European Evaluation Network for Rural Development

European Commission
Agriculture and Rural Development

GUIDANCE DOCUMENT

The Application of the High Nature Value Impact Indicator

Annexes

2007-2013

Manuscript finalised in November 2008

European Evaluation Network for Rural Development

The European Evaluation Network for Rural Development (abbreviated to “Evaluation Expert Network”) operates under the responsibility of the European Commission’s Directorate-General for Agriculture and Rural Development. The overall aim of the Network is to increase the usefulness of evaluation as a tool for improving the formulation and implementation of rural development policies by helping to establish good practice and capacity building in the evaluation of rural development programmes up until 2013.
Additional information about the activities of the Evaluation Expert Network and its Evaluation Helpdesk is available on the Internet through the Europa server (http://ec.europa.eu/agriculture/rurdev/eval/network/index_en.htm)

Cover photos, courtesy of the LIFE programme co-funded projects: Odense Pilot River Basin (LIFE05 ENV/DK/000145); Schütt-Dobratsch (LIFE00 NAT/A/007055); Lake of Bourget (LIFE99 NAT/F/006321); Restoration of alvar-habitats at Stora Karlsö (LIFE00 NAT/SLO/007118); Restoration of Latvian floodplains (LIFE04 NAT/LV/000198); Schütt-Dobratsch (LIFE00 NAT/A/007055); Action for sustaining the population of Marsh fritillary butterfly (LIFE05 NAT/DK/000151); Restoration and conservation of xeric grasslands in Germany (Rheinland-Pfalz) (LIFE02 NAT/D/008461).
For further information about the programme, visit the LIFE website: http://ec.europa.eu/life

GUIDANCE DOCUMENT

The Application of the High Nature Value Impact Indicator

Annexes

Programming Period 2007-2013

CONTENTS

ANNEXES

Annex 1
Glossary of Key Terms and Acronyms

CMEF	Common Monitoring and Evaluation Framework.
CORINE	Coordinate Information on the Environment (CORINE Land Cover Project)
EAFRD	The European Agricultural Fund for Rural Development.
EEA	European Environment Agency
EU SDS	EU Sustainable Development Strategy
FSC	Forest Stewardship Council
FSS	Farm Structure Survey
HNV Farmland	High Nature Value farmland comprises those areas in Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports or is associated with either a high species and habitat diversity, or the presence of species of European conservation concern, or both. In the context of the evaluation of rural development programmes, this EU-wide definition may be modified to include those areas in Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports or is associated with either a high species and habitat diversity, or the presence of species of European and/or national, and/or regional conservation concern, or both. This document uses the term HNV *farming* consistently throughout the text as a means of referring both to the land use (farmland) and the associated management practices. This is important in the context of the evaluation of rural development programmes, where measures impact both on farming practices, and via these, on the land itself.
HNV Feature	An HNV feature supports the presence of habitats and species of European, and/or national, and/or regional conservation concern whose survival depends on the maintenance or continued existence of the feature.
HNV Forests	All natural forests and those semi-natural forests in Europe where the management (historical or present) supports a high diversity of native species and habitats, and/or those forestry which support the presence of

	species of European, and/or national, and/or regional conservation concern. This document uses the term HNV *forestry* consistently throughout the text as a means of referring both to the land use (forest) and the associated management practices. This is important in the context of the evaluation of rural development programmes, where measures impact both on forestry practices and via these, on the land itself.
HCVF	High Conservation Value Forests are forests of outstanding and critical importance due to their high environmental, socio-economic, biodiversity or landscape values.
IACS	Integrated Administration and Control System
IRENA	Indicator Reporting on the Integration of Environmental Concerns into Agriculture Policy (a joint activity between DG Agriculture, DG Environment, Eurostat, the EU Joint Research Centre and the European Environment Agency for developing a common set of EU agri-environment indicators).
LFA	Less Favourable Area
LPIS	Land Parcel Identification System
LU	Livestock Unit
MCPFE	Ministerial Conference on the Protection of Forestry in Europe.
PEBLDS	Pan-European Biodiversity and Landscape Strategy
RDP	Rural Development Programme
Traditional Agricultural Landscapes	Traditional Agricultural Landscapes in Europe are typically derived from historic - frequently family and/or subsistence-style - farming methods where the dominant cultural landscape characteristics are the result of a traditional or locally adapted approach to management. In general, these farming systems are characterised by the presence of farming features, whose distribution will be regionally and/or locally specific, which contribute to the landscape's aesthetic qualities as well as to supporting its ecological integrity.
UAA	Utilised Agricultural Area
UNEP	United Nations Environment Programme

Annex 2
Rural Development Measures with a Potential Impact HNV Farming and Forestry

All rural development measures which have been identified in the indicator fiches of the Common Monitoring and Evaluation Framework as having the potential to support the maintenance of HNV farming and forestry are listed in the table below. They are all Axis 2 measures. Although not identified as having a direct impact in the indicator fiches, certain measures under Axis 1 (such as the training and advice measures) may have a positive effect if targeted at environmental land management. In assessing the impact of the whole programme, programme evaluators should also take account of any measures which may exert a negative effect.

In considering the impact of the rural development programme on the maintenance of HNV farming and forestry in a given Member State or region, programme evaluators should take account of the whole suite of measures which potentially impact on the extent and condition of HNV farming and forestry.

