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FARMING IN HIGH NATURE VALUE REGIONS

The role of agricultural policy in maintaining HNV farming systems in Europe

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Agricultural Economics Research Institute (LEI-DLO)

ABSTRACT

FARMING IN HIGH NATURE VALUE REGIONS; THE ROLE OF AGRICULTURAL POLICY IN MAINTAINING HNV FARMING SYSTEMS IN EUROPE
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High Nature Value (HNV) farming systems and their traditional forms of management practice are important in the maintenance of landscapes and biodiversity in Europe. Intensification of agriculture and abandonment of agricultural land are the main threats to HNV areas. This research will provide insight into the role the Common Agricultural Policy (CAP) and related structural and accompanying measures play and might play in maintaining High Nature Value farming systems in Europe. This is done in a consistent quantitative manner, based on the Farm Accountancy Data Network (FADN) of the European Commission.

The economic viability of some HNV farming systems in a number of study areas in Europe is investigated. Farms in HNV study areas are divided in two categories: viable farms and farms at risk, in order to provide insight into differences in structure characteristics and subsidies between both groups. The maximum amounts of allowances farms are eligible for on the basis of present and alternative policy measures are assessed. Attention is also paid to the impact new developments like an EU membership of the Visegrad countries and further trade liberalization can have on the HNV farming systems.

High Nature Value farming systems/Agricultural policies/Viability/Farm level/Europe

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PREFACE

This study on Farming in High Nature Value (HNV) regions in Europe was commissioned by the Department of Nature Management of the Ministry of Agriculture, Nature Management and Fisheries of the Netherlands, and was carried out by the Agricultural Economics Research Institute (LEI-DLO) (The Hague, the Netherlands). The objectives of this study were (i) to investigate the viability of High Nature Value farming systems in Europe and (ii) to provide insight into the role the Common Agricultural Policy plays and might play in maintaining HNV farming systems in Europe.

The study was guided by a Steering Committee, which included the following persons from:
the Dutch Ministry of Agriculture, Nature Management and Fisheries:

- G. van Dijk of the Department of Nature Management,
- P. Berkhout of the Department of Agriculture,
- J.A. van Driel of the Department of Agriculture,
- A.J. Vermuë of the Department of International Affairs,
- H.F. Smit of the Department of International Affairs,

the Dutch Ministry of Housing, Spatial Planning and the Environment:

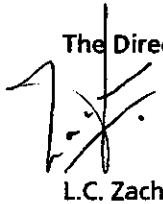
- E.C.A. Bolsius of the National Spatial Planning Agency.

The authors gratefully acknowledge the critical remarks and useful suggestions made by the Steering Committee during all stages of the project.

Studies on HNV farming systems are often very descriptive. This research, however, investigates HNV farming systems in a consistent quantitative manner compared to the more qualitative approaches used in the recent past. This report builds upon the report 'Farming at the Margins; abandonment or redeployment of agricultural land in Europe' (Baldock et al., 1996), which focuses on marginalization and abandonment, whereas in this study emphasis will be given to viability of HNV farming systems.

Comments on a draft version of the report were received from F.M. Brouwer, J.H. Post and S. Van Berkum. The authors highly appreciate their critical remarks made on the report.

The Director,



The Hague, May 1998

L.C. Zachariasse

SUMMARY

Objective of the study

High Nature Value (HNV) farming systems and their traditional forms of management practice are important in the maintenance of landscapes and biodiversity in Europe. Intensification of agriculture and abandonment of agricultural land are the main threats to HNV areas. Therefore the viability of HNV farming systems in Europe is the central concern of this study. The report provides insight into the role the Common Agricultural Policy (CAP) and related structural and accompanying measures play and might play in maintaining HNV farming systems in Europe. The impact of future developments, like extension of the European Union (EU) with the Visegrad countries and further trade liberalization, on HNV farming systems is investigated as well.

Definition of HNV farming systems

There is no clear agreed definition of HNV farming systems in Europe. The term often refers to low-intensity systems with highly diverse habitat types. However, it may also be high-intensive farming systems with a rich natural potential, like the dairy farms in the Dutch Peatlands.

The availability of information and approach used

Studies on HNV farming systems are often very descriptive. This research investigates HNV farming systems in a consistent quantitative manner compared to the more qualitative approaches used in the recent past. First of all European areas with HNV farming systems are identified on the basis of the literature. In these study areas farming types of importance for the maintenance of the high natural value of the area are selected for further investigation. This selection is based on the literature and data availability. European data sources are used, like the Farm Accountancy Data Network (FADN) of the European Commission and the Farm Structure Survey (FSS). In view of the absence of a good scientific base of information that describes the functional and habitat value of farming systems, an ecological approach of viability is not elaborated in this study. An economic approach of viability of farms has been applied to the farming systems in the study areas, although it is obvious that the viability of habitats is not only determined by the economic viability of farms. On the basis of the development of the own financial resources plus depreciation relating to replacement-cost value, farms are divided into two groups: the viable farms and farms at risk. Both groups are compared to derive differences in structural characteristics and subsidies received between viable farms and

farms at risk. The support present and alternative agricultural policy measures can provide to HNV farming systems is investigated.

There is insufficient information available from which to determine precisely which agricultural systems in the Visegrad countries are associated with high natural values. Besides, there is insufficient data available on income and structure characteristics of farms for a quantitative assessment on HNV farming systems in the Visegrad countries. The structure of farms is changing constantly.

Farming types in the HNV study areas

Twelve study areas have been selected in this research with the aim of covering a range of geographical locations and most characteristic landscapes with HNV farming systems and practices: Black Forest, Pindos Mountains, Asturias, Spanish Drylands, Dehesas, Jura, Limousin, Lozère, Valle d'Aosta, Calabria, Dutch Peatlands and Scottish Highlands. The share of specialized farms in total Utilized Agricultural Area (UAA) has increased in time in almost all these study areas. The share of specialized farms in the total number of holdings has increased as well. The main farming types considered to be responsible for the conservation of HNV areas are specialized dairy farms, sheep, goat and other grazing livestock farms and specialized cattle-rearing and fattening farms. These farming types have a considerable share in the total area of land of the study areas. They have, however, only a limited share in the final production.

Differences between viable farms and farms at risk

Of all farms selected in this research about 70% is classified as viable and 30% is considered to be at risk. Viable farms did not turn out to be larger than the farms at risk. The intensity of farming seems to be a more determining factor for the viability of farms.

Subsidies before the 1992 CAP reform

There are large differences in the share of direct subsidies in the Family Farm Income (FFI) among study areas. In some study areas the FFI only remains positive because of the direct subsidies received. So, in these study areas direct subsidies are essential for HNV farming systems. The share of direct subsidies in the FFI is higher at the category farms at risk compared to the category farms considered to be viable. The absolute amount of direct subsidies is, however, higher at the category viable farms compared to the category farms at risk. Most viable farms also receive a higher level of indirect government support compared to the farms at risk, due to a higher production value.

Subsidies after the 1992 CAP reform (present policy measures)

The main policy measures affecting HNV faming systems after the 1992 CAP reform are market and price policies (e.g. ewe premium and quota rights),

accompanying measures (e.g. agri-environmental payments) and structural policies (e.g. LFA allowances). Direct subsidies (mainly the ewe premiums which already existed before the 1992 CAP reform) make a considerable contribution to the viability of HNV farming systems. While market and price policy changes of the 1992 CAP reform do not assist the viability in the study areas or only to a limited extend, in terms of support provided. Market and price policy changes of the 1992 CAP reform seem to be too general to support HNV farming systems. The conditions to receive premium are not very specific.

Alternative agricultural policies

Some alternative policy measures are explored and assessed. Abolition of the set-aside obligation does not affect a large proportion of the HNV farms. The increase in the allowances farms are eligible for is modest. Support provided by a supplementary additional beef premium, in case low livestock density thresholds are met, is also limited in most study areas. The impact of conversion of the additional ewe premium for which producers in Less Favoured Areas (LFAs) are eligible for, into a payment targeted at all HNV areas is also modest, since most HNV areas are LFAs. Agri-environmental payments could potentially be a big source of support in most study areas. Although these payments are mainly compensations. Agri-environmental payments seem to be very suitable to support HNV farming systems, environmental requirements can be attached to these payments.

Agenda 2000

It is likely that HNV farming systems will benefit from the proposed adjustments in the CAP, described in Agenda 2000. These systems are often the more extensive systems, which will be eligible for headage premiums since they fulfill the livestock density requirements. Losses due to the termination of the maize for silage premium will be modest, since the area under this crop is limited. Besides it is likely that HNV farming systems will benefit from the increase in the budget for agri-environmental measures. Finally, Agenda 2000 also proposes to transform the support scheme of LFA into an instrument to maintain and promote low-input farming.

Support and viability

Subsidies before the 1992 CAP reform are substantial, mainly the ewe premiums make a considerable contribution to the viability of HNV farming systems. The allowances (minus the decrease in the production value) of the market and price policy changes of the 1992 reform are considerably less as well as the allowances of the assessed alternative policy measures. Agri-environmental payments could potentially be an important source of support.

At farms at risk, the total allowances are limited in relation to the negative development of the own financial resources plus depreciation in most study areas, especially at specialized dairy farms. This implies that at this farm-

ing type other adjustments in agricultural policy are required to maintain the HNV farming systems. Regional agri-environmental policies or policies directed towards a particular sector can provide more targeted support.

Visegrad countries

The situation in the Visegrad countries is changing rapidly. Traditional relatively extensive agricultural systems in the Visegrad countries still occur in part of these countries, they have in general high natural values. Currently, the support for HNV farming systems is limited in the Visegrad countries; there exists some support for LFAs and organic farming. These countries are, however, gaining valuable experience in developing initiatives that aim to maintain the natural value of agricultural land. Working groups are established which develop agri-environmental programmes. The future funding of agri-environmental programmes is still under discussion. The Visegrad countries face budgetary constraints and there is no guarantee yet that the EU will provide financial assistance for agri-environmental schemes in the Visegrad countries. The share of real HNV areas in the Visegrad countries does probably not exceed the share in the EU significantly. This could imply only modest budget consequences in case the EU is funding agri-environmental programmes in these countries.

Trade liberalization

On the basis of the relatively high trade barriers which presently surround the EU and the large production potential in the Visegrad countries, it could be expected that trade liberalization between the EU and Visegrad countries may have a considerable impact on agriculture. However, it is not likely that removal of the trade barriers between the EU and the Visegrad countries will increase the production in the Visegrad countries drastically at once. Production in the Visegrad countries will recover gradually from the transition. Currently, these countries are not able to produce large quantities of homogeneous quality. The time path is an important aspect in this respect. The impact on the three farming types mainly responsible for the maintenance of HNV areas in the EU (namely: specialized dairy farms, specialized cattle-rearing and fattening farms and sheep, goats and other grazing livestock farms) will be limited. The impact of removal of trade barriers between the EU and Visegrad countries on production in the Visegrad countries will, however, have consequences for the further intensification of agricultural practices. HNV areas may be threatened by a loss of nature and landscape values in the absence of adequate agri-environmental policies.

On the basis of the relatively high trade barriers which presently surround the EU, it could be expected that trade liberalization between the EU and the world market will affect EU's agriculture considerably. Estimations indicate that trade liberalization will decrease the EU production of ruminant meat and dairy products. This question raises whether this will encourage extensification. It is also possible that only the intensive farms will survive. A considerable drop

in ruminant meat and dairy sector prices can be a major threat to HNV farming systems. Production will be less profitable. However, the price of dairy products will probably not change drastically. Besides, the 1992 CAP reform and Agenda 2000 make farmers less dependent of prices, a shift to direct payments can be observed.

Recommendations

In this report, policy as well as research recommendations are formulated to develop a strategy for the maintenance of farming systems in HNV areas.

Ewe premiums, which contribute considerably to the viability of HNV farming systems, should be maintained at HNV farming systems. While environmental conditions, based on regional circumstances, should be attached to direct subsidies. Besides, production quotas should be set at a regional level. Further, regional agri-environmental policies and policies directed towards particular sectors should be used since they provide more targeted support. It is important to be aware of the vulnerability of farmers when they become more dependent on subsidies. Emphasis should be placed on the integration of ecological viability in the analysis. It is recommended to take account of the 'carrying capacity' of the area in the development of policies. Besides it is important to take care of the way environmental aspects are incorporated in policies, they can provide wrong incentives. Finally, it is recommended to guide the development of agriculture in the Visegrad countries.

Some research recommendations are formulated in addition. The role of other management forms of land like through public organizations should be investigated. Besides, a larger number of highly productive agricultural regions and Agenda 2000 should be investigated in more detail. Further, it is recommended to monitor the ecological value of HNV farming systems and to elaborate the 'carrying capacity' concept on the basis of several indicators. Finally, the impact of changes in land use on HNV areas should be studied.

1. INTRODUCTION

1.1 Background

Agriculture and forestry occupy some 80 per cent of the land area of the European Union (EU). The share of land used agriculturally in total land use of Europe is almost 60 per cent, but the total area of agricultural land shows a steadily decreasing trend over time. The area of forest land, however, has increased during the recent past. Human interference of European landscape by the cultivation of land for agriculture and forestry is significant for the state of landscapes and biodiversity. Agriculture plays an important role in the maintenance of biological and landscape diversity (Baldock and Beaufoy, 1993). For example, the 'montados' and 'dehesas' systems in Portugal and Spain and their grazing systems with black pigs have high environmental importance. Semi-natural habitats (including semi-natural grassland) also are very important to biodiversity.

The majority of semi-natural grasslands, however, have disappeared in the lowlands of Northwestern Europe due to the intensification of agriculture (Brouwer and Van Berkum, 1996). Abandonment of agricultural land could increase in areas with marginal agriculture with subsequent deteriorating effects on landscape and biodiversity. Marginalization of agricultural land is presently observed in parts of Europe (e.g. Spain, France, Italy and Greece) with their negative effects on ecosystems. Mitigating marginalization processes require policy measures towards rural development in Europe. This applies especially in areas with high natural values (Baldock and Beaufoy, 1993). Intensification of agriculture and abandonment of agricultural land are main threats to areas with high natural values. The so-called High Nature Value (HNV) farming systems are important in their maintenance of biodiversity and landscape. The viability of these HNV farming systems is of crucial importance. Therefore in this research the role agricultural policy plays and might play in the provision of support to HNV farming systems in Europe will be investigated.

1.2 Summary of the study objectives

The viability of HNV farming systems in Europe is the central concern of this study, because these systems play an important role in the maintenance of the biodiversity and landscape. Both management questions and economic questions determine the future of nature values on agricultural lands. The viability of these farming systems is not only determined by the economic viability of farms, social and regional circumstances, demographic and political developments and environmental and landscape aspects are important as well. All

these aspects are important elements to the conservation of landscape. The study also provides insight into the role the Common Agricultural Policy (CAP) and related structural and accompanying measures play and might play in maintaining HNV farming systems in Europe. Important in this respect is support given to produce agricultural products (through market and price policies), direct payments and compensatory payments for farmers for the part they play in improving the environment and landscape (agri-environmental measures). Possible adjustments in agricultural policy, which will be beneficial for the viability, will be explored.

Other management forms of land like nature conservation through public organizations rather than through agriculture by private farm holders are beyond the scope of this project.

An economic viability concept will be made operational in this study. The income situation and the capital structure of HNV farming systems in Europe will be explored. The study is to provide insight into viability and the future economic potential of such agricultural systems, taking account of the role agricultural policy plays and may play in this respect. This will be done in a consistent quantitative manner. In order to achieve this the following items will be addressed:

1. identification of the present existence of HNV farming systems in Europe. This part is to identify a number of HNV farming systems in study areas in the EU;
2. assessment on the viability of HNV farming systems in Europe. This part is to analyse the income situation and structural characteristics of HNV farming systems;
3. identification of present agricultural policy measures which support HNV farming systems. This part investigates the linkages among agricultural policy and viability of these systems;
4. exploration of feasible policy adjustments in the CAP to maintain HNV farming systems;
5. attention will also be paid to the impact new developments, like an EU membership of the Visegrad countries and further trade liberalization, can have on HNV farming systems.

Policy reform in the EU is likely to take the form of some further liberalization of agricultural policy, in the framework of the next World Trade Organization (WTO) Round. The Visegrad countries are considered in the study because these countries may enter the EU. The cooperation between the EU and the Visegrad countries can evolve in an EU membership of at least Poland, Slovakia, the Czech Republic and Hungary. This could affect HNV farming systems in the EU and the Visegrad countries, because extension of the EU with these countries will affect the production in the EU as well as in the Visegrad countries. It is useful to look at the advantages and disadvantages of the integration of markets for those sectors most relevant to nature conservation. For Visegrad countries it is important to take EU policies into account. On the one hand, this is important when developing long-term strategies for nature conservation on farmland. On the other hand, the voices of these countries will

perhaps be heard if the CAP is reformed before negotiations start (Van Dijk, 1996). Present policy measures in the Visegrad countries supporting HNV farming systems will be reviewed.

CAP reform might include the abolition of parts of the CAP and some structural policies. It is therefore important to analyse which elements of the present CAP are judged important for nature conservation. This is in the interest of both present and future EU Member States.

1.3 Relationships to other studies

The study is to build upon recent efforts on HNV farming systems (Baldock and Beaufoy, 1993; Beaufoy et al., 1994). Emphasis will be given to investigate the importance of HNV farming systems in a quantitative manner compared to the more qualitative approaches used in the recent past. The study also builds upon work undertaken by Baldock et al. (1996). In their report 'Farming at the Margins; abandonment or redeployment of agricultural land in Europe', emphasis is put on current trends and processes of agricultural marginalization in Europe. It also investigated agricultural policies which might contribute to the mitigation of environmentally damaging effects of agricultural marginalization and encourage viable uses of land in marginal areas.

1.4 Method

The study explores linkages among agricultural policy and viability of HNV farming systems. HNV farming systems, however, do not only respond to changes in agricultural policy. Other development trends of society and policy also affect such farming systems. Important in this respect are regional policies (e.g. Member States' regional policies), other policies (e.g. economic, fiscal and employment policies) and consumer behaviour. The alternatives available in the region are important as well. Such a diverse pattern of existing relationships among HNV farming systems and policy however support the need to analyse the relationships among HNV farming systems and agricultural policy which are currently known.

Not all existing relationships among HNV farming systems and policy can be considered in the quantitative approach which will be used in this study, the data sources which will be used contain only a limited set of data. This study does not aim to be as completely as possible in the direction of analyses (in other words it will not consider all existing relationships). A big advantage of a quantitative approach like followed in this study is the fact that it provides a consistent pan-European assessment.

The approach used in this report identifies study areas with a high natural value in the EU. A number of farming types of importance for the high natural value of these study areas are selected. The economic viability of these farming types is investigated. This is done in a quantitative manner, based on individual farm data of the Farm Accountancy Data Network (FADN) of the European

Commission. Indicators are identified which provide information on the farm structure characteristics, farm income and capital structure of the farms. The approach offers a relatively consistent and systematic method to investigate HNV farming systems in the European Union which are susceptible for change (intensification and marginalization) and provides a basis for examining the role of agricultural policy in providing support to farms in HNV regions.

1.5 Structure of the report

A typology of High Nature Value farming systems is provided in chapter 2 together with the location and extent of low-intensity farming systems. Chapter 3 summarizes the available information for further investigation of HNV farming systems in a more consistent quantitative manner. A selection of study areas and farming types is made in that chapter. Besides, some statistical indicators provide insight into the characteristics of the study areas and into the structure and income situation of HNV farming systems. Chapter 4 discusses the viability of farms in a broad sense. It contains an assessment on the economic viability of HNV farming systems in the study areas selected. It also provides insight into the subsidies received before the 1992 CAP reform. Chapter 5 describes present policy measures and contains an assessment on the support provided to HNV farming systems in the study areas. Possible alternative policies to maintain HNV farming systems in Europe are explored and assessed in chapter 6. Agenda 2000 is considered in this respect. An overview of the support farms in HNV areas are eligible for on the basis of present and alternative agricultural policy measures in the EU in relation to the viability is provided in chapter 7. Present policy measures in the Visegrad countries affecting HNV farming systems are described in chapter 8. Attention is paid to the possible impact of further trade liberalization on HNV farming systems in chapter 9. Finally, in chapter 10 some concluding remarks and recommendations of the study on Farming in High Nature Value regions and the role of agricultural policy in maintaining HNV farming systems in Europe are presented.

2. HNV FARMING SYSTEMS IN EUROPE

2.1 Studies on HNV farming systems

HNV farming systems in Europe include numerous farming practices, landscapes and a wide variety of flora and fauna. This diverse pattern merely is because of the wide range of biophysical conditions, geomorphological features, intensity of farming practice, and structural characteristics of agriculture across the EU. HNV farming systems in Europe are often referred to as low-intensity farming systems with highly diverse habitat types (Baldock and Beaufoy, 1993). However, it may also be high-intensive farming systems with rich natural potential, like the old polders in the Netherlands. A rough picture of main categories of farmland with high natural values is given by Van Dijk (1996):

- *semi-natural grasslands (permanent, and never or barely fertilised):* important for flora and invertebrate fauna, and if large enough also for birds;
- *important breeding areas for birds*: wet lowland grasslands, important for waders and other water-birds; dry lowland habitats, arable land and/or grasslands, important for steppe birds;
- *important areas for migratory birds, often water-birds;*
- *areas with many 'natural' features, like hedges, small woodlands etc*: in general the 'bocage' landscape; other areas with many 'natural' features are polders rich in ecologically interesting ditches and areas with important floral relics along field or meadow margins;
- *dehesas/montados*: agro-forestry systems (rotation of arable and livestock production under trees) in Iberia, important for breeding and wintering birds and flora.

Proper land management in such areas is important to maintain existing biodiversity. Large-scale abandonment without subsequent nature management may imply a great loss of biodiversity. Two different approaches about management exist: on the one hand traditional grazing and mowing practices, maintaining semi-natural habitats, and on the other hand an approach that gives more room to natural processes (Van Dijk, 1996).

Low-intensity farming systems vary greatly across regions in Europe and are often beneficial for nature conservation. To come to a selection of HNV areas with farming systems relevant to nature conservation, the typology and distribution of low-intensity farming systems is studied. A typology of low-intensity farming systems is developed by Beaufoy et al. (1994). A rough distribution of these farming systems across Europe is added to this typology and is provided in figure 2.1. In this table various types of HNV farming systems are classified according to land utilization, agricultural activities performed and

HNV farming systems	Approximate distribution in Europe	Land use	Activity	Farming practice
Low-intensity livestock raising in upland and mountain areas	Large areas of uplands and mountains in Scotland and northern England, western and central Ireland, southern and eastern France, northern Spain, central and northern Portugal and northern Italy	Grazing of rough grassland, moorland, heaths and forest	Sheep, some beef cattle and horses	Rough grazing land with low animal density. Meadow management may be quite intensive in fields near the farm
Low-intensity livestock raising in Mediterranean regions (open pasture, scrub)	Large areas of southern France, Mediterranean Spain, Italy, Portugal and northern Greece	Based on Mediterranean dry grassland and rough grazing, including maquis and garrigue	Predominantly sheep and goats	Grazing land often rented or communal. Traditional system involved transhumance of livestock to pastures in the summer
Low-intensity livestock raising in wooded pastures	Largest area is the dehesas and montados of the southwest of the Iberian Peninsula in some upland and mountain regions; northern Spain, central Italy, southern France, southwest Hungary, Greece and Portugal	Extensive grazing on permanent pasture with dispersed tree cover	Sheep, pigs and cattle. Small areas in Hungary are for beef production	Supplementary forage sometimes provided by shifting cultivation of forage cereals. Traditionally, livestock were of mixed types
Low-intensity livestock raising in temperate lowland regions	Remnants of chalk grassland in southern England, northern France and central Hungary and isolated patches of grazing marsh in the Camargue in southern France	Permanent meadows and/or pastures	Beef, sheep and some dairy production	Traditional systems with low-input pasture and meadows
Low-intensity dryland arable cultivation in Mediterranean region	Large areas occur in Spain (Castilla-Leon, Aragon, Extremadura and Andalucia) Portugal (in the interior regions of Alentejo and Tras-os-Montes) and southern Italy (in Apennines). Small areas remain in Greece, southern France and in parts of the Great Plain in central Hungary	Some land is left fallow each year. Arable systems often combined with seasonal grazing by sheep of stubbles and fallows	Crops are mainly cereals	Input use is low (nitrogen and plant protection products)
Low-input arable cultivation in temperate regions	Mostly in northwestern Europe; nowhere widespread	Arable cultivation sometimes combined with livestock grazing grassland and forage	Cereals, sometimes with beef, sheep and dairy	Principally organic and other restricted input systems

Low-input rice cultivation	Mondego valley in central Portugal and in Catalonia in north-eastern Spain	Flood irrigation	Rice	Organic systems in Spain; traditional systems in Portugal
Low-input tree production	Orchards in Spain (Asturias, Galicia and Cantabria), France (Normandy) and Hungary, with isolated remnants in southern England. Olive groves in Greece (Pelopese, Crete and the Aegean and Ionian islands), the interior regions of Portugal, the Calabria region of Italy, and the vicinity of villages in Mediterranean Spain and France	Orchards of apples, pears, plums etc. In Spain, smaller, traditional groves near to villages. In Italy, olive groves with permanent grass	Fruits, nuts and olive oil	Low use of agrochemicals
Low-input vineyards	In Italy or as part of the tanya mixed system in Hungary	Often combined with arable cultivation and tree crops (e.g. Italy)	Grapes, wine	Low use of agrochemicals
Low intensity mixed Mediterranean cropping	Many areas of Spain, Portugal, Italy, Greece and southern France	Mosaic of low-input arable and permanent crops	Cereals, vines, olives, carobs, almonds, etc.	Crop production has not been highly rationalised and intensified
Low intensity, small scale, traditional mixed farming	Localized and declining, such as crofting in northern Scotland, the tanya system in central Hungary, coltura promiscua in Italy, and minifundia in central and northern Portugal	Small-scale, integrated crop and livestock production (dairy, beef, sheep, pigs, poultry)	Cereals, trees, vegetables, vines, fruit livestock	Subsistence/part-time farming, mostly mixed systems, little use of external inputs, use of land and labour may be intensive
High intensity, important breeding areas for birds	The Netherlands, Normandie	Dry lowland habitats, arable land and/or grasslands	Dairy, beef and sheep	Input use is high
High intensity, important areas for migratory birds	The Netherlands, Normandie	Pastures	Dairy, beef and sheep	Input use is high
High intensity, areas with many 'natural' features like hedges, small woodlands etc.	The Netherlands, Wales	Bocage landscape; polders rich in ecologically interesting ditches and areas with important floral relics along field or meadow margins	Dairy, beef and sheep	Input use is high

Figure 2.1 Typology of High Nature Value farming systems.
Source: Beaufoy et al., 1994; adaptation LEI-DLO.

their farming practice observed. Low-intensity farming systems are grouped according to livestock, arable, permanent crop and mixed systems. Such farming systems generally are low in their use of external inputs, including mineral fertilizers, plant protection products and other agrochemicals. In this respect they differ largely from intensive agriculture with their high usage levels of agricultural inputs. Some forms of high intensity farming with a high natural value and rich natural potential are added.

