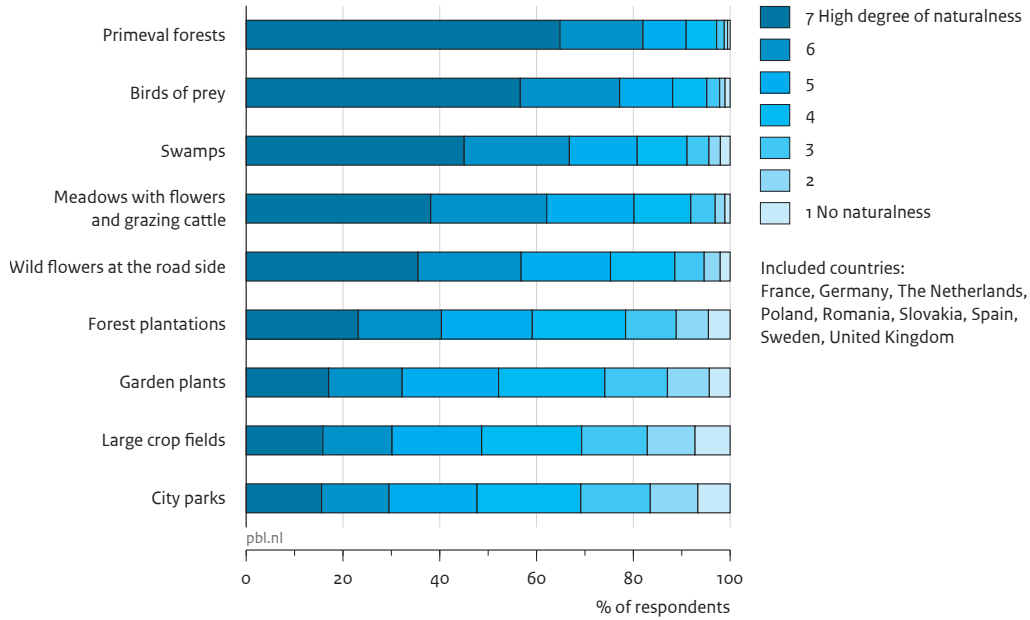
Meadows with grazing cattle are seen as belonging to both groups.

The average scores on naturalness awarded to these two groups are a good illustration of the variation between countries (Figure 2.2, Annex 3). First of all, in all countries respondents rate the very human-dependent group as less natural than the less human-dependent group, with a mean rating of 4.8 against 5.9. This finding corresponds with the results a series of Dutch surveys on the cognitive dimensions of images of nature (Buijs and Volker, 1997; De Bakker, Van Koppen and Vader, 2007; De Boer et al., 2014).

Secondly, there are some differences between Member States in the ranking of meadows and wild flowers. The French consider their meadows to be more natural than average, while the Polish, the British and the Dutch rate them less natural than average. These three nationalities also give wild flowers at the roadside a lower rating than the other countries. Perception is one explanation for the difference in ranking, and varying 'naturalness' between countries could be another explanation. For example, Dutch meadows are less natural because to a large extent they are intensively managed, while French meadows are generally less intensively used.

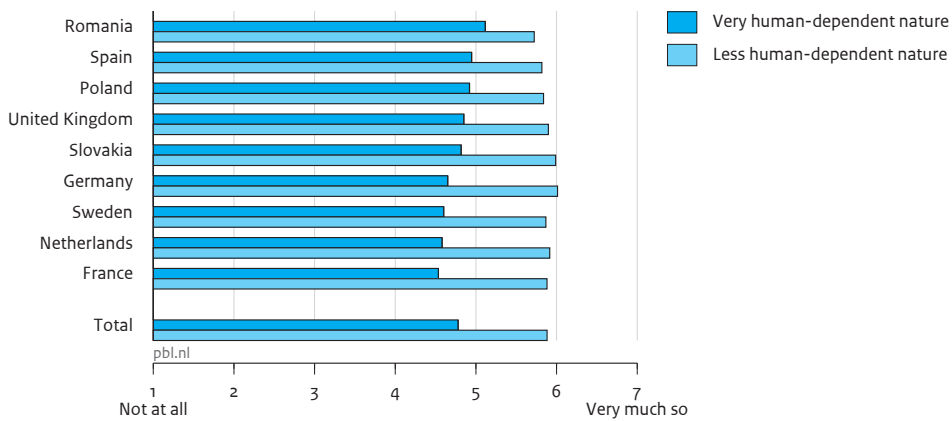
Finally, it is striking that the differences in perceived naturalness between the two groups of nature are relatively small in Romania, Spain, Poland and the United Kingdom where citizens rate human-dependent nature higher and autonomous nature lower than their counterparts in Germany, Slovakia, Sweden, the Netherlands and France.

Figure 2.1
Opinions about the degree of naturalness for certain types of nature, 2014



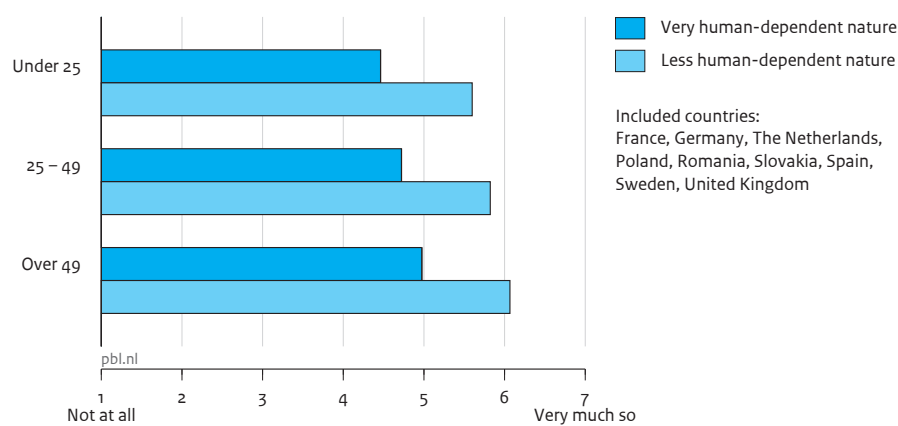
Source: GfK; analysis by Wageningen UR

Figure 2.2
Opinions about the degree of naturalness of nature, per country, 2014



Source: GfK; analysis Wageningen UR

Figure 2.3
Opinions about the degree of naturalness of nature, per age, 2014



Source: GfK; analysis by Wageningen UR

Older people give higher ratings than younger people to the naturalness of both autonomous and human-dependent nature (Figure 3). The differences between the three age groups are statistically significant and a possible explanation is that longer experience with nature promotes the appreciation of naturalness. In contrast, the analyses show that the influence of education and living environment on opinions about naturalness is less pronounced.

How nature is valued

Europeans have contrasting opinions on the right way of dealing with nature. Ethical views on nature differ.

This section explores the normative dimension of citizens' images of nature and measures the variety among opinions about values of nature in a more comprehensive way through an analysis of the response to six propositions. The question was to what extent the respondents agreed with the propositions that:

- a. Vulnerable nature areas should be closed to leisure and recreational activities.
- b. We should use nature in such a way that we get the most economic value from it.
- c. Too much emphasis has been placed on nature conservation.
- d. Hunting is cruel and inhumane to animals.
- e. It is natural that wild animals sometimes starve to death or are injured by other animals, and we should accept that.
- f. Trees may be felled if needed to increase the diversity of species in a forest.

An explorative factor analysis revealed the three factors that account for the variation in the response to these propositions, (see Annex 3):

- an anthropocentric factor in propositions b and c that indicates to what extent the respondents agree with utilitarian values of nature;
- an ecocentric factor in propositions a and d that reveals to what extent respondents appreciate the intrinsic value of nature;
- a holistic factor in propositions e and f that shows to what extent the respondents agree with a vision that nature comprises much more than the fate of an individual animal or plant and that nature conservation should focus on the preservation of habitats and ecosystems rather than the protection of individuals.

This section presents the results of the comprehensive analysis. The results for the individual propositions are given in Annex 2. These show that there occasionally is a striking variation in opinion as can be seen in Box 1 with the proposition on hunting. The variations are slightly less pronounced in the comprehensive presentation.

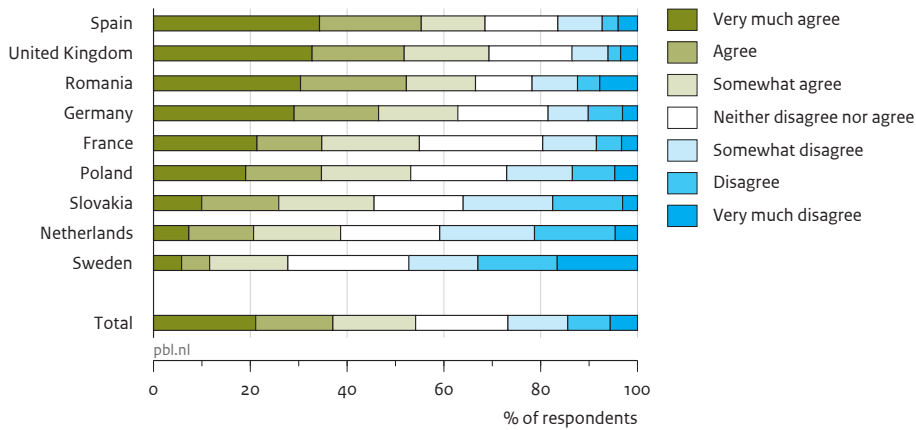
Section 3.1 describes and discusses the overall results for all respondents and Section 3.2 details the differences the survey revealed between Member States. Finally, Section 3.3 looks at the dynamics of these values.