Measure
211 Natural handicap payments to farmers in mountain areas
212 Payments to farmers in areas with handicaps, other than mountain areas
213 Natura 2000 payments and payments linked to Water Framework Directive
214 Agri-environment payments
216 Support for non productive investments
221 First afforestation of agricultural land
222 First establishment of agro-forestry systems on agricultural land
223 First afforestation of non-agricultural land
224 Natura 2000 payment
225 Forest environment payments
226 Restoring forestry potential and introducing prevention actions
227 Support for non-productive investments

Annex 3
The Relationship between Farming and Biodiversity

Since the end of the last ice age, Europe's natural environment has been shaped by human activities, and particularly by farming. The loss of "naturalness" caused by the rise of agriculture was compensated for, in biodiversity terms, by the emergence of open, semi-natural habitats, and the increases in habitat diversity per area resulting from mixed farming landscapes. The mosaic of habitats resulting from traditional farm management favoured the diversity of plant and animal species across Europe (Tubbs 1977; Plachter 1996; 1998). It is estimated that 50 per cent of all species in Europe depend on agricultural habitats, including a number of endemic and threatened species (Kristensen 2003).

At the present time, farming in Europe ranges from the most intensive production systems, typically on more fertile land, to very low-intensity, more traditional land uses, usually found on poorer land. The differences in intensity are enormous. Nitrogen inputs range from zero to several hundred kg/ha/year; arable yields from less than 1 t/ha to over 10 t/ha; olive yields from less than 0.5 t/ha to over 8t/ha; and livestock densities from as low as 0.1 Livestock Units (LU) per hectare to 5 LU or more.

Typically, the highest levels of species richness are associated with semi-natural habitats, under low intensity management. This is explained in Grime's classic hump-backed model which depicts the relationship between species richness and levels of disturbance (Grime 1973; 1979; Oba *et al*., 2001). Low-medium levels of disturbance, such as those generated through low intensity agricultural management, introduce a greater variety of niches and provide greater colonisation opportunities for a wider range of species.

Only a limited number of species are adapted to high levels of disturbance, associated with intensive forms of land use, and hence the overall species richness is relatively low. At the other end of the scale, where there are very low levels of disturbance - associated with conditions of land abandonment - a relatively limited number of plant species, with the capacity to outcompete others, tend to dominate. Both extremes result in relatively homogeneous vegetation types which limit the possibility of colonisation and growth by other species.

Whilst most farming biodiversity is associated with semi-natural vegetation under low intensity grazing or mowing, some more intensive agricultural landscapes are punctuated with farmland features, certain of which are beneficial for biodiversity, providing nesting and breeding sites, food sources and migratory corridors.

Furthermore, certain more intensively managed farmland areas can support large populations of species important for nature conservation. Examples include the intensively managed wet pasture in Denmark and the western Netherlands, which support important populations of breeding waders and wintering

wildfowl, such as the black-tailed godwit (*Limosa limosa*) (Andersen *et al*., 2003). There are a number of reasons for this. Under these specific circumstances, the farmed land provides a specific habitat and especially feeding (and breeding) opportunities that are exploited by a limited number of species - almost exclusively birds - as a substitute for a natural habitat. Certain bird species will tolerate, or even benefit from, habitats found on productive, relatively intensively managed farmland where there is little botanical diversity coupled with high-yielding crops which are compatible with feeding or breeding conditions.

In recent decades, there has been a marked decline in biodiversity across European farmland. This has arisen primarily through the industrialisation of agriculture, resulting in farm specialisation, increased farm size, and mechanisation. Simplification of the landscape has occurred, replacing the systems of multiple use that predominated in the past. These changes happened first and most intensely in the lowlands of northwest Europe on the best land, such as in southern England, northern France, Belgium, Netherlands and Germany. However, the wider availability of technologies, and more recently the influence of market forces and public policy, have meant that the trend has spread to all but the least accessible areas and the poorest land.

Another cause of the decline in agricultural biodiversity in recent years has been the progressive marginalisation and abandonment of agricultural land caused by physical or climatic handicaps and wider socio-economic changes. Agricultural land abandonment can have a detrimental affect on biodiversity as many of the farmland habitats of high nature value need to be actively managed to maintain them, especially semi-natural grasslands (van Dijk *et al.,* 2005; Keenleyside and Baldock, 2007). The main reason for abandonment arises from the considerable challenges of socio-economic viability faced by HNV farming systems. As intensive farming expands and as incomes rise in the wider economy, it becomes harder to earn a living from low-intensity farming.

As such, HNV farming is under threat. Those farmers who deliver the greatest biodiversity benefit are typically farming under the most difficult circumstances and vulnerable to technical, social and economic change, they are subject to the greatest pressures to abandon their traditional way of life. Identifying these systems is an important precursor to being able to target measures to ensure their ongoing maintenance. There is an urgency to this task given that many of the farming systems so integral to the maintenance of Europe's cultural landscapes and semi-natural habitats face an uncertain future.