For a comparison between intensive and extensive arable and livestock systems and their implications for nature conservation, reference is made to Baldock and Beaufoy (1993, pp. 42-43). The main characteristics and implications for nature conservation are summarized below.

At extensive grassland less than 50 kg of nitrogen is applied per hectare per year and hardly any pesticides are used. Generally no reseeding takes place, although in traditional dehesa management occasional ploughing takes place. Usually no more than once or maybe twice per year the grass is cut, followed by grazing. Grazing (among others shepherding) is more important than forage production or buying in feed. The land has traditional boundaries (like hedges and walls). The dry matter production is less than 6-7 tonne per hectare per year and the stocking density is low. These extensive grassland practices affect nature conservation. There is a greater diversity (including large number of less-common species) and hardly any loss of diversity. The semi-natural vegetation is maintained. There are good conditions for ground-nesting birds and small mammals. Animals are not concentrated. Grazing is diverse, which has a habitat and landscape value.

At extensive arable systems, the nutrient input is less than 50 kg of nitrogen per hectare per year and hardly any pesticides are used. Generally no, but in southern Europe, occasional irrigation may be used in drought years. The cropping plan is varied and is rotational, it contains traditional varieties and fallow. The yield is low (0.5-3 tonne per hectare per year). The old boundaries of the field are maintained. These extensive arable systems affect nature conservation. There is a greater diversity and quantity of weeds (including less-common species) and of insects. Low intensity of cultivation, often involves fallow periods with resulting feeding and nesting opportunities.

A categorization of the main extensive farming systems and practices found in Europe and the type of landscape which they maintain (figure 2.2) is developed by Baldock and Beaufoy (1993). These farming systems are likely to be of high nature conservation value.

Farming system or practice	Approximate distribution in Europe
Grazing and mowing of semi-natural dry grassland	Parts of south Italy, Spain, south Portugal, France, England, Germany
Grazing and mowing of lowland wet grassland	Parts of Ireland, Netherlands, France, UK
Grazing of moorland and heaths	Large areas of UK uplands and Ireland and smaller areas in other regions
Grazing of high (e.g. Alpine) mountain wooded agro-pastoral	Pyrenees, Cantabria, Alps etc.
Grazing of Iberian dehesa and montado wooded agro-pastoral	Large areas of west and southwest Iberian Peninsula systems
Grazing of Mediterranean scrub (maquis, matorral, etc)	Large areas of Spain, southern France, Greece, Italy
Grazing of coastal marshes	Part of Netherlands, UK, France, Spain, Portugal
Grazing and traditional silviculture of forests and woodlands	Mainly upland/mountain areas in the south of the Community
Arable cultivation and grazing of 'pseudo' steppes	Mainly Spain, also parts of Portugal, Italy, Greece
Management (including replacement planting) of old perennial/tree crops, especially olives and orchards	Olives: Spain, Portugal, Italy, Greece Orchards: Normandy, Provence, southern Germany, Italy
Maintenance of bocage landscapes and other rich in semi-natural features, as part of livestock and mixed farming	Parts of northern France, Britain, Ireland, Portugal, Spain, Italy, Greece
Mixed, low-intensity arable land use	Especially in southern Europe: Portugal, parts of Spain, Italy and Greece

Figure 2.2 Farming systems which are likely to be of high nature conservation value
Source: Baldock and Beaufoy, 1993.

2.2 Extent and location of low-intensity farming systems

An estimation of the area of farmland under low-intensity farming systems (in each of the nine countries considered by Beaufoy et al. (1994)) is provided in table 2.1.

Low-intensity farmland mostly survives in upland and remote areas where there are physical constraints on the development and modernization of agriculture (Bignal and McCracken, 1996). Southern Europe has both the most

types and the greatest area of land under low-intensity farming, with Spain, Portugal and Greece in particular all having over 60% of their Utilized Agricultural Area (UAA) under such systems. Although the estimated areas in table 2.1 are preliminary and indicative, it is estimated that across the nine study countries there are more than 55 million ha of land under these systems, 30 million ha of which are associated with livestock systems alone. The Iberian peninsula contains approximately half of the low-intensity farmland (Bignal and McCracken, 1996).

Table 2.1 Estimated area (x million ha) of farmland under low-intensity farming systems

	Land surface	Land surface area under agriculture	Agricultural area under low-intensity systems	Share of UAA under low-intensity systems (%)
Greece	13	9	6	61
Spain	50	31	25	82
France	55	31	8	25
Ireland	7	6	2	35
Italy	30	23	7	31
Portugal	9	5	3	60
United Kingdom	24	18	2	11
Hungary	9	6	2	23
Poland	31	19	3	14
Total	230	148	56	38

Source: Bignal and McCracken (1996).

3. IDENTIFICATION OF STUDY AREAS

3.1 Introduction

A number of study areas are selected for further investigation of HNV farming systems in a consistent quantitative manner. The selection of the study areas is based on the literature and data availability. First of all the available data sources, which allow a consistent assessment across regions in the European Union, will be described in section 3.2. The location, characteristics and profiles of the study areas chosen are presented in section 3.3. The farming types selected in the study areas are shown in section 3.4. Besides an overview is provided of the development of the kind of farming types over time. Section 3.5 will provide insight into structure characteristics, the income situation and capital structure of the farms selected in the study areas. Finally, some concluding remarks are presented in section 3.6.

3.2 Available information in the EU

The available information with regard to the EU originates from two main data sources: the Farm Structure Survey (FSS) of Eurostat and the Farm Accountancy Data Network (FADN) of the Commission of the European Communities (CEC). Besides the regional databank REGIO of Eurostat has been used. FSS is periodically conducted in order to collect data on the structure of farms. FSS data refer among other things to the composition of the agricultural labour force, the number of full-time and part-time farmers, land use and the number of livestock per farm. A distinction is made between subregions across EU 12. FSS has a high level of spatial detail. Although farms below a certain limit, which differs among Member States, are not included in the FSS, it is nevertheless the most complete statistical source on agricultural structures at EU level. In this report the Farm Structure Survey of 1989/90 has been used, primarily to get information on farm structures in the regions with HNV areas. This year is used because it is a full survey with high spatial detail. The FSS of 1993 has less spatial detail. FSS contains only a limited set of data according to farming type at the high spatial level (number of farms, Utilized Agricultural Area (UAA) and Standard Gross Margin (SGM)).

FADN contains farm level data on the structure of the farm (economic size, agricultural area and livestock population), total output, intermediate consumption, a balance sheet account and a profit and loss account. FADN is based on the annual accounting results for a sample of commercial farms in the EU Member States. Commercial farms refer to farms which are large enough to provide a main activity for the farmer and a level of income sufficient to

support the farmers' family (CEC, 1989:4). Farms are classified as 'commercial' when they exceed a minimum economic size, measured in European Size Units (ESU). Because of the different farm structures in the Union, the thresholds applied for the economic size of farms vary among Member States. The selection procedure to FADN implies that marginal (small) farms may be highly under-represented in the sample. Another serious shortcoming of FADN for the present report is the fact that part-time farmers are less represented in FADN. The farms in the sample are rather heterogeneous. FADN stratifies farms according to region, economic size and farming type to reflect this heterogeneity adequately. In this report the 1990/91 up to 1992/93 samples of the FADN have been used. The 1990/91 sample includes almost 58,000 farms which in total represent 4.4 million farms in the EU. Among Member States there are large differences in the representativeness of FADN. FADN distinguishes 91 regions in the EU.

The Eurostat data bank REGIO covers the principal aspects of the economic and social life of the EU, such as demography, economic accounts, employment etc. at a regional level. REGIO has been used in this research to gain insight into rural and regional developments across the EU.

3.3 Location, characteristics and profiles of the study areas

In this section the location of the study areas will be presented and the study areas will be briefly described. A number of study areas are selected in this project, which will be further investigated in a more quantitative manner. The areas selected are located across EU 12 since the main European data sources, currently available for a consistent analysis, do not include the Member States which entered the Union in 1995, nor the Neue Bundesländer in Germany. The areas are chosen on the basis of the literature (chapter 2) and the data availability (section 3.2) with the aim of covering a range of geographical locations and most characteristic landscapes with HNV farming systems and practices in both southern and northern Europe. Twelve study areas have been selected in seven different Member States. In Spain and France three and in Italy two study areas have been selected. One study area was selected in the Netherlands to illustrate the kind of processes taking place in a highly productive agricultural region with a rich natural potential. Some study areas are comparable to other HNV areas, like the Dehesas and the Montados.

Location of the study areas

The location of the selected study areas with a high natural value is shown in figure 3.1. The size of the study areas selected is not always conform the size of the 91 regions distinguished in FADN. The study areas often are of more spatial detail and cover only one or more FSS subregions, which are part of the FADN regions. For example the study area Black Forest is located in the FSS subregion Freiburg which is part of the FADN region Baden-Wuerttemberg. The same holds for the FSS subregions Jura and Lozère which are located in the

FADN regions Franche-Comté and Languedoc-Roussillon. The FADN regions, FSS subregions and REGIO subregions used to approach the study areas, are shown in appendix 1 (table A1.1).

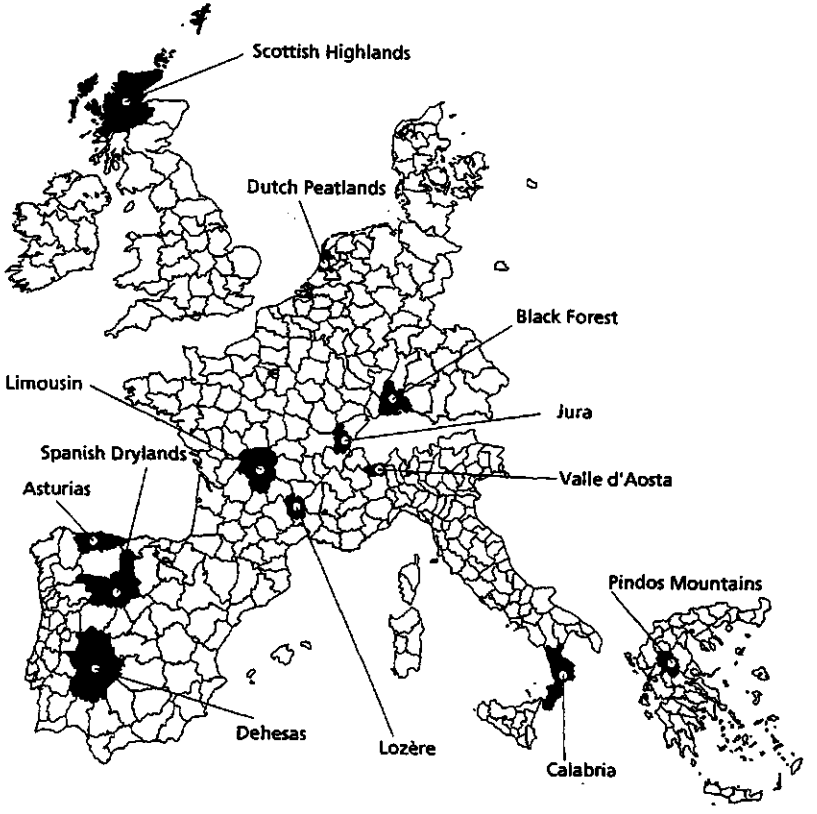


Figure 3.1 Location of the study areas
Source: LEI-DLO.

Characteristics of the study areas

Stanners and Bourdeau (1995) show maps of the landscape types distinguished by Meeus (map 8.1, p.176) and biogeographic regions distinguished by the European Ecological Network EECONET (map 9.33, p.250). The landscape types and biogeographic regions typology of the study areas selected in this project are shown in appendix 2 (table A2.1).

Share of HNV areas in total production

According to Baldock et al. (1996), the agricultural production in extensive farming regions covers 26% of total UAA in EU 12 in 1987-1991. The extensive nature of agricultural production in these regions is reflected by the rather low share of these regions in the final production of EU 12, the share is only 9%. This implies that the HNV areas selected in this research which are also rather extensive will have only a limited share in the final production.

Rural and regional situation in the study areas

Statistical indicators can provide information on characteristics of the study areas, which may be relevant for the viability of HNV farming systems in these areas. Eurostat's data bank REGIO provides insight into the Gross Value Added (GVA) per worker in agriculture (including forestry and fishery) and outside the agricultural sector. This indicator provides insight into the rural and regional situation of the area. Table 3.1 indicates that the GVA per worker in agriculture is less than the GVA outside agriculture in all study areas, except in the Scottish Highlands. It is even more than twice as high in seven study areas. The higher GVA per worker outside agriculture can encourage farmers to stop farming or work on a part-time basis outside agriculture. Mainly in Asturias, Valle d'Aosta and Calabria the GVA per worker is substantially lower in agriculture, it is around 20%of the GVA per worker outside agriculture. The share of agriculture in total GVA is presented as well. It provides insight into the importance of agriculture in the study area and possibilities to work outside agriculture. The share exceeds 10 per cent in the Pindos Mountains and the Dehesas.

Table 3.1 Gross Value Added (GVA) per worker in and outside agriculture (average 1990-91)

Study area a)	GVA per worker in agriculture (x 1,000 ecu)	GVA per worker outside agriculture x 1,000 ecu)	Share of agriculture in total (GVA (%)
Black Forest	20	41	2
Pindos Mountains	12	13	35
Asturias	6	32	3
Spanish Drylands	11	30	7
Dehesas	13	28	12
Jura	28	38	4
Limousin	11	34	4
Lozère	31	37	7
Valle d'Aosta	8	41	2
Calabria	7	34	7
Dutch Peatlands	29	36	2
Scottish Highlands	27	27	3

a) The figures of this table refer to larger regions which the study areas form a part of; see appendix 1.
Source: Eurostat (REGIO);adaptation LEI-DLO.

Biophysical conditions and labour input in the study areas

The other indicators presented in this section are based on the FSS of 1989/90, because this year is a full survey with high spatial detail. Six indicators are presented in table 3.2 which provide insight into the biophysical conditions of the area and the characteristics with regard to labour input. Proper land management is of utmost importance in HNV areas. Large-scale abandonment without subsequent professional nature management often means a great loss of biodiversity. The occurrence of abandonment may be high in areas with natural handicaps (like altitude and slope). Such conditions are partly reflected by the share of Less Favoured Area (LFA) in total UAA, and this indicator is therefore introduced as a proxy to biophysical conditions in Europe.

The share of LFA in total UAA (in 1989/90) exceeds 60% in most study areas (table 3.2). With the exception of the Pindos Mountains and the Dutch Peatlands. It needs to be mentioned that the LFA scheme is applicable only to small areas in the Netherlands. Participation rates in the southern Member States are below those in the northern Member States, primarily because about half of all LFA holdings in these countries are smaller than the minimum size for eligibility, especially in Italy.

The availability of off-farm employment can allow low-intensity farming to continue on a part-time basis rather than as the sole source of income and activity. This can allow farmers to maintain in business and support income from activities outside agriculture. Therefore insight is provided into some of the characteristics of the study areas with regard to labour input. Table 3.2 presents the share of farm holders, partners and other family members with other gainful activities (dual activities, working at the farm as well as outside the farm). Farm holders are distributed among classes of work time (as percentage of an Annual Work Unit, AWU) and among age classes.

Farm holders with other gainful activities may remain in business in case the amount of labour required for agriculture is below an AWU. Other gainful activities may include activities on other farms, employment outside agriculture, and work at the holding from non-farm activities. The share of farm holders with other gainful activities exceeds 30% in the Black Forest, the Dehesas, Calabria and the Scottish Highlands. The share of holders with other gainful activities may be low because the share of holders with work time below 50% is low as well (like in the Netherlands).

The share of partners with other gainful activities in addition to working at the farm exceeds 30% in Calabria and the Scottish Highlands. The share of other family members with other gainful activities in addition to working at the farm exceeds even 50% in the Dehesas, Valle d'Aosta and the Scottish Highlands.

The extent of part-time farming may indicate the occurrence of holdings with insufficient work to fulfill the amount of work required for an Annual Work Unit (AWU). It reflects the potential need for additional activities in order to maintain a viable agriculture. The share of the number of holders with work time below 50% of AWU is highest (more than 70%) in the Dehesas and

Calabria. In the Black Forest, Pindos Mountains and Valle d'Aosta it is high as well (more than 50%).

HNV areas might be susceptible to abandonment and intensification in case they have a high share of farms without sufficient other gainful activities and also insufficient activities to meet the requirements to fulfill the standards on AWU. In the Pindos Mountains and in the study areas selected in Spain and Italy the share of farms with other gainful activities is low whereas the share of the number of holders with work time below 50% of an AWU is high. This reflects the need in these regions for additional activities in order to maintain a viable agriculture.

Decisions on succession of farming are taken around the age of retirement. The share of the number of holders aged 55 years and over therefore reflects transition of farming which is to be expected in a period of 10 years.

Table 3.2 Characteristics of the study areas (1989/90)

Study area d)	Share of LFA in UAA (%)	Share of farm holders with other gainful activities (%)	Share of partners with other gainful activities dual activities a)	Share of other family members with other gainful activities; dual activities a) (%)	Distribution of farm holders with agricultural work time in % of an AWU by class (%)			Distribution of farm holders by age class (%)	
					<50	50-100	100	55-64 year	>=65 year
Black Forest	70	58	13	44	66	9	25	31	9
Pindos Mountains	20	21	5	21	56	28	16	30	22
Asturias	90	11	10	26	39	15	46	32	30
Spanish Drylands	63	20	6	26	45	28	27	33	17
Dehesas	91	39	18	53	70	14	16	31	22
Jura	78	24	15	14	34	13	53	29	15
Limousin	100	24	18	18	23	24	53	32	14
Lozère	100	18	19	11	19	35	47	23	13
Valle d'Aosta	100	24	29	56	58	20	23	29	29
Calabria	79	34	31	33	89	8	3	28	33
Dutch Peatlands	6 b)	17 c)	5	11	10	16	74	28	12
Scottish Highlands	97	49	50	56	42	19	39	22	42

a) Dual activities means: working at the farm as well as outside the farm; b) The share of LFA in UAA in the Dutch Peatlands is based on own calculations based on FSS 1989/90 and Official Journal (CEC) No. L 110 of 04/05/93; c) The share of farm holders with other gainful activities in the Dutch Peatlands is based on the Dutch FSS of 1990; d) The figures of this table refer to larger regions of which the study areas are part of; see appendix 1.
Source: Eurostat (FSS); adaptation LEI-DLO.

The agricultural holding might be taken over by successors or sold to other farmers. The impact of such a transfer on the environment, does not have to be negative. Alternatively, the land might be used for activities other than agriculture or abandoned. There is a lack of insight into the presence of a successor at the farm. The share of farm holders aged 55 years and over is highest (more than 60%) in Asturias, Calabria and the Scottish Highlands. The share of farm holders aged 65 years and over exceeds 30% in these areas.

Profiles of the study areas

Below the study areas will be briefly described, attention will be paid to the characteristics which are determining factors for the high natural value of these study areas.

Black Forest, Germany (low-intensity dairy farming)

The Black Forest region of Baden-Wuerttemberg is an ecologically and culturally important region which is under threat of disappearance. Agriculture and viable rural communities in the Black Forest are necessary because they result in the preservation of landscapes with cultural values of long tradition and the rearing of rare livestock species. Besides it results in the production of high quality food, an economic basis for tourism, the provision of recreation areas for urban populations and a basis for the maintenance of infrastructure for settlements. Reference: Luick (1996).

Pindos Mountains, Greece (low-intensity livestock raising in Mediterranean regions)

The most common agricultural land use in Greece is low-intensity rearing of sheep and goats for meat and milk, with the livestock often herded in large flocks. This system covers much of the mainland and is especially significant in maintaining the nature conservation value of mountainous areas. In total, around five million ha are utilized as seasonal grazing, with the vast majority occurring above 600 m on the mainland. In summer, the largest concentration of migrant animals is on the high alpine pastures of the Pindos mountains, and the flocks descend to the surrounding foothills and lowland plains of Thessalia and Epiros in the autumn (transhumance). Many of the mountain pastures have great botanical interest. High grazing pressure by livestock for a relatively short period is essential to prevent scrub encroachment and maintain floristic diversity. Reference: Bignal and McCracken (1996).

Asturias, Spain (mountain pastoral system)

Asturias contains just over one million inhabitants with the majority living in towns and cities. Less than one thousand people live in the mountain and rural areas, and livestock farming based on the grazing of natural pastures is the traditional agricultural land use. Large areas of calcareous grasslands can

be found in Asturias. Local and regional breeds are still used, though some are in serious decline and are crossed with other breeds for meat production. Recent increases in the intensity of grazing have resulted in a conflict between the continuation of grazing and the conservation of the nature conservation value of the pastures. Since Spain joined the EU in 1986, sheep numbers have expanded considerably. This recent increase in sheep numbers has been driven largely by headage premiums from the CAP. Many low-intensity farming systems have undergone important internal changes and have suffered intensification. Overgrazing mainly occurred in those mountain pastures with easier access. There has been a tendency towards specialized raising of beef cattle, mainly because of the low labour requirements associated with cattle. The reduction in livestock diversity, combined with a decline in shepherding and a tendency to leave livestock to range freely, is reported to result in overgrazing of certain pastures with easy access for cattle, and the development of scrub in areas previously grazed by sheep. Reference: Beaufoy (1995).

Spanish Drylands, Spain (low-intensity dryland arable cultivation in Mediterranean regions)

The great plains of the Duero, Tajo and Ebro river basins and of La Mancha, La Campiña in Andalucia and a large part of the southeast (Murcia and Alicante) have been cultivated for centuries. Where the land is irrigated, these arable production systems have come under quite intensive management in recent years. However, the high proportion of non-irrigated arable land (4 million ha) which is left fallow annually indicates that this dryland cultivation is predominantly low intensity in character compared with northern and central Europe. This fallow land is of considerable conservation interest for their flora. Grazing of stubbles and fallows by sheep and goats is still an important feature of much arable cultivation, and these livestock play an important role in fertilizing the ground and dispersing the arable weed seeds. The combination low-intensity cultivation, fallow land and patches of permanent pasture creates a habitat for rare birds. Reference: Bignal and McCracken (1996).

Dehesas, Spain (low-intensity livestock raising in wooded pastures)

The Dehesas is essentially a low-intensity Mediterranean pastoral system with some arable cultivation, principally for the production of animal feed. Complementary silviculture at a density varying between open woodland and scattered individual trees is an integral part of traditional Dehesas management. Where intact, the system maintains a diverse mosaic of habitats including species-rich grassland, open woodland and scrub. Reference: Beaufoy et al. (1994).

Jura, France (low-intensity dairy farming)

Dairy production is usually intensive in France but in some areas like the Franche-Comté and especially in Jura, dairy cattle are raised on semi-natural

grassland, managed at low intensities. Dairy farms produce specialist local cheeses and incorporate closely managed hay meadows. The system involves strong communal organization, such as cooperatives, communal land and grouped housing. Economic viability has been promoted by intensification of the livestock management system, the enlargement of holdings and the break-up of common land; but the system of land management has remained essentially extensive. Future uncertainties for the Jura livestock system result from the demanding nature of intensive farm management, the associated financial difficulties and competition from industrial cheese manufacture. Reference: McCracken and Bignal (1994).