Box 1: Opinions about hunting diverge widely

Figure 3.1

Opinions about hunting, per country, 2014

How do you feel about the proposition that hunting is cruel and inhumane to the animals?



Source: GfK; analysis by Wageningen UR

The extent to which ethical views differ between persons and countries is clearly illustrated by the response to the proposition that hunting is cruel and inhumane to animals. Of all respondents, 54% agree to a certain point with this proposition, which underpins the predominance of ecocentric over anthropocentric values. In some countries, this moral issue, which centres around animal rights, hunting methods and the motives for hunting, generates heated debates. A survey in the Netherlands showed that hunting is more widely accepted when done to prevent the starvation of wild animals than to prevent wildlife causing damage to crops or danger to traffic (Natuurmonumenten (Dutch nature conservation society), 2014). In Sweden, only 25% of the respondents agree to some extent with the proposition. The familiarity of the Swedes with hunting and the local consumption of game meat could be an explanation for the broad acceptance there (Svenska Jägareförbundet, 2014). At the other end of the spectrum is the United Kingdom, where 69% agree to some extent with the proposition. This may be a reflection of the ongoing intensive public debate about fox hunting with hounds which started ten years ago (Mason, 2015). The Netherlands seems to be the most divided country when it comes to hunting with 40% of respondents agreeing with the proposition and 40% disagreeing.

3.1 Results for all respondents

Though the response to the propositions varies widely, it is clear that in the European citizens' appreciation of nature, ecocentric and holistic values carry more weight than anthropocentric values (Figure 3.2). Around 40% of respondents agree or very much agree with propositions drawn up to measure ecocentric and holistic values and around 14% disagree or very much disagree. In the same vein, 40% disagree or very much disagree with propositions that measure anthropocentric values and around 14% agree or very much agree. Finally, half of all respondents indicate no strong preferences on any of the three response scales, neither agreeing nor disagreeing with the propositions, or only somewhat. The following section discusses three of the findings.

3.1.1 Predominance of ecocentric values

Most of the research literature supporting the measured predominance of ecocentric or non-anthropocentric values does not focus on values of nature, but on the related subject of environmental attitudes. Many studies use the New Ecological Paradigm (NEP) scale to characterise environmental attitudes of preservation versus utilisation (Milfont and Duckitt, 2004; Milfont and Duckitt, 2010; Wiseman and Bogner, 2003). Preservation refers to the belief that nature and biodiversity should be preserved in their original state. To achieve this, it is assumed that nature has to be protected from use and alteration by humans. Utilisation refers to the belief that the use and alteration of nature and biodiversity is legitimate and necessary for human development (Milfont and Duckitt, 2010). The NEP scale corresponds more or less with the ecocentric and anthropocentric factors applied in the survey.

Over the past 25 years, surveys of environmental attitudes around the world using the New Ecological Paradigm (NEP) scale have clearly shown that European citizens have a preference for preservation rather than utilisation of the environment (Hawcroft and Milfont, 2010). Several European publications confirming this are: Bauer, Wallner and Hunziker (2009), Bonnes, Passafaro and Carrus (2011), Gesis (2013), Hedlund-De Witt, De Boer and Boersema (2014), Jiménez Sánchez and Lafuente (2010), Sevenant and Antrop (2010) and Bozonnet (2014). Dunlap, Schmidt and Guerra (2011) demonstrated that at present a preservationist attitude towards the environment predominates in all European countries except Azerbaijan.

However, the predominance of a preservationist attitude does not necessarily imply that people adhere to ecocentric or non-anthropocentric values of nature. Most research on values of nature has been carried out in the 21st century and been based on samples that are not statistically representative for the whole population (Flint,

Kunze, Muhar, Yoshida and Penker, 2013). Nevertheless, the few quantitative surveys of attitudes towards nature that are available in Europe are in line with the findings published in this report. A representative survey in France, Germany and the Netherlands (De Groot, Drenthen and De Groot, 2011) revealed that almost all respondents adhered to non-anthropocentric values of nature. Less than 15% of the respondents in that survey adhere to the anthropocentric attitude called 'mastery over nature' which holds that humans stand above nature, may act as they please, and are not bound by moral restraints or awareness of nature's fragility. All other attitudes can be considered ecocentric because they conceive of humans as part of nature, making them responsible for preserving the intrinsic value of nature, now and for future generations, but attitudes differ in the way they feel connected to nature. In a Polish survey, Hunka, De Groot and Biela (2009) found that most respondents agree with ecocentric rather than with anthropocentric values of nature.

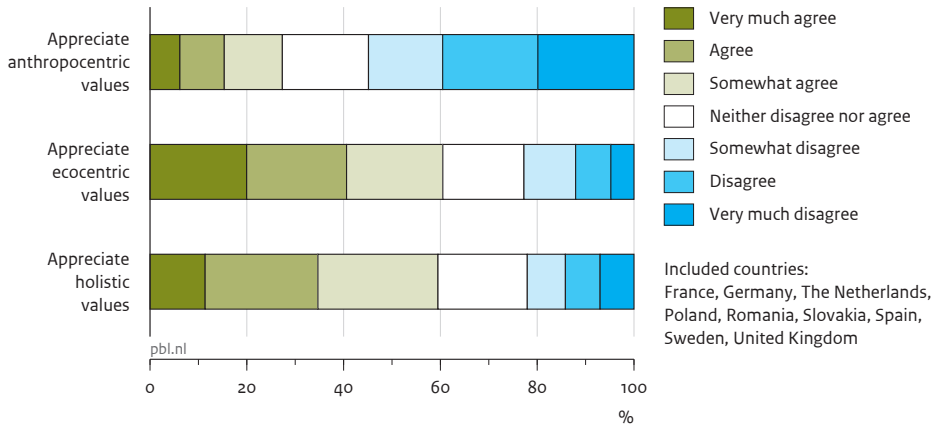
3.1.2 Anthropocentric values

The identification of a distinct but much smaller group of respondents who hold evident anthropocentric or non-ecocentric values confirms the findings of De Groot et al. (2011) which point to the existence of a group of people that can be typified as following the principle of 'mastery over nature'. It also confirms the results of the Flash Eurobarometer on Biodiversity (TNS Political and Social, 2015) concerning the proposition that 'Sometimes economic development results in damage or destruction of nature protection areas'. In this survey, 7% of EU citizens indicated that the assertion closest to their opinion was 'acceptable because economic development takes precedence'. On the other hand, 46% of the respondents in the Flash Eurobarometer indicated that these economic developments should be prohibited. The pragmatic middle, 41% of the respondents, indicated that damage was only acceptable for developments of major public interest and when fully compensated for.

3.1.3 The pragmatic middle

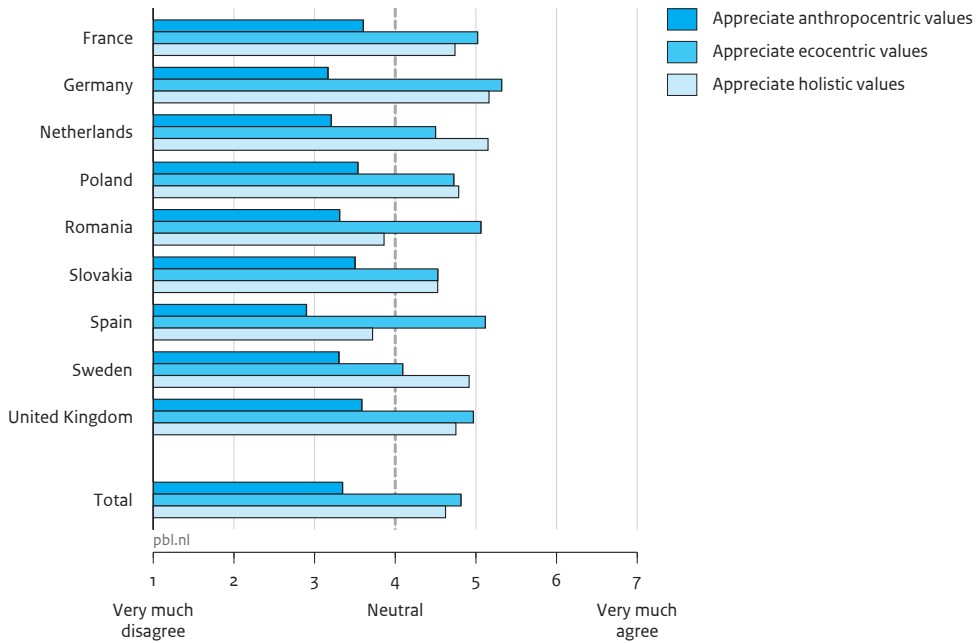
The implications of the fact that about half of the respondents seems to have no strong value preferences at all are not so unequivocal. Could it be that people do not care about the issues? Do they not feel knowledgeable enough to react to these normative propositions? Do they weigh values pragmatically? De Groot et al. (2011) estimated that 91% of their respondents can be typified as 'guardians of nature'. This attitude is characterised by a strong agreement with propositions such as 'we have to ensure that we leave enough nature intact for future generations', 'we must not set ourselves above nature, but must work together with it', 'human beings are part of nature (and are also responsible for it)' and 'human beings have a responsibility to conserve the nature environment'.