Annex 4
A Schematic Representation of the Four Step Process in the Application of the CMEF HNV Indicators

Step	Process	Output	Comments
1a	Describing the main types of HNV farming in MS or region, through expert consultation and existing literature.	Broad typology of main HNV farming systems, including descriptions of relationships between farming practices and biodiversity.	See Annex 5 for a schematic typology of HNV farming systems in Europe.
1b	Describing the main types of HNV features in MS or region, through expert consultation and existing literature.	Descriptions of typical features and of the characteristics of those features that contribute to their biodiversity value.	Focus on those features for which there are data – e.g. monitoring data. Information on the abundance and condition of additional or all features may be collected over time.
1c	Describing the main types of HNV forestry in MS or region, through expert consultation and existing literature.	Broad typology of main HNV forestry systems, including descriptions of relationships between management practices and biodiversity.	May be informed by existing typologies of broad forest types (e.g. EEA, 2006).
2a	Develop indicators to identify HNV farming based on 3 core characteristics (low intensity, semi-natural vegetation and diversity of land cover) for: - HNV semi-natural forage - HNV arable - HNV permanent cropping Use of species indicators where appropriate.	Possible quantitative indicators of HNV farming: - Number of hectares of semi-natural land used for grazing and/or mowing - Number of hectares of forage declared by holdings in the lowest range of livestock densities per hectare of forage - Number of hectares of arable land with a proportion of fallow and semi-natural vegetation within defined thresholds	The IRENA indicator has produced estimates based on EU data. National data may produce a more precise approximation, with investment in relevant data encouraged over time. The figures in hectares produced could be combined to produce a single figure of the extent of HNV farming, or they could remain as separate figures.

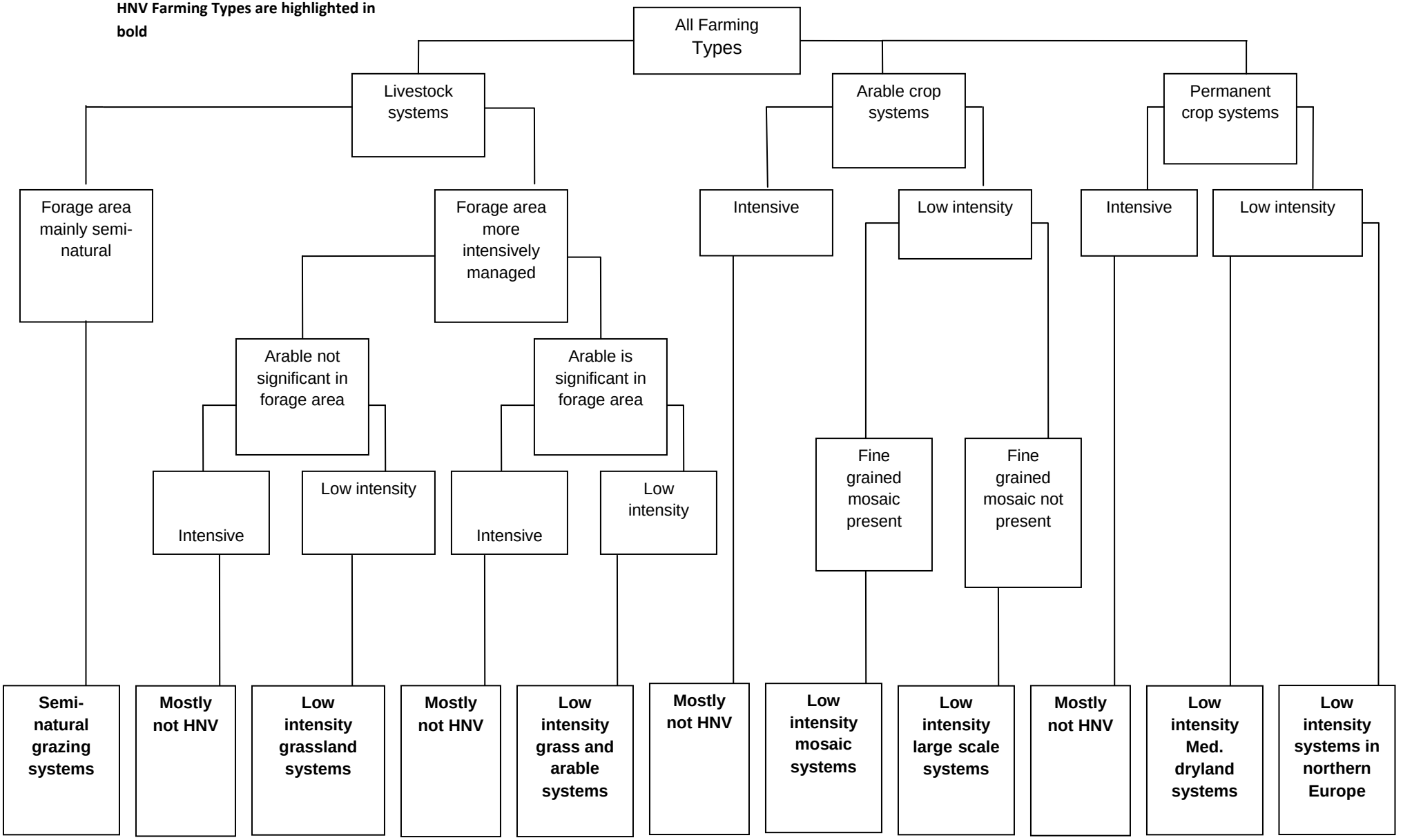
		- Number of hectares of HNV permanent cropland with trees in production over a defined age threshold and with a semi-natural understorey - Number of hectares of farmland with a density of semi-natural features within defined thresholds - Number of hectares of HNV farmland which harbour populations of certain taxa of conservation concern, or European or global populations.	
2b	Develop indicators to identify HNV forestry for: - Natural forestry - Semi-natural forestry Develop species indicators where appropriate.	Possible quantitative indicators of HNV forestry (in hectares): - Area of natural and semi-natural HNV forestry (hectares) - Number of hectares of forest valuable for certain taxa.	These estimates do not lend themselves to being combined, and included in a total figure of the extent of HNV forestry. Keeping these as separate figures provides programme evaluators with valuable information.
2c	Develop other quantitative indicators, relating to the extent or length of HNV features.	Quantitative estimates of extent of HNV features, (for example): - Length of HNV hedgerows, or other semi-natural field margins (qualities must be defined) - Area of HNV water bodies (qualities must be defined)	Initially, these will be derived from existing data, but additional data may be collected over time.
2d	Establish baseline which may be added to over time as more data become available. This baseline may comprise a number of discrete quantitative estimates.	Number of hectares of HNV farming (or other quantitative measures). Number of hectares of HNV forestry (or other quantitative	May be combined or separate figures. May be combined or separate figures.