Limousin, France (low-intensity beef cattle breeding)

Low-intensity beef cattle breeding is found in and around the Massif Central (e.g. Limousin). It is based primarily on the exploitation of permanent grassland by grazing and mowing for forage. In part of Limousin the average stocking density is less than 0.8 livestock units per hectare. About 30 to 50% of the permanent grassland is not fertilised. This area is of high botanical and zoological value, and is important for migrant and nesting of bird species. Reference: Beaufoy et al. (1994).

Lozère, France (low-intensity livestock raising in Mediterranean regions)

Lozère in central southern France is situated at the southern end of the Massif Central and has an average altitude of about 1,000 metres. Around half the land area is devoted to farming and 45% to forest and woodland. Most of the farmland consists of permanent grassland, used for grazing sheep, cattle and goats; livestock represents 95% of production. The southern and north-west parts of the département are of particular nature conservation interest. Almost half the land area is classified as 'Zone Naturelle d'intérêt Ecologique Faunistique et Floristique' type II and the famous Cévennes national park is the south of the département - a dry limestone plateau managed by extensive sheep and goat farming with a highly distinctive flora. The pattern of farming and land use varies considerably within Lozère. The overall tendency is for pastoral farming to be displaced by forest. On permanent pasture the pattern of grazing has been changing, with the familiar pattern of more intensive management on better land and a parallel reduction in grazing pressure on poorer land. Undergrazing is visible in the form of lank vegetation, bush and scrub.

In the Causse Méjan (one of the four zones of Lozère), the traditional form of extensive sheep farming has continued, partly because of the premium available for milk used in Roquefort cheese. Concern about the viability of the system has been growing since 1980, with falling prices for lamb. Between 1987 and 1991 the number of farms in the area fell by 8.8%, the area of land farmed fell by 3.7% and the number of ewes grew by 19.8%, illustrating the pressures for intensification. There is strong consensus in favour of continuing pastoral agriculture, if realistic incomes can be achieved. Reference: Guiheneuf et al. (1996).

Valle d'Aosta, Italy (low-intensity livestock raising in Mediterranean regions)

In the mountainous north of Italy, cattle breeding is based on the seasonal movement of stock to mountain pastures during the late spring and early summer, and their return in winter to the valleys. This form of transhumance is called alpeggio. Traditionally, alpeggio is associated with particular breeds of dairy cattle. Three types of pasture are used, alpine meadows in mid-summer, lower mountain pastures in spring and valley lands at the turn of the year, amounting in total to about one million ha. During the winter, stock feed is supplemented with corn, and hay cut from meadows close to farms. In the Valle d'Aosta, the main product of the system is now milk, but in the past most milk was used to produce a number of hard cheese varieties. Almost all the grazing areas used are in various forms of common ownership. On average, each holding has a herd of around 15-25 cattle. Stocking levels tend to be appropriate to the environment, with densities rarely exceeding one cow per hectare on the most productive pastures. In the Valle d'Aosta stocking rates are much less, averaging one cow per four or five hectares. This practice maintains species-rich pasture and ensures regeneration of certain flowering plants and herbs in the sward. Alpine cattle ranges are rich in breeding bird species. The alpeggio system has a number of tangible benefits. Conservation of endangered plant and animal species is perhaps most important, but there are substantial gains for the landscape also. Alpeggio ensures that a traditional pastoral landscape is maintained over large areas of the lowlands, foothills and alpine regions of northern Italy. However, between 1970 and 1990, numbers of alpine cattle fell by 15%. The area of pasture which is grazed is shrinking annually and some alpine pastures now face abandonment. Reference: Beaufoy et al. (1994) and Petretti (1996).

Calabria, Italy (low-input tree production)

The majority of olive groves in Italy only receive small quantities of pesticides and fertilizers, and under such conditions the olive trees support a high diversity and density of insects. Many different varieties of trees are grown and the associated insects and fruit are exploited by many passerine birds during autumn and winter. Olive groves provide important nesting areas for many birds. Traditional management involves winter pruning, ploughing the ground during the summer and manual harvest in the autumn. The olives are either picked from the tree by hand or by shaking. Reference: Bignal and McCracken (1996).

Dutch Peatlands, the Netherlands (highly productive region with a rich natural potential)

Along the coast, rivers, estuaries, and in the low-moorlands of the Netherlands, there are the wetlands, which are particularly important to nature. Wet grasslands provide habitats for wild species of plants and animals, such as meadow- and migratory birds. The flat and open 'polder' landscapes in the

lowlands of the western part of the Netherlands are the most characteristic landscapes of the Netherlands. The landscape is open with grassland intersected by ditches, drainage channels and larger areas of water. More than four centuries ago wetlands and waterlogged peat soils were drained. The results are long stretched parcelling of land in peat-reclaimed areas. The more remote parts of the reclaimed parcels of land were often less intensively used. These old polders, are characterized by a backward agricultural structure and a rich natural potential. Reference: Stanners and Bourdeau (1995).

Scottish Highlands, the United Kingdom (low-intensity livestock raising in mountain areas)

Crofting and low-intensity sheep raising are the main surviving low intensity systems in the upland and mountain areas of Scotland. Crofting is small-scale, part-time farming. A typical holding has a few hectares of better land on which fodder crops are grown and a much larger area of acidic grass and/or heather moor, often owned in common, used for sheep and cattle grazing. This resulting mosaic of managed and semi-natural vegetation has high conservation value. Over large areas of the uplands, low-intensity raising of sheep is still quite common. Usually flocks, possibly augmented by a small suckler cow herd for beef production, are ranged over an extensive area of mostly semi-natural pasture. In valleys and on lower slopes, enclosed grass is used for grazing. The uplands contain large areas of semi-natural vegetation of conservation interest. The extensive areas of upland acidic grassland are of great environmental value. Reference: Beaufoy et al. (1994).

3.4 Farming types selected in the study areas

Development of farming types over time

Before selecting the farming types considered to be responsible for the maintenance of the high natural value of the areas described above, first insight is provided in the development of the kind of farming types in these areas over time. The development in the share of specialized and mixed farms in the total number of holdings and UAA in the study areas over a period of 15 years (in case available) is presented in table 3.3. The table indicates that the share of specialized farms in total UAA varies between 45 and 97 per cent at the beginning of the period studied. It varies between 68 and 98 per cent at the end of the period. So, the share of the UAA covered by specialized farms has increased over time. In some study areas from less than a half to over two third of the UAA, over a period of 15 years. The share of specialized farms in the number of holdings varies between 54 and 94 per cent at the beginning of the period considered. It varies between 78 and 94 per cent at the end of the period. So, the share of specialized farms has increased over time.

Table 3.3 Development of farming types in time

Study area c)	Specialized a)			Mixed b)		Total	
	period	share in total UAA (%)	share in total number of holdings(%)	share in total UAA (%)	share in total number of holdings(%)	annual change in period between mentioned years	
						in UAA (%)	in the numberof of holdings (%)
Black Forest	1975	45	54	55	46		
	1989/90	68	78	32	22	-0.3	-2.0
Pindos Mountains	1979/80	80	80	20	20		
	1993	89	84	11	16	-0.5	-1.9
Asturias	1983	46	68	54	32		
	1993	93	85	7	15	1.1	-3.1
Spanish Drylands	1983	63	62	37	38		
	1993	85	82	15	18	-0.0	-4.7
Dehesas	1983	51	66	49	34		
	1993	73	80	27	20	0.2	-2.1
Jura	1975	82	83	18	18		
	1989/90	82	83	18	17	-0.2	-2.4
Limousin	1975	86	81	14	19		
	1989/90	91	85	10	15	-0.4	-2.3
Lozère	1975	96	90	4	8		
	1989/90	96	90	4	11	-0.3	-2.7
Valle d'Aosta	1975	92	74	8	25		
	1989/90	97	78	3	22	0.1	0.2
Calabria	1975	63	64	37	36		
	1989/90	73	83	27	17	-1.3	0.3
Dutch Peatlands	1975	92	94	8	6		
	1989/90	94	94	7	6	-0.3	-2.4
Scottish Highlands	1975	97	91	3	8		
	1989/90	98	91	2	8	-0.8	-1.1

a) Specialized farms: type 11, 12, 20, 31, 32, 33, 34, 41, 42, 43, 44, 50; for a classification of the major farming types see appendix 3; b) Mixed farms: type 60, 71, 72, 81, 82, for a a classification of the major farming types see appendix 3; c) The figures of this table refer to larger regions of which the study areas are part of; see appendix 1; Source: Eurostat (FSS); adaptation LEI-DLO.

So, an increase over time in the share of specialized farms in the total UAA and number of holdings can be observed. This is mainly the case in the Black Forest and the Spanish regions (which had a high share of mixed farms) and to a lesser extent also in Calabria. In all other study areas the changes are less than 10 per cent.

The total UAA and the number of holdings decreased over time in most study areas (table 3.3). The highest decrease in the number of holdings can be

observed in the study areas selected in Spain and France and also in the Netherlands, an annual decrease of over 2 percent can be observed. The annual decrease in the number of holdings exceeds the annual decrease in the UAA in focuses on management of agricultural land in HNV areas. According to the literature farming systems which are relevant for the conservation of HNV areas, cover a considerable area of land. Table 3.3 indicated that the largest part of the UAA of the study areas is cultivated at specialized farms. Therefore, mainly specialized types are selected in this research, whereas a variety of farming types can be found in the study areas. The principal farming types selected in the study areas for further investigation are summarized in table 3.4 (see appendix 3 for a classification of the major farming types according to the EU typology of farms). Specialized dairy farms, sheep, goats and other grazing livestock farms and specialized cattle-rearing and fattening farms are the most relevant farming types in the study areas selected. A more detailed description of the farming types selected, in relation to the study area, is provided in appendix 4.

Table 3.4 Farming types selected in the study areas

Study area	Farming types selected	Type a)	Referred to as
Black Forest	specialized dairy farms	41	Black Forest_dairy
Pindos Mountains	general field cropping farms	12	Pindos Mountains_field
Pindos Mountains	sheep, goats and other grazing livestock farms	44	Pindos Mountains_sheep
Asturias	specialized dairy farms	41	Asturias_dairy
Asturias	sheep, goats and other grazing livestock farms	44	Asturias_sheep
Spanish Drylands	specialized cereal farms	11	Spanish Drylands_cereal
Dehesas	sheep, goats and other grazing livestock farms	44	Dehesas_sheep
Dehesas	mixed farms	71,72,81,82	Dehesas_mixed
Jura	specialized dairy farms	41	Jura_dairy
Limousin	specialized cattle-rearing and fattening farms	42	Limousin_cattle
Lozère	specialized cattle-rearing and fattening farms	42	Lozère_cattle
Lozère	sheep, goats and other grazing livestock farms	44	Lozère_sheep
Valle d'Aosta	specialized dairy farms	41	Valle d'Aosta_dairy
Calabria	specialized olives farms	33	Calabria_olive
Dutch Peatlands	specialized dairy farms	41	Dutch Peatlands_dairy
Scottish Highlands	sheep, goats and other grazing livestock farms	44	Scottish Highlands_sheep

a) See appendix 3 for a classification of the major farming types according to the EU typology of farms.
Source: LEI-DLO.

Some of the farming systems in the study areas, like the sheep, goats and other grazing livestock farms in the Dutch Peatlands, which are also of importance for the conservation of the high natural value of the area are not considered since the sample was too small to provide reliable results.

Representativeness

To asses to what extent FADN is representative for all farms in the selected study areas, a comparison between the population of farms in FADN and FSS has been made. Although farms below a certain size, which varies per Member State are not included in the FSS, it is nevertheless the most complete statistical source on agricultural structures at EU level. Among regions there are large differences in the representativeness of FADN. The main reason for these differences is that FADN results are based on a sample of farms, which only represents 'commercial' farms (see also section 3.2). The farms below a certain economic size, depending on the Member States, are not represented by FADN. In some regions a large part of the farms is smaller than the FADN threshold,

Table 3.5 Share of holdings and UAA in the economic size classes which are not represented by FADN (1989/90) and the representativeness of FADN in the other economic size classes, by study area (1990/91-1992/93)

Study area a)	Share of holdings and UAA in economic size classes which are not represented by FADN in total number of holdings and UAA in FSS		Representativeness of FADN in the economic size classes which are represented by FADN (number of holdings and UAA in FADN in % of FSS)	
	holdings (%)	UAA (%)	holdings (%)	UAA (%)
Black Forest_dairy	36	12	113	120
Pindos Mountains_fieldc	11	2	102	97
Pindos Mountains_sheep	27	7	79	77
Asturias_dairy	18	5	98	116
Asturias_sheep	79	14	76	19
Spanish Drylands_cereal	30	4	99	108
Dehesas_sheep	55	4	107	42
Dehesas_mixed	56	5	35	11
Jura_dairy	7	2	104	104
Limousin_cattle	35	12	106	105
Lozère_cattle	42	20	123	113
Lozère_sheep	47	11	91	82
Valle d'Aosta_dairy	13	3	100	107
Calabria_olive	44	10	100	143
Dutch Peatlands_dairy	6	2	107	117
Scottish Highlands_sheep	58	10	95	119

a) The figures of this table refer to larger regions of which the study areas are part of; see appendix 1.
Source: FADN-CCE-DG VI/A-3 (1990/91-1992/93) and Eurostat FSS 1989/90; adaptation LEI-DLO.

so the representativeness of the number of farms will be low. Table 3.5 shows that a low representativeness of the number of holdings does not imply a low representation of the UAA. The smaller farms only have a small share in the total UAA.

The representativeness of farms in the economic size classes which are represented by FADN is more than 75%, except at Dehesas_mixed farms, only 35% is represented (table 3.5). The representation of UAA is less homogeneous. In nearly all regions it is more than 75%. At Asturias_sheep, Dehesas_mixed and to a lesser extent at Dehesas_sheep farms it is far below this percentage (respectively 11, 19 and 42%). In these regions the sample of farms is relatively small, which reduces the reliability of the results. The sample is only stratified by region, farming type and economic size class (above the threshold size), which explains the representativeness of UAA of more than 100%.

3.5 Structure and income situation of HNV farming systems

The data sources FADN and FSS contain different kind of data. FADN contains data on farm income and the balance sheet account contrary to FSS. FADN data are suitable to make a set of indicators operational which provide insight into the viability of HNV farming systems. The work largely builds upon the indicators identified in the report 'Farming at the Margins' (Baldock et al., 1996). In addition to indicators on the income situation and capital structure of the farms, some characteristics of the structure of the farms will be shown in this section. Linkages among such characteristics and the income situation and capital structure of the farms will be made. The results presented in this section are based on the annual average of the three-year period of the FADN sample 1990/91-1992/93. This period has been chosen because it is the period before the 1992 CAP reform is implemented. Farm income results are not influenced by the compensatory payments of this reform. Data on the full implementation of the reform are not available yet.

In section 3.2 it has been shown that FADN and FSS present data at different levels of spatial detail.

FADN distinguishes 91 regions, whereas FSS has more spatial detail (it distinguishes subregions). In section 3.3 it is shown that the study areas selected are often only part of the FADN regions. In order to approach the HNV farming systems in the subregions as good as possible an additional key variable is required in some study areas. This key variable aims to select the farms in the region which are of importance for the high natural value of the subregion. The nature of the key variable depends on the characteristics of the HNV farming system in the subregion. The key variables applied to the regions are summarized in appendix 4 (table A4.1). For example from the study area profiles of section 3.3 it becomes clear that mainly fallow land is of considerable conservation interest in the Spanish Drylands. Therefore only specialized cereal farms with some area left fallow are selected in this study area. These farms contribute to the high natural value of the area.

Table 3.6 Farm structure (average 1990/91-1992/93)

Study area	Number of farms represented (x 1,000)	UAA				Livestock density (LU/ha UAA)	In % of total LU			Grazing livestock density (LU/ha forage crops)
		total (ha)	of which in %				dairy cows	other cattle	sheep and goats	
			cereals	grass	rough grazing					
Black Forest_dairy	6.3	31	20	66	0	1.1	56	39	1	1.3
Pindos Mountains_fieldc	28.7	7	40	0	0	0.1	21	17	57	1.2
Pindos Mountains_sheep	4.7	4 a)	65	0 a)	0 a)	5.3 a)	0	2	98	16.8 a)
Asturias_dairy	16.5	8	0	77	1	1.6	74	25	0	1.6
Asturias_sheep	2.2	12	0	89	0	0.9	9	40	42	0.9
Spanish Drylands_cereal	16.5	70	70	0	0	0.0	15	14	54	0.1
Dehesas_sheep	7.2	71	3	82	11	0.3	1	18	81	0.3
Dehesas_mixed	2.1	24	22	39	4	0.6	39	18	35	0.8
Jura_dairy	2.2	61	15	78	0	0.6	63	37	0	0.8
Limousin_cattle	9.7	51	11	40	1	1.0	0	95	4	1.1
Lozère_cattle	0.9	89	2	18	70	0.6	0	100	0	0.6
Lozère_sheep	1.0	135	6	5	65	0.3	2	10	88	0.3
Valle d'Aosta_dairy	1.2	34	0	31	69	0.5	67	33	0	0.5
Calabria_olive	39.3	6	7	5	4	0.0	26	19	56	0.3
Dutch Peatlands_dairy	2.6	27	0	100	0	1.9	59	31	7	1.9
Scottish Highlands_sheep	1.4	888	1	6	90	0.3	0	30	70	0.3

a) Livestock grazes on common pastures, these areas are not considered in the UAA, this distorts figures on a per hectare basis.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

First of all the farm structure of the farming types selected in the study areas is presented in table 3.6. Farm size is of importance to the analysis of main factors which drive the process of marginalization and intensification. UAA per farm is extreme large at the Scottish Highlands_sheep farms (888 hectare) compared to the other study areas. The cropping plan varies among the areas and farming types selected. More than half of the UAA is covered by cereals, grass and rough grazing in almost all study areas. There are some exceptions to this. At Pindos Mountains_fieldc farms other arable crops cover the major part of the area. Permanent crops have the highest share in the cropping plan of Calabria_olive farms. In Spanish Drylands and Limousin other forage crops cover a considerable part of the area.

Stocking density is an indicator to reflect the intensity of farming practice, but does not tell anything about the 'carrying capacity' of the area in relation to the high natural value of the area. The low levels of livestock density reflect extensive ways of farming. In some regions livestock grazes on common mountain or other pastures. These areas are not considered in the total UAA of the farm. The total number of grazing days on common pastures per grazing livestock unit gives some insight into common grazing and is presented in table 3.7.

The share of LFA in total UAA is introduced as a proxy to biophysical conditions (section 3.3). At the farming types selected in the study areas more than 75% of the area is considered to be part of this regulation (table 3.7). Exceptions to this are the Pindos Mountains_fieldc (only 19% LFA), the Spanish Drylands_cereal (66%), the Calabria_olives (40%) and the Dutch Peatlands_-dairy farms (6%). In the Netherlands the LFA scheme is only applied in small parts of the country and is not significantly registered in FADN.

Another indicator introduced as a proxy for the biophysical conditions is the altitude of the area. The occurrence of abandonment may be high in areas with natural handicaps (like altitude and slope). The share of the area with an altitude which is higher than 300 m almost exceeds 50% in most regions (table 3.7). It is less at Pindos Mountains_fieldc, Asturias_dairy, Valle d'Aosta_dairy and Dutch Peatlands_dairy farms. The share of the area with an altitude which is higher than 600 m exceeds even 75% in the Spanish Drylands and the Lozère (the altitude and slope are part of the LFA conditions). The livestock density is low as well in these regions.

Decisions on succession of farming are taken around the age of retirement. An average high age of the farm holder reflects transition of farming which is to be expected. The agricultural holding might be taken over by successors or sold to other farmers. Alternatively, the land might be used for activities other than agriculture or abandoned. The average age of the farm holder varies between 40 years at Lozère_cattle farms and 55 years at Calabria_olive farms (table 3.7).The rather high age of the farm holders in Calabria reflects that many transitions of farming can be expected in a period of 10 years.

In section 3.3 insight is provided into the share of farm holders, partners and other family members with other gainful activities and the need for additional activities in the study areas. These figures are based on the FSS. Unfortunately FADN provides no information on the family income, only on the Family

Table 3.7 Farm characteristics (average 1990/91-1992/93)

Study area	Share Mountain area in UAA (%)	Share other LFA in UAA (%)	Share area with altitude between 300-600m in UAA (%)	Share area with altitude >600m in UAA (%)	Number of gazing days on common pastures per grazing LU	Age of farm holder (year)
Black Forest_dairy	17	66	40	43	0	48
Pindos Mountains_fieldc	3	16	5	2	77	50
Pindos Mountains_sheep	48	33	27	39	272	52
Asturias_dairy	82	0	27	19	1	51
Asturias_sheep	100	0	33	56	26	48
Spanish Drylands_cereal	5	61	1	96	39	52
Dehesas_sheep	7	93	81	0	53	46
Dehesas_mixed	2	93	72	0	45	43
Jura_dairy	9	81	44	7	0	46
Limousin_cattle	29	71	73	7	0	44
Lozère_cattle	78	0	22	78	27	40
Lozère_sheep	100	0	0	100	0	42
Valle d'Aosta_dairy	100	0	0	0	47	46
Calabria_olive	31	9	55	18	1	55
Dutch Peatlands_dairy	0	6 a)	0	0	1	50
Scottish Highlands_sheep	0	99	94	6	21	54

a) The share of LFA in UAA in the Dutch Peatlands is based on own calculations based on FSSS 1989/90 and Official Journal (CEC) No. L 110 of 04/05/93.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

Farm Income (FFI). The FFI per Family Work Unit (FWU) is an important indicator to reflect income which is generated from farm activities. In this respect it is considered to be a key indicator to the occurrence of marginalization. Marginalization may start in cases where income from farming is insufficient to maintain a viable agriculture. FFI/FWU is highest at Lozère_sheep, Dutch Peatlands_dairy and Scottish Highlands_sheep farms (table 3.8). FFI is composed of output generated from farming practice (output produced and sold at the market) and direct subsidies. Income generated from off-farm activities is not included. The share of direct subsidies in FFI/FWU is an important indicator on direct government support provided to farming. Various forms of direct payments are available under CAP, including LFA payments. The share of direct subsidies in FFI/FWU is highest in the Scottish Highlands (about 180%) and Lozère (about 110 and 70%). In case the share of direct subsidies in FFI/FWU exceeds 100%, FFI only remains positive because of the direct subsidies. The share of direct subsidies in FFI/FWU varies largely across farming types.

The indicator derives from a combination of direct subsidies and from FFI/FWU. Absolute levels of direct subsidies do not necessarily differ across regions with high levels of FFI/FWU compared to the ones with low levels of FFI/FWU. Therefore in section 4.4 absolute levels of direct subsidies will be presented. The share of direct subsidies in FFI/FWU may be considerably affected by the 1992 CAP reform, which increased the range and level of direct payments. A further investigation of direct subsidies after the reform is provided in Chapter 5. The Farm Net Value Added (FNVA) per AWU, which is an indicator for the labour productivity, is highest in the Dutch Peatlands.

The Standard Gross Margin (SGM) per hectare of UAA is an indicator on the intensity of agricultural production. It reflects the economic size of the different species of land use and livestock population which belong to a holding. It is important to notice in this respect that extensive produced special local products can generate a relatively high revenue per hectare. Low values of this indicator reflect small levels of returns from farming on a per hectare basis, and might be a potential source of marginalization and intensification (in order to increase the SGM per hectare). Differences in SGM/ha across study areas are very large. The SGM per hectare is relatively high in the Dutch Peatlands (2,050 ecu) and Calabria (1,625 ecu). It is lowest in the Scottish Highlands (below 100 ecu) with on average very extensive agricultural systems. Contrary to this it is highest in regions with very intensive agricultural systems in the Netherlands (over 2,000 ecu). Differences across study areas partly result from the farming types selected, the intensity of agricultural practice of specialized olive farms is for example relatively high. The SGM per AWU is highest in the Dutch Peatlands (table 3.8).