Figure 3.2
Opinions about the values of nature, 2014



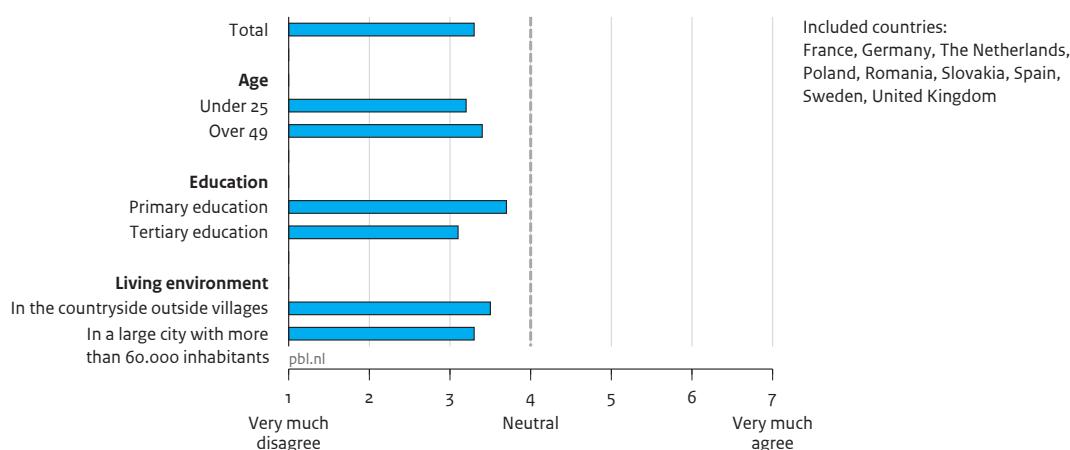
Source: GfK; analysis by Wageningen UR

Figure 3.3
Opinions about the values of nature, per country, 2014



Bron: GfK; analysis by Wageningen UR

Figure 3.4
Opinions about the antropocentric values of nature, 2014



Source: GfK; analysis by Wageningen UR

Therefore, according to this 2011 study, the general population is more ecocentric than anthropocentric. On the other hand, Bozonnet (2005, 2014) concluded that three quarters of the Europeans are not very committed or even indifferent to all the grand narratives about the environment, and therefore neither ecocentric nor anthropocentric. His conclusion is founded on the high percentage of Europeans that did not answer the questions of the NEP scale in the European Value Study.

3.2 Variations between countries

The variation in opinions about values of nature as presented in Section 3.1 is observed in most Member States, although there are differences between countries. In all countries, the respondents on average disagree with anthropocentric values and agree with ecocentric values (Figure 3.3). Only with regard to holistic values, the response that does not conform to the overall picture is from Romania and Spain where respondents slightly disagree with the propositions. Most of these citizens do not agree with proposals to fell trees to benefit the ecological development of the woods or to leave starving animals to their lot.

Although the differences between Member States are statistically significant, the survey analysis does not provide a systematic explanation of the rankings. A low ranking on the anthropocentric scale was expected to be coupled to a high ranking on the ecocentric scale. While this is the case for Germany for instance, for most countries this assumed relationship was not found. This is most clearly observed in France, which has the highest

ranking on the anthropocentric scale and comes second on the ecocentric scale.

Secondly, a systematic difference between countries was expected, based on their material wealth. This assumption is based on Inglehart's finding that in countries with a higher GDP per capita, the more non-materialistic cultural values predominate (Inglehart, 2008). The correlation did not reveal a statistically significant relationship between any of the three factors from this survey and GDP per capita.

3.3 Dynamics of the values of nature

In the past decades, cultural values in Europe have not remained static, but changed drastically from predominantly materialistic to post-materialistic (Inglehart, 2008). In addition, Inglehart expects a further, but less pronounced, shift in values in the decades ahead, because the cultural values of today's youngest generation are still less materialistic than those of older generations. The question now is whether values concerning nature and the environment have changed as well and how they may change in the future. Future developments are inherently uncertain, but highly relevant when rethinking nature policies for the decades ahead. Since intergenerational differences have been a driver for changing cultural values in the past (Inglehart, 2008), a summary of the survey's results regarding differences between generations is provided first. A discussion of the implications follows in the form of a systematic literature review of quantitative surveys on values of nature and the environment.

The survey shows that the values of the youngest generation differ significantly from those of older citizens (Figure 3.4). The respondents younger than 25 disagree more with anthropocentric values than those over 49. Similar marked, although less strong relationships were found between age and ecocentric and holistic values. The differences between educational levels are even larger than between age groups: people who have attained higher levels of education agree less with anthropocentric values and more with ecocentric and holistic values.

These findings are in line with a study by Inglehart (2008) who, on the basis of a 35-year-long monitoring programme of cultural values, convincingly demonstrated how today's young generation in Europe agrees more with post-materialistic values than older generations do. Although with less pronounced differences than in the previous 35 years, Inglehart believes that the same process will cause post-materialistic values to become even more predominant. His records revealed a drastic shift from materialist to post-materialist values, caused by a process of intergenerational change. Values are often specific to a certain generation, as these are formed in people's early years and stay with them throughout their lives. This means that the predominant values held by a particular generation become less prevalent as this generation ages and ultimately dwindles in size. In the past, this intergenerational shift in values was caused by the dramatic rise in existential security after World War II. In the coming years, people in Europe may become even less anthropocentric than they are today, assuming that values of nature change in the same way as cultural values have changed during the past decades, and will continue to do so in the future, according to Inglehart's expectations. Increasing numbers of people attaining higher education may further support a trend towards non-anthropocentric or preservationist values (Franzen and Vogl, 2013).

However, the uncertainties about a possible future trend towards less anthropocentric values are considerable. First of all, as suggested by De Groot and Van den Born (2003), Van den Born (2008) and Hunka et al. (2009), no evidence was found for a shift in values of nature in the past, simply because the systematic literature review of representative quantitative surveys revealed no longitudinal data on nature values. Furthermore, a secondary analysis, described in Annex 4, of worldwide quantitative monitoring data based on the NEP scale shows no statistically significant increase of preservationist values at the expense of utilitarian values during the 1987–2007 period in Europe. On the other hand, the International Social Survey Programme revealed a slight decline in preservationist values during the first decade of the 21st century (Franzen and Vogl, 2013).

Ecocentric values will probably remain predominant over anthropocentric values of nature, but there is insufficient evidence to affirm that they will become more important.

Objectives for nature management

The management of nature areas may have various objectives, which are detailed specifications of the values of nature. Two people can share a strong preference for ecocentric values but disagree on the functions of a certain nature area. For instance, one can be in favour of preserving pristine areas while the other loves cultural landscape heritage. As these preferences are not always mutually compatible within a single nature area, an insight in the array of preferred objectives for management is required.

The opinion of the respondents was estimated by asking them to value the importance of ten management objectives which promoted values ranging from unambiguously ecocentric to clearly anthropocentric:

- the diversity of species and plants
- the conservation of pristine areas
- beautiful landscapes
- the conservation of old and characteristic landscape features
- the identity of local communities
- the contribution to flood prevention
- the production of clean air and clean water
- the attractiveness for recreation
- the maximum provision of goods and services, such as by forestry, hydroelectric power stations and wind farms
- the prevention of damage to agricultural and other land uses by, for example, predators, pests and weeds

The results show that the respondents have a broad, multi-objective perspective on nature. On average, all presented objectives are considered important to very

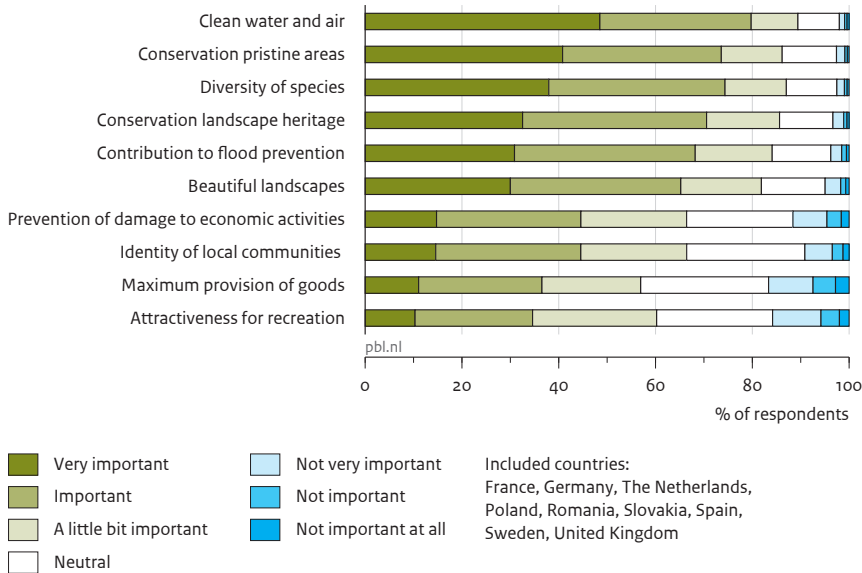
important (Figure 4.1). Even the least important objective, the maximisation of the provision of goods and services, was rated as important to some extent by a majority of the respondents.

The variation in responses can be summarised in a more comprehensive way into three groups that were revealed by an explorative factor analysis (see Annex 3 for a detailed description):

- Multiple objectives, a group with the most important objectives, including intrinsic values (the diversity of animal and plant species, the conservation of pristine areas, beautiful landscapes, the conservation of old and characteristic landscape features) and the regulating ecosystem services (e.g. flood prevention, clean air and clean water). Figure 12 shows that this group is considered to be more important than the other two groups.
- Utilitarian objectives, a group with clear utilitarian motives aiming to maximise the provision of goods and services, prevent damage to agriculture and other forms of land use by pest species, and contribute to flood prevention.
- Cultural objectives, a group relating to cultural ecosystem services involving beautiful landscapes, the attractiveness for recreational activities and the identity of local communities.