		measures). Quantitative measure relating to HNV features.	
2e	Identify case studies to test whether regional/national indicators are appropriate on the ground	Selection of a limited number of representative case studies for ground-truthing of indicators.	The accuracy and sensitivity of the indicators may be ground-truthed through local case studies.
3a	Develop indicators to capture the condition of HNV farming.	Indicators relating to: - Relevant farming practices - Abundance of selected species.	Data are generally not available for an entire Member State and/or region and so may be collected through stratified random samples or through the case studies selected under step 2e, to provide a picture of how the condition is changing over time.
3b	Develop indicators to capture the condition of HNV features.	Indicators relating to: - Relevant management practices - Abundance of selected species.	Data are generally not available for an entire Member State and/or region and so may be collected through stratified sample surveys or through the case studies selected under step 2e, to provide a picture of how the condition is changing over time.
3c	Develop indicators to capture the condition of HNV forestry.	Indicators relating to: - Relevant forestry practices - Abundance of selected species.	Data are generally not available for an entire Member State and/or region and so may be collected through stratified sample surveys or through the case studies selected under step 2e, to provide a picture of how the condition is changing over time.
4a	Application of Impact Indicator 5: - Assess quantitative changes in HNV resource.	Estimate of any changes in the different quantitative measures of HNV farming, features and forestry.	
4b	Application of Impact Indicator 5:	Estimate of any changes in management practices and	Evaluators to use judgement to assess whether it is appropriate

	- Assess qualitative changes in HNV resource.	population sizes of selected species based on observable trends in sample surveys.	to extrapolate any changes in condition to the entire HNV resource.
4c	Programme evaluators to assess results from all available information.		Evaluators to interpret what proportion of the observed changes can be attributable to the combined impact of all relevant measures.

Annex 5

Typology of Potential HNV Farming Types in the EU-27



Annex 6
Overview of the Range of Forage Types

Forage types range from intensively cultivated crops (for example, irrigated forage maize), to scrubby and woody vegetation that may be grazed or browsed only occasionally. The forage types found between these extremes are summarised in the figure below.

<table>
<tr><td colspan="3">Semi-natural forage</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="2">Rough grazing</td><td colspan="2"></td><td></td></tr>
<tr><td></td><td colspan="3">Permanent Pasture (CAP definition R796/2004)</td><td></td><td></td></tr>
<tr><td>Scrubby and/or wooded pasture of native species, grazed and/or browsed.</td><td>Permanent grassland that has not been reseeded or fertilised.</td><td>Traditional hay meadows, not reseeded. May receive low levels of manure.</td><td>Permanent grassland that may be reseeded after 5 years and/or fertilised.</td><td>Multi-annual sown forage, such as grass, lucerne, reseeded after < 5 years.</td><td>Annual sown forage, such as grass leys, forage maize, other forage crops.</td></tr>
<tr><td colspan="6"><0.1 LU/ha ---------- >5 LU/ha</td></tr>
</table>

Semi-natural forage types are those that have not been sown or artificially fertilised. They consist of spontaneous vegetation that is used for grazing or browsing, or as traditional hay meadows. Semi-natural forage is not always grassland; it may also include scrub, woodland, or a combination of these types.

Distinguishing semi-natural forage from other forage types is important in order to understand the HNV farming concept and to identify HNV farming. However, existing agronomic definitions of forage types often do not lend themselves to making this distinction.

Permanent Pasture is defined under the CAP as, “Land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that has not been included in the crop rotation of the holding for five years or longer” (Commission Regulation 796/2004). Thus at the more productive extreme, Permanent Pasture includes pasture that may be reseeded after five years, and may be heavily fertilised. Such pasture is not semi-natural or of significant biodiversity value.

At the least productive end of the forage spectrum, the CAP Permanent Pasture definition may be interpreted as excluding the scrubby and woody forage types which often are of particular biodiversity value. This is because it focuses explicitly on *herbaceous* forage.

Under the FSS, Permanent Grassland is broken down into more intensively used Permanent Pasture and Meadows, and Rough Grazings. In Regulation (EC) No 1166/2008 of the European Parliament and of the Council on farm structure surveys and the survey on agricultural production methods and repealing Council Regulation (EEC) No 571/88, Rough Grazings are defined as "low yielding permanent grassland, usually on low quality soil, for example on hilly land and at high altitudes, usually unimproved by fertiliser, cultivation, reseeding or drainage. These areas can normally be used only for extensive grazing and are not normally mown, or are mown in an extensive manner; they cannot support a large density of animals" (Handbook on implementing the FSS and SAPM definitions, Eurostat, September 2008).