Table 3.8 provides also insight into the capital structure of the farms. The development of the own financial resources and depreciation are required to make the viability concept which will be followed in the next chapter operational. The development of the own financial resources at negative in Calabria_olive and Dutch Peatlands_dairy farms, the own financial resources shrink. The solvability of the farm reflects the share of own financial resources in the of outside capital by farms. The solvability is lowest (less than 75) at Lozère_-

Table 3.8 Farm income and capital structure (average 1990/91 - 1992/93)

Study area	FFI/FWU (ecu)	Share of direct subsidies in FFI/FWU (%)	FNVA/AWU (ecu)	SGM/UAA (ecu)	SGM/AAA (ecu)	Development own financial resources (x 1,000 ecu)	Depreciation (relating to replacement-cost value (x 1,000 ecu)	Own financial resources (x 1,000 ecu)	Outside capital (x 1,000 ecu)	Solvability
Black Forest_dairy	7,300	46	9,800	790	15,500	3.3	11.5	181	50	78
Pindos Mountains_fieldc	6,200	5	7,000	1,770	7,600	1.8	1.9	70	4	94
Pindos Mountains_sheep	6,500	28	6,600	2,260	a) 4,800	0.8	0.9	41	4	92
Asturias_dairy	5,000	5	5,300	1,340	8,000	3.0	1.6	102	1	99
Asturias_sheep	3,600	22	3,800	660	6,700	3.0	1.5	98	0	100
Spanish Drylands_cereal	3,800	36	7,100	250	18,800	2.2	3.0	107	4	96
Dehesas_sheep	8,800	34	9,100	220	15,100	7.6	0.7	107	0	100
Dehesas_mixed	8,200	12	8,500	490	10,500	8.7	1.8	131	1	99
Jura_dairy	10,000	14	13,300	500	21,700	0.9	6.8	110	30	79
Limousin_cattle	9,000	60	11,300	520	17,800	4.1	6.6	144	40	78
Lozère_cattle	10,300	110 b)	12,000	210	17,000	7.3	8.7	181	53	77
Lozère_sheep	18,100	74	19,900	170	19,200	3.9	12.9	152	53	74
Valle d'Aosta_dairy	10,400	45	10,700	320	5,800	6.9	4.5	210	17	93
Calabria_olive	4,400	37	5,200	1,630	7,500	-1.6	0.9	72	0	100
Dutch Peatlands_dairy	17,200	4	26,300	2,050	41,500	-0.3	9.8	257	104	71
Scottish Highlands_sheep	13,400	184 b)	17,200	70	23,400	14.1	13.0	321	53	86

a) Livestock grazes on common pastures, these areas are not considered in the UAA, this distorts figures on a per hectare basis; b) The share of direct subsidies in FFI/FWU may exceed 100% in case the amount of direct subsidies received exceeds FFI/FWU; FFI on such farms only remains positive because of direct subsidies.

Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

sheep and Dutch Peatlands_dairy farms. This means that these farms have the highest share of outside capital.

3.6 Concluding remarks

1. Specialized farms cover the largest part of the UAA in the study areas, they seem to be mainly responsible for the high natural value of the area. The share of specialized farms in the total UAA and in the total number of holdings has increased or remained constant over time in all study areas selected.
2. The main farming types considered to be responsible for the conservation of HNV areas are specialized dairy farms, sheep, goats and other grazing livestock farms, and specialized cattle-rearing and fattening farms. These farming types cover a considerable area of land.
3. The HNV study areas selected have only a limited share in the production of EU 12.
4. In almost all study areas the GVA per worker in agriculture is below the GVA per worker outside agriculture. This may encourage farmers to stop farming or work on a part-time basis outside agriculture.
5. The farming types responsible for the high natural value of the area are characterized by a large share of LFA in total UAA and a high altitude. The major part of the area is covered by cereals, grass and rough grazing, while the livestock density is low. The number of grazing days on common pastures per grazing livestock unit is mainly substantial at Pindos Mountains_sheep farms. The average age of farm holders varies between 40 and 55 years.
6. The SGM per hectare of UAA is used as an indicator on the intensity of agricultural production. It varies largely among the study areas. It is important to notice in this respect that extensive produced special local products can generate a high revenue per hectare. Such a high revenue per hectare is reflected in a high SGM per hectare of UAA, which indicates an intensive production.
7. The share of direct subsidies in FFI/FWU varies largely among study areas. In some study areas the FFI only remains positive because of the direct subsidies received. So, these direct subsidies are very important for the maintenance of HNV farming systems.

4. VIABILITY OF FARMS

4.1 Introduction

Proper management practices on HNV farming systems are beneficial to the maintenance of the landscape and biodiversity. Continuity of traditional forms of management practices, which sometimes have been used for centuries, is assumed to be desirable. There is a need to discover what incentives are needed to perpetuate such management practices (Bignal and MacCraken, 1996). The viability of the habitat, which is the result of proper management practices, is important. If management practices are changed, for instance due to intensification, the diversity of flora and fauna may be endangered. Whenever solutions are proposed to sustain the economic viability of farms, this has to be done under the restriction of viability of the habitat.

The consideration to continue farming is not only based on the economic viability of the farm. Income can be generated from outside the farm as well, for example by part-time work. Besides social aspects like farming as a way of living and the value of living in a rural area can play a role as well. Economic alternatives to farming need to be developed. Farmers practising low-intensity agriculture are often under employed and therefore see intensification as a means of seeking full employment and, of course, a higher income. The availability of off-farm employment can allow low-intensity farming to continue on a part-time basis rather than as the sole source of income and activity.

In view of the absence of a good scientific base of information that describes the functional and habitat value of farming systems, the ecological approach of viability will not be elaborated in this study. In section 4.2 an economic approach of viability of farms will be put forward. In section 4.3 results of this economic viability concept will be presented for the study areas selected. In section 4.4 insight will be provided in the agricultural subsidies farms receive. Finally, some concluding remarks are presented in section 4.5.

4.2 An economic approach of viability of farms

In general farms are considered viable if full factor remuneration (profitability) is to be ensured. However, in practice farms can sustain their employment of factors of production and their related production capacity for a fairly long time even if they do not fulfill the criterion of profitability in the sense of full factor remuneration. This may be the case if the holder families place a value on the costs of using the factors employed by them in the farms which is lower than the average figures used as a basis for determining the profitability or if they give a higher priority to other advantages linked with the running

of the farm than to the highest possible factor remuneration. How long the running of farms can be continued under these conditions depends in part on the development of the own financial resources of the farms. Even when farms are not profitable in the sense that they do not satisfy the criteria of full factor remuneration, farms can exist for a long time when (for example as a result of modest consumption expectations or as a result of inputs from outside sources) the own financial resources of the farms do not shrink. On the other hand the longer-term viability of farms may still be at risk if the own financial resources of the farm shrink considerably as a result of drawings being too high. A distinction can be made between different levels of risk to existence depending on the extent of the reduction of the own financial resources and the capital structure of the farm (Zeddies, 1991). The change of the own financial resources can be used as a yardstick for the viability of farms. To define longer-term viability, a risk-threshold concept has been developed by Zeddies (1991), which takes into account the own financial resources formation and capital structure. It distinguishes four levels. In this research only two levels are distinguished on the basis of this concept: viable farms and farms at risk. Farms are considered viable if the development of the own financial resources is positive (level 1 of the Zeddies concept). It is also possible that the own financial resource losses are negative due to the high depreciation relating to replacement-cost value. However, depreciation are costs but no expenditures. Therefore, as long as the own financial resource losses are smaller than the depreciation relating to replacement-cost value, farms are also considered to be viable. In other words as long as the own financial resource losses plus the depreciation relating to replacement-cost value is positive, farms are still considered to be viable (level 2 of the Zeddies concept). If this is not the case, farms are considered to be at risk (Zeddies also distinguishes farms moderate at risk and farms at high risk (level 3 and 4) on the basis of the capital structure). So, in this research farms are divided into two groups: viable farms and farms at risk. The criteria for this distinction are summarized in figure 4.1.

This economic viability concept depends on the development of the own financial resources. It is therefore important to notice that the development of the own financial resources of the farm can be influenced by the farm successor construction, about which no further information is available.

Viable farms	Farms at risk
- Development of the own financial resources is positive or - Own financial resource losses are lower than depreciation relating to replacement-cost value	- Own financial resource losses are greater than depreciation relating to replacement-cost value

Figure 4.1 Criteria for the distinction between viable farms and farms at risk

4.3 Results of the economic viability of farms concept

The individual farms available from FADN are divided into two groups: viable farms and farms at risk, on the basis of the economic viability concept presented in section 4.2. The criteria for this division are presented in figure 4.1. The main aim of this assessment is to provide insight into differences among others in structure characteristics between the group viable farms and farms at risk. Differences in farm management cannot be measured on the basis of the available data. The results of this assessment which are presented in this section are based on the annual average of the three-year period of the FADN sample 1990/91-1992/93. Of all farms selected in this research about 70% is classified as viable and 30% is considered to be at risk. The size of the sample of the farms at risk is still too small to present reliable results for Asturias_sheep, Dehesas_mixed and Lozère_cattle farms. Both categories are compared to observe differences between viable farms and farms at risk. The farm structure and some farm characteristics of the viable farms are presented in table 4.1 and of the farms at risk in table 4.3. The farm income and capital structure of viable farms are presented in table 4.2 and of the farms at risk in table 4.4.

More than 25% of the represented farms are considered to be at risk at Asturias_dairy, Spanish Drylands_cereal, Valle d'Aosta_dairy and Calabria_olive farms (table 4.3). It is important to notice in this respect, that these percentages do not necessarily deviate from the regional average. In such a case regional instead of HNV specific policies are required. The farm size (UAA) of the category viable farms exceeds the size of farms at risk in the Black Forest, Asturias, Spanish Drylands, the Dehesas, Jura, Limousin and in Lozère (table 4.1 and 4.3). It is the other way round in all other study areas. So, the farm size seems irrelevant to the viability of farms, contrary to what was found in other studies like 'Farming at the margins' (Baldock et al., 1996). There are only two significant differences in the cropping pattern of both categories. At Pindos Mountains_field farms the share of cereals in UAA is higher at the category farms at risk (50%) compared to the category viable farms (38%). At Dehesas_sheep farms the share of grass (81%) and rough grazing (12%) in UAA at the category viable farms is different from the category farms at risk, where 97% of the area is covered by grass and there is no rough grazing.

The livestock density as well as the grazing livestock density per hectare forage crops of the category viable farms exceeds (or is equal to) the density of the category farms at risk in all study areas (table 4.1 and 4.3). There are no significant differences in the livestock composition between both categories. There is only a difference in the share of other cattle and the share of sheep and goats in total livestock population at Lozère_sheep farms between both categories. At the category viable farms the shares are 13% and 86%, whereas it is 2% and 96% at the category farms at risk.

There are no big differences in the share of LFA in the total UAA between both categories. The most extreme difference is 8% and can be observed at Pindos Mountains_sheep and Asturias_sheep farms. More significant differences can be observed in the altitude between both categories, mainly in the Dehesas and Calabria. In the Dehesas the share of the area with an altitude

which exceeds 300 m is 80% at the category viable farms and 99% at the category farms at risk. In Calabria it is 81% at the category viable farms and 67% at the category farms at risk (table 4.1 and 4.3). There is also no significant difference observed between both categories in the number of grazing days on common pastures per grazing livestock unit.

The farm holder is in most study areas somewhat older at the category farms at risk compared to the category viable farms, except in the Pindos Mountains, Calabria and the Scottish Highlands. In the Dutch Peatlands the difference is most extreme. The average age of the farm holder at the category farms at risk is 64 years in this study area. These farms are probably transferred to another generation, the own financial resources of the farm shrink. The own financial resource losses of this category are probably due to this transfer. The farm can be gradually taken over by a successor, who recruits outside capital. This explains why these specialized dairy farms are considered to be at risk.

The FFI per FWU, which reflects income generated from farm activities, is considerably higher at the category viable farms compared to the category farms at risk (table 4.2 and 4.4). The only exception to this are the Pindos Mountains_fieldc farms. The share of direct subsides in FFI/FWU is highest at the category farms at risk. The absolute direct subsidies and indirect government payments both categories receive are presented in section 4.4.

The FNVA per AWU, which reflects the labour productivity, is higher at the category viable farms compared to the category farms at risk (table 4.2 and 4.4). The only exceptions to this are the Pindos Mountains_fieldc farms.

The SGM and output per hectare are higher in almost all study areas at the category viable farms compared to the category farms at risk (table 4.2 and 4.4). The total capital stock of the viable farms exceeds the stock of the farms at risk, except at Pindos Mountains_fieldc farms. The solvability of the category viable farms is higher compared to the category farms at risk. Main differences in the solvability between both categories can be observed in the Pindos Mountains (difference of 9), Lozère (11), Valle d'Aosta (6), the Dutch Peatlands (11) and the Scottish Highlands (20).

The average FWU may indicate the extent of part-time farming and the occurrence of holdings with insufficient work. The average FWU of the study areas varies between 1.8 and 0.7 at the category viable farms and between 1.9 and 0.8 at the category farms at risk. The FWU is only less than 1 at the farming types selected in the Spanish Drylands and the Dehesas.

Table 4.1 Farm structure and some farm characteristics of the category farms considered to be viable (average 1990/91 - 1992/93)

Study area	Share farms considered to be viable farms (%)	UAA (ha)	Livestock density (LU/ha UAA)	Grazing livestock density (LU/ha forage crops)	Share LFA in UAA (%)	Share are with altitude >300 m in UAA (%)	Number of grazing days on common pastures per grazing LU	Age of farm holder (year)
Black Forest_dairy	83	32	1.1	1.3	83	82	0	47
Pindos Mountains_fieldc	88	7	0.1	1.2	19	8	76	50
Pindos Mountains_sheep	78	4 a)	5.5 a)	17.1 a)	83	66	277	52
Asturias_dairy	73	8	1.7	1.7	80	48	1	50
Asturias_sheep	81	12	1.0	0.9	99	86	30	48
Spanish Drylands_cereal	69	71	0	0.1	68	96	46	51
Dehesas_sheep	92	72	0.3	0.3	100	80	55	45
Dehesas_mixed	91	25	0.5	0.9	95	77	40	43
Jura_dairy	77	64	0.7	0.8	90	49	0	45
Limousin_cattle	80	52	1.0	1.1	100	80	0	43
Lozère_cattle	81	80	0.6	0.6	83	100	32	40
Lozère_sheep	75	136	0.3	0.3	100	100	0	42
Valle d'Aosta_dairy	72	32	0.5	0.5	100	0	47	46
Calabria_olive	44	6	0.1	0.4	36	81	1	56
Dutch Peatlands_dairy	76	27	2.0	1.9	0	0	1	46
Scottish Highlands_sheep	85	865	0.3	0.3	99	100	21	55

a) Livestock grazes on common pastures; these areas are not considered in the UAA; this distorts figures on a per hectare basis.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

Table 4.2 Farm income and capital structure of the category farms considered to be viable (average 1990/91 - 1992/93)

Study area	FFI/ FWU (ecu)	Share of direct subsidies in FFI/FWU (%)	FNVA/ AWU (ecu)	SGM/ UAA (ecu)	Output per ha UAA (x 1,000 ecu)	Development own financial resources	Depreciation (x 1,000 ecu)	Total capital (x 1,000 ecu)	Solvability
Black Forest_dairy	8,000	45	10,400	790	1660	7.4	12.2	247	78
Pindos Mountains_fieldc	6,000	5	6,700	1800	3480	3.0	1.8	73	95
Pindos Mountains_sheep	6,900	27	7,000	2300 a)	5170 a)	2.5	1.0	46	94
Asturias_dairy	5,800	5	6,000	1380	2420	5.3	1.8	113	99
Asturias_sheep	4,300	20	4,500	680	850	5.0	1.5	92	100
Spanish Drylands_cereal	5,800	28	8,700	260	320	5.6	3.6	124	97
Dehesas_sheep	9,300	33	9,500	220	230	8.6	0.7	111	100
Dehesas_mixed	9,100	11	9,300	470	840	10.4	1.8	132	99
Jura_dairy	11,000	14	14,600	500	880	4.3	7.4	149	78
Limousin_cattle	10,200	56	12,500	520	740	8.8	6.7	190	78
Lozère_cattle	12,400	100	13,600	230	370	14.4	8.9	230	76
Lozère_sheep	20,700	68	21,900	170	430	18.9	13.0	207	77
Valle d'Aosta_dairy	11,000	39	10,800	330	1190	20.2	4.6	229	94
Calabria_olive	8,300	23	8,400	1620	2120	1.3	0.9	73	100
Dutch Peatlands_dairy	17,900	4	26,800	2070	3060	11.2	10.1	374	74
Scottish Highlands_sheep	15,200	164	17,800	70	90	21.3	13.1	378	89

a) Livestock grazes on common pastures; these areas are not considered in the UAA; this distorts figures on a per hectare basis.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

Table 4.3 Farm structure and some farm characteristics of the category farms considered to be at risk (average 1990/91 - 1992/93)

Study area	Share farms considered to be at risk (%)	UAA (ha)	Livestock density (LU/ha UAA)	Grazing livestock density (LU/ha forage crops)	Share LFA in UAA (%)	Share are with altitude >300 m in UAA (%)	Number of grazing days on common pastures per grazing LU	Age of farm holder (year)
Black Forest_dairy	17	25	1.0	1.3	81	86	0	51
Pindos Mountains_fieldc	12	10	0	0.9	19	8	89	47
Pindos Mountains_sheep	22	4 a)	4.9 a)	15.7 a)	75	55	257	51
Asturias_dairy	27	7	1.5	1.5	88	39	0	52
Asturias_sheep	.	.	.	.	.	.	.	.
Spanish Drylands_cereal	31	66	0	0	63	100	0	53
Dehesas_sheep	8	60	0.3	0.3	100	99	29	49
Dehesas_mixed	.	.	.	.	.	.	.	.
Jura_dairy	23	48	0.7	0.8	93	58	0	51
Limousin_cattle	20	48	1.0	1.1	100	81	0	46
Lozère_cattle	.	.	.	.	.	.	.	.
Lozère_sheep	25	133	0.2	0.3	100	100	0	41
Valle d'Aosta_dairy	28	38	0.5	0.5	100	0	45	47
Calabria_olive	56	6	0.00	0.2	42	67	1	54
Dutch Peatlands_dairy	24	28	1.9	1.8	0	0	0	64
Scottish Highlands_sheep	15	1,016	0.2	0.2	100	100	21	50

a) Livestock grazes on common pasture; these areas are not considered in the UAA; this distorts figures on a per hectare basis.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

Table 4.4 Farm income and capital structure of the category farms considered to be at risk (average 1990/91 - 1992/93)

Study area	FFI/ FWU (ecu)	Share of direct subsidies in FFI/FWU (%)	FNVA/ AWU (ecu)	SGM/ UAA (ecu)	Output per ha UAA (x 1,000 ecu)	Development own financial resources	Depreciation (x 1,000 ecu)	Total capital (x 1,000 ecu)	Solvability
Black Forest_dairy	4,200	62	6,400	770	1,420	-17.4	7.8	155	78
Pindos Mountains_fieldc	8,000	5	9,000	1,600	2,120	-6.3	2.3	81	91
Pindos Mountains_sheep	5,200	31	5,100	2,120 a)	4,070 a)	-4.8	0.8	40	85
Asturias_dairy	2,800	5	3,000	1,230	1,850	-3.2	1.0	77	99
Asturias_sheep	.	.	.	.	.	.	.	.	.
Spanish Drylands_cereal	b)	b)	3,700	220	220	-5.2	1.6	84	95
Dehesas_sheep	3,100	47	3,800	250	200	-3.2	0.6	63	100
Dehesas_mixed	.	.	.	.	.	.	.	.	.
Jura_dairy	6,500	16	9,100	510	790	-10.7	4.8	109	79
Limousin_cattle	4,700	92	6,700	520	630	-15.1	6.0	162	78
Lozère_cattle	.	.	.	.	.	.	.	.	.
Lozère_sheep	11,000	105	14,300	150	370	-40.1	12.7	202	66
Valle d'Aosta_dairy	8,800	64	10,400	310	880	-26.6	4.4	221	88
Calabria_olive	1,600	88	3,000	1,630	1,010	-3.8	1.0	71	100
Dutch Peatlands_dairy	15,300	3	24,700	2,000	2,800	-35.9	9.0	319	63
Scottish Highlands_sheep	2,900	794	13,600	60	60	-27.7	12.6	349	69

a) Livestock grazes on common pastures; these areas are not considered in the UAA; this distorts figures on a per hectare basis; b) FFI/FWU is -81 ecu. Direct subsidies are around 790 ecu per farm.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

4.4 Agricultural subsidies

In this section absolute levels of direct subsidies and indirect government support both categories of farms distinguished in section 4.3 received before the 1992 CAP reform will be presented. Direct agricultural subsidies of farms (which are available from FADN) are related to structural characteristics of farms whereas indirect government support is related to the production (the nature of the subsidies and support is explained in section 5.2).

Direct subsidies

Direct subsidies can have a considerable impact on the viability of farms in HNV areas. They can also affect the management of land, crops and livestock by the way it is provided. It will be investigated whether HNV farming systems are largely dependent on the various forms of direct payments available under the CAP. This makes HNV farming systems vulnerable to changes in policy.

Table 4.2 and 4.4 (section 4.3) indicated that the share of direct subsidies in the FFI/FWU is higher at the category farms at risk compared to the category farms considered to be viable. But what about the absolute amount of direct subsidies per holding both categories receive. Table 4.5 and table 4.6 show the amount of direct subsidies received at viable farms and at farms at risk. The subsidies presented in table 4.5 and 4.6 are based on the annual average of the two years' period of the FADN sample 1990/91-1991/92 instead of on the annual average of the three-year period like the tables in section 3.5 and 4.3. The subsidies in the 1992/93 sample showed some outliers, so it is excluded in this section. In some Member States the subsidies were even two-fold of the years before, which might be due to differences in the period of the accounting year (some are from January until December, others from July until June) rather than due to changes in price support measures.

The total amount of direct CAP agricultural subsidies is higher at the category of farms considered to be viable compared to the category at risk (table 4.5 and 4.6). At Pindos Mountains_fieldc, Spanish Drylands_cereal, Valle d'Aosta_dairy and at Scottish Highlands_sheep farms it is the other way round. Absolute levels of direct subsidies are low at the specialized cereal and general field cropping farms because in the period before the 1992 CAP reform (which is presented here) the arable sector received mainly indirect price support on cereals. This is partly replaced by direct payments after the 1992 CAP reform (see chapter 5).

There are big differences in the total amount of direct subsidies farms receive between farming types, study areas and the both groups of farms distinguished. Scottish Highlands_sheep farms receive the highest amount of direct subsidies per holding (over 37,000 ecu). The farming types selected in Lozère receive on average a relatively high amount of subsidies as well (over 12,000 ecu). These farms have a considerable farm size (UAA). The lowest average amount of direct subsidies is received at Asturias_dairy farms (less than 500 ecu).

Direct income subsidies under CAP were comprised of subsidies (1) on animals, particularly headage payments, (2) on products, (3) on costs (e.g. labour and machinery farming overheads: land charges and interest paid), (4) on purchase of animals, and (5) on investments. Subsidies on purchase of animals is zero or almost zero in all study areas and is therefore not shown in table 4.5 and 4.6. Subsidies on animals and products contributed most to total direct subsidies. With the exception of subsidies on costs provided to Jura_dairy farms at risk and subsidies on investments provided to viable Lozère_cattle farms and viable Valle d'Aosta_dairy farms. There are mainly differences between both categories of farms in the subsidies on investments. The category farms at risk receives less subsidies on investment, which implies that they invest less compared to the category farms considered to be viable. In most study areas farms at risk also receive less subsidies on costs.

Indirect Guarantee payments

Community expenditure on CAP is financed by the European Agricultural Guidance and Guarantee Fund (EAGGF), which consists of a Guarantee and Guidance section. Common expenditure on market and price policy is mainly paid by the Guarantee section and common expenditure on structural policy by the Guidance section. About 95% of the EAGGF is spent on the Guarantee section, the remainder is spent on structural policy.

The amount of indirect payments farms receive as part of the product prices is not available from European data sources used in this study. Indirect payments cannot be derived from the guarantee expenditures straight forward. Indirect payments farms receive are only partly funded by guarantee expenditures. The other part results from consumers since they pay a higher internal price for products. Besides part of the direct subsidies like ewe premiums are also financed by the guarantee section. The remaining amount of guarantee expenditures is spent on indirect payments.

In this research a rough estimate is made of that part of the indirect subsidies HNV farming systems in the study areas receive which is funded by guarantee expenditures. The higher prices farmers receive which is financed by consumers, is not considered in the analyses. Total EAGGF Guarantee expenditures are 23,650 million ecu in '1990' and 29,015 million ecu in '1991'. The abovementioned direct subsidies financed by the Guarantee section are deducted from the total amount of Guarantee expenditure. The remaining Guarantee expenditures per product group are divided by the final production value per product group (based on Eurostat, REGIO). On the basis of these derived shares of expenditure per unit of production value for each product group and the production value of each product group available at farm level from the FADN, indirect Guarantee expenditure per farm is calculated.