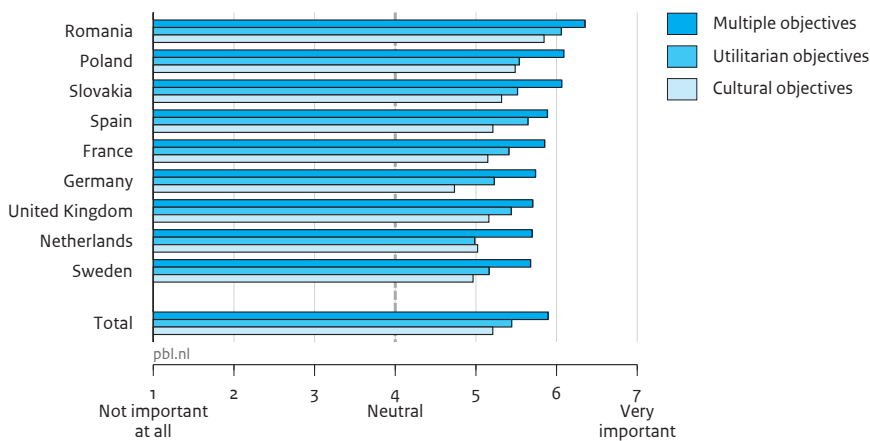
Figure 4.1
Opinions about objectives for nature management, 2014

How important do you consider the objectives for nature management?



Source: GfK; analysis by Wageningen UR

Figure 4.2
Opinions about objectives for management of natural areas, per country, 2014



Source: GfK; analysis by Wageningen UR

The variation in ranking of objectives between countries is summarised in Figure 4.2. Citizens from Germany, the Netherlands, Sweden and the United Kingdom rate all objectives as slightly less important than average, but the Eastern European Member States rate them as slightly more important.

Individual traits have a limited influence on the valuing of objectives. Only age has a distinct weight as older people were found to rate the objectives more highly. This seems to be in line with what the survey revealed about age and the valuing of the naturalness of nature types.

Responsibility for protection of nature

To gain insight into who is responsible for the protection and management of nature and the environment, respondents were asked to rank eight groups of actors.

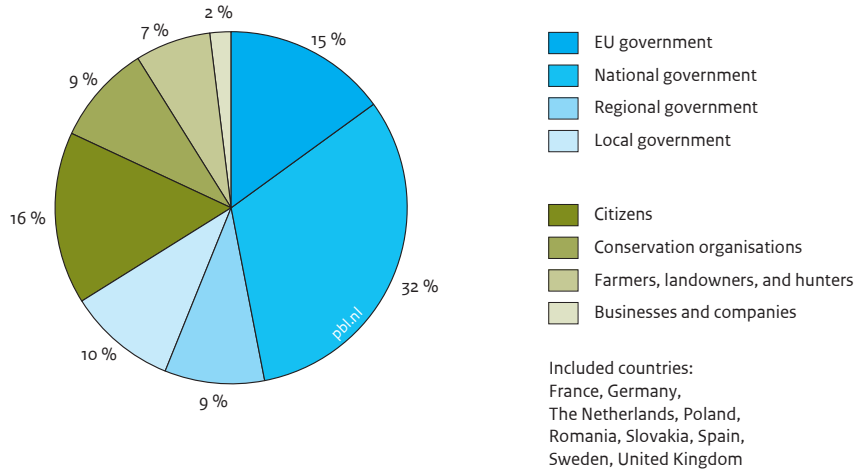
Two thirds of all respondents in this survey consider governments as the most responsible actor in the protection of nature and the environment (Figure 5.1). Of all levels of administration, national governments are pointed to as having far more responsibilities than the EU or regional and local governments. Furthermore, the respondents rank individual citizens as the second most responsible actor. What is remarkable is that local actors such as landowners, farmers and hunters, are hardly considered to bear any responsibility. Businesses and companies are believed to be the least responsible.

Considerable differences between countries do exist. As for the levels of administration, citizens from Germany, France and Slovakia assign less responsibility to national and more responsibility to regional governments than people in the other Member States. This seems to reflect the importance of the French arrondissements and German Länder in their national government structures.

Of all respondents, the Dutch and the British consider national governments the most, and the European Union the least responsible for the protection and management of nature. This may reflect a wish for their national governments to gain more control.

The Romanians and the Slovaks, more than citizens from other Member States, pointed to individual citizens as the most responsible actors, revealing a relative preference for individual action as compared to the other countries.

Figure 5.1
Opinions about the responsibility for protection and management of nature and the environment, 2014



Source: GfK; analysis by Wageningen UR

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Annex 1

The survey in detail

A 1.1 Selection of countries

For practical reasons, PBL could not carry out the survey in all EU Member States and, therefore, selected the following countries:

- France
- Germany
- Netherlands
- Poland
- Slovakia
- Spain
- Sweden
- Romania
- United Kingdom

The selection was based on the following criteria:

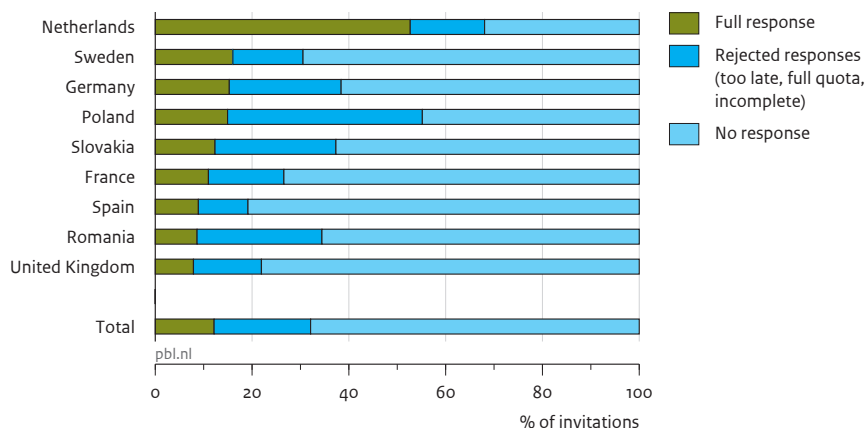
- a more or less equal distribution over major language groups in Europe (Romance, Germanic and Slavic);
- a selection of countries in each language group so as to represent the variation in citizen opinion of the relationship between economy and ecology, citizen involvement in nature and the potential strength of government regulations on land-use change. The choice was based on information from the Flash Eurobarometer (TNS Political & Social, 2013: questions 11-1 and 13-3) and on planning policies (Tosics et al., 2010).
- the possibilities for internet surveying.

A 2.2 Data collection: the survey

The survey was executed by GfK, an international market research bureau, using online panels in the nine selected countries. The aim was to prompt a response of 1,000 questionnaires in each country, completed by a representative sample of the population between 16 and 74 years old. The panel members were invited to submit their questionnaires between 3 and 16 September 2014. While the population sampling was stratified on age, education and gender, the response to the question about living environment was also monitored to ensure sufficient response was gathered from rural areas. During the course of the survey, a one-time reminder was sent to participants who had not yet responded by a certain date. All participants received a symbolic compensation of about one euro.

In total, 74,248 European citizens were invited to take part, but two thirds did not accept the invitation. One fifth of the responses received was rejected, either because the questionnaire was submitted too late or because the established quota for age, gender or education had been reached. Of all invited panel members, a relatively low share (12%) returned a fully completed questionnaire. That is to say, a total of 9,021 Europeans, roughly a 1,000 in each country, participated in the survey. (Figure A 1.1). Furthermore, certain countries had a rather high percentage of rejected responses, such as Poland with 39%. This high figure is to some extent explained by the GfK strategy to ensure enough response from groups that are known to react poorly. A large number of citizens were invited, but could only participate in the survey as long as the quotas for the strata they belong to had not been reached yet.

Figure A 1.1
Response of panel members to invitation, per country, 2014



Source: GfK

A 1.3 Representativeness

Great effort was made to gather a sufficient amount of fully completed questionnaires but this may have had the consequence that the sampling of participants, in spite of the applied quota for age, education and gender, was skewed instead of random. In some countries, involving certain groups proved to be a challenge. Table A 1.1 compares the response per country with census data to highlight underrepresented or overrepresented groups in the survey. It is safe to conclude that the response is representative for the population insofar as gender and age are concerned.

However, the response from people with a low level of education is rather poor in most countries, with the exception of Germany and Slovakia. The largest discrepancy occurs in the response from Romania. People who have attained low levels of education are less well represented in online panels as access to the internet is less common in this group.

Limited internet access may also explain the considerable underrepresentation of people living in rural areas in Poland and Slovakia. On the other hand, the urban population in the Netherlands and France is also markedly underrepresented. Nevertheless, in all cases there are enough respondents to perform statistical analyses and tests.

Table A 1.1
Respondents' individual characteristics compared with population data

	Germany		Spain		France		Netherlands		Poland		Romania		Slovakia		Sweden		United Kingdom	
	population	response	population	response	population	response	population	response	population	response	population	response	population	response	population	response	population	response
Gender¹																		
Male	49%	49%	49%	49%	48%	48%	50%	50%	48%	48%	49%	50%	50%	50%	50%	50%	49%	49%
Female	51%	51%	51%	51%	52%	52%	50%	50%	52%	52%	51%	50%	50%	50%	50%	50%	51%	51%
Age¹																		
16–24	13%	13%	12%	12%	15%	15%	15%	15%	15%	15%	14%	14%	13%	13%	16%	16%	16%	16%
25–49	46%	46%	53%	52%	46%	46%	46%	46%	48%	48%	48%	48%	48%	48%	46%	46%	48%	47%
50–74	41%	41%	35%	35%	38%	38%	39%	39%	37%	36%	37%	37%	39%	39%	38%	38%	36%	37%
Education¹																		
Low	18%	18%	25%	16%	28%	9%	29%	17%	16%	5%	28%	6%	19%	18%	23%	14%	22%	4%
Middle	57%	52%	44%	45%	43%	52%	42%	48%	61%	69%	58%	75%	57%	54%	46%	47%	43%	51%
High	25%	29%	31%	39%	29%	38%	29%	35%	23%	26%	14%	19%	24%	28%	31%	39%	36%	44%
Living environment²																		
Urban (cities & towns)	74%	70%	77%	85%	86%	56%	83%	69%	61%	83%	53%	86%	55%	60%	85%	74%	80%	77%
Rural (villages & countryside)	26%	30%	23%	15%	14%	44%	17%	31%	39%	17%	47%	14%	45%	40%	15%	26%	20%	23%

Source: 1 Eurostat; 2 World Fact Book

A 1.4 The questionnaire

The Dutch version of the questionnaire was compiled jointly by GfK and the authors of this report. Taking charge of the translations, GfK employed translators to convert the Dutch questionnaire into English and then from English into the seven other languages. Subsequently, GfK hired proofreaders who reviewed the spelling and grammar. Furthermore, PBL consulted native-speaking nature experts from each country to check the translations of terms related to nature and the environment.

