High Nature Value Farming Areas

Defining the concept and developing an agri-environmental indicator

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1 Introduction

The European countryside is strongly influenced by human activities, and especially by agriculture. About half of the EU territory is managed by farmers. Varying farming traditions in conjunction with specific soil and climate conditions have resulted in diverse and highly characteristic agricultural landscapes. Apart from their aesthetic appeal and cultural heritage value extensively used agricultural areas also host a rich flora and fauna. In the 20th century, however, the biodiversity of Europe' s farmland has declined sharply, mainly due to intensification of farming. Areas with extensive agricultural land use and corresponding species richness still exist, but farming in these areas is generally under strong economic pressure. Thus, it is essential to gear policy efforts towards maintenance of extensive farming systems in so-called 'High Nature Value farming areas'.

'High Nature Value areas'[1] are included as an indicator in Commission Communication COM (2001) 144. The concept has been part of the debate on the efficient targeting of agri-environment and other CAP policies in the EU for quite some time. However, since the mid-1990s, not much work has been done to further develop the definition of High Nature Value (HNV) farming systems and to come up with parameters that would allow their delimitation in space. At present consistent datasets on the intensity of farming and the associated biodiversity are largely lacking. We are in need of a proper conceptual framework and corresponding data in order to plan and evaluate policy measures. For these reasons, the EEA has decided to include the development of the HNV-concept in its 2002 work programme. This expert meeting is the first step in this process.

[1] In COM144, the term' High Nature Value areas' is used without an explicit reference to farming. Since COM144 deals with agri-environment indicators, it is clear that the term exclusively refers to farmed areas. It should be pointed out, that the term itself has remained rather loosely defined and is often confused with 'semi-natural grasslands'. In EEA terminology, the term 'High NatureValue farming areas' refers to areas under mostly extensive agricultural management with a high biodiversity value. These do not necessarily include a high share of grassland, although they are often pastoral in nature. Unutilized elements are only included in the concept, if they can be considered an integral part of the agricultural landscape. Thus small elements, such as hedges, ponds and thickets are included, whereas larger non-farmed habitats are not. Large-scale semi-natural systems, such as grazed moorland and uplands, are included in the concept, as long as farming is practised and considered necessary for maintenance of the specific nature value. In this approach, semi-natural grasslands are a sub-category of HNV farming areas.

2 Purpose of the meeting

The expert meeting aimed to lay the basis for developing the 'High Nature Value farming area' concept as an agri-environmental indicator in the light of available data at EU level. Three different objectives can be distinguished in this context:

a) to arrive at a commonly agreed, clear and operational definition of HNV farming areas;
b) to review the usefulness of existing data sets for defining HNV farming areas in space;
c) to develop recommendations for promising approaches to developing additional data sets where required.

The conceptual framework (aspect a) was discussed during the first day of the meeting. The second day was dedicated to operationalization of the concept (aspects b and c).

The contributions and conclusions are summarized below in order of the expert meeting agenda.

3 The concept of High Nature Value (HNV) farming areas

3.1 What are High Nature Value Farming Areas

Davy McCracken (Scottish Agricultural College)

Davy McCracken highlighted the broad ecological principles that underlie the high nature conservation value of extensively farmed semi-natural vegetations.

In general, there will be a greater range of organisms living within any one area when that area:

a) Contains a greater range of different types and structures of niches;
b) Is subject to medium levels of disturbance through climatic factors (e.g. flooding, exposure) or agricultural management (e.g. grazing, cutting);
c) Is large enough to contain viable populations and to allow for habitat variation due to natural senescence/development of conditions in part of the area.

A wider range of species will be found in an area where there is heterogeneity both at the 'field' level (in terms of vegetation composition and structure) and in the wider landscape (in terms of greater mixture of different habitat types - grassland, woodland, wetlands etc).