From the above definition, Rough Grazings appear to be well within the category of semi-natural forage. However, this category does not cover the full range of semi-natural forage. More productive types, such as hay meadows, are excluded. Also, Permanent Grassland (including Rough Grazings) under FSS is defined with the same focus on herbaceous forage, as in Commission Regulation 796/2004. In practice, what is included and what is excluded from these categories depends on the interpretation of each Member State. In practice, Rough Grazings often include some types of non-herbaceous pasture (for example, heathland), but it does not necessarily cover the scrubby and wooded types of forage.

Determining which pastures are semi-natural, and which are not, is to some extent a value judgement. One approach is based on the presence of certain indicator species, another is to decide that a pasture that has not been resown or fertilised for a certain number of years can be considered semi-natural.

In some circumstances, grassland that has been resown and fertilised may revert to a semi-natural state after reseeding. The time this takes varies with the substrate and the surrounding vegetation and seed sources. The resulting sward may be qualitatively different from the original vegetation.

Occasional manuring at very low levels may be considered compatible with a semi-natural state, for certain specific types of grassland.

Occasional tillage also may be compatible with semi-natural status. This is especially relevant in Mediterranean regions, where grasslands may be tilled occasionally for scrub control, without significantly reducing their natural value. Under these climatic conditions a large proportion of the 'sward' consists of annual species which are less affected by tillage. Spontaneous vegetation in olive groves and on low-intensity fallow land may be counted in the same category if it is not affected significantly by fertilisers or biocides (Beaufoy, 2008).

Annex 7
Potential Data Sources for HNV Farming Indicators

The following tables detail the data available at the farm level in a sample of Member States.

Table 1

Relevant data from national Farm Structure Survey (FSS) data for selected Member States

Member State	Livestock Categories Recorded	Semi-Natural Vegetation (SNV) or Permanent Grassland (PG) Categories Recorded	FSS information
Denmark	All: pigs, poultry, dairy cattle, beef, sheep, goats and horses	Permanent grassland not in rotation	Census every 10 years and an annual sample
Finland	-	-	-
France	All: pigs, poultry, dairy cattle, beef, sheep, goats and horses		Census, every 10 years and no integration with IACS or LPIS
The Netherlands	All: pigs, poultry, dairy cattle, beef, sheep, goats and horses	3 categories of natural grassland (per parcel) are recorded: natural grassland (max 5 ton dry matter production) with 1) >75% grassland coverage; 2) 75-50% grassland coverage; 3) <50% grassland coverage.	Yearly recording because FSS is matched with IACS

Table 2

Relevant data from IACS declarations for selected Member States

Member State	Livestock Categories Recorded	Semi-Natural Vegetation/Permanent Grassland Categories	Other Landscape Elements Recorded
Denmark	Not registered in IACS but in separate animal registry	Since 2005 the following categories: Permanent grassland, very low yield Permanent grassland, low yield Permanent grassland, normal yield Permanent grassland <50% clover, re-sown <5 years Permanent grassland >50% clover, re-sown <5 years Permanent grassland without clover, re-sown <5 years Permanent grassland and clover-grass, re-sown <5 years Permanent grassland for drying industry min. yield 6 t/ha Permanent grassland for grass layers Permanent grassland under AEP scheme pre-2003, max. 80 kg N/ha Permanent grassland under AEP scheme pre-2003, 0 kg N/ha	

Member State	Livestock Categories Recorded	Semi-Natural Vegetation/Permanent Grassland Categories	Other Landscape Elements Recorded
France	Animal categories are only registered if subject to decoupled payments or second pillar payments (e.g. LFA and/or special AE grassland payment (PHAE) and/or the “extensification premium”). This implies that a proportion of cows and pigs are not registered. However, these are usually the share of the animals which are not generally part of HNV system.	At farm level following the categories are collected: Permanent grassland: >5 years, Temporary grassland: 1-5 years old, Estive (summer pasture) (on farm only, no mention of collective estive), Moorland and individual grazing land (on farm).	Non-productive surfaces (“non agricultural surfaces” such as ponds, woods, and other features) are registered if subject to cross compliance and/or AE payments.
The Netherlands	All: pigs, poultry, dairy cattle, beef, sheep, goats and horses	3 categories of natural grassland (per parcel) are recorded: natural grassland (max 5 ton dry matter production) with: 1) >75% grassland coverage; 2) 75-50% grassland coverage; 3) <50% grassland coverage.	

Table 3

Relevant data from the Land Parcel Information System (LPIS) for selected Member States

Member State	Title of LPIS System, Status, Scale, Methodology	Semi-Natural Vegetation or Permanent Grassland Categories Recorded	Other Landscape Elements Recorded	Link to IACS
Denmark		Same land use categories are registered as in IACS, but at the level of a block of fields (this is an amalgamation of parcels/fields (max 10 fields)		Yes, link at the level of block of fields, but not individual fields
France	Registre Parcellaire Graphique	At parcel level all productive land uses receiving payments are registered. A link is established with IACS, so all IACS land uses are registered per parcel: Permanent grassland: >5 years: Temporary grassland: 1-5 years old, Estive (summer pasture) (on farm only, no mention of collective estive), Moorland and individual grazing land (on farm).	Mon-productive surfaces ("non agricultural surfaces" such as ponds, woods, and other features) are registered if subject to cross compliance and/or AE payments.	
The Netherlands	Dutch LPIS system called GIAP collects information through BRP (Parcel registration information) and FSS survey (Landbouw meitelling). In the GIAP system all collected information is integrated at farm level (both BRP and Landbouw meiteling). In addition a link at farm level is also established with the animal health	3 categories of natural grassland (per parcel) are recorded: - natural grassland (max 5 ton dry matter production) with: 1) >75% grassland coverage; 2) 75-50% grassland coverage;		Yes, complete integration at farm level.