Values of nature in the EU

35834
Version 1

PBL Netherlands Environmental Assessment Agency would like to know your opinion about nature, landscape and the environment.

For this reason PBL regularly surveys the Dutch population. But we are also interested in the opinion of people in other European countries about these subjects.

We would like to invite you to participate in this survey. It is not relevant whether you are familiar with these subjects or not.

Thank you kindly – in advance – for your cooperation!

DEALING WITH NATURE

Selection: ALL

Q1. The following propositions concern how society should deal with nature.
How do you feel about these propositions? [S]

Grid, answers in column

1. Very much disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Very much agree

Grid, in row: RANDOMIZE

- a. Vulnerable nature areas should be closed for leisure and recreational activities.
- b. We should use nature in such a way that we get the most economic value from it.
- c. Too much emphasis has been placed on nature conservation.
- d. Hunting is cruel and inhumane to animals.
- e. It is natural that wild animals sometimes starve to death or are injured by other animals, and we should accept that.
- f. Trees may be felled if needed to increase the diversity of species in a forest.

Selection: ALL

Q2. Here you find some examples of what one could consider nature. Please indicate for all examples to what extent you consider it to be real nature. [S]

Grid, answers in column

Grid, in row: RANDOMIZE

1. Not at all
- 2.
- 3.
- 4.
- 5.
- 6.
7. Very much so

- a. Swamps
- b. Birds of prey
- c. City parks
- d. Garden plants
- e. Wild flowers at the roadside
- f. Meadows with grazing cattle and flowers
- g. Large crop fields
- h. Timber forests
- i. Primeval forests

Selection: ALL

Q3. How do you feel about the following propositions? [S]

Grid, answers in column

Grid, in row: RANDOMIZE

1. Very much disagree
2. Disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Agree
7. Very much agree

- a. If nature areas are allowed to develop freely according to natural processes, their quality will improve.
- b. Careful human guidance will improve the quality of nature areas

Selection: ALL

Q4. The management of nature areas has different goals and functions. How important do you consider a focus of this management on: [S]

Grid, answers in column

Grid, in row: RANDOMIZE

1. Not important at all
2. Not important
3. Not very important
4. Neutral
5. A little bit important
6. Important
7. Very important

- a. ... the diversity of species and plants
- b. ... the conservation of pristine areas
- c. ... beautiful landscapes
- d. ... the attraction for recreation
- e. ... the contribution to flood prevention
- f. ... the production of clean air and clean water
- g. ... the maximum provision of goods and services through
e.g. forestry, hydroelectric power stations and wind farms
- h. ... the prevention of damage to agricultural and other
land uses by species, e.g. predators, pests and weeds
- i. ... the identity of the local communities
- j. ... the conservation of old and characteristic landscape
features

Selection: ALL

Q5. In your view, who is responsible for the protection and management of nature and the environment in your country? Please rank 1–9: 1=most responsible, 9= not responsible at all)
[Q]

- | | |
|---|---|
| <input type="checkbox"/> EU | <input type="checkbox"/> Local government |
| <input type="checkbox"/> National government | <input type="checkbox"/> Conservation organisations |
| <input type="checkbox"/> Regional government | <input type="checkbox"/> Businesses and companies |
| <input type="checkbox"/> Farmers, landowners, and hunters | <input type="checkbox"/> Individual civilians |

CRUCIAL BACKGROUND INFORMATION

Selection: ALL

Q6. Where do you currently live? Please choose the best option. [S]

1. In a large city or metropolitan area (more than 60,000 inhabitants)
2. In a medium or large town (10,000–60,000 inhabitants)
3. In a village (less than 10,000 inhabitants)
4. In the country side outside towns and villages

Selection: ALL

Q7. What is the highest level of education you have completed? [S]

1. Primary school
 2. Left school after age 14 without qualification
 3. Secondary school
 4. University
- Don't know

Selection: ALL

Q8. What is your age?
[Q]

_____ years

END OF QUESTION

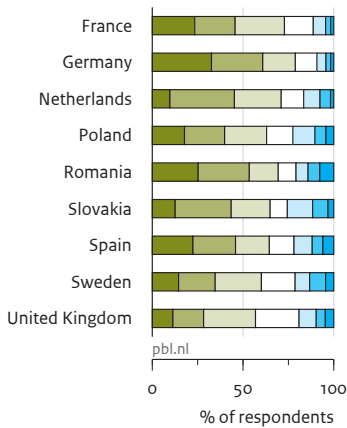
Annex 2

Response to each question

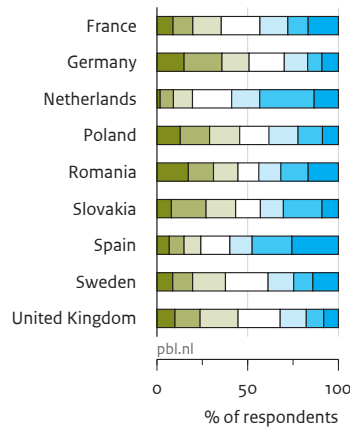
Question 1

The following propositions concern how society should deal with nature.
How do you feel about these propositions?

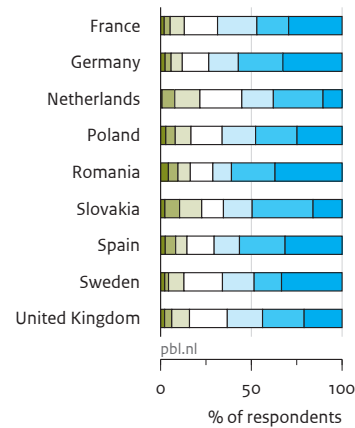
Vulnerable natural areas should be closed for leisure and recreational activities



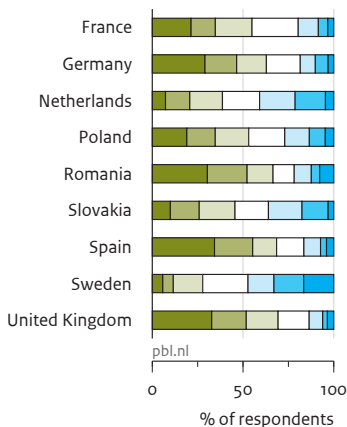
We should use nature in such a way that we get the most economic value from it



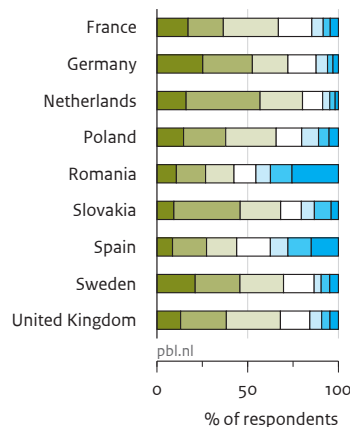
Too much emphasis has been placed on nature conservation



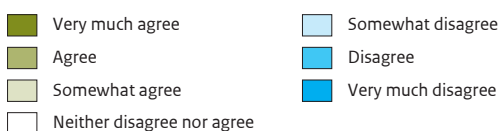
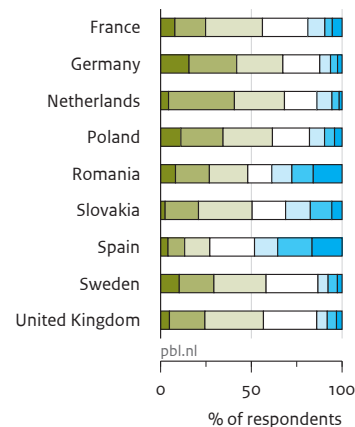
Hunting is cruel and inhumane to the animals



It is natural that wild animals starve sometimes to death or are injured by other animals, and we should accept that



Trees may be felled if needed to increase the diversity of species in a forest



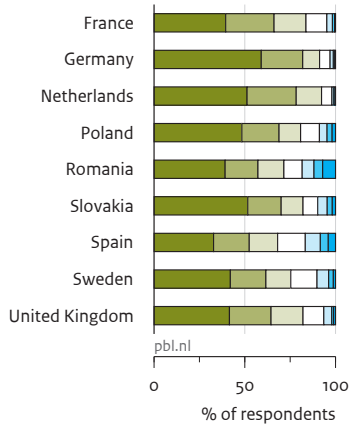
Source: GfK 2014; analysis Wageningen UR

Question 2 part 1

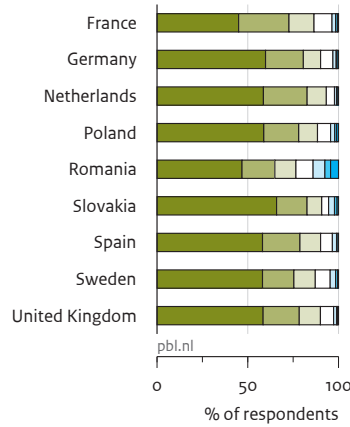
Here you find some examples of what one could consider nature.