Extensive pastoral systems are particularly valuable in this context. They occur at a large scale under ecological and topographic constraints that limit intensification of management. Typically parts of the area are inaccessible or can be used on a seasonal basis only. Hence the semi-natural vegetation is generally found within a mix of more natural habitats and features. The low nutritional value of semi-natural vegetations prevents high stocking densities. Herd behaviour can introduce seasonal and cyclic pressures which are virtually impossible to produce in any other way - not only through grazing but also through trampling, dunging, resting and ruminating in favoured places and selecting foraging areas in relation to the seasonal availability of herbage. Thus, such pastoral systems are a key example of the complex ecological factors that define HNV farming areas.

3.2 From semi-natural grassland mapping units to functional HNV Units

Peter Veen (Royal Dutch Society for Nature Conservation)

The approach by Peter Veen is based on a classification and evaluation of vegetation types. He focuses on semi-natural grasslands, a sub-category of HNV farming areas. Veen's method relies on grassland mapping. The plant alliances according to the Braun Blanquet phytosociological school are used as mapping units. They can be characterized by ecological profiles, with humidity, acidity and nutrients as differentiating factors. The criteria for distinguishing semi-natural grasslands are :

- Close similarity in species composition with selected reference alliances (to be identified on the basis of character species and differentiating species);

- Species composition reflects type of management and abiotic conditions, rather than climatic conditions on the locality;
- Vegetation is maintained by man and has long management history of mowing and/or grazing;
- Species diversity is typically high, but may vary considerably according to local abiotic conditions (<20 taxa/m2 in salt marshes to >50 taxa/m2 in dry festuca-Brometea vegetations);
- Input of nutrients is generally low (<50kg/ha).

This method of delineating semi-natural vegetations is site-based, does not require very much external interpretation and yields easily replicable results. Veen presented the results of a survey of semi-natural grasslands in Central and Eastern European Contries (table 1).

Table 1. Estimated distribution of agricultural area, permanent grassland and semi-natural grassland in Central and Eastern European Countries.

Country	Total area (ha.)	Agricultural area (ha)	Permanent grassland (ha)	Alpine grassland (ha)	Semi-natural grassland (ha)	% Semi-natural grassland of total agricultural area
Bulgaria	11099400	6215700	1163500	332100	444400	**7**
Czech Republic	7886400	4258700	946400	1800	550000	**13**
Estonia	4510000	1533400	315700	0	73200	**5**
Hungary	9303200	6233100	1116400	0	850000	**14**
Latvia	6458900	2454400	775100	0	117900	**5**
Lithuania	6530000	3134400	848900	0	167900	**5**
Poland	31270000	18762000	4040400	413600	1955000	**11**
Romania	23750000	11846900	4987500	285000	2332700	**20**
Slovakia	4903600	2451800	833600	13100	294900	**12**
Slovenia	2025600	500400	495000	29800	268400	**54**
CEEC total	**107737100**	**57390800**	**15522500**	**1075400**	**7054400**	**12**

3.3 Approaches to classifying farming systems

Eric Bignal (EFNCP)

In contrast to Peter Veen, Eric Bignal tackles the problem of delineating High Nature Value farming systems by starting at the other end of the scale: farming inputs. He stresses the importance of internal logic and policy relatedness of the classification. The classification should be relevant and easily interpretable in view of EU agriculture policy. This policy is generally aimed at yields of particular products and corresponding farm types. Bignal therefore proposes a simple hierarchical system, where the first discriminating variables are a selection of relevant variables, such as crop types, livestock

types, livestock density per ha, fertilizer input, farm size etc. On the basis of these variables a coarse classification of farm systems should be made.

The nature value of the areas within these systems depends very much on detailed farming practices, such as cutting and burning regimes, rotation patterns etc. This category of variables follows very different regional patterns and is thus not useful for the overall classification at the European level. Instead they may be used for a regional breakdown of farming systems. Analysis of the relations between these regional farming practices and biodiversity is the final step to understand and predict changes in response to policy measures (see figure 1).