The results of this rather normative calculation of the indirect Guarantee expenditures are presented in table 4.5 and 4.6. There are big differences among study areas. This can be explained by the differences in indirect Guarantee expenditure per product group. Some Guarantee expenditures are made directly, like for ewes. The derived share of indirect Guarantee expenditure per

Table 4.5 Direct CAP subsidies (ecu) and indirect guarantee expenditures per holding of the category farms considered to be viable (average 1990/91-1991/92)

Study area	Direct subsidy				Indirect guarantee expenditure
	animals and products	costs	investments	total	
Black Forest_dairy	4,130	710	240	5,100	7,000
Pindos Mountains_fieldc	420	10	50	500	3,500
Pindos Mountains_sheep	3,160	0	0	3,150	400
Asturias_dairy	260	20	160	450	2,400
Asturias_sheep	970	0	10	950	600
Spanish Drylands_cereal	370	220	20	600	4,550
Dehesas_sheep	2,100	10	0	2,100	600
Dehesas_mixed	850	0	0	850	3,500
Jura_dairy	930	780	250	1,950	9,200
Limousin_cattle	4,520	3,320	580	8,400	5,600
Lozère_cattle	4,300	4,440	4,490	13,250	3,900
Lozère_sheep	6,760	5,580	2,280	14,600	1,400
Valle d'Aosta_dairy	3,250	1,130	4,210	8,600	5,000
Calabria_olive	1,850	20	0	1,850	150
Dutch Peatlands_dairy	600	0	520	1,100	11,150
Scottish Highlands_sheep	35,920	450	670	37,050	4,850

Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

Table 4.6 Direct CAP subsidies (ecu) and indirect guarantee expenditures per holding of the category farms considered to be at risk (average 1990/91-1991/92)

Study area	Direct subsidy				Indirect guarantee expenditure
	animals and products	costs	investments	total	
Black Forest_dairy	2,600	580	0	3,200	5,000
Pindos Mountains_fieldc	620	0	0	600	4,050
Pindos Mountains_sheep	2,990	0	0	3,000	300
Asturias_dairy	130	9	20	150	1,500
Asturias_sheep	.	.	.	.	.
Spanish Drylands_cereal	500	250	0	750	5,200
Dehesas_sheep	1,350	0	0	1,350	850
Dehesas_mixed	.	.	.	.	.
Jura_dairy	470	540	0	1,000	5,650
Limousin_cattle	3,510	2,550	160	6,200	4,350
Lozère_cattle	.	.	.	.	.
Lozère_sheep	6,040	4,900	1,290	12,200	950
Valle d'Aosta_dairy	8,730	1,140	0	9,850	5,050
Calabria_olive	1,690	7	0	1,700	150
Dutch Peatlands_dairy	380	0	350	750	12,500
Scottish Highlands_sheep	36,910	370	160	37,450	5,350

Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

unit of production is rather high for oil seeds and pulse crops contrary to pigs, poultry and eggs. The total amount of indirect Guarantee expenditure per sector is rather high for the dairy sector. Most farms which are considered to be viable receive a higher level of indirect government support compared to the farms which are considered to be at risk, due to a higher production value (table 4.2 and 4.4).

4.5 Concluding remarks

1. An economic approach of viability of farms has been followed in this chapter. The development of the own financial resources of the farm has been used as a yardstick for the viability of farms. Of all farms selected in this research about 70% is classified as viable and 30% is considered to be at risk. An advantage of the rough method used here is that a clear distinction is made between viable farms and farms at risk. It is assumed that farms which are economically viable are less susceptible to abandonment of agricultural land and can continue farming without enormous pressure for further intensification. This will contribute to proper management and to the maintenance of the landscape and biodiversity. It is interesting to find out why HNV farming systems are economically viable or just at risk.
2. Statistical indicators which give a clear picture of the ecological viability are not available. Therefore, some rough indicators are developed to get grips with the processes taking place.
3. Differences between the category viable farms and farms at risk are investigated. Farms which are considered to be viable did not turn out to be larger than the farms at risk, contrary to what was found in other studies. Differences in biophysical conditions between both categories are also modest. More significant differences are observed in the intensity of farming. Viable farms often revealed to be the relatively more intensive farms. The question raises whether this is compatible with HNV farming. The FFI/FWU, the total capital stock and the solvability of the farms considered to be viable is also higher in almost all study areas.
4. The share of direct subsidies in the FFI/FWU is higher at the category farms at risk compared to the category farms considered to be viable. The absolute amount of direct CAP subsidies is, however, higher at the category of farms considered to be viable compared to the category at risk. Most viable farms also receive a higher level of indirect government support compared to the farms considered to be at risk, due to a higher production value. The category farms at risk receive less subsidies on investment, which implies that they invest less than the category viable farms.
5. Although the total amount of support received is less at the category farms at risk, these subsidies might contribute more to the maintenance of the high natural value of these farming systems compared to the contribution at viable farms. The share of direct subsidies in the FFI/FWU is after all higher at the category farms at risk.

5. PRESENT AGRICULTURAL POLICIES IN THE EU

5.1 Introduction

An important question in this study is how to increase the viability of land management in HNV areas, while maintaining characteristics of the farming systems in these areas. One possibility is to keep farming systems in HNV areas of Europe viable and maintain their current farming practices which are beneficial for the habitat. In this chapter the support market and price policy changes of the 1992 CAP reform, accompanying measures and structural policy provide to HNV farming systems in the EU will be analysed. Maximum amounts of payments farms are eligible for will be assessed. These payments can have a considerable impact on the viability of farms.

In this chapter it will be investigated whether the CAP and related structural and accompanying measures potentially play an important role in maintaining HNV farming systems throughout the EU. The advantages as well as disadvantages of the CAP on the environment will be explored. The guarantee of high prices above world market level and of export subsidies is often seen as a stimulus for agricultural intensification. Several initiatives have been taken to 'green' EU policies - to reduce their negative effects on the environment and strengthen their positive effects (Van Dijk, 1996).

The analysis builds upon the study areas and farming types identified in chapter 3. The objective of section 5.2 is to identify and review present policy measures affecting HNV farming systems. In section 5.3 the method used to calculate the compensatory allowances farms are eligible for will be explained. In section 5.4 the results of the assessments will be presented. Finally, in section 5.5 some of the findings on the assessment will be summarized.

5.2 Identification of present agricultural policies

The CAP is a system of agricultural policy measures, including market and price support measures, direct payments, intervention (purchasing surpluses), export subsidies, production control (quotas, set-aside) and accompanying measures (agri-environment measures, afforestation, early retirement). In addition, LFA payments and horizontal structural measures can also be reckoned to be part of the CAP (Van Dijk, 1996).

The aim of this section is to review briefly present CAP measures affecting HNV farming systems which will be further investigated in the next stage of this study. The inventory will distinguish between market and price policy changes of the 1992 CAP reform, accompanying measures and structural poli-

cies of the CAP. For a more detailed and complete description of the effect of CAP on the environment reference is made to Brouwer and Van Berkum (1996).

Market and price policy changes of the 1992 CAP reform

- *Arable sector*

Under the arable sector reform, production-oriented support is partly replaced by direct producer payments coupled with set-aside requirements. Farmers producing more than 92 tonnes of cereals, oil seeds and protein crops not applying for the small-scale producers scheme, have a 5 per cent set-aside obligation in order to receive compensation on a per hectare basis.

- *Beef sector*

Presently there are headage premiums for beef cattle and suckler cows and additional premiums for cattle if livestock density thresholds (including dairy cows, suckler cows, male cattle and ewes) are met (both are 100 per cent EU funded). The 1992 reform of the beef regime included a 15% reduction in the intervention price for beef from July 1993, in three steps with compensation through direct headage payments which are subject to a maximum stocking rate of 2 Livestock Units (LU) per hectare of forage crops. Producers may qualify for an additional premium per animal on top of any beef and suckler cow premium claims if they stock at less than 1.4 LU per hectare of forage crops. Recently, producers may qualify for an additional premium of 36 ecu per animal on top of any beef and suckler cow premium claims if they stock at less than 1.5 LU per hectare. From 1997 onwards, a further claim of 52 ecu is allowed if stocking is at less than 1 LU per hectare.

- *Sheep sector*

With regard to the sheep sector there are currently headage premiums for ewes and additional premiums for ewes for producers in Less Favoured Areas (both are 100 per cent EU funded). Beef and ewe premiums, may have encouraged overstocking and local overgrazing and hence damage to swards and soils (Baldock and Beaufoy, 1993).

- *Olive oil premium*

The EU premium for olive oil production is an important factor permitting the economic survival of many olive producers. It provides a vital mainstay for producers in marginal areas who might otherwise abandon olive oil production. Presently there are two kind of production support: a fixed support and a support based on the real production. Those farms producing less than 500 kg of oil per year are categorized as 'small producers' and receive a slightly higher premium than the 'large oil producers'. The Commission proposes a reform of the olive oil support. It is proposed to replace the current support by a support per tree, to be paid on the basis of historic production figures per area. Member States should be able to adjust the support according to the production method, the region and the individual farmer. Besides the possibili-

ties should be investigated for cross-compliance; to link the support to socio-economic, regional and ecological criteria.

- *Quota rights*

Where production quotas are tradeable, it is likely that quota will be transferred to areas with the most advantageous production conditions. It is possible to set quotas at a regional level; this allows to control transfer of production from less competitive to more advantaged regions. This does occur in some Member States like in France; a proportion of the milk quota is reserved for the LFA's. It would be preferable to set quotas on a farm by farm basis, taking account of the 'carrying capacity' of the land, climatic and geographical conditions. In practice, this would be a highly interventionist and bureaucratic approach. It is more realistic to consider methods of incorporating environmental elements into quota regimes. For example for milk quota redistribution, a ceiling per hectare could be used for quota allocation (Baldock and Beaufoy, 1993).

- *Accompanying Measures*

The agri-environmental measure aid scheme (Regulation 2078/92) encourages farmers to introduce or continue with agricultural production methods compatible with the requirements of protection of the environment and the maintenance of the countryside and provides income support to those farmers (circa 50-75 per cent is EU funding). The measures must compensate farmers for any income losses caused by reductions in output and/or increases in costs for the part they play in improving the environment. It requires Member States to draw up programmes under which farmers are paid to farm in an environmentally friendly way. The programme includes aid to farmers who undertake measures summarized in figure 5.1.

Types of measures include aid for:
a. reducing inputs; organic farming;
b. arable extensification;
c. livestock extensification (sheep and cattle);
d. other environmentally-friendly farming techniques, including rearing rare local breeds;
e. maintaining abandoned farmland or woodlands;
f. 20 year set-aside (biotope reserves, natural parks, water protection);
g. managing land for public access and leisure;
h. training farmers in environmental friendly practices.

Figure 5.1 Agri-environmental Regulation (Regulation 2078/92)

The payments to farmers under the programmes are partly funded by the Union budget (75 per cent in Objective 1 regions, 50 per cent in other areas). The remaining part of the budget is paid by the Member State. The differential capability of different regions to co-finance the agri-environmental measures

is off-set by the much greater levels of EU assistance available for Objective 1 regions. However, in Objective 1 regions, the limited organizational and administrative capacity may be a more significant barrier to full involvement in the agri-environment regulation. Besides Member States vary in the extent to which they have developed responsibility sub-nationally for preparing schemes under the agri-environment regulation. Further, in preparing zonal programmes Member States have fallen back on administrative units rather than seek to tailor their schemes to coherent geographical areas. The variety of national and regional responses raise questions about the equity and effectiveness of the payments being made. For example, the extensification programme pays farmers up to a certain stocking density, however, the problem is a lack of sensitivity towards localised conservation needs.

- *Structural policies*

The main structural policy to support agriculture in marginal regions has been the Less Favoured Area (LFA) payments designation under EC Directive 75/268. Three types of LFAs can be distinguished, i.e. i) mountain areas, ii) areas in danger of depopulation and where the conservation of the countryside is necessary, and iii) areas affected by specific handicaps in which farming must be continued in order to conserve the countryside. Member States are authorized to give farmers direct payments in order to support farm income. This income support, which is financed by Member States and partly by the EU, consists of compensatory allowances per animal and per hectare.

The share of LFA in total UAA is approximately 56% in EU 15 in 1995 and the share of holdings with compensatory allowances granted for LFAs is 13% of total number of holdings in EU 12 in 1994 (Brouwer and Van Berkum, 1996). Although it may have helped to sustain some farmers in low-intensity farming systems, the form of support, has provided a further incentive to raise stocking densities, which may be detrimental to nature conservation. The system of LFA compensation payments is making only a modest contribution to the viability of holdings in several Member States (Baldock et al., 1996). Participation rates in the southern Member States are below those in the northern Member States, primarily because about half of all LFA holdings in these countries are smaller than the minimum size for eligibility, especially in Italy (Baldock et al., 1996).

- *Subsidies before and after the reform*

Below the differences between the subsidies received before the 1992 CAP reform (section 4.4), and the subsidies farms are eligible for due to market and price policy changes of the 1992 CAP reform (section 5.4) will be explained. Attention is paid to the way subsidies are derived (from data sources or calculated in a rather normative way), the nature of the subsidies (direct or indirect) and the financing of the expenditures (Guarantee or Guidance fund).

In this chapter maximum allowances of the market and price policy changes of the 1992 CAP reform (for arable, beef, suckler cows and ewes) will be calculated in a rather normative way; this are direct subsidies. The direct subsidies shown in section 4.4 (table 4.5 and 4.6) are available from FADN (1990/91-

1991/92) and represent the period before the 1992 reform (pre-Mac Sharry). The pre-Mac Sharry direct payments include the direct payments on ewes and suckler cows. These allowances already existed before the 1992 CAP reform (which implies no increase in income support after the reform).

The direct arable and beef allowances after the reform are not considered in the direct subsidies shown in section 4.4. Before the reform the arable and beef sector received production-related indirect support, these indirect payments are partly replaced by direct headage and hectare payments after the 1992 reform. The direct arable and beef allowances will be calculated in a normative way in this chapter. The associated decrease in intervention prices will be calculated as a decrease in the production value.

The agri-environmental measure payments are direct subsidies. The new schemes developed under this measure are not considered in the direct subsidies shown in section 4.4 since many schemes only came into operation in 1996. These payments provide additional income support. However, existing schemes placed under this measure (like the Dutch management agreements) are also part of the direct subsidies shown in section 4.4.

The LFA allowances already existed before the 1992 CAP reform. They are part of the direct subsidies presented in section 4.4.

	Direct Subsidies	Indirect Payments
Guarantee section of EAGGF	* Ewe premium * Fallow premium (since 1993 full; 1990-1992 50%) * Compensatory allowances (since 1992 CAP reform): - cereals, oil seeds and pulse crops - suckler cows and bulls for fattening * accompanying measures since 1992 CAP reform) - agri-environmental measures - afforestation - early retirement	* Price support - Cereals (including rice), sugar, olive, oil seeds, pulse crops, fruit and vegetables, wine products, tobacco, milk and dairy products, beef, pork, eggs and poultry
Guidance section of EAGGF	* LFA premium * Investment premium * Fallow premium (until 1990;1990-1992 50%)	

Figure 5.2 CAP payments distinguished by the nature of payments (direct subsidies and indirect payments) and by the source of financing (Guarantee and Guidance section)

The subsidies presented in section 4.4 are the total amount of subsidies received at farms before the 1992 CAP reform whereas in this chapter allowances of a number of measures after the market and price policy changes of the 1992 CAP reform will be assessed.

Figure 5.2 categorizes the different CAP payments and distinguishes between direct subsidies and indirect payments and expenditures financed by the Guarantee and Guidance section. Guidance expenditures are mainly direct subsidies like the LFA payments. Guarantee expenditures can be direct (like the ewe premiums) as well as indirect (like production related price support). The market and price policy changes of the 1992 CAP reform for the arable and beef sector represents a significant shift in the nature of the support provided from indirect payments to more direct subsidies.

5.3 Method used to calculate present support

In this section the method used to calculate CAP allowances affecting HNV farming systems after the market and price policy changes of the 1992 CAP reform will be explained.

Market and price policy changes of the 1992 CAP reform

The market and price policy changes of the 1992 reform represent a significant shift in the nature of support provided under the CAP. Farmers increasingly will receive a smaller proportion of their income from the market and a larger proportion in the form of subsidies, particularly direct income payments. This makes farmers vulnerable to policy changes.

The compensatory payments for which farms are eligible after the market and price policy changes of the 1992 CAP reform are not available from the 1990/91 - 1991/92 samples of the FADN data source which are used in the study (this is the period before the reform). These compensatory payments are therefore calculated in a rather normative way. The calculations are based on the farm structure characteristics available from FADN (like the livestock composition, livestock density, cropping plan and production value) and the maximum level of compensation payments per hectare and per headage (taking account of requirements attached to premiums like stocking density thresholds). Not only the compensation payments but also the decrease in production value due to a decrease in intervention prices will be calculated.

- *Arable sector*

The level of compensation payments used in the assessment are 45 ecu per tonne for cereals (including maize for silage and excluding rice and durum wheat), 65 ecu per tonne for pulse crops, 70 ecu per tonne for oil seeds and 57 ecu per tonne of cereal equivalent at set-aside acreage. (The amounts of subsidies which have been used refer to the year 1993, these amounts have been adjusted since then.) The calculated decrease in the arable production value consists of two components: i) a 30 per cent decrease in the production value

of the crops summarized above (which aims to reflect the 30 per cent reduction in the cereal intervention price) and ii) a reduction in the production value due to set-aside obligations. Production values are available from FADN, except for maize for silage. The average production of maize for silage per hectare has been derived from the regional databank REGIO of Eurostat.

- *Beef sector*

Under the livestock sector reform of beef, the reduction in the output price is compensated by payments based on the number of livestock on the farm. Male cattle receive annually 90 ecu compensation per head up to a maximum headage ceiling of 90 premiums and suckler cows receive annually 120 ecu per head. These premiums are paid for stocking densities up to 2 LU per hectare. An additional premium for male cattle and suckler cows of 30 ecu per animal is paid if stocking density is less than 1.4 LU per hectare. The calculated decrease in the beef production value aims to reflect the 15 per cent reduction in the intervention prices of beef. The livestock density thresholds only consider dairy cows, suckler cows, male cattle and ewes. The density limit does not account for young female cattle, cull dairy cows and bulls for breeding. So, this density does not reflect the real livestock density.

- *Sheep sector*

With regard to the sheep sector there are currently headage premiums of 15 ecu per ewe. Holdings with sheep in LFAs are also subject to a fixed premium of 5.5 ecu per ewe which is part of measures beneficial to rural areas. The payment of this supplementary premium is subject to the same conditions as the payment of the ewe premium. The payment is not subject to any stocking density. The ewe premiums are part of the direct subsidies presented in section 4.4.

Agri-environmental measures

The agri-environmental measures under Regulation (EEC) 2078/92 are implemented on the basis of proposals developed by national and regional authorities in the Member States. Member States can set up programmes at national, regional or local level, depending on the degree of administrative decentralization as well as on the environmental and agricultural characteristics of the relevant areas and their specific needs. The programmes which have been accepted by the STAR Committee have been summarized by De Putter (1995). Appendix 5 provides an overview of the programmes accepted in the study areas. The schemes available in the study areas are diverse, reflecting different regional conditions. Farmers can choose between several measures and they can often determine to what extent the measures will be implemented. Therefore it is not so straight forward to assess the income support these measures can provide. It is not realistic to assume that all farmers are eligible for all measures. Besides it is not very reliable to estimate the percentage of farms which will choose a particular measure. Further there is a lack of information in the European data sources used in this study to calculate the income

support farms are eligible for on the basis of these measures, f.e. there are no figures available on the presence of local breeds at the farm.

In Germany a databank is composed for Regulation 2078/92, on the basis of contributions from country experts. The databank contains data on the kind of schemes, the uptake of these schemes and budgetary issues. This kind of information provides insight into the actual use of different schemes.

Appendix 5 shows that the agri-environmental measure payments are based on different criteria. Payments can be made per farm or can be based on the number of hectares at the farm, the number of grazing livestock units at the farm or the grazing livestock density per hectare forage crops at the farm. These different criteria for payments will be compared in section 6.4, to show the impact of various bases for payment on the support provided to HNV farming systems. The allowances farms are eligible for under optimal use of Regulation 2078/92 will be shown in that section. In this section no assessments are made on the payments farms currently receive on the basis of Regulation 2078/92. The data sources used in this research do not provide insight into these payments.

- *Less Favoured Area payments*

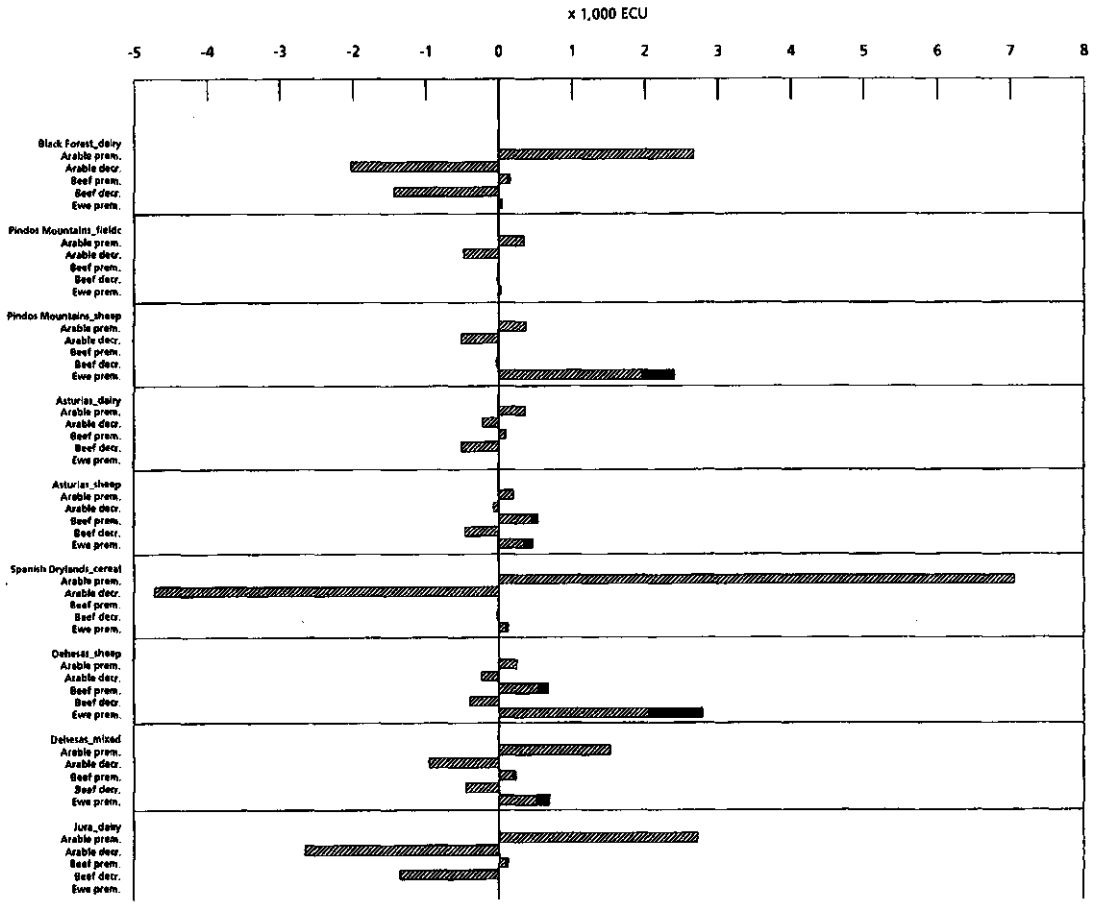
The compensatory allowances granted for LFA at the farm are not available from European data sources (like FADN). It is possible to assess the amount of LFA compensatory payments farms are eligible for in a normative way, although this is rather complicated. The LFA scheme is complex, there are a large number of requirements for payment and the level of compensatory allowances is differentiated by Member State. Besides, the LFA scheme already supported farms (LFA allowances are part of the direct subsidies presented in section 4.4). Therefore, no normative assessment will be made on the LFA payments in this study.

Average compensatory allowances granted for LFA per holding are available from other sources (like Brouwer and Van Berkum, 1996, table 6.3). The allowances per farm vary considerably among Member States and range between 410 ecu per farm (which is eligible for an allowence) in Portugal and 4,437 ecu per farm in Luxembourg. It amounts to 1,310 ecu per holding on average in EU12 in 1994. It is less than this average in Greece (521 ecu), Spain (447 ecu), Italy (689 ecu) and the Netherlands (884 ecu). It is higher in Germany (2,163 ecu), France (2,127 ecu) and the United Kingdom (2,419 ecu).

5.4 Assessment of present agricultural policies

Market and price policy changes of the 1992 CAP reform

Maximum CAP package compensatory payments, farms are eligible for on the basis of market and price policy changes of the 1992 CAP reform of the arable (first bar), beef (third bar) and sheep (fifth bar) sector as well as the re-


x 1,000 ECU
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
Black Forest_dairy
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Pindos Mountains_fieldc
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Pindos Mountains_sheep
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Asturias_dairy
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Asturias_sheep
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Spanish Drylands_cereal
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Dehesas_sheep
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Dehesas_mixed
Arable prem.
Arable decr.
Beef prem.
Beef decr.
Ewe prem.
Jura_dairy
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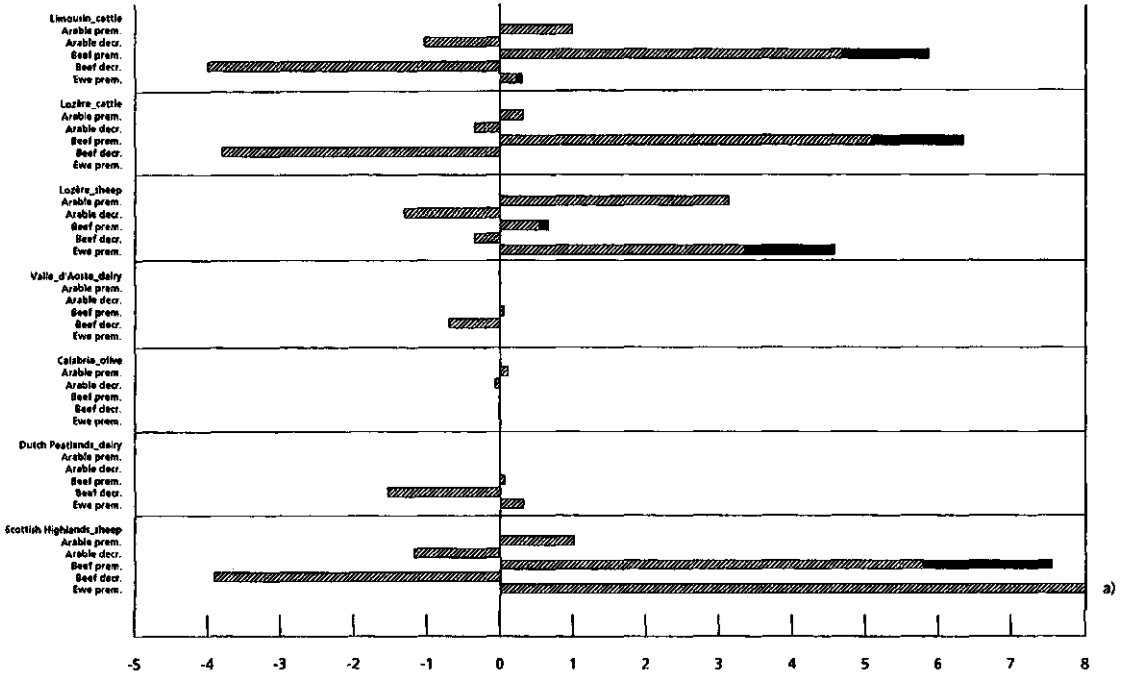


Figure 5.3 Maximum payments (ecu) of the market and price policy changes of the 1992 reform for arable (first bar), beef (third bar), and ewes (fifth bar) and decrease in production value of arable (second bar) and beef (fourth bar). The second (black) part of the third and fifth bar shows the additional beef and ewe premiums (average 1990/91-1991/92)

a) The ewe premiums Scottish Highlands_sheep farms are eligible for are not fully presented. The total ewe premium is 17,800 ecu of which 4,800 ecu is the additional premium.

Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

lated decrease in the arable (second bar) and beef (fourth bar) production value are presented in figure 5.3.

- *Arable sector*

The arable premium allowances exceed 1,000 ecu per farm at Black Forest_dairy, Spanish Drylands_cereal, Dehesas_mixed, Jura_dairy, Lozère_-sheep and Scottish Highlands_sheep farms (first bar of each study area). In most study areas the arable premium payments (first bar) are sufficient to off-set the decrease in production value (second bar), as a result of the 30% reduction in the intervention price of cereals and the set-aside obligation. Especially at Spanish Drylands_cereal and Lozère_sheep farms the arable premium payments exceed the decrease in production value considerably (with 1,800 ecu per farm).

- *Beef sector*

Beef premium payments (first part of the third bar) are mainly substantial at Limousin_cattle, Lozère_cattle and Scottish Highlands_sheep farms (and even exceed 4,500 ecu per farm). The additional beef premiums (second part of the third bar) are also highest in these study areas, respectively 1,200, 1,250 and 1,750 ecu per farm. In all other study areas it is less than 150 ecu per farm. In most study areas the total beef premium payments (third bar) are not sufficient to compensate the decrease in the production value of beef (fourth bar). The decrease is mainly substantial compared to the allowances at Black Forest_-dairy, Jura_dairy and Dutch Peatlands_dairy farms, the difference exceeds even 1,200 ecu per farm. At Asturias_dairy and Valle d'Aosta_dairy farms, the difference exceeds 400 ecu. In other study areas, however, the total beef premium payments exceed the decrease in production value of beef like at Asturias_-sheep, Dehesas_sheep, Lozère_sheep, Scottish Highlands_sheep and Limousin_-cattle and Lozère_cattle farms.

- *Sheep sector*

The ewe premium (first part of the fifth bar) and additional ewe premium (second part of the fifth bar) allowances are mainly substantial at the sheep, goats and other grazing livestock farms selected in the study areas and at Dehesas_mixed farms. There are large differences between study areas in the total amount of premiums (fifth bar) sheep, goats and other grazing livestock farms are eligible for. It varies between 450 ecu in Asturias and 17,800 ecu in the Scottish Highlands. Of the total of 17,800 ecu of ewe premiums received at Scottish Highlands_sheep farms about 4,800 ecu is received as an additional ewe premium. These premiums are not fully presented in figure 5.3, otherwise differences between other bars could hardly be observed.

5.5 Concluding remarks

1. In most study areas the arable premium payments of the market and price policy changes of the 1992 CAP reform are sufficient to off-set the decrease in production value. At specialized dairy farms the total beef premium payments are not sufficient to compensate the decrease in the production value of beef. However, at sheep, goats and other grazing livestock farms and at specialized cattle-rearing and fattening farms the total beef premium payments exceed the decrease in the production value of beef. In total market and price policy changes of the 1992 CAP reform have a negative impact at all specialized dairying farms selected in the study areas and in the Pindos Mountains.
2. Ewe premiums are mainly substantial at sheep, goats and other grazing livestock farms. These premiums are not the result of market and price policy changes of the 1992 CAP reform.
3. The agri-environmental schemes available in the study areas are rather diverse. With many schemes only coming into operation in 1996 it is too early to estimate the area of land affected or the extent to which schemes under the Regulation will assist the viability of farms in HNV areas or promote environmentally sensitive practices.
4. The results of the calculations may be different compared to the real payments received for a number of reasons. Payments are calculated in a rather normative way, farmers often do not receive the maximum amount they are eligible for. Besides, there are constantly changes in the Regulations. Finally, the calculations do not account for monetary developments and developments in the market.

6. ALTERNATIVE AGRICULTURAL POLICIES IN THE EU

6.1 Introduction

The figures presented in chapter 4 and 5 show that most HNV farming systems are dependent on the current pattern of CAP payments. If changes are made to the CAP support regimes, they may have disproportionate effects on HNV farming systems and the potential implications need to be examined in advance. An overview of possible future changes in agricultural policy is provided in section 6.2. Some feasible adjustments in the CAP in order to maintain HNV farming systems in Europe will be explored in that section. The method used to analyse this kind of adjustments is explained in section 6.3. The results of a sensitivity analysis on changes in policy are shown in section 6.4. Some concluding remarks are presented in section 6.5.

6.2 Identification of possible future developments in agricultural policies

The Commission proposes some adjustments in the CAP. The proposals of deepening and extending the 1992 CAP reform through further shifts from price support to direct payments, and developing a coherent rural policy to accompany this process are described in Agenda 2000. The main proposals which may affect agriculture in marginal regions are summarized below.

With regard to the arable sector reform, the Commission proposes the following measures:

- the cereal intervention price to be fixed in one step at a level of 95.35 ecu per tonne;
- non-crop-specific area payments to be established at 66 ecu per tonne (depends on market prices);
- the reference rate for compulsory set-aside to be fixed at 0%, voluntary set-aside to be allowed, extraordinary set-aside to be abolished; set-aside areas get the non-crop-specific payment;
- silage cereals (mainly silage maize) to be excluded from the regime;
- for protein crops, a supplementary aid to be established at a level of 6.5 ecu per tonne.

With regard to the beef sector reform, the Commission proposes the following measures:

- gradually establishing, over the period 2000-2002, effective market support at a level of 1,950 ecu per tonne (presently it is 2,780 ecu per tonne);

- increase in direct income payments, paid per head of cattle (current level between brackets);
  - suckler cow (yearly payment) 215 ecu (145 ecu);
  - male bovine: bull (one payment) 368 ecu (135 ecu) and steer (two payments) 232 ecu (109 ecu);
  - dairy cow: (yearly payment) 70 ecu (no premium);
- the different mechanisms governing headage payments and favouring extensification will be adapted to take account of the termination of the silage maize regime.

With regard to the dairy sector reform, the Commission proposes the following measures:
- extending the quota regime up to 2006;
- improving flexibility and simplifying the present common market organizations;
- gradually decreasing support prices, by an average of 10% in total over the period;
- introducing a new yearly payment for dairy cows, at a level of 145 ecu.

The Commission emphasizes the prominent role of agri-environmental instruments to support a sustainable development of rural areas and respond to society's increasing demand for environmental services. Agri-environmental measures will be encouraged through increased budget funding and higher part-financing rates (where necessary). Another possibility which deserves further consideration is to take into account the considerable overlap between LFAs and HNV areas, and to gradually transform the support scheme into a basic instrument to maintain and promote low-input farming systems. Finally, the Commission will make a proposal enabling Member States to make direct payments conditional on compliance with environmental provisions.

In section 6.4 the effects of some of the proposed adjustments described below will be assessed. The method used for these calculations is described in section 6.3.

Arable sector

With regard to the arable sector the impact of a reference rate for compulsory set-aside of 0% will be assessed. The proposed reform with regard to silage cereals (maize for silage) and protein crops is not elaborated in this study. The loss due to termination of the maize for silage regime will probably be modest since the area under such crops is limited at HNV farming systems.

Beef sector

Since it is not clear yet how the different mechanisms governing headage payments and favouring extensification will be adapted no calculations are made on the higher level of headage payments. Instead some sensitivity analyses are made on the additional premium producers may qualify for if they stock

below a certain livestock density threshold. It is likely that the HNV farming systems will benefit from the increase in the level of headage payments. These systems are often more extensive systems. The level of the dairy cow premium will probably partly be based on the milk production. It aims to compensate the decrease in the production value of milk and meat and the termination of the silage maize regime. The levels of the premium are not determined yet, therefore the dairy cow premium is not assesseed in this research.

Sheep sector

The overlap between LFAs and HNV areas is considered in this chapter. The present 'rural world' supplementary premium for ewes, for which producers in all the LFAs are eligible, is converted in this chapter into a payment targeted more precisely at HNV areas.

Agri-environmental measures

Attention will be paid to the optimal use of agri-environmental measures. Different criteria for payments will be assessed. The use of forage hectares as a basis for support of the agri-environmental measure payments will be discussed. The concept of the so-called 'adjusted forage hectares' proposed by Goss (1997) is explained.

6.3 Method used to calculate alternative support

In this section the method used to calculate allowances based on adjustments in market and price policies will be explained. Secondly, different criteria for agri-environmental measure payments will be described. Finally, attention is paid to the 'carrying capacity' of the area. The results of these assessments are presented in section 6.4.

Adjustments in market and price policies

- *Arable sector*

In Agenda 2000 a reference rate for compulsory set-aside of 0% is proposed, this means that there is no set-aside obligation. The impact of such a change has been assessed for the HNV farming systems selected in the study areas.

- *Beef sector*

According to the 1992 CAP reform producers may qualify for an additional premium on top of any beef and suckler cow premium claims if they stock below the threshold of 1.4 LU (including dairy cows, suckler cows, male cattle and ewes) per hectare of forage crops. In practice, many producers who would not be considered extensive in the normal sense of the word qualify for this aid so it does not appear an effective means of targeting producers in HNV

areas. However, it would be possible to formulate additional policy which targets premiums more precisely on farmers employing more extensive systems, including HNV farmers. A sensitivity analysis on the additional beef premium payment is done with different livestock density thresholds and levels of additional premium. Two different schemes are assessed: scheme A and B. In both schemes the premiums are cumulative. For example under scheme A, farmers are eligible for a premium of 30 ecu per animal if they stock at a density of less than 1.4 LU per hectare. If they meet the 1 LU per hectare density they are eligible for an additional 30 ecu per animal on top of the other 30 ecu per animal. If they even meet the 0.75 LU per hectare threshold they receive 30 ecu per animal on top of the other 60 ecu and so on. Under scheme A referred to as 'additional beef premium A' the following premiums and thresholds are assessed:

- a threshold of 1.4 LU per hectare for an additional premium of 30 ecu per animal (see chapter 5);
- a threshold of 1.0 LU per hectare for an extra additional premium of 30 ecu per animal;
- a threshold of 0.75 LU per hectare for an extra additional premium of 30 ecu per animal;
- a threshold of 0.5 LU per hectare for an extra additional premium of 30 ecu per animal.

Recently, producers may qualify for an additional premium of 36 ecu per animal on top of any beef and suckler cow premium claims if they stock at less than 1.5 LU per hectare. From 1997 onwards, a further claim of 52 ecu is allowed if stocking is at less than 1 LU per hectare. An even further claim of 85 ecu on top of the 36 and 52 ecu per animal is assumed if the threshold of 0.5 LU per hectare is met. Under scheme B referred to as 'additional beef premium B' the following premiums and thresholds are assessed:

- a threshold of 1.5 LU per hectare for an additional premium of 36 ecu per animal;
- a threshold of 1.0 LU per hectare for an extra additional premium of 52 ecu per animal;
- a threshold of 0.5 LU per hectare for an extra additional premium of 85 ecu per animal.

Other adjustments which are not assessed might be too alter the formula for deriving total livestock density on a farm. Another option could be to introduce rules specifying the type of forage which would need to be grown on the farm in order to qualify for premium. Rules on forage crops could be devised in such a way as to aid farmers reliant mainly on grass or other semi-natural vegetation and to reduce or withdraw the premium from those growing significant areas of maize.

- *Sheep sector*

The present 'rural world' supplementary premium, for which producers in all the LFAs are eligible, could be converted into a payment targeted more

precisely at HNV areas. This would require the introduction of new criteria and might necessitate appropriate rules to allow some flexibility according to variations in regional conditions. The impact of such a conversion on the additional ewe premiums of HNV farming systems has been assessed in this study.

Agri-environmental measures

As the Member States increase their expenditure on agri-environmental schemes, most of which now fall within Regulation 2078/92, they are becoming a more significant source of support for HNV farming systems. Although many schemes are designed primarily to compensate farmers for adopting or maintaining a practice which is desirable environmentally rather than to support farm incomes (Baldock et al., 1996). With many schemes only coming into operation in 1996 it is too early to estimate the area of land affected or the extent to which schemes under the Regulation will assist the viability of farms in marginal areas or promote environmentally sensitive practices. Nevertheless, it is interesting to see how different bases for payments under Regulation 2078/92 work out, assuming an optimal use of allowances. This will provide insight into the amount of support farms might be eligible for on the basis of different bases for payments under this regulation.

The total amount of payments farms are eligible for is the product of the basis times the level of payments. There are different levels of compensation possible (constant, increasing, etcetera). A step-wise decreasing level of compensation payments based on the grazing livestock density per hectare of forage crops would for example compensate extensive farms more than proportionally, whereas over-stocking is not stimulated.

Different criteria for agri-environmental measure payments are compared. The support of the various bases for agri-environmental measure payments provided to HNV farming systems is presented in section 6.4. Below the advantages and disadvantages of the various bases for payments: per farm, per hectare UAA, per grazing livestock unit, per grazing livestock density, per hectare forage crops and per 'adjusted forage hectare' are described.

- *Payments per farm*

A fixed amount of agri-environmental measure payments per farm provides equal allowances for all farms, whereas Regulation 2078/92 aims to compensate farms for any income losses for the part they play in improving the environment. Since it is not likely that all farms play a similar role, this basis seems to be not specific enough. A payment of 1,000 ecu per farm is assessed.

- *Payments based on the average UAA per farm*

An advantage of payments based on the average UAA per farm is that support is not linked to production and will not stimulate overgrazing. A payment of 50 ecu per hectare of UAA is assessed.

- *Payments based on the number of grazing livestock units per farm*

Production-oriented support, like payments based on the number of LU per farm, can increase the production and stimulate overgrazing unless adequate ceilings are set. A payment of 50 ecu per grazing livestock unit is assessed.

- *Payments based on the grazing livestock density per hectare forage crops per farm*

Support based on the livestock density can restrict intensification and avoid abandonment. This basis is not assessed. Sensitivity analysis on livestock density thresholds are discussed before in this section.

- *Payments based on the average forage area per farm*

An advantage of payments based on the average forage area per farm is that support is not linked to production and to other crops. A payment of 50 ecu per hectare of forage crop is assessed.

- *Payments based on the 'adjusted forage hectares'*

A derived alternative of the average area of forage crops per farm are the so-called 'adjusted forage hectares' which is proposed by Goss (1997). According to Goss, whether setting an area payment or a stocking rate limit, a hectare of rough hill grazing cannot be compared with a hectare of fertilised temporary grass ('it is the same as comparing a lamb and a dairy cow'). He proposes the use of 'adjusted forage hectares', based on relative forage productivity, to compare different types of grassland (in the same way as grazing livestock units compare different types of stock). The 'adjusted forage area' can be calculated on the basis of the total areas under each kind of forage (which are available from the FADN). For each forage category a 'productivity coefficient' appropriate for the region, based on permanent grass is 1 has to be set. Local information should be used in setting these figures. An illustration is shown for the United Kingdom (Goss, 1997). In this illustration the 'productivity coefficients' for arable forage crops is 1.5, for temporary grass 1.3, for permanent grass 1, for rough grazing (sole rights) 0.40 and for common grazing 0.35. However, it is clear that temporary grass has a far lower natural value than permanent grass, rough razing and common grazing. So, even if these higher coefficients are justified from a viewpoint of fair compensation, provisions should be included to avoid the ploughing up of existing permanent grassland. The 'adjusted forage area' for each region can be derived by aggregation of the area of each forage category times its 'forage productivity coefficient'. A correction is made on the 'adjusted forage area' for the estimated forage area currently used by dairy cows, it is subtracted from the 'adjusted forage area'.

In this study first the 'adjusted forage hectares' are approached, just as an example of another basis for support. The 'productivity coefficients' of the UK have been used (instead of region-specific coefficients). Common grazing is not considered as forage area in the analysis here (only the number of grazing days on common pastures is available from FADN, see table 3.7). Mainly at Pindos Mountains_sheep farms the forage area would increase considerably in

case common grazing would have been considered. Fallow lands are treated as arable forage crops, because mainly arable lands are left fallow. No correction has been made on the 'adjusted forage area' for the estimated forage area currently used by dairy cows. A payment of 50 ecu per 'adjusted forage hectares' is assessed.

Carrying capacity of the area

Farmers can be encouraged to maintain appropriate grazing pressures by means of premiums. In order to receive such premiums some management requirements can be set out which take account of the 'carrying capacity' of the area. For example, minimum and maximum livestock density limits appropriate for the region, based on the 'carrying capacity' of the region can be set, which need to be met in order to receive area payments. Livestock density threshold requirements have to be determined with great care. The livestock density at the farm might increase in case the livestock density threshold required for premium exceeds the actual livestock density at the farm. This can be avoided by restricting the total number of premiums on the basis of reference numbers. Another possibility is to determine fixed livestock densities at farm level. In case livestock density is too low, a minimum limit can be set which has to be met in order to receive premiums. The 'carrying capacity' cannot be derived so straight forward. A 'carrying capacity' derived from the roughage production per hectare seems to be inappropriate, since the 'carrying capacity' of the area will increase in case mineral fertilizer is used. However, then the natural value will decrease, over 50 kg N/ha even very significantly. Therefore, the carrying capacity approach is only suitable for farms where no or low fertilizer input has already been agreed. It is recommended to determine the 'carrying capacity' of the area on the basis of indicators like climate conditions, length of the growing season, altitude and livestock occupation during the year or in the case of agreed low-input management on dry matter production per soil type on a regional and local basis. No figures are available on this kind of indicators in the European data sources used in this study, the 'carrying capacity' concept is not further elaborated in this study.

6.4 Assessment of alternative agricultural policies

The results of the assessments and sensitivity analysis discussed in section 6.3 are presented in this section. The impact of adjustments in the requirements for direct subsidies and of optimal use of agri-environmental payments under various bases for payments on HNV farming systems will be shown.

Adjustments in market and price policies

- *Arable sector*

In order to know what the impact of abolition of the set-aside obligation might be, first insight is provided into the number of small-scale producers,

farmers which produce less than 92 tonnes of cereals, pulses and oilseeds. From these calculations it became clear that in most study areas all or almost all farmers are small-scale producers (these farms have no set-aside obligation). There are a few exceptions to this. At Black Forest_dairy, Jura_dairy, Spanish Drylands_cereal, Dehesas_mixed and Limousin_cattle farms respectively 29, 31, 37, 17 and 16 per cent of the farms produce more than 92 tonnes. These farms have a set-aside obligation in order to receive compensation on a per hectare basis, in case they do not apply for the small-scale producers scheme. Mainly at these farms changes can be expected in case there is no set-aside obligation anymore. Although voluntary set-aside will still be possible, this possibility is not considered in the assessment made. Assessment of a set-aside rate of 0% shows that the largest changes in the arable premium farms are eligible for take place at Spanish Drylands_cereal, changes are about 220 ecu per farm (figure 6.1, the second part of the first bar shows the changes in arable premium, the first part is the arable premium assessed in chapter 5). All other changes are less than 70 ecu per farm.

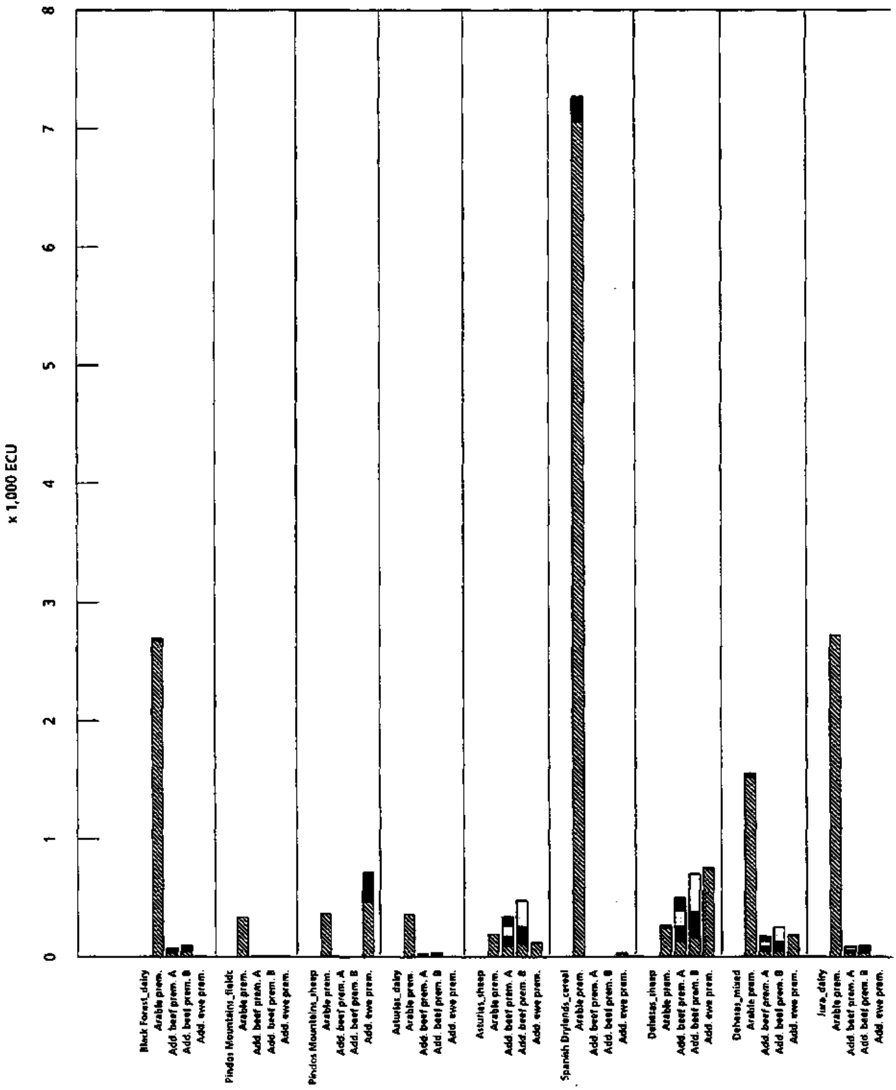
- *Beef sector*

The share of farms with a density below the threshold density is shown in table 6.1. The results of the sensitivity analysis on the additional beef premium are presented in figure 6.1. The second bar shows 'additional beef premium A' and the third bar 'additional beef premium B'.

Table 6.1 Share of farms below the threshold density (%) (average 1990/91-1991/92)

Study area	1.5 LU/ha	1.4 LU/ha	1.0 LU/ha	0.75 LU/ha	0.5 LU/ha
Black Forest_dairy	99	97	78	37	.
Pindos Mountains_fieldc	93	93	92	91	91
Pindos Mountains_sheep	18 a)	18	16	16	16
Asturias_dairy	62	55	32	20	13
Asturias_sheep	69	69	68	67	56
Spanish Drylands_cereal	99	99	98	98	97
Dehesas_sheep	82	82	79	77	69
Dehesas_mixed	55	55	48	47	41
Jura_dairy	100	100	100	96	35
Limousin_cattle	100	99	91	44	.
Lozère_cattle	91	91	88	85	.
Lozère_sheep	100	100	100	99	85
Valle d'Aosta_dairy	71	66	55	38	23
Calabria_olive	100	99	98	98	97
Dutch Peatlands_dairy	98	86	9	0	0
Scottish Highlands_sheep	100	100	99	96	82

a) Livestock grazes on common pastures; these areas are not considered in the UAA; this distorts figures on a per hectare basis.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.



x 1,000 ECU
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Black Forest_dairy
Arable prem.
Add. beef prem. A
Add. beef prem. B
Add. ewe prem.
Pindos Mountains_field
Arable prem.
Add. beef prem. A
Add. beef prem. B
Add. ewe prem.
Pindos Mountains_sheep
Arable prem.
Add. beef prem. A
Add. beef prem. B
Add. ewe prem.
Asturias_dairy
Arable prem.
Add. beef prem. A
Add. beef prem. B
Add. ewe prem.
Asturias_sheep
Arable prem.
Add. beef prem. A
Add. beef prem. B
Add. ewe prem.
Spanish Drylands_cereal
Arable prem.
Add. beef prem. A
Add. beef prem. B
Add. ewe prem.
Dehesas_sheep
Arable prem.
Add. beef prem. A
Add. beef prem. B
Add. ewe prem.
Dehesas_mixed
Arable prem.
Add. beef prem. A
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Add. ewe prem.
Jura_dairy
Arable prem.
Add. beef prem. A
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Add. ewe prem.