Please indicate for all examples to what extent you consider it to be real nature.

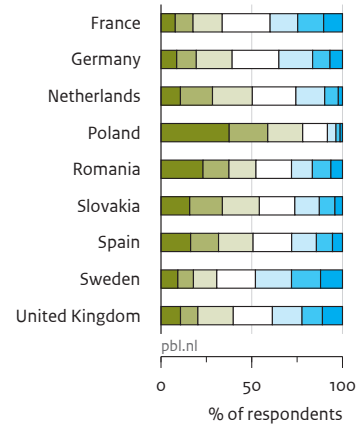
Swamps



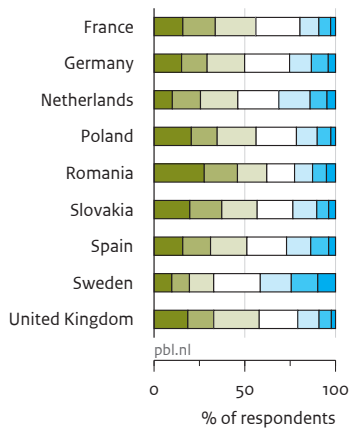
Birds of prey



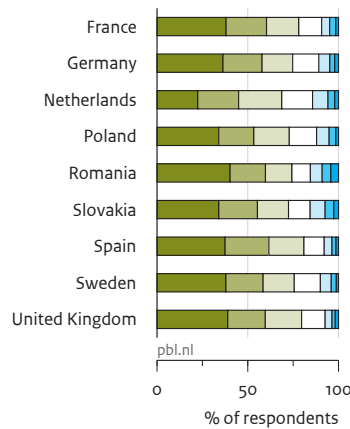
City parks



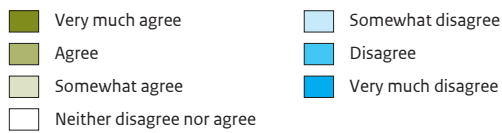
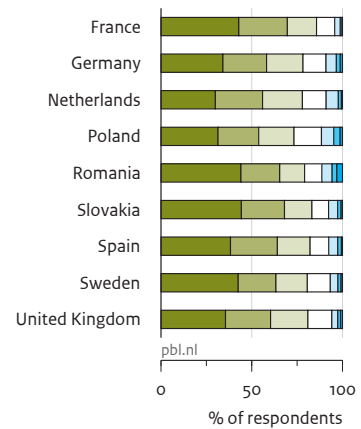
Garden plants



Wild flowers at the roadside



Meadows with grazing cattle and flowers

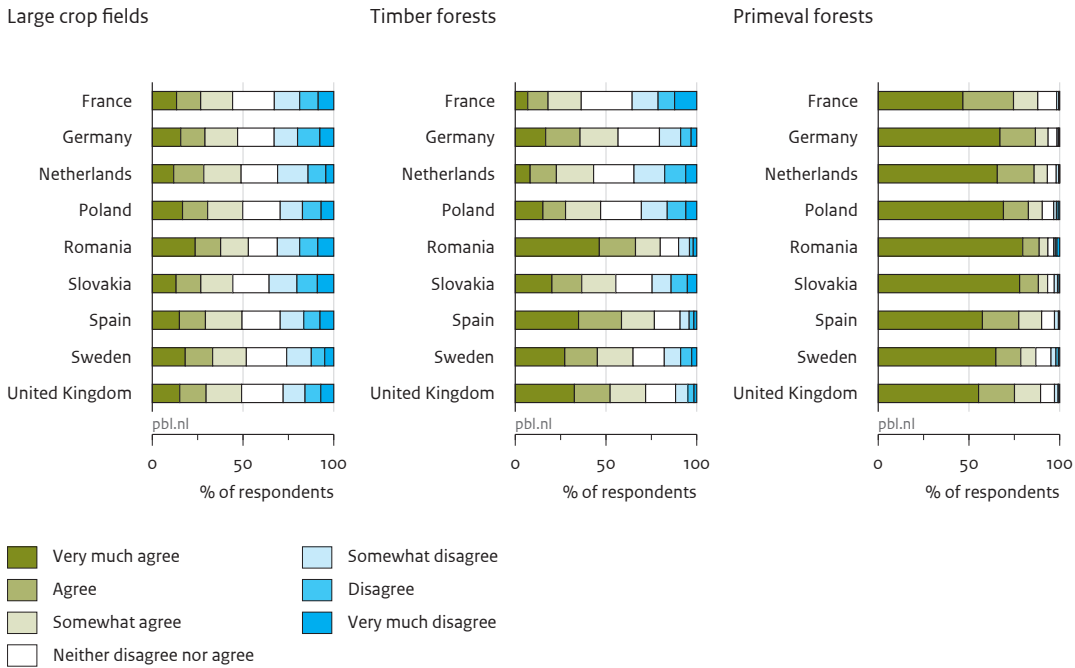


Source: GfK 2014; analysis Wageningen UR

Question 2 part 2

Here you find some examples of what one could consider nature.

Please indicate for all examples to what extent you consider it to be real nature.



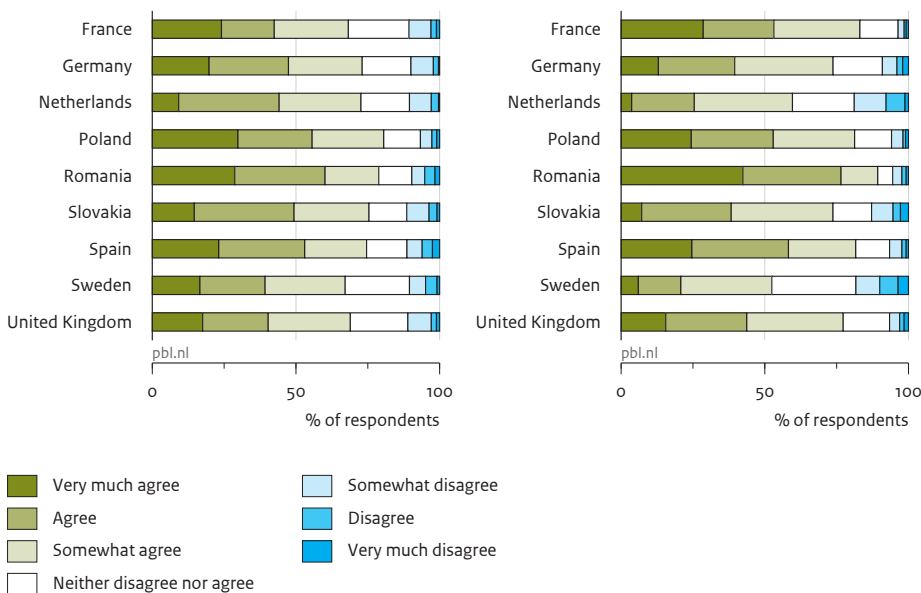
Source: GfK 2014; analysis Wageningen UR

Question 3

How do you feel about the following propositions?

If natural areas are allowed to develop freely according to natural processes, their quality will improve

Careful human guidance will improve the quality of natural areas



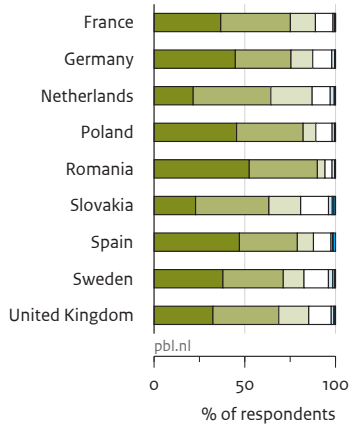
Source: GfK 2014; analysis Wageningen UR

Question 4 part 1

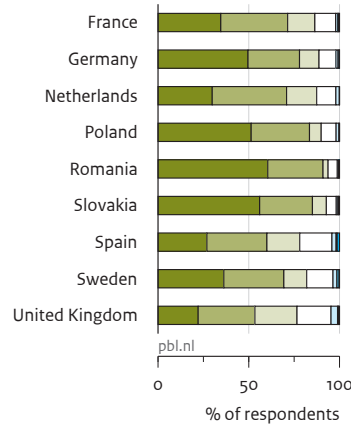
The management of natural areas has different goals and functions.

How important do you consider a focus of this management on the following goals and functions?