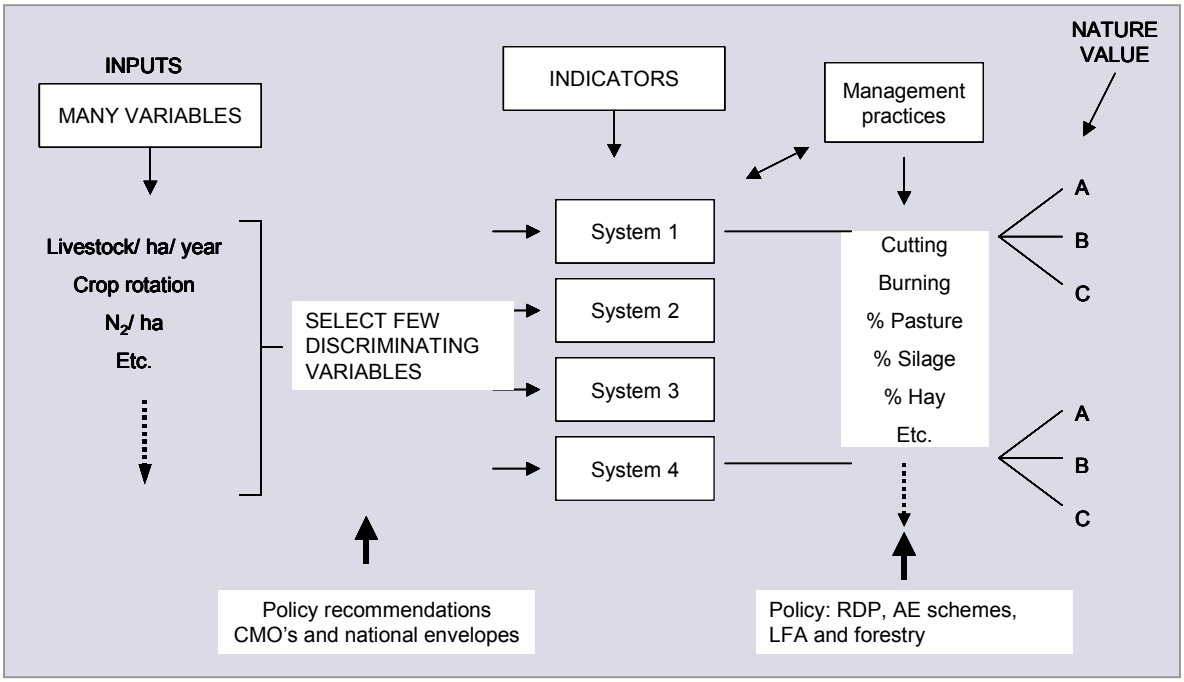


Fig 1. Dualistic approach to HNV farming classification as proposed by Bignal

3.4. Defining an indicator for High Nature Value farming areas
Two parallel workshops

3.4.1 Aim of the workshops

There are in principle two alternative and potentially complementary ways of identifying High Nature Value farming areas:
Nature quality approach: This approach takes species and habitat distribution patterns as the basis for arriving at a (geographical) definition of HNV farming areas.
Input / farming systems approach: This approach uses farm systems characteristics as proxy indicators for nature quality. These can include stocking densities, levels of fertiliser use, the proportion of semi-natural habitats in the farming system; livestock management patterns (e.g. stabled or outdoor grazing), crop rotation cycles etc.

The workshop participants were asked to discuss the pros and cons of the two approaches and the possibility of combining them. They were also asked to propose parameters that could be used in practice for delineating HNV farming areas. The total area of HNV farming would then be the overall indicator, based on a limited number of underlying parameters.

It was stressed that the indicator concept should meet the general criteria as given in the Commission Communication on agri-environmental indicators (COM (2001) 144 final).

- *policy-relevance* – address the key environmental issues;
- *responsiveness* – change sufficiently quickly in response to action;
- *analytical soundness* – based on sound science;
- *measurability* – feasible in terms of current or planned data availability ;
- *ease of interpretation* – communicate essential information in a way that is unambiguous and easy to understand;
- *cost effectiveness* – costs in proportion to the value of information derived.