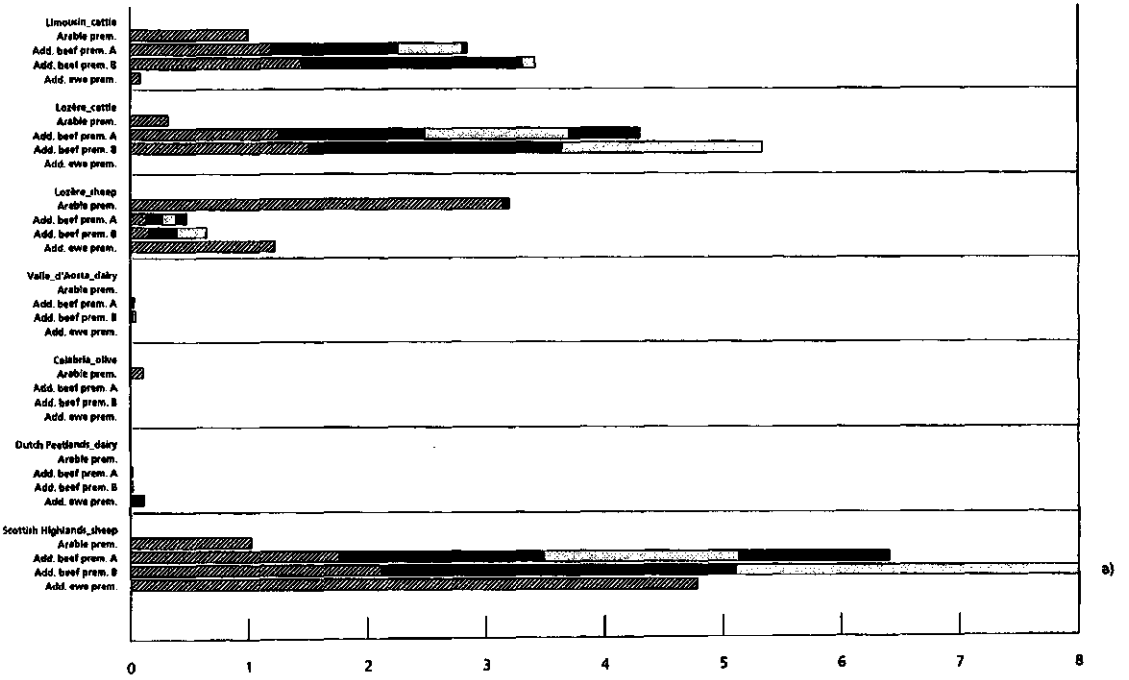


Figure 6.1 Adjustments in the requirements for direct payments: arable premium if the set-aside obligation is abolished (first bar), additional beef premium A (second bar, first part; 30 ecu per animal if the threshold of 1.4 LU/ha is met, second part; 30 ecu if 1.0 LU/ha is met, third part; 30 ecu if 0.75 LU/ha is met and fourth part; 30 ecu if 0.5 LU/ha is met), additional beef premium B (third bar, first part; 36 ecu per animal if the threshold of 1.5 LU/ha is met, second part; 52 ecu if 1.0 LU/ha is met and third part; 85 ecu if 0.5 LU/ha is met) and additional ewe premiums for all HNV farms (fourth bar) (average 1990/91 - 1991/92).

a) additional beef premiums Scottish Highlands_sheep farms are eligible for are not fully presented. The total 'additional beef premium B' is 8,730 ecu of which 3,620 ecu on the basis of a threshold of 0.5 LU/ha for an additional premium of 85 ecu.

Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

- *Additional beef premium A*

In accordance with the 1992 CAP reform farms receive an additional beef premium for male cattle and suckler cows of 30 ecu per animal if stocking density is less than 1.4 LU per hectare (first part of the second bar). The maximum additional amount of beef premiums farms are eligible for under these requirements can be considered as a kind of base. The results of this base situation have already been discussed in section 5.4. The share of farms, with a livestock density less than 1.4 LU/ha, is only less than 70 per cent in Asturias and at Dehesas_mixed and Valle d'Aosta_dairy farms.

A lower livestock density threshold of 1 LU/ha for an additional level of premium of 30 ecu per animal (second part of the second bar) provides an amount of premium of an equal or somewhat smaller size than the 1.4 LU/ha premium. The amount of additional beef premium farms are eligible for almost doubles. Around 86 per cent of the Dutch Peatlands_dairy farms can fulfill the 1.4 LU/ha requirement, whereas only 9 per cent can fulfill the 1.0 LU/ha threshold. It hardly affects the premium. Dutch Peatlands_dairy farms are only eligible for a small additional beef premium under the 1.4 LU/ha threshold, since they have a considerable number of dairy cows.

A premium of 30 ecu per animal if livestock density is less than 0.75 LU per hectare (third part of the second bar) provides an amount of premium of an equal or somewhat smaller size than the 1.0 LU/ha premium. Except at Limousin_cattle farms, where the premium is considerably less. Around 91 percent of the farms in this region can fulfill the 1.0 LU/ha requirement, whereas only 44 per cent can fulfill the 0.75 LU/ha threshold. At Black Forest_dairy farms the share of farms which can fulfill the required threshold is also reduced considerably, from 78 to 37 per cent.

A further reduction of the livestock density threshold to a level of 0.5 LU/ha for the same level of premium of 30 ecu per animal (fourth part of the second bar) increases the total additional beef premium mainly at Asturias_sheep, Dehesas_sheep, Lozère_cattle, Lozère_sheep and Scottish Highlands_sheep farms.

- *Additional beef premium B*

A premium of 36 ecu per animal if livestock density is less than 1.5 LU per hectare (first part of the third bar), increases the amount of additional beef allowances compared to the base situation. Payments mainly increase in Limousin, Lozère and in the Scottish Highlands, not because of a higher share of farms eligible for an additional premium, but because of the higher level of the premium per animal (36 instead of 30 ecu). The share of Dutch Peatlands_dairy farms eligible for premium is 12% higher compared to the 1.4 LU per hectare density.

A further claim of 52 ecu per animal is allowed if stocking density is less than 1 LU/ha (second part of the third bar). This will provide a 'supplementary' additional beef premium on top of the above shown 36 ecu premium per animal when livestock density is less than 1.5 LU per hectare. This increases the total additional beef premium considerable.

A further claim of 85 ecu premium per animal if stocking density is less than 0.5 LU/ha (third part of the third bar) increases the total additional beef premium mainly at Lozère_cattle and Scottish Highlands_sheep farms (more than 1,500 ecu). It increase the total additional beef premium to a lesser extend in Asturias_sheep, Dehesas_sheep and Lozère_sheep (more than 200). Premium allowances for Asturias_sheep, Dehesas_sheep and Scottish Highlands_sheep farms even doubled compared to the base. However, at Limousin_cattle farms the amount of premium farms are eligible for reduced considerable. In this region only a very low share of the farms have a livestock density less than 0.5 LU/ha. This threshold targets the farmers employing extensive systems more precisely.

Additional beef premiums Scottish Highlands_sheep farms are eligible for under the 'additional beef premium B' are not fully represented in figure 6.1, otherwise differences between other bars could hardly be observed.

- *Sheep sector*

The present 'rural world' supplementary ewe premium (of 5.5 ecu per animal), for which producers in all the LFAs are eligible is converted here into a payment targeted more precisely at all HNV areas. The additional payments for ewes mainly increases at farming systems with ewes in HNV study areas which are only partly considered as LFAs (see table 3.7). The additional ewe premium farms are eligible for increases with 250 ecu per farm at Pindos Mountains_sheep farms and with 120 ecu per farm at Dutch Peatlands_dairy farms (figure 6.1, the second part of the fourth bar shows the changes in additional ewe premium, the first part is the additional ewe premium assessed in chapter 5). The increase in the additional ewe premium is less than 10 ecu in all other study areas, since large parts of these areas are LFAs and therefore farmers were already eligible for an additional ewe premium.

Agri-environmental measures

- *Payments per farm*

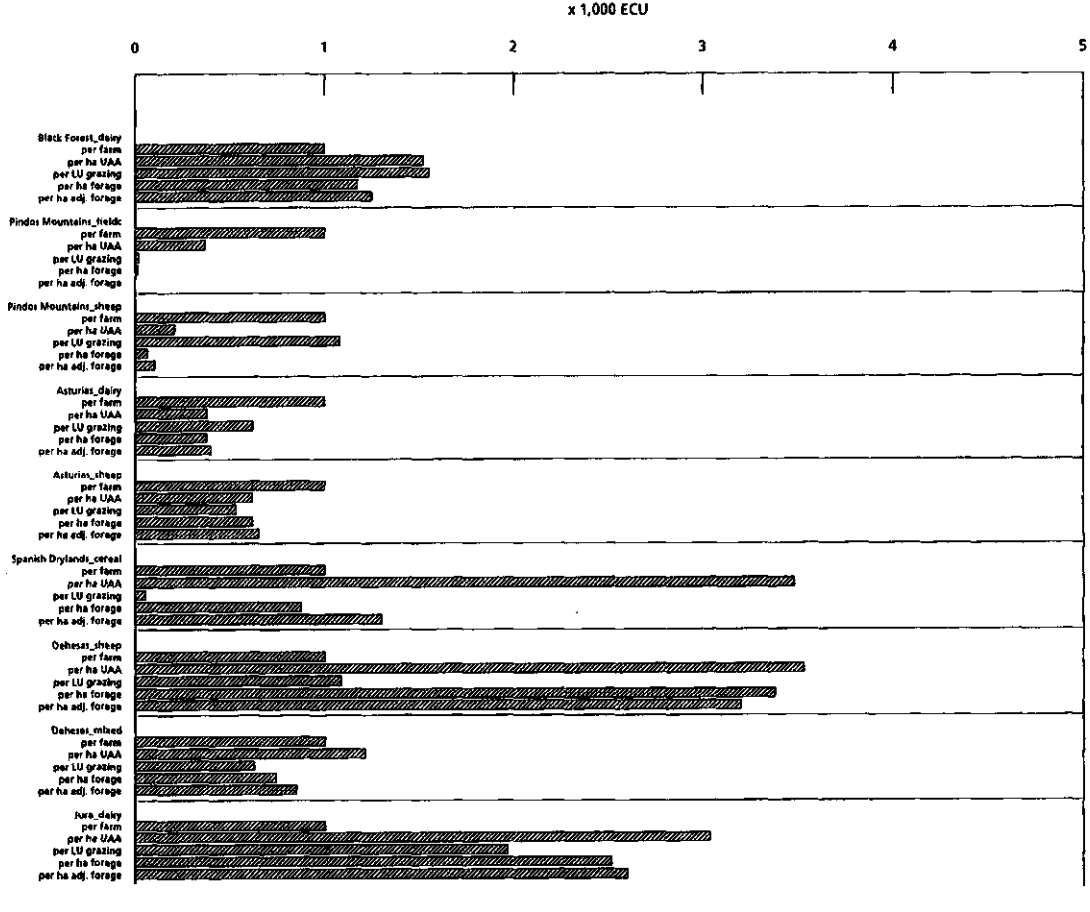
Fixed payments of 1,000 ecu per farm provide equal allowances for all farms in all study areas. This payment is presented in figure 6.2, the first bar of each study area.

- *Payments based on the average UAA per farm*

Payments per hectare UAA are presented in figure 6.2, the second bar. It provides relatively low payments to the Pindos Mountains, Asturias and Calabria and extremely high payments to Lozère_sheep farms and Scottish Highlands_sheep farms. These extremely high payments farms are eligible for are not fully presented, otherwise differences between bars could hardly be observed.

- *Payments based on the number of grazing livestock units per farm*

The total number of grazing livestock units per farm is less than 50 in all study areas with the exception of the Scottish Highlands. Allowances for Scot-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Black Forest_dairy
per farm
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per LU grazing
per ha forage
per ha adj. forage
Pindos Mountains_fieldc
per farm
per ha UAA
per LU grazing
per ha forage
per ha adj. forage
Pindos Mountains_sheep
per farm
per ha UAA
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Asturias_dairy
per farm
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per ha UAA
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per ha adj. forage
Spanish Drylands_cereal
per farm
per ha UAA
per LU grazing
per ha forage
per ha adj. forage
Dehesas_sheep
per farm
per ha UAA
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Dehesas_mixed
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Jura_dairy
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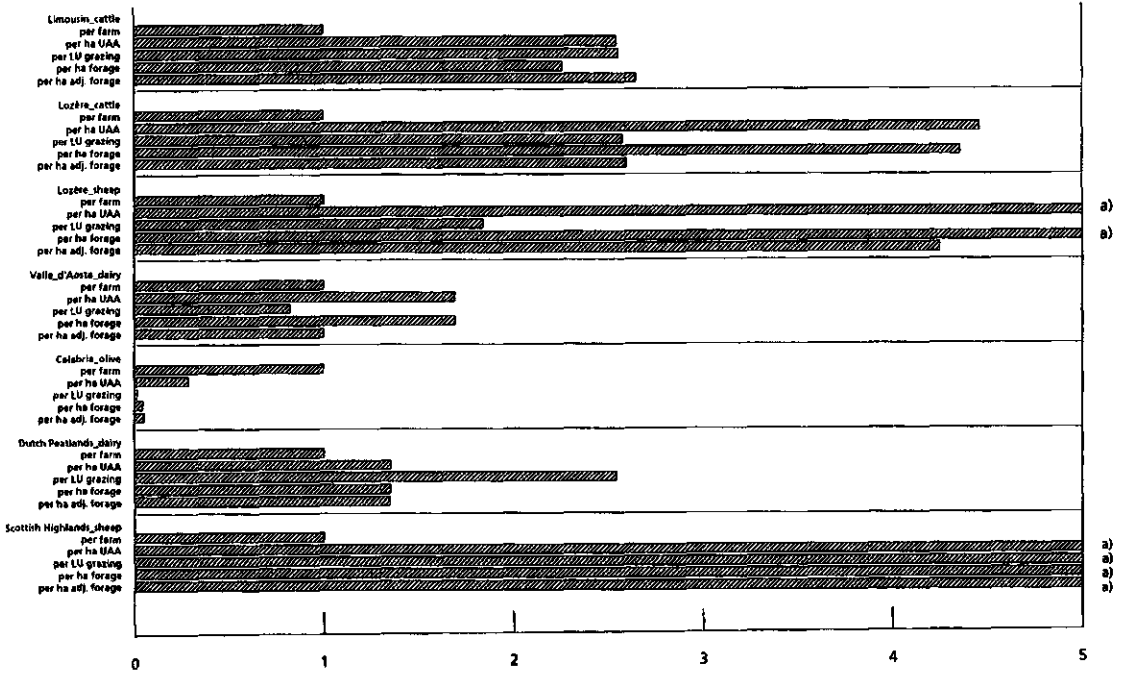


Figure 6.2 Optimal use of agri-environmental payments under different bases for payments of: 1,000 ecu per farm (first bar), 50 ecu per hectare of UAA (second bar), 50 ecu per grazing livestock unit (third bar), 50 ecu per hectare of forage crops (fourth bar) and 50 ecu per hectare of adjusted forage (fifth bar) (average 1990/91 - 1991/92)

a) agri-environmental payments based on the number of hectares are not fully presented for Lozère_sheep and Scottish Highlands_sheep farms. At Lozère_sheep payments based on the UAA are 6,750 ecu and based on the forage hectares 6,350 ecu. At Scottish Highlands_sheep farms payments based on the UAA, number of grazing livestock units, forage area and adjusted forage area are respectively 44,400 ecu, 12,000 ecu, 44,100 ecu and 20,600 ecu.

Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

tish Highlands_sheep farms are again extremely high (12,000 ecu) and not fully presented (third bar).

- *Payments based on the average forage area per farm and the 'adjusted forage hectares'*

In some study areas substantial differences can be observed between payments based on the number of forage hectares per farm (figure 6.2, fourth bar) and the number of 'adjusted forage hectares' (figure 6.2, fifth bar). The bars for the Scottish Highlands are not fully presented. At sheep, goats and other grazing livestock farms in Scotland the average number of forage hectares per farm is around 880 hectare, the 'adjusted forage hectares' amount 410 hectares. This substantial difference can be explained by the fact that rough grazing covers 90 per cent of the UAA of these farms, whereas a forage 'productivity coefficient' of 0.4 has been used for rough grazing. Payments based on the number of forage hectares at Lozère_sheep farms are also not fully presented, the amount of payments is 6,350 ecu. The 'adjusted forage hectares' are more than 35 hectares smaller compared to the average number of forage hectares in Lozère. This can also be explained by the fact that over 65 per cent of the UAA is under rough grazing at the farming types selected in this study area. This is also the case in Valle d'Aosta where the 'adjusted forage hectares' is 14 hectares smaller. In most study area the differences between the average number of forage hectares per farm and the 'adjusted forage hectares' are modest. The 'adjusted forage hectares' even exceed the average number of forage hectares per farm in most study areas. In Spanish Drylands the 'adjusted forage hectares' are even 9 hectares larger, arable forage crops cover a considerable share of the UAA, whereas a 'productivity coefficient' of 1.5 has been used for arable forage crops.

At Black Forest_dairy farms, the impact of differences in bases for payments on the allowances is limited (figure 6.2). Pindos Mountains_fieldc farms, which have hardly any grazing livestock and a small UAA are better off with a payment per farm. In the assessments made the common pastures are not considered. Pindos Mountains_sheep farms are therefore only eligible for small payments in case payments are based on the number of hectares at the farm. In fact we here have a serious problem, as common pastures are supposed to be of high natural value, because of their extensive use. Payments per grazing livestock unit are comparable to payments per farm in this region. In Asturias payments based on the number of hectares and grazing livestock units are less than the payment of 1,000 ecu per farm. Spanish Drylands_cereal farms will benefit from payments based on the average UAA per farm, payments per hectare of forage crops are less attractive. At Dehesas_sheep farms payments per hectare of UAA as well as per hectare of (adjusted) forage crops are relatively high. Payments per grazing livestock unit are comparable to a payment of 1,000 ecu per farm in this region. At Dehesas_mixed farms, the impact of differences in bases for payments on the payments are limited. At Jura_dairy, Limousin_cattle, Lozère_cattle and Lozère_sheep farms payments based on the number of hectares and grazing livestock units exceed payments per farm. Especially at Lozère_sheep farms payments based on the number of hectares are

considerable. At Valle d'Aosta_dairy farms the impact of differences in bases for payments on the allowances is limited. Calabria_olive farms, which have hardly any grazing livestock and a small UAA are better off with payments per farm. At Dutch Peatlands_dairy farms payments per grazing livestock unit are preferred. Scottish Highlands_sheep farms benefit considerably from payments based on the number of hectares per farm. Payments based on the number of grazing livestock units are also considerable.

6.5 Concluding remarks

1. It is likely that HNV farming systems will benefit from the proposed adjustments in the CAP, described in Agenda 2000. These systems are often the more extensive systems, which can fulfill the environmental requirements in order to receive premium. Losses due to the termination of the maize for silage premium will be modest, since the area under this crop is limited. Besides it is likely that HNV farming systems will benefit from the increase in the budget for agri-environmental measures. Finally, Agenda 2000 also proposes to transform the support scheme of LFA into an instrument to maintain and promote low-input farming.
2. In this chapter some feasible adjustments in the CAP are assessed. Abolition of the set-aside obligation does not affect a large proportion of the HNV farms and consequently the average increase in the allowances farms are eligible for is modest.
   A sensitivity analysis on the livestock density threshold required to receive an additional premium indicates that a very low density threshold of 0.5 LU/ha is mainly met at sheep, goats and other grazing livestock farms. At specialized cattle-rearing and fattening farms, the additional premium is modest at such a low livestock density threshold. More than 50% of the Asturias_dairy, Dehesas_mixed and Dutch Peatlands_dairy farms have a density of less than 1.4 LU/ha, whereas, more than 50% of the Black Forest_dairy, Limousin_cattle and Valle d'Aosta_dairy farms have a density of less than 1.0 LU/ha. In all other study areas livestock density is, at the farming types selected, less than 0.75 LU/ha.
   An additional ewe premium targeted more precisely at all HNV areas increases the ewe premium at farming systems with ewes in HNV areas which are only partly considered as LFA, like in HNV areas in the Netherlands. In most HNV areas the share of LFA in total UAA is considerable and consequently the impact is modest.
3. The basis for the agri-environmental payments is a determining factor for the amount of allowances farms are eligible for. A number of criteria for payments and their advantages and disadvantages are described below. Instead of this kind of bases for payments, allowances can also be attached to the HNV results achieved, like the number of species.
   - A fixed payment per farm provides equal allowances per farm, whereas the regulation aims to compensate farms for any income

losses for the part they play in improving the environment. This basis seems to be not specific enough.

- Payments based on the average UAA per farm do not support production. However, these payments can be extremely high in case the farm size is large. Whether such a premium is too high depends on the associated losses in income the premium aims to compensate for. The level of the premium has to be so high that it is interesting for farms to maintain the high natural value of the area.
- Payments based on the number of grazing livestock units can increase the production and stimulate overgrazing unless adequate ceilings are set. Payments vary largely among study areas and are extremely low at arable farms.
- Payments based on the 'adjusted forage area' are more conform to the intensity of usage compared to premiums based on the forage area. Again payments can be extremely high in case the farm size is large.

4. The livestock density limit which has to be met in order to receive an (additional) beef premium does not correspond to the 'carrying capacity' of the area for a number of reasons. Only a limited number of animals is considered in this density limit: dairy cows, suckler cows, male cattle and ewes. So, this density threshold does not reflect real livestock density. Besides, the density threshold is not differentiated by region. In regions with a low 'carrying capacity' a similar density threshold is set as in regions with a high 'carrying capacity'.
5. It is important to take care of the way environmental aspects are incorporated in policies, since they can provide wrong incentives. For example the livestock density at the farm might increase in case the livestock density threshold required for premium exceeds the actual livestock density at the farm. This can be avoided by restricting the total number of premiums on the basis of reference numbers. Another possibility is to determine fixed livestock densities at farm level or to set a lower livestock density threshold. In case livestock density is too low for HNV reasons, a minimum limit can be set, which has to be met in order to receive premiums.

7. POLICIES AND VIABILITY

7.1 Introduction

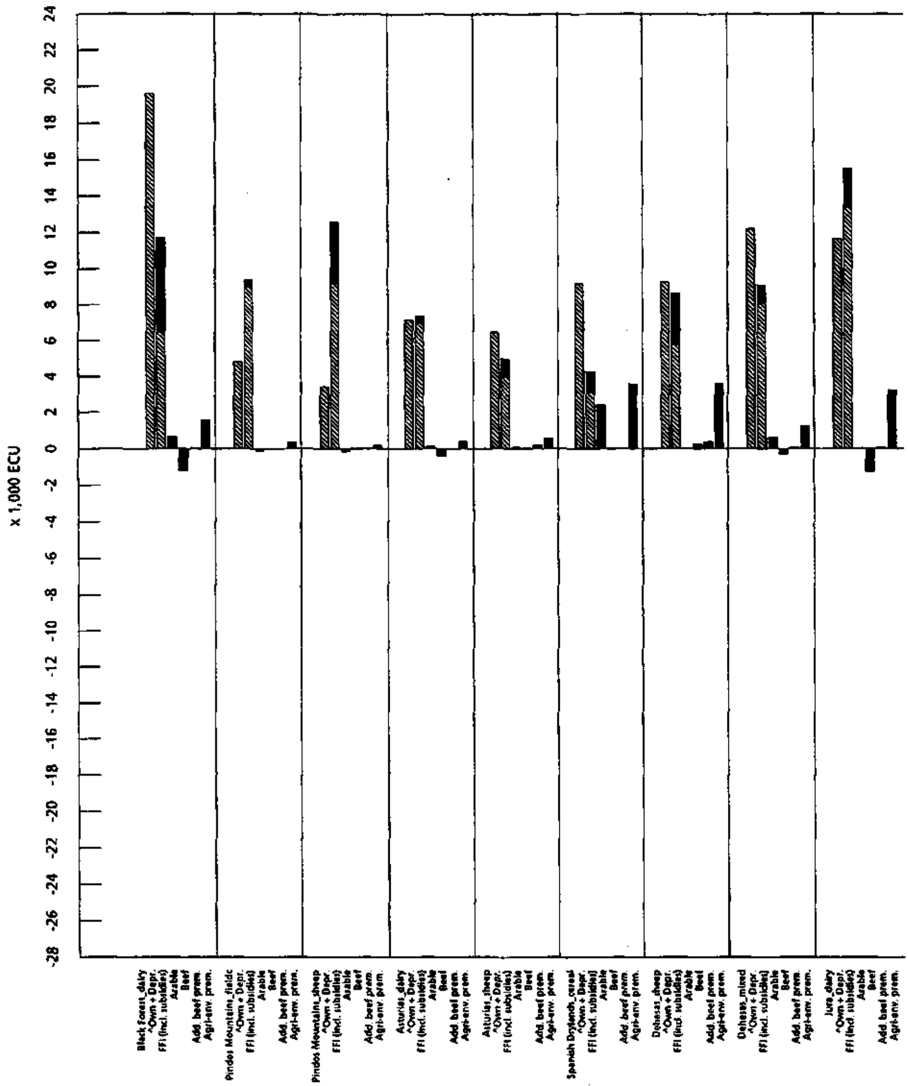
In this chapter an overview will be given of the support farms in HNV areas are eligible for on the basis of present and alternative agricultural policies in the EU. This support can increase the economic viability of farms in HNV areas which assists farms to maintain their current farming practices which are beneficial for the habitat. Support received cannot fully be accounted to an equal increase in savings and a more positive development of the own financial resources. An increase in support can provide incentives for higher private expenditures and a decrease in the income generated outside the farm. Nevertheless, allowances received can support farms to keep the farm viable or make the farms which are considered to be at risk, viable again. In this chapter insight will be provided into the present and alternative agricultural policy support farms are maximal eligible for in relation to the development of the own financial resources of the farm plus depreciating relating to replacement-cost value and the family farm income.