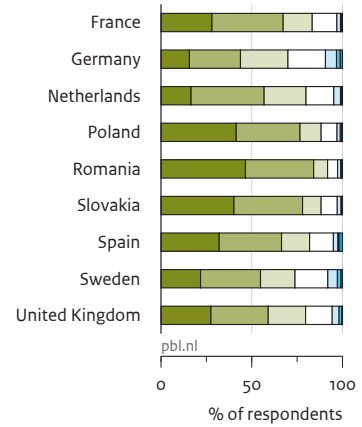
Focus on the diversity of species and plants



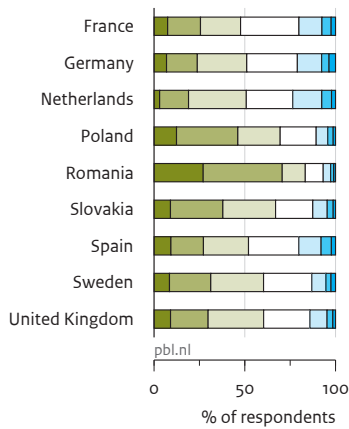
Focus on the conservation of pristine areas



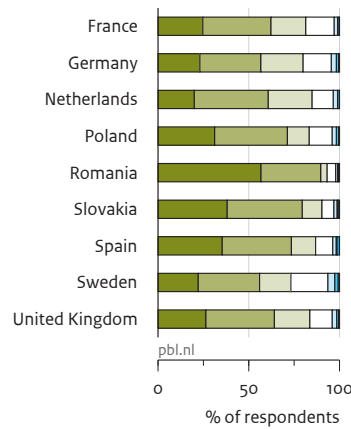
Focus on beautiful landscapes



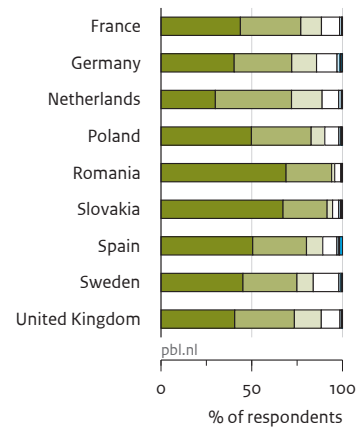
Focus on the attraction for recreation



Focus on the contribution to flood prevention



Focus on the production of clean air and clean water



Source: GfK 2014; analysis Wageningen UR

Question 4 part 2

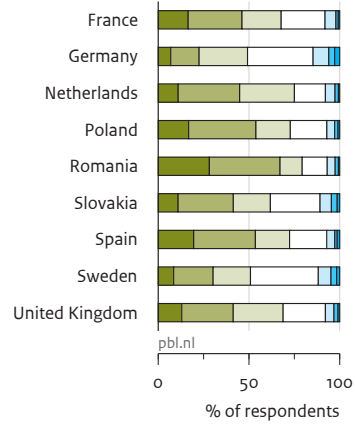
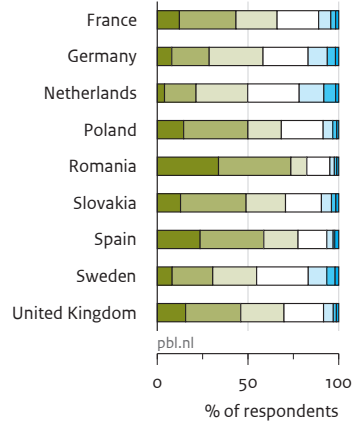
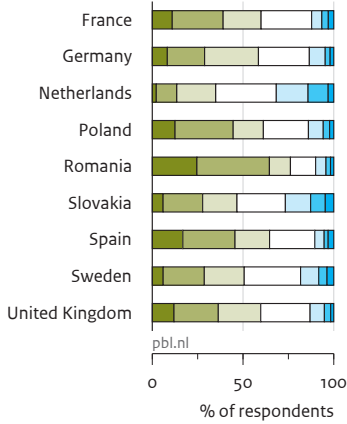
The management of natural areas has different goals and functions.

How important do you consider a focus of this management on the following goals and functions?

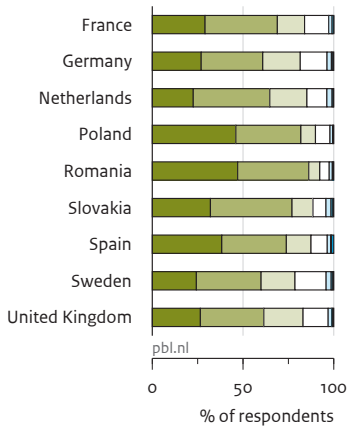
Focus on the maximum provision of goods and services through e.g. forestry, hydroelectric power stations and wind farms

Focus on the prevention of damage to agricultural and other land uses by species, e.g. predators, pests and weeds

Focus on the identity of the local communities



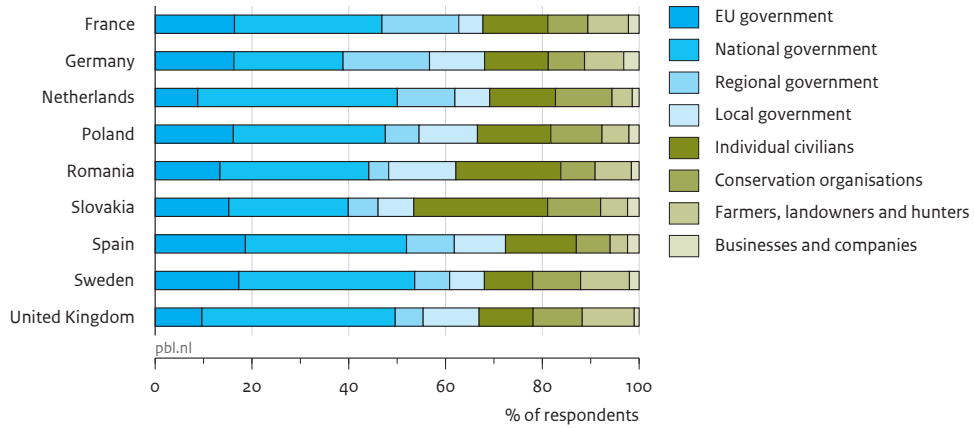
Focus on the conservation of old and characteristic landscape features



Source: GfK 2014; analysis Wageningen UR

Question 5

In your view, who is responsible for the protection and management of nature and the environment in your country?



Source: GfK 2014; analysis by Wageningen UR

Annex 3

Factor analyses

A 3.1 Introduction

Factor analyses can be used to empirically test a hypothesis, for instance to test whether a proposition fits in a theoretical model or to explore similarities in agreement with the various propositions at the level of the individual respondent. In this survey, factor analyses were conducted to reveal the variation in the cognitive and normative dimensions and in the objectives for nature management. First, a hypothetical model of images of nature was tested. The analysis confirmed the model only partly, probably because the chosen propositions did not adequately address the cultural differences between Member States or because of the wording or even the way they were translated. Therefore, explorative factor analyses were carried out only to describe the measured variations. The factor analyses were executed per country and for all countries as a group.

The following sections show the results of the factor analysis for each dimension, overall and per Member State. In each section, the first table gives the overall values of the explained variance of the significant factors (eigenvalue > 1, in order of the explained variance) and the extent to which the survey propositions contribute to a factor. Only factor loadings > 0.4 with $p < 0.001$ are displayed. The second table in each section displays the results by Member State, showing how the composition of a particular factor in a single country deviates from its equivalent in the overall results. For an explanation of the results, see the main text and the notes under the tables.

The value of each factor is the mean of all variables that contribute to the variation of the factor. The value ranges from 1 (not natural at all / very much disagree / very unimportant), through 4 (neutral) to 7 (very natural / very much agree / very important).

A 3.2 Cognitive dimension

Table A 3.1
Two factors in the cognitive dimension, all respondents

Proposition	Factor 1: Human-dependent nature	Factor 2: Autonomous nature
d. Garden plants	.806	
g. Large crop fields	.790	
c. City parks	.744	
h. Timber forests	.646	
f. Meadows with grazing cattle and flowers	.552	.488
b. Birds of prey		.845
i. Primeval forests		.801
a. Swamps		.786
e. Wild flowers at the roadside		.580
Explained variance (total: 58.7%)	38.6%	20.1%

Table A 3.2
Deviations from factor analysis of the cognitive dimension per country, compared with a factor analysis for all respondents

Swamps	Spain: in human-dependent nature factor
Wild flowers at the roadside	Netherlands, Poland, United Kingdom: in human-dependent nature factor
Meadows with grazing cattle and flowers	France: limited to autonomous nature factor Netherlands, Poland, United Kingdom: limited to human-dependent nature factor

A 3.3 Values of nature

Table A 3.3
Three factors in the normative dimension, all respondents

Proposition	1: Holistic factor	2: Anthropocentric factor	3: Ecocentric factor
It is natural that wild animals sometimes starve to death or are injured by other animals, and we should accept that (e)	0.819		
Trees may be felled if needed to increase the diversity of species in a forest (f)	0.739		
We should use nature in such a way that we get the most economic value from it (b)		0.805	
Too much emphasis has been placed on nature conservation (c)		0.773	
Hunting is cruel and inhumane to animals (d)			0.813
Vulnerable nature areas should be closed to leisure and recreational activities (a)			0.714
Explained variance (total 66.8%)	27.3%	21.9%	17.6%

Table A 3.4
Factor analysis of the normative dimension, per country

Country	Factor 1	Factor 2	Factor 3	Explained variance
Total	e, f	b, c	d, a	66.8
France	b, c	e, f, a	d, a	68.5
Germany	e, f	d, a	c, b	68.8
Netherlands	b, c	e, f	a, d	65.7
Poland	d, a	b, c	e, f	52.2
Romania	e, a, f	b, c	d	48
Slovakia	e, f	b, c	d, a	64
Spain	b, c	a, d	e, f	53.2
Sweden	d, a	c, b	e, f	67.2
United Kingdom	e, f	b, c	d, a	52.3

Note: In each country a factor is explained by the same pairs of propositions except for France and Romania where slight deviations were observed. The differences in the order of the factors reflect the contribution of each factor to the explained variance. For instance, in Poland the ecocentric factor (a, d) is more important than the factor analysis for all respondents, while the holistic factor (e, f) is less important.