3.4.2 Results

The two separate workshops yielded similar results. There was a preference for the nature quality based approach (see table 2), but farm characteristics were considered as valuable additional parameters. Most speakers recommend a combination of input/ farming system parameters with nature quality indicators. The second can complement and refine the first. The preferred concept would thus be a mixture of elements of both approaches.

Table 2. Relative scores for alternative approaches to HNV definition. Criteria derived from COM (2001) 144 final.

Criterion	HNV indicator definition approach	
	Farming systems/ input based	Nature quality based
Policy relevance	+	+
Responsiveness	+	+
Analytical soundness	+/-	++
Measurability	+/-	+/-
Ease of interpretation	+	++
Cost effectiveness	+/-	+/-

It appeared very difficult to find HNV farming parameters that are suitable across Europe. Thus, the preferred solution was to identify a common methodology and to select HNV parameters according to regional farming systems and nature characteristics. In addition to the schematic representation of such a dualistic approach by Bignal (see fig. 1), several concepts were broadly outlined.

Jones proposed a system, in which HNV farming areas would be characterized in a two-dimensional matrix, with two variables along the axes:

a) the degree of integration in farming systems , and
b) the dependence on farming for maintenance (see fig. 2)

Typical HNV farming areas, such as semi-natural grasslands, are highly dependent on agriculture and highly integrated in the farming system.

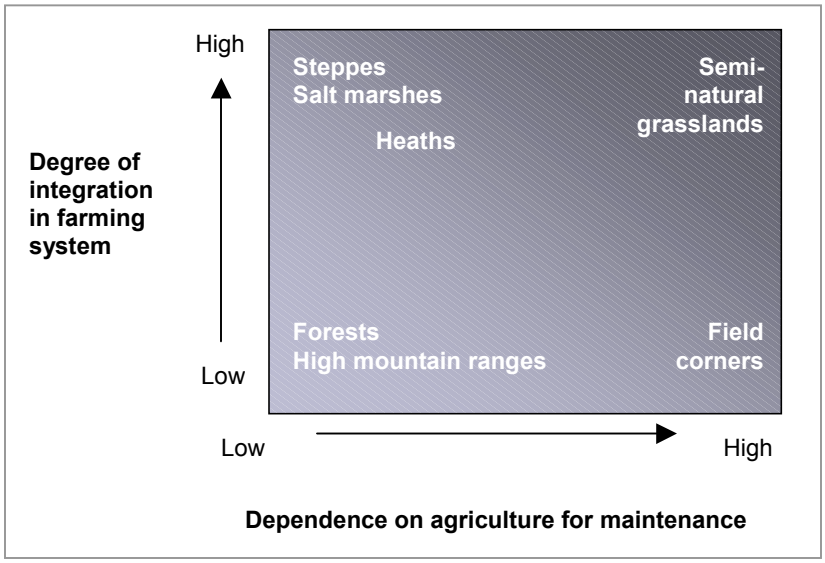


Fig. 2. HNV farming areas characterized in a two-dimensional matrix proposed by Jones.

In spite of the difficulty of going into detail, some general parameters, that would be relevant in any HNV concept, could be defined (see table 3). The analysis of data availability on the subsequent day was based on these.

Table 3. Proposed general HNV parameters.

Farming systems / input based approach	Nature quality based approach
Input use (fertilizer/pesticide/fodder import)	Landscape parameters
Management practices (crop rotation)	Share of semi-natural habitats
Livestock density	Presence of key species
Biomass production/ ha of UAA	

4 Relevant European databases and ongoing initiatives

4.1 CORINE land cover

Chris Steenmans (EEA)

Chris Steenmans presented the basic specifications and methodology in the Corine Land Cover Survey (CLC). The CLC is a geographic land cover/ land use database and with a minimum mapping area of 25 ha the CLC consists of 44 classes in a scale of 1:100,000. the first inventory was carried out in the early 1990s and by updating every 10 year new results should be in place by the end of 2003 (completion for 28 countries). During the presentation Steenmans emphasized that CLC is a mapping tool, not a statistical land cover tool. Various technical documents concerning CLC have been published by the EEA.