In section 7.2 the different kinds of allowances supporting HNV faming systems, which will be considered in this chapter will be summarized. In section 7.3 an overview is provided of the development of the own financial resources plus depreciation relating to replacement-cost value (which is used as a yardstick for the viability of farms) and the Family Farm Income (assessed in chapter 4) in relation to the present and alternative policy measures support (assessed in chapter 5 and 6). In section 7.4 some concluding remarks are made on the viability of farms. Such an overview will indicate whether supplementary support is required to make farms economically viable.

7.2 Structure of support

The development of the own financial resources plus depreciating relating to replacement cost value, which is used in this research as an indicator for the economic viability of farms, is considered in the overview. At farms at risk this indicator is negative, whereas it is positive at farms considered to be viable. The FFI will also be considered in the overview, it reflects income generated from farm activities before the 1992 CAP reform. It is composed of output generated from farming practice and direct subsidies. Income generated from off farm activities is not included in the FFI.

With regard to present policy measures assessed in chapter 5 only the arable and beef premiums minus the decrease in production value of the market and price policy changes of the 1992 CAP reform are considered. Ewe pre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Black Forest_dairy
^Own + Depr.
FFI (incl. subsidies)
Arable
Beef
Add. beef prem.
Agri-env. prem.
Pindos Mountains_fieldc
^Own + Depr.
FFI (incl. subsidies)
Arable
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Add. beef prem.
Agri-env. prem.
Pindos Mountains_sheep
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Spanish Drylands_cereal
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Jura_dairy
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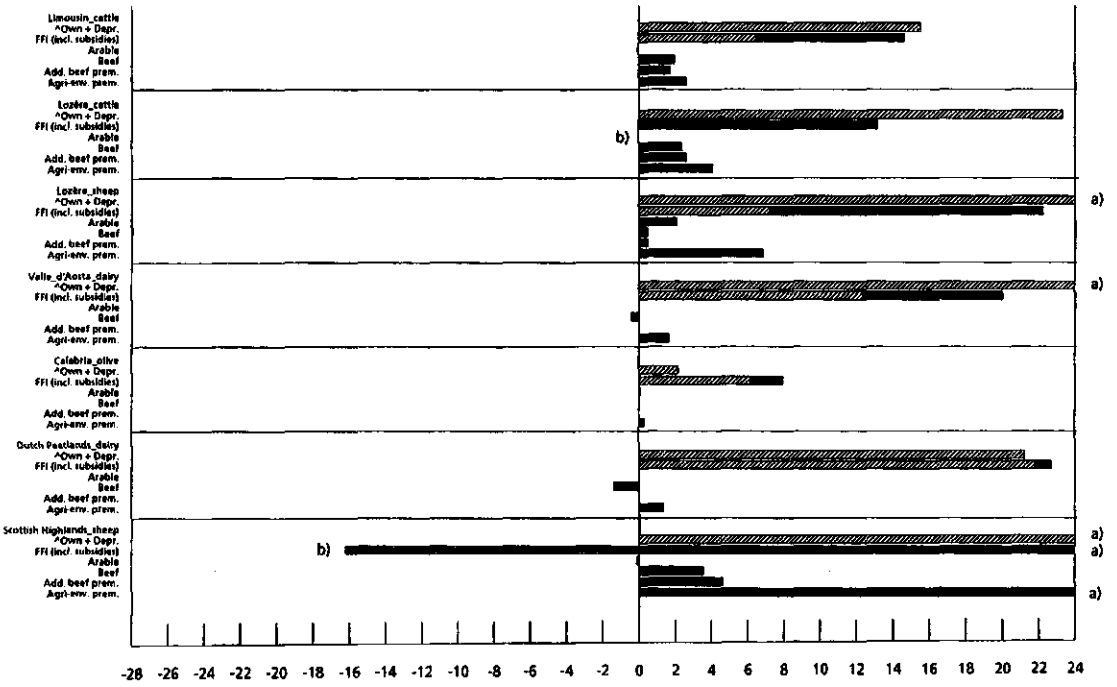
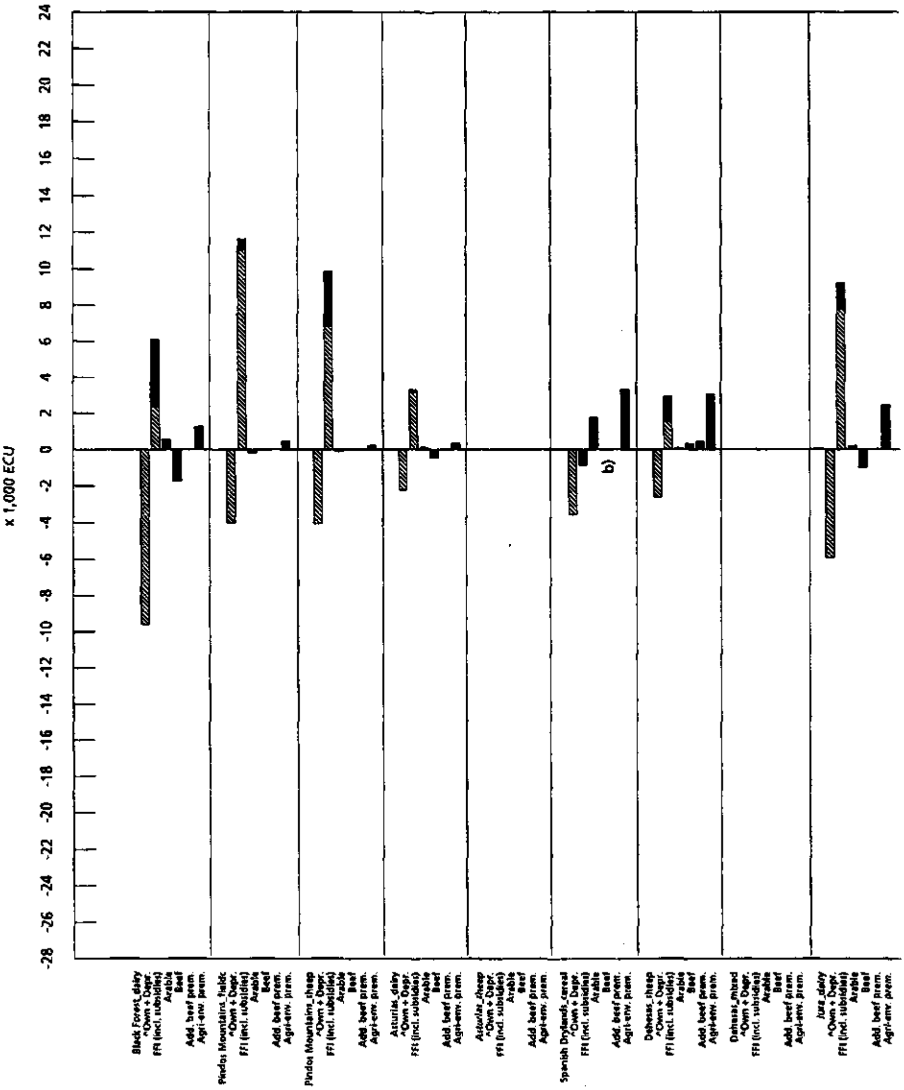


Figure 7.1 Development of own financial resources plus depreciation relating to replacement-cost value (first bar) and FFI (second bar, including the direct subsidies, the black part) of the category farms considered to be viable in relation to: the arable premium minus the decrease in production value (third bar), the beef premium minus the decrease in production value (fourth bar), an additional beef premium (fifth bar) and agri-environmental payments based on the UAA per farm (sixth bar)

a) The development of the own financial resource plus depreciation at Lozère_sheep (31,900 ecu), Vallle d'Aosta_dairy (24,800) and Scottish Highlands_sheep (34,300 ecu) farms is not fully presented. As well as the family farm income (25,100 ecu) and agri-environmental payments (43,250 ecu) at Scottish Highlands_sheep farms; b) The presented FFI includes subsidies. The FFI excluding subsidies can be negative (like at Scottish Highlands_sheep farms); the subsidies make FFI positive; C) The black parts of the bars are allowances.
Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.



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b)
Black Forest_dairy
^Own + Depr.
FFI (incl. subsidies)
Arable
Beef
Add. beef prem.
Agri-env. prem.
Pindos Mountains_sheep
Asturias_dairy
Asturias_sheep
Spanish Drylands_cereal
Dehesas_sheep
Dehesas_mixed
Jura_dairy

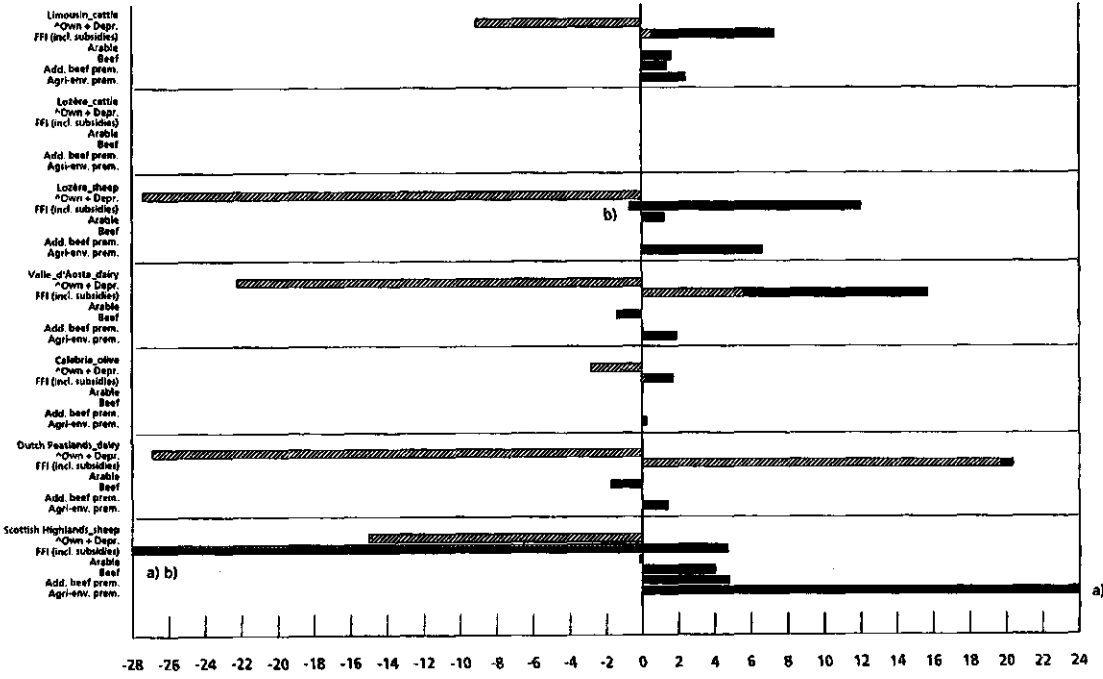

Figure 7.2 Development of own financial resources plus depreciation relating to replacement-cost value (first bar) and FFI (second bar, including the direct subsidies, the black part) of the category farms considered to be at risk in relation to: the arable premium minus the decrease in production value (third bar), the beef premium minus the decrease in production value (fourth bar), an additional beef premium (fifth bar) and agri-environmental payments based on the UAA per farm (sixth bar)

a) The FFI excluding subsidies (-32,700 ecu) and the agri-environmental payments (50,800 ecu) at Scottish Highlands_sheep farms are not fully presented; b) The presented FFI includes subsidies. At the Scottish Highlands_sheep farms and the Lozère_sheep farms the FFI excluding subsidies is negative; the subsidies make FFI positive. At Spanish Drylands_cereal farms FFI excluding and including subsidies is negative; C) The black parts of the bars are allowances.

Source: FADN-CCE-DG VI/A-3; adaptation LEI-DLO.

miums will not be presented. The 1992 CAP reform did not change the ewe premium drastically. Ewe allowances supported farms already, they are incorporated in the FFI before the 1992 CAP reform (assessed in chapter 4). For the same reason LFA premiums are also not presented, these allowances are also part of the FFI assessed in chapter 4.

With regard to the alternative policy measures assessed in chapter 6 only the 'additional beef premium A' allowances (excluding the existing additional beef premium based on the 1.4 LU/ha threshold) and the agri-environmental payment based on the number of hectares UAA per farm are considered. Existing agri-environmental schemes available in the study areas, like summarized in Appendix 5, are mainly based on payments per hectare. The other agri-environmental payments assessed in chapter 6 are not considered in the overview provided in this chapter. Adjustments in the arable and sheep sector assessed in chapter 6, had only a modest impact on the arable and ewe allowances and are therefore not considered in the overview presented in this chapter.

7.3 Overview of support and viability

In this section an overview will be provided of the support the category viable farms (figure 7.1) and farms at risk (figure 7.1) receive. The development of the own financial resources plus depreciation relating to replacement cost value (first bar) is positive in figure 7.1 for all farms since on the basis of this yardstick farms are considered to be either viable or at risk (section 4.2). The FFI (second bar) is positive as well in all study areas. It is composed of output generated from farming practice and direct subsidies. The direct subsidies are presented by the black part of the FFI bar. In figure 7.1 and 7.2 allowances and allowances minus the decrease in production value are presented by black bars. At most viable farms present and alternative policy measure allowances (third, fourth, fifth and sixth bar) are small compared to the development of the own financial resources of the farm plus depreciation. At Spanish Drylands_cereal, Dehesas_sheep, Limousin_cattle, Lozère_cattle, Lozère_sheep and Scottish Highlands_sheep farms it is the other way round, allowances are relatively large and provide significant support to farms. Although farms are considered to be viable already, these payments allow these farms to stay viable and maintain current farming practices which are beneficial for the habitat. Allowances are mainly limited in relation to the development of the own financial resources plus depreciation at specialized dairy farms.

Figure 7.2 shows the allowances farms at risk are eligible for. The development of the own financial resources plus depreciation relating to replacement cost value (first bar) is negative for all farms. The FFI (second bar) is positive as well in most study areas, except at Spanish Drylands_cereal farms. Present and alternative policy measure allowances (third, fourth, fifth and sixth bar) are relatively large and provide significant support to Spanish Drylands_cereal, Dehesas_sheep, Limousin_cattle, Lozère_sheep and Scottish Highlands_sheep farms. At these farming types viable farms as well as farms at risk are eligible for considerable allowances in relation to the development of the

own financial resources of the farm plus depreciation. These allowances make the farms which are considered to be at risk, more viable. It has to be mentioned that direct subsidies before the 1992 CAP reform and agri-environmental payments are the biggest sources of support. In figure 7.3 an example is provided for two study areas, which explains figure 7.2 in more detail.

Assume farm A is a specialized dairy farm in the Black Forest and farm B is a specialized cattle-rearing and fattening farm in Limousin. The development of the own financial resources of the farm plus depreciation is negative at both farms (respectively -9,600 and -9,100 ecu); they are considered to be at risk. Both farms have a positive FFI of respectively 6,100 and 7,400 ecu. The share of direct subsidies in FFI is 62% in the Black Forest and 92% in Limousin (black part of second bar). At farm A the arable premium exceeds the decrease in the production value of arable with 600 ecu. At farm B both components are almost equal. The decrease in the production value of beef exceeds the beef premium at farm A with 1,750 ecu, whereas at farm B the beef premium exceeds the decrease in the production value of beef with 1,650 ecu. The introduction of an additional beef premium on top of the existing additional beef premium of 30 ecu per animal in case the threshold density of 1.4 LU per hectare is met is not significant (less than 25 ecu) at farm A, but it is amounts 1,400 ecu at farm B. The agri-environmental measure payments based on the number of UAA per farm provide allowances of respectively 1,250 and 2,400 ecu. So, farm A is in total eligible for considerably less allowances (600, -1,750 and 1,250 ecu) compared to farm B (1,650, 1,400 and 2,400). They both have, however, a comparable negative development of the own financial resources plus depreciation. At both farms the allowances are considerably less than this negative development, mainly at farm A. The allowances are considerable compared to the FFI at farm B. A higher level of agri-environmental payments per hectare of say 100 ecu per hectare of UAA instead of 50 ecu, could increase the allowances considerably. Farm A would be eligible for 600, -1,750 and 2,500 ecu and farm B for 1,650, 1,400 and 4,800 ecu. This improves the viability.

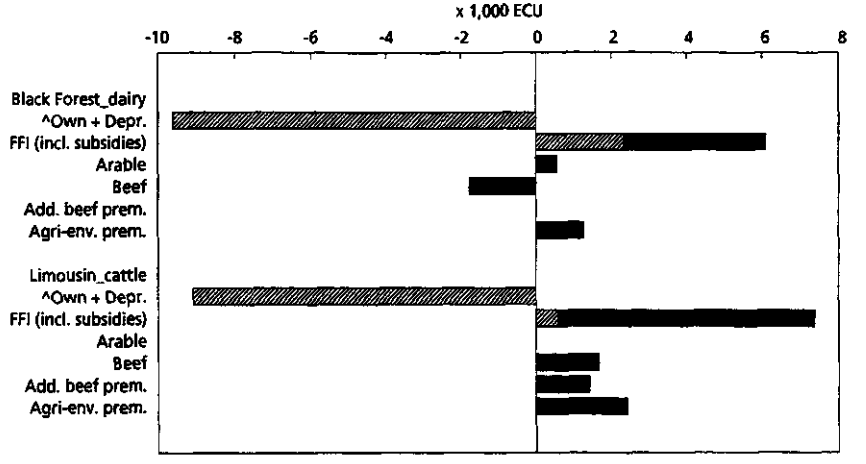

Figure 7.3 Examples of a specialized dairy farm in the Black Forest and a specialized cattle-rearing and fattening farm in Limousin; both are at risk

7.4 Concluding remarks

1. Direct subsidies before the 1992 CAP reform and potentially agri-environmental payments are the biggest sources of support for HNV farming systems. Market and price policy changes of the 1992 CAP reform did not alter significantly regarding their impact on the viability in all study areas. These changes have a negative impact at all specialized dairying farms selected in the study areas and in the Pindos Mountains. The support provided by a supplementary additional beef premium is also limited. It is only significant at Limousin_cattle, Lozère_cattle and Scottish Highlands_sheep farms.
2. It is important to notice that maximum allowances farms are eligible for are assessed, whereas often lower amounts will be received for several reasons. Besides in the assessments made no specific environmental requirements are attached to the agri-environmental payments made per hectare of UAA per farm. It aims to compensate farms for any increase in costs or decrease in output for the part they play in improving the environment, whereas there is not accounted here for any increase in costs nor for the decrease in output. It is assumed that HNV farming systems already fulfill the environmental requirements in order to receive premiums in most of these HNV areas.
3. Spanish Drylands_cereal, Dehesas_sheep, Limousin_cattle, Lozère_cattle, Lozère_sheep and Scottish Highlands_sheep farms are eligible for considerable allowances in relation to the development of the own financial resources plus depreciation. These farms have a relatively large area of land and low livestock density. This allows farms which are considered to be viable to stay viable and maintain current farming practices, which are beneficial for the high natural value of the area. Farms which are considered to be at risk are supported to become viable again. To what extent these farms become more viable is hard to estimate on the basis of support farms are eligible for. The change in private expenditures and income generated from outside the farm in response to higher levels of support farms receive is not known. Nevertheless, it is likely that higher levels of support have a positive impact on the viability of HNV farming systems.
4. Allowances are limited in relation to the development of the own financial resources plus depreciation at all specialized dairy farms assessed in the analysis. Mainly at specialized dairy farms considered to be at risk other adjustments in policy which support these farms are required to make these farms viable and to maintain the high natural value of the area. For example an increase in the level of agri-environmental payments can support these farms.

8. THE VISEGRAD COUNTRIES

8.1 Introduction

The Visegrad countries are now in a process of transformation of society and economy. They are preparing for accession to the European Union. So, it is very timely to start to investigate the relationship between agriculture and nature conservation in relation to EU accession. The traditional extensive agricultural systems in the Visegrad countries have in general a high natural value. They can be regarded as an important reservoir of many species that have disappeared or are under serious threat in Western Europe. These countries are gaining valuable experience in developing initiatives that aim to maintain the natural value of agricultural land. The International Union for Conservation of Nature and Natural Resources (IUCN) ecological network and other projects are directed at contributing to the revitalization of abandoned farmland, the integration of nature conservation objectives into policy sectors and the development of a rural development strategy. The ecological network projects propose several priorities for the further development of agri-environment policies in the Visegrad countries. The relevance of EU-policy measures for supporting HNV farming systems in the Visegrad countries is described in section 8.2. Present national policy measures affecting HNV farming systems in the Visegrad countries will be summarized in section 8.3. Finally, some concluding remarks are presented in section 8.4.

8.2 EU-policy measures and HNV farming systems in the Visegrad countries

There is insufficient information available from which to determine precisely which agricultural systems in the Visegrad countries are associated with high natural values. However, it is likely that most of them will be low-intensity systems, often under more traditional forms of management including hilly and mountainous areas, wet grassland, patches of traditionally managed and mixed farming and certain zones within protected areas. There appear to be concentrations of such systems in areas where the majority of land has not been collectivised and so restructuring and intensification has been more limited.

For Visegrad countries adaptation of national legislation to meet the obligations of the EU Directives is likely to be an important priority. The Visegrad countries can learn from the positive experience of agri-environment policies in the EU. There are several needs in order to conserve and enhance the natural value of agricultural land. These included the need for a high cofinan-

cing rate, capacity-building (education and training), closer international cooperation and financial and political support, from both the countries themselves and the EU. In view of the budgetary constraints in the Visegrad countries state support to agriculture is not expected to increase much above current levels, limiting the possibilities to a maintain natural values of agricultural land.

The Commission's pre-accession strategy for the Visegrad countries includes references to support integrated rural development. A package of accompanying measures could be introduced responding to the clear necessities of the Visegrad countries. It is not clear how the Commission will deal with this proposal or how it will be funded. An initiative could be to provide aid for schemes to integrate farming and nature conservation concerns, following the model of Regulation 2078/92 of the EU. There is no guarantee yet that the EU will provide assistance for agri-environment schemes in the Central and Eastern European Countries (CEECs), although the climate for such assistance is improving. Proposals could take the form of pilot integrated rural development packages, and should refer to existing initiatives, such as the EU habitats and species Directive and the pan-European Biological and Landscape Diversity Strategy.

In terms of share in total area, share in total Gross Domestic Product (GDP) and in particular share in total employment, agriculture is relatively more important in the Visegrad countries than in the EU (table 8.1). Compared to the area under low-intensity systems in Europe, the area under such systems in Poland and Hungary is limited. This implies that EU funding of the introduction of Regulation 2078/92 in Poland and Hungary will have only modest budget consequences. Currently, the EU's agri-environment Regulation 2078/92 accounts for up to 5 per cent of the CAP budget. There is an increasing pressure, for budgetary and equity reasons, for direct payments to be made conditional on environmental cross compliance. The payments have to be compatible with General Agreement on Tariffs and Trade (GATT) requirements for production neutral subsidies.

Table 8.1 'Importance' of agriculture (1993)

	Agricultural area		Agricultural production		Agricultural employment		Area under low-intensity systems	
	(million ha)	(% total area)	(billion ecu)	(% GDP)	(x 1,000)	(% total employment	(million ha)	(% total agricultural area
Poland	19	59	4.6	6	3661	26	2.6	14
Czech Republic	4	54	0.9	3	271	6	.	.
Slovakia	2	49	0.5	6	178	8	.	.
Hungary	6	66	2.1	6	392	10	1.4	23
EU 15	138	43	208.8	3	8190	6	52.2 a)	43 a)

a) Only 7 EU Member States; Greece, Spain, France, Ireland, Italy, Portugal, and United Kingdom.
Source: LEI-DLO.

8.3 Identification of present policy measures in the Visegrad countries

The aim of this section is to review briefly present national policy measures in the Visegrad countries for nature conservation in agriculture. There is not much up-to-date literature available about present policy measures