Table A 3.5
Factor analysis of objectives for the management of nature areas for all respondents

Proposition	Factor 1 Multiple objectives	Factor 2 Utilitarian objectives	Factor 3 Cultural objectives
b...the conservation of pristine areas	.822		
a...the diversity of species and plants	.803		
f...the production of clean air and clean water	.781		
j...the conservation of old and characteristic landscape features	.769		
c...beautiful landscapes	.549		.501
g...the maximum provision of goods and services through e.g. forestry, hydroelectric power stations and wind farms		.783	
h...the prevention of damage to agricultural and other land uses, e.g. by predators, pests and weeds		.761	
e...the contribution to flood prevention	.563	.571	
i...the identity of the local communities			.784
d...the attractiveness for recreation			.705
Explained variance (total 68.2 %)	47.7%	13.4%	7.2%

Table A 3.6
Factor analysis of objectives for nature management, by country

	Factor 1: Multiple objectives	Factor 2: Utilitarian objectives	Factor 3: Cultural objectives	Explained variance
Total	a, b, c, e, f, j	d, e, g, h	c, d, i	68.2%
France	a, b, c, e, f, i, j	d, e, g, h	d, i	70.7%
Germany	a, b, e, f, j	d, e, f, g, h	c, d, i	67.3%
Netherlands	a, b, c, e, f, i, j	e, g, h	c, d, i, j	63.8%
Poland	a, b, c, f, j	e, g, h	c, d, i	70.0%
Romania	a, b, c, e, f, j	d, e, g, h	c, d, i	70.4%
Slovakia	a, b, c, e, f, j	d, e, g, h	a, b, d	61.8%
Spain	a, b, c, h, i, j	g, h	d, i	74.2%
Sweden	a, b, c, e, f, j	d, e, g, h	d, i	70.8%
United Kingdom	a, b, c, d, e, f, i, j	d, g, h, j	a, e, f	67.5%

Note: In all Member States except Romania, some deviations in factor loading by objectives occurred, compared with the analysis of the overall results. Examples are the lack of beautiful landscapes (c) in factor 1 in Germany, and the contribution of diversity of species and plants (a) to factor 3 in Slovakia and the United Kingdom.

Annex 4

Empirical evidence from 20 years of NEP studies

Over the past decades only very few longitudinal representative surveys have been carried out which reveal changes in values of nature. However, there is a large body of information about the changes in environmental attitudes, involving much more than nature alone. This includes a data record of 20 years of figures on environmental attitudes that have been collected through surveys using the New Environmental Paradigm, the NEP scale, developed by Dunlap and Van Liere (1978). It measures a respondent's agreement with various statements concerning human attitudes towards the environment on a scale from 1 (totally disagree), to 5 (totally agree). The average of all statements also ranges from 1 to 5 (strong preference for utilitarian view to strong preference for preservationist view of the environment), with 3 being the neutral position. Examples of NEP statements are: 'Humans have the right to modify the natural environment to suit their needs' and 'Plants and animals have as many rights as humans to exist.'

Hawcroft and Milfont (2010) published the dataset mentioned above, but an analysis of trends in the data has not yet been made. However, the authors executed a secondary analysis on the database to reveal trends in the NEP scale during the 1987–2007 period. The analysis looked at samples which met the following criteria:

- use a minimum of five items from the original, shortened or revised NEP scale;
- always include adults;
- include the mean NEP score;

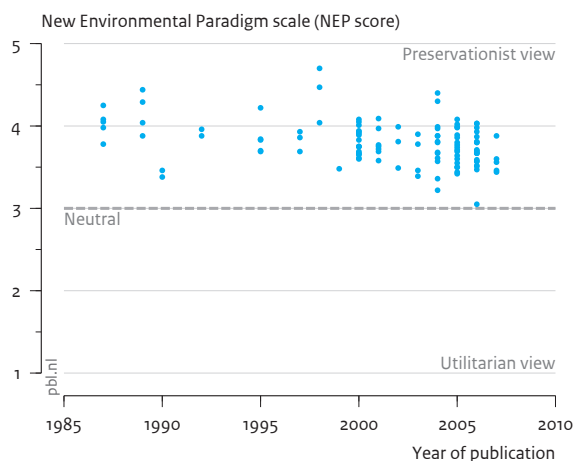
- gather a response from over 100 individuals;
- include information on publication year, authors, country of residence of respondents, and representativeness of the sample.

For the trend analysis, representative samples from Europe would have provided the most interesting data, but only seven were available, which is not sufficient for statistical analyses. Therefore, the number was expanded to 114, by including samples from other continents as well as convenient samples that were not representative for the total population. Most samples come from North America (44%), followed by Europe (22%) and the other continents, except Africa.

A trend analysis compared the year of publication with the average NEP score for all samples and different subsets which were established according to continent and representativeness. In each case, the date three years prior to a survey's year of publication was used as a proxy for the date of execution..

The analysis shows that the mean NEP score varies between 2.9 and 4.7, and has an average value of 3.8 which is markedly higher than neutral (3). This means that in almost all samples preservationist values of the environment predominate over utilitarian values (Figure A 4.1). Over the 20 year period, the NEP score decreased slightly. This was tested by calculating Spearman correlations between the survey year and the mean NEP score for different subsets (Table 4.1). The calculated

Figure A 4.1
Preservationist/utilitarian view of the environment, 1987 – 2007



Source: Hawcroft and Milfont 2010; analysis by Wageningen UR

correlation coefficients are mostly negative, and only significant when considering all samples worldwide or datasets combining all representative and convenient student samples worldwide. A half to two thirds of the samples are not representative for the population of a country, region or city. When only representative samples are taken into account (n=36), the correlation appears to be positive instead of negative, referring to a more

ecocentric world view. This correlation is not significant either. To conclude, this secondary analysis shows that support for a preservationist attitude towards the environment is stronger than support for a utilitarian attitude. There was a slight decline in support for a preservationist point of view between 1987 and 2007, which suggests that worldwide attitudes may be changing.

Table A 4.1
Correlation between mean NEP score and year of publication for different subsets between 1987 and 2007

Included samples	Number of samples (n)	Correlation (R)	Significance (P)
Sample size >100, all continents, all backgrounds	114	-0.353	0.000
Sample size >100, all continents, only representative and students	72	-0.295	0.012
Sample size >100, all continents, only representative	36	0.211	n.s. (0.194)
Sample size >100, only Europe, all backgrounds	25	-0.375	n.s. (0.065)
Sample size >100, only Europe, only representative and students	16	-0.296	n.s. (0.266)
Sample size >100, only Europe, only representative	9	0.365	n.s. (0.334)

Annex 5

Glossary of terms

Anthropocentric values of nature	An anthropocentric point of view puts human beings at the centre of attention and holds that nature deserves moral consideration because it is instrumental to human well-being, providing goods and services that enhance quality of life for humans. (Dunlap and Van Liere, 1978; Gagnon Thompson and Barton, 1994; Kortenkamp and Moore, 2001) (Kortenkamp & Moore, 2001; Thompson & Barton, 1994). The opposite of anthropocentric value is ecocentric value.
Biocentric values of nature	Biocentric values are a specification of ecocentric values focusing on the importance of the well-being of individual animals and plants instead of on the principles of abstract concepts such as biodiversity and ecosystem. This distinction reflects long-standing debates in environmental ethics (Leopold, 1949; Taylor, 1986; Callicott, 1989; Stenmark, 2002). The opposite of biocentric value is the holistic value of nature.
Ecocentric values of nature	Ecocentric values do not focus on the usefulness of nature for humans, but on the intrinsic value of nature, the notion that it is valuable in itself, and therefore should be treated as such. (Dunlap and Van Liere, 1978; Gagnon Thompson and Barton, 1994; Kortenkamp and Moore, 2001)
Environmental attitudes	See New Environmental Paradigm scale
Guardian of nature	In the guardian attitude, humans are part of nature and responsible for conserving the natural environment to ensure enough is left intact for future generations. Humans are not placed above nature, but are seen as part of it and should work together with it (De Groot et al., 2011). This attitude is related to traditional stewardship but has a more ecocentric content.
Holistic values of nature	Holistic values are a specification of ecocentric values that focus on the importance of the quality and integrity of ecosystems. In the protection of nature, the well-being of individual animals and plants is considered subordinate to the value of natural processes. (Leopold, 1949; Taylor, 1986; Callicott, 1989; Stenmark, 2002). The opposite of holistic value is biocentric value.
Human attitudes toward nature	A commonly used scale to define the relationships between people and nature is the Humans and Nature (HAN) scale (Flint et al., 2013). Inspired by the work of Zweers (2000), it largely builds on qualitative studies and non-representative surveys (De Groot and Van den Born, 2003; Van den Born, 2007). The scale is meant to distinguish between varying attitudes towards nature, such as master, steward, guardian, partner and participant.

Intrinsic value	Nature is valuable in itself, and should be treated as such.
Master over nature	In the master attitude, humans stand above nature and may do whatever they please, not bothered by moral restraints or awareness of nature's fragility. The master attitude trusts economic growth and technology will solve all environmental problems.
New Environmental Paradigm scale	Research on environmental attitudes has led to the development of the New Environmental Paradigm (NEP). Commonly used since the 1970s, it provides a framework and a scale to measure environmental attitudes. (Dunlap and Van Liere, 1978; Hawcroft and Milfont, 2010; Milfont and Duckitt, 2010)
Participant in nature	The participant attitude considers humans to be part of nature; not just biologically, but with a sense of (spiritual) belonging. Being a part of nature is important in the human identity. Humans are not inferior to nature, but have the ability to participate in it.
Partner with nature	In the partner attitude, nature has its own status, not inferior to, but rather on a par with humans. Nature develops according to its own independent values. Humans and nature work together in a dynamic process of interaction and mutual development.
Preservationist view	The preservationist view expresses the belief that priority should be given to preserving nature and the diversity of species in their original state, protected against human pressure. (Milfont and Duckitt, 2010).
Steward of nature	The steward attitude considers that humans are superior to nature but have a responsibility to ensure enough nature is left intact for future generations.
Utilitarian view	A utilitarian view refers to the belief that it is legitimate, appropriate and necessary for humans to use and alter nature and all natural phenomena and species for their own benefit. (Milfont and Duckitt, 2010).

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