Some CLC classes correspond partly to HNV farming areas, e.g. the category 2.4.2 'Complex cultivation patterns' and 2.4.3 'Land principally occupied by agriculture with significant areas of natural vegetation'. These classes have a good overlap with preliminary HNV maps. On the other hand, CORINE allows no further breakdown of the broad category of grasslands, which is of particular relevance to the HNV discussion. Thus, no distinction can be made between intensively used grasslands with very little associated nature value on the one hand, and species rich extensive grasslands on the other.

The general concluson should therefore be, that CORINE's potential for delineating HNV farming areas is limited, due to its low update frequency and the broad habitat classes. However, in the future it could provide more detailed data on the basis of modern high-resolution remote sensing techniques.

4.2 LUCAS / Farm Structure Survey

Gerd Eiden (LANDSIS)

Gerd Eiden gave an overview of the Farm Structure Survey (FSS) and the LUCAS survey. FSS is one of the main EU data sources for agriculture in general. It aims at the compilation of objective, reliable and comparable information on the structure of the agricultural holdings at EU level in order to track their current state and changes. It is based on a questionnaire. Data on holding characteristics, land use, livestock and labour force are gathered at NUTS 2 or 3 levels. Since 1966/67 a sample-based survey is carried out every 2-3 years, a full census every 10 years. The 2003 survey will be adapted to new data requests and will provide additional environmental information that may serve as a basis for HNV proxy indicators.

The LUCAS survey investigates land cover and use in a systematic sample of points across Europe, and monitors various environmental characteristics (soil erosion, noise and different landscape features) related to these points. In 2001, the LUCAS pilot survey started. Observations were made for a total of 86,384 points in an area frame

covering 3,240,190 km^2 based on a 18 x 18 km grid. The survey consists of two phases, namely a field survey and interviews carried out at farm level. These interviews partly overlap with the FSS survey.
LUCAS nomenclature is similar to CLC classification, but the methodological approach is different. LUCAS distinguishes between land use and land cover and relies on direct observation, which is more powerful than interpretation of satellite images.

The LUCAS pilot survey does not yet provide the information that would be needed for delineating HNV farming areas. Land cover classes are too broadly defined. Extensively used species rich grasslands, for example, are not discerned. The density of sampling plots is too low for accurate delineation, and rare farming systems are not sufficiently represented in the total sample to yield statistically significant results.

The general LUCAS methodology, however, is potentially very powerful. It builds on a harmonised classification system with specifically trained surveyors, which minimizes noise in the data. Further breakdown of land cover categories is possible, but requires special survey skills. Concerning the LUCAS farm level interview, the questionnaire still needs integration of issues related to HNV farming areas.