Member State	Title of LPIS System, Status, Scale, Methodology	Semi-Natural Vegetation or Permanent Grassland Categories Recorded	Other Landscape Elements Recorded	Link to IACS
	registry in which all livestock is registered.	3) <50% grassland coverage.		
Romania				The Romanian government is implementing a Land Parcel Information System/Integrated Administration and Control System (LPIS/IACS). Farmers often own or work a number of small, noncontiguous parcels of land. There are approximately 2.5 million agricultural plots farmed by more than 1.5 million people in the country. It is estimated that the LPIS system will handle about 1.5 million subsidy claims per year and will manage about 755,000 claimants. An agricultural information and decision support system will be installed in the country's agency of payments and interventions in agriculture (APIA). In the first phase, only authorised employees from the 210 local offices will have access to the LPIS system. A dedicated geoportal for use by the general public will be integrated into the system at a later date, providing access for farmers to register online for subsidies.

Table 4

Relevant data from the Animal Health Registry for selected Member States

Member State	Livestock Categories Recorded	Link to IACS	Other Relevant Data Sources (Scale, Quality, Methodology)	Semi-Natural Vegetation or Permanent Grassland Categories Recorded	Other Landscape Elements Recorded
Denmark	All: pigs, poultry, dairy cattle, beef, sheep, goats (except horses)	Not clear			
The Netherlands	All: pigs, poultry, dairy cattle, beef, sheep, goats and horses	Yes, at farm level	Topographic information (Top-10 vector) at 1:10000 m resolution; SynBioSys (Syntaxonomic Biological System). This is an information system for the evaluation and management of biodiversity among plant species, vegetation types and landscapes. It incorporates a GIS platform for the visualisation of layers of plant species, vegetation and landscape data. The section 'Vegetation' holds a distribution database of relevé data (plot data). Because each relevé in the database is – through an automated process using the program ASSOCIA - assigned to a plant community we have a database with distribution of plant communities. SynBioSys can be used to predict the distribution of HNV Farming. The different HNV farming areas have first been described in terms of plant communities as described in Symbioses. Subsequently these plant communities have been mapped using Synbioses. For example the type 'Saltmarsh' belonging to HNV type 1 can be associated with 8 plant communities.	Semi-natural types that can be mapped are: Dry calcareous and non-calcareous dune grasslands; Salt meadows in or behind dunes; Dry heather and moorland (including on dunes); Peatlands; Dry and wet infertile grasslands; Calcareous grasslands; Wet (semi) - infertile grasslands; Marsh Marigold grasslands in peat, clay and brook valleys.	Top-10 vector provides coordinates of wet (ditches of less and more than 3 metres wide) and green (hedges, tree lines and field boundaries) landscape elements.

Table 5

Relevant data from national grassland surveys for selected Member States

Czech Republic			Grassland inventory Czech Republic		
Estonia			Grassland inventory project; Estonian Fund for Nature and Estonian Seminatural Community Conservation Association: period 1998-2001: http://www.veenecology.nl/data/Estonia.PDF	Wooded, floodplain, coastal and alvar meadows	
Hungary			Grassland inventory project: http://www.veenecology.nl/data/Hungary.PDF	Grassland type total area in Hungary (x1.000 ha) Alkali grasslands 250-270 Sand grasslands 35-40 Steppes 100-230 Rock grasslands 1.7-3 Flood-plain and hay meadows 200-250 Fen meadows and sedge-beds 20-60 Mountain grasslands 1.4-2	

Latvia			Grassland inventory project: http://www.veenecology.nl	Area of grassland habitat type (ha) and % (of all grasslands) 1. Dry grasslands 1851 ha (11%) 1.1. Dune grasslands Corynephorion 124 ha (0.72%) 1.2. Dry siliceous grasslands Plantagini-Festucion 473 ha (2.73%) 1.3. Dry grasslands on cliffs Alysso-Sedion albi 4 ha (0.02%) 1.4. Dry calcareous grasslands Bromion erecti 1116 ha (6.44%) 1.5. Xero-thermophile fringes Geranion sanguinei 12 ha (0.07%) 1.6. Mesophile fringes Trifolion medii 121ha (0.7%) 2. Fresh grasslands 6386 ha (36.86%) 2.1. Nardus grasslands Violion caninae 221 ha (1.28%) 2.2. Mesophile pastures Cynosurion 4236 ha (24.45%) 2.3. Hay meadows Arrhenatherion 1908 ha (11.01%) 2.4. Potentillion anserinae 10 ha (0.06%) 3. Moist grasslands 5876 ha (33.92%) 3.1. Humid riverine grasslands Alopecurion 1088 ha (6.28%) 3.2. Humid eutrophic grasslands Calthion 3889 ha (22.45%) 3.3. Humid oligotrophic grasslands Molinion 46 ha (4.88%) 3.4. Coastal brackish grasslands Armerion maritima 47 ha (0.27%) 4. Wet grasslands 2937 ha (16.96%) 4.1. Acidic dwarf sedge communities Caricion fuscae 258 ha (1.49%) 4.2. Calcareous dwarf sedge communities Caricion davallianae 47 ha (0.27%) 4.3. Tall sedge communities Magnocaricion 2632 ha (15.19%) 5. Semi-ruderal grasslands 273 ha (1.57%)	
Lithuania			Grassland inventory project: http://www.veenecology.nl (See below)		