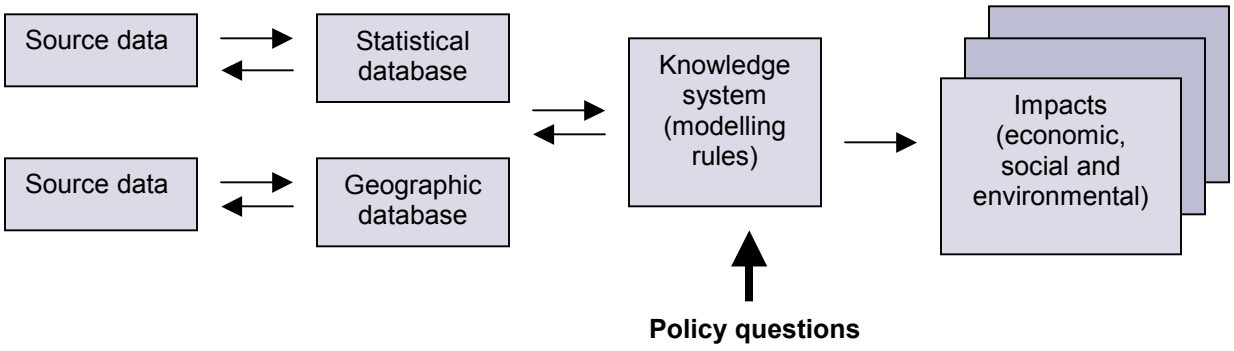
4.3 ELPEN / Ecoland

Berien Elbersen

Berien Elbersen presented the European Livestock Policy Evaluation Network (ELPEN). This project delivers an innovative tool, which will enable EU and national policy makers to assess the economic, environmental and social impacts of livestock related policy measures on a regional basis.

The ELPEN decision support system consists of four components:

1. *Statistical data:* These data describe the characteristics of livestock systems, livestock farms and EU regions.
2. *Geographical data:* These are site-specific biophysical data, including soil, landscape, land cover and climate.
3. *Policy measures:* These come from politicians and officials who indicate what policy measures or changes need to be assessed for impacts.
4. *Knowledge system:* In this component the knowledge, which is necessary to assess the economic, environmental and social impacts of policy changes, is stored.



In principle ELPEN is a very powerful tool for analyzing environmental impacts of agricultural policy. The missing link, however, is the relation between farming system and nature value. With this information added to the 'knowledge system', ELPEN will enable structured, policy related quantitative and qualitative assessments with regard to the environmental impact of selected European livestock farming systems. The necessary additional data will be obtained from a number of reference farms, representative for the ELPEN farm types.

4.4 Operationalization of an HNV agri-environmental indicator

Two parallel workshops on data availability and possible approaches.

4.4.1 Aim of the workshops

The workshops focused on the following questions:

a) How can the initial set of parameters (as presented in table 3) be assessed using the statistical databases and land use surveys discussed in the previous sessions.
b) Which parameters are most easily developed in sufficient detail at European level?
c) What is the time frame for development?
d) Which follow up is recommended for further elaboration of the concept? (e.g. Commission task force; further expert seminars; new technological tools?)

4.4.2 Results

The remarks on data availability (aspects a and b) for each of the selected HNV parameters are summarized in table 4.

The time frame for development was not discussed in detail given the uncertainties and conceptual issues to be solved. The recommended follow-up was a second expert meeting on the basis of a further developed HNV concept. This concept should allow for regional differentiation (regionally differing sets of discriminating parameters) and give further guidance on delineating semi-natural habitats. Some of the possible approaches for identifying HNV farming areas should be tested in practice before arranging a second expert discussion.

Table 4. Potential datasources for the identified HNV parameters.

Farming systems / input based approach	Nature quality based approach
Input use (fertilizer/pesticide/fodder import) o Economic data could be derived from FADN, but representativeness is a problem. Small farms are not included. o More information from reference farms is needed.	Landscape parameters o Some targeted national surveys exist (e.g. british Countryside Survey) and will possibly be integrated in the international ECOLAND initiative o LUCAS is a possible source, provided that the relevant parameters will be incorporated in the survey o Remote sensing data from CLC are available, but nee refined (grassland) detection
Management practices (crop rotation) o Very important, but no data available yet. o Very region specific; requires differentiated approach o LUCAS may provide useful data on cropping patterns	Share of semi-natural habitats o Data available for some regions, but work on common definition beyond semi-natural grasslands is still required. o Feasible, but needs expert knowledge
Livestock density o FSS provides data on livestock numbers. Combination with data on UAA and farm size may provide a more detailed info on geographical distribution o ELPEN is a promising tool for analysis of statisical data	Presence of key species o Several possible datasource o Commonly agreed selection of key species is needed
Biomass production/ha of UAA o Different datasources are available, for example on cereal yields. o Agricultural models, such as MARS and CAPRI, may provide adequate information.	

5 Conclusions

Definition of HNV farming areas

- The discussions and workshops at the expert meeting showed that it is an ambitious task to define a common indicator for HNV farming areas at European level. However, a Europe-wide comparable data set is a necessity if one wants to use the HNV farming area concept for policy assessment, such as an analysis of agriculture policy spending or agri-environment scheme targeting in comparison to the distribution HNV farming areas.
- Given the difficulty of finding HNV farming indicators that are suitable across Europe, the preferred solution was to identify a common methodology and to select HNV farming indicators according to regional systems and nature characteristics. Most speakers recommend a combination of input/ farming system parameters with nature quality indicators. The second can complement and refine the first.
- Developing a farming system typology appears very helpful in understanding how farming interacts with the environment and thus also the nature value of farmland. This needs to be complemented by an analysis of management practices that are a key influence on species and habitants. We need to be able to link these farm management practices to specific farming systems to use them as proxy indicators for HNV farming areas.
- The development of an indicator for HNV farming areas needs to take full account of the criteria set out in Commission Communication (COM(2001) 144 final): policy-relevance, responsiveness, analytical soundness, measurability, ease of interpretation, and cost effectiveness.
- The parameters defined in table 3 are likely to be useful for defining HNV farming areas in Europe.

Analysis of available datasets

- The usefulness of existing data sets in the context of defining HNV farming areas has not yet been fully explored. The expert meeting could only make a limited contribution to this task. The approach utilised in the ELPEN project gives a positive example for possible ways forward in this regard.
- Promising data sets, such as semi-natural grassland distribution maps, need to be completed. It is also very necessary to explore possibilities for combining data sets from different domains, such as Farm Structure Survey data with administrative data or satellite based land cover information.

Recommendations

- Further research is required to better understand the link between farm management and farmland biodiversity and to validate our assumptions on the effect of certain farming systems on nature value/biodiversity.
- The feasibility of different approaches as well as the usefulness of individual parameters for identifying HNV farming areas need to be tested out in real-life pilot studies at European level. Only such practical experience will reveal whether a common indicator for HNV farming areas in Europe can be developed.

Appendix: List of participants

Invited participants

- Erling Andersen - Danish Forest and Landscape Research Institute (FSL), Denmark
- Guy Beaufoy - Instituto de Desarrollo Rural Sostenible (IDRISI), Spain
- Eric Bignal - European Forum for Nature Conservation and Pastoralism (EFNCP), Scotland
- Sophie Condé - European Topic Centre on Nature Protection and Biodiversity, France
- Teresa Pinto Correia - University of Evora, Portugal
- Dimitrios Dimopoulos University of Thessaloniki, Greece
- Dobromira Dimova - Vitosha Natural Park, Bulgaria
- Gerd Eiden - LANDSIS, Luxembourg
- Berien Elbersen - Wageningen University and Research Centre, The Netherlands
- Sten Folving - JRC, Italy
- Marco Genghini - National Institute of Wild Fauna, Italy
- Frans Godeschalk - Wageningen University and Research Centre, The Netherlands
- Ivan Hristov Vitosha National Park, Bulgaria
- Gwyn Jones - Scottish Agricultural College, Scotland
- Antoni Kuzniar - Institute for Land Reclamation and Grassland Farming, Poland
- Ferenc Markus - WWF, Hungary
- Davy McCracken - Scottish Agricultural College, Scotland
- Merit Mikk - Centre for Ecological Engineering Tartu, Estonia
- Andre Pflimlin - CEMAGREF, France
- Ferenc Tar - IEEP, UK
- Peter Veen - Veen Ecology, The Netherlands
- Claude Vidal - Eurostat, Luxembourg
- Thomas Walter - Swiss Federal Research Station for Agro-ecology and Agriculture, Switzerland

EEA participants

- Jan-Erik Petersen - Project manager, agriculture and environment
- Ybele Hoogeveen - Project manager, agriculture and biodiversity
- Peder Gabrielsen - Visiting scientist, agriculture and environment
- Ulla Pinborg - Project manager, biodiversity, nature and forest
- Chris Steenmans - Project manager, land and remote sensing
- Niels Thyssen - Programme manager, environmental assessment