Slovenia			Grassland inventory project: http://www.veenecology.nl	Area of grassland habitat type (ha) and % (of all grasslands) 1. Submediterranean-Illyrian- meadows (Scorzonerion villosae) 9534 ha (3%) 2. Submediterranean-Illyrian karst pastures (Satureion subspicatae) 10095 ha (4%) 3. Suboceanic/submediterranean dry grasslands predominately on basic (calcareous) substrate (Mesobromion) 8875 ha (3%) 4. Matgrass (Nardus stricta dominated grasslands on acid substrate (Nardo-Callunetea) 221 ha (1%) 5. Oligotrophic moist meadows with Molinia caerulea (Molinion) 2875 ha (1%) 6. Mesotrophic wet meadows (Calthion) 354 ha (0.1%) 7. Meadowsweet dominated wet meadows and lowland tall herb communities (Filipendulion) 120ha (0.04%) 8. Manured mesotrophic and eutrophic slightly moist (Arrhenatheretalia) 84809 ha (27%). 8.1. Oatgrass dominated manured meadows (Arrhenatherion) 3884ha (1.4%) 8.2. Ryegrass-Crested Dogstail grasslands (Cynosurion) 2719ha (0.01%). 9. Small Sedge intermediate mire and swamp swards (Scheuchzerio-Caricetea fuscae) 32ha (0.01%). 10. Water fringe vegetation and swamps (Phragmition communis) 1137ha (0.4%). 11. Vegetation dominated by bulky sedges (Magnocaricion elatae) 1090ha (0.4%). 12. Vegetation dominated by grasses and herbs along the water banks (Glycerio-Sparganion) 8ha 13. Pioneer annual flooded mudflats grasslands (Thero-Salicornietea) 271 ha (0.1%) 14. Perennial halophytic grasslands of muddy semi-dry soils (Arthrocnemetea fruticosi) 16 ha (0.01%). 15. Marine swamps (Juncetea maritimi) (not mapped). 16. Submarine grasslands (Posidonia, Cymodocea, Zostera in Ruppia beds) (not mapped)/ 17. Village mosaic 7935 ha (2.8%). 18. Extensive grasslands (based on Land use map 2002) 100905 ha (35.2%). 19. Unclassified (mosaic of types) 58303 ha (20.3%). Total Area 286581ha	

Slovak Republic			Grassland inventory project: http://www.veenecology.nl		
Bulgaria			Grassland inventory project: http://www.veenecology.nl		
Romania			Grassland inventory project: http://www.veenecology.nl/data/Hungary.PDF		

Annex 8
Farming Species of European Conservation Concern

European Farmland Bird Species

Species indicators of the condition of HNV farmland can be drawn from the following list of 119 farmland bird species. They are either species of European conservation concern, or species for which a high proportion of European or World populations are associated with European farmland[1].

Scientific Name	Common Name
Accipiter brevipes	Levant Sparrowhawk
Acrocephalus paludicola	Aquatic Warbler
Aegypius monachus	Cinereous Vulture
Alauda arvensis	Eurasian Skylark
Alectoris chukar	Chukar
Alectoris rufa	Red-legged Partridge
Anas querquedula	Garganey
Anser albifrons	Greater White-fronted Goose
Anser anser	Greylag Goose
Anser brachyrhynchus	Pink-footed Goose
Anser erythropus	Lesser White-fronted Goose
Anser fabalis	Bean Goose
Anthus campestris	Tawny Pipit
Aquila adalberti	Spanish Imperial Eagle
Aquila clanga	Greater Spotted Eagle
Aquila heliaca	Imperial Eagle
Aquila pomarina	Lesser Spotted Eagle
Asio flammeus	Short-eared Owl

[1] This list was drawn up by the JRC/EEA for use in their mapping approach of HNV Farming areas (Paracchini *et al*., 2008). The contributions of Birdlife International are acknowledged. An initial list of 75 farming bird species was derived from 'Birds in Europe' (Birdlife International, 2004). Following a consultation exercise with the Member States carried out by the EEA in the second half of 2006, this list was revised. The final list was produced in April 2007.

Athene noctua	Little Owl
Branta bernicla	Brent Goose
Branta leucopsis	Barnacle Goose
Branta ruficollis	Red-breasted Goose
Bucanetes githagineus	Trumpeter Finch
Burhinus oedicnemus	Eurasian Thick-knee
Buteo rufinus	Long-legged Buzzard
Calandrella brachydactyla	Greater Short-toed Lark
Calandrella rufescens	Lesser Short-toed Lark
Carduelis cannabina	Eurasian Linnet
Carduelis flavirostris	Twite
Chersophilus duponti	Dupont's Lark
Chlamydotis undulata	Houbara Bustard
Ciconia ciconia	White Stork
Circaetus gallicus	Short-toed Snake-eagle
Circus cyaneus	Northern Harrier
Circus pygargus	Montagu's Harrier
Columba oenas	Stock Pigeon
Coracias garrulus	European Roller
Corvus frugilegus	Rook
Corvus monedula	Eurasian Jackdaw
Coturnix coturnix	Common Quail
Crex crex	Corncrake
Cursorius cursor	Cream-coloured Courser
Cygnus columbianus	Tundra Swan
Cygnus cygnus	Whooper Swan
Cygnus olor	Mute Swan
Dendrocopos syriacus	Syrian Woodpecker
Elanus caeruleus	Black-winged Kite
Emberiza cirlus	Cirl Bunting

Emberiza citrinella	Yellowhammer
Emberiza hortulana	Ortolan Bunting
Emberiza melanocephala	Black-headed Bunting
Emberiza schoeniclus	Reed Bunting
Erythropygia galactotes	Rufous-tailed Scrub-robin
Falco biarmicus	Lanner Falcon
Falco cherrug	Saker Falcon
Falco naumanni	Lesser Kestrel
Falco tinnunculus	Common Kestrel
Falco vespertinus	Red-footed Falcon
Francolinus francolinus	Black Francolin
Galerida cristata	Crested Lark
Galerida theklae	Thekla Lark
Gallinago gallinago	Common Snipe
Gallinago media	Great Snipe
Glareola pratincola	Collared Pratincole
Grus grus	Common Crane
Gyps fulvus	Eurasian Griffon
Haematopus ostralegus	Eurasian Oystercatcher
Hieraaetus fasciatus	Bonelli's Eagle
Hieraaetus pennatus	Booted Eagle
Hippolais olivetorum	Olive-tree Warbler
Hippolais pallida	Olivaceous Warbler
Hirundo rustica	Barn Swallow
Jynx torquilla	Eurasian Wryneck
Lanius collurio	Red-backed Shrike
Lanius excubitor	Great Grey Shrike
Lanius minor	Lesser Grey Shrike
Lanius nubicus	Masked Shrike
Lanius senator	Woodchat Shrike

Limosa limosa	Black-tailed Godwit
Locustella fluviatilis	Eurasian River Warbler
Locustella naevia	Common Grasshopper-warbler
Lullula arborea	Wood Lark
Melanocorypha calandra	Calandra Lark
Merops apiaster	European Bee-eater
Miliaria calandra	Corn Bunting
Milvus migrans	Black Kite
Milvus milvus	Red Kite
Motacilla flava	Yellow Wagtail
Neophron percnopterus	Egyptian Vulture
Numenius arquata	Eurasian Curlew
Nycticorax nycticorax	Black-crowned Night-heron
Oenanthe hispanica	Black-eared Wheatear
Oenanthe oenanthe	Northern Wheatear
Otis tarda	Great Bustard
Otus scops	Common Scops-owl
Passer montanus	Eurasian Tree Sparrow
Perdix perdix	Grey Partridge
Philomachus pugnax	Ruff
Picus viridis	Eurasian Green Woodpecker
Pluvialis apricaria	Eurasian Golden-plover
Porzana porzana	Spotted Crake
Pterocles alchata	Pin-tailed Sandgrouse
Pterocles orientalis	Black-bellied Sandgrouse
Pyrrhocorax pyrrhocorax	Red-billed Chough
Saxicola rubetra	Whinchat
Saxicola torquata	Common Stonechat
Serinus canaria	Island Canary
Streptopelia turtur	European Turtle-dove

Sylvia communis	Common Whitethroat
Sylvia hortensis	Orphean Warbler
Sylvia nisoria	Barred Warbler
Tetrao tetrix	Black Grouse
Tetrax tetrax	Little Bustard
Tringa totanus	Common Redshank
Turdus iliacus	Redwing
Turdus pilaris	Fieldfare
Tyto alba	Barn Owl
Upupa epops	Eurasian Hoopoe
Vanellus vanellus	Northern Lapwing

European Farmland Butterfly Species

The following butterfly species are considered indicators of HNV farmland.

Species indicators of the condition of HNV farmland can therefore be drawn from the following list which includes either species of European conservation concern, or species for which a high proportion of European or World populations are associated with European farmland[2].

Alpine Grassland

Erebia calcaria

Erebia Christi

Erebia sudetica

Parnassius apollo

Polyommatus golgus

Dry Grassland

Argynnis elisa

Erebia epistygne

Hipparchia azorina

Hipparchia miguelensis

Hipparchia occidentalis

Lycaena ottomanus

Maculinea arion

Maculinea rebeli

Melanargia arge

Papilio hospiton

Plebeius hespericus

Plebeius trappi

Polyommatus dama

[2] This list was drawn up the EEA/JRC in their mapping approach of HNV Farming areas (Paracchini *et al.,* 2008) using Van Swaay, C. and Warren, M. (2003). The contributions of De Vlinderstichting (Wageningen) are acknowledged. The final list has been revised following consultation with the Member States.

Polyommatus galloi

Polyommatus humedasae

Pseudochazara euxina

Pyrgus cirsii

Humid Grassland

Coenonympha hero

Coenonympha oedippus

Euphydryas aurinia

Maculinea nausithous

Maculinea teleius

Note: Woodland species were not included in the list.

European Evaluation Network
for Rural Development

Evaluation Helpdesk
260 Chaussée St Pierre – B-1040 Brussels
Tel: +32 (0)2 736 18 90
E-mail: info@ruralevaluation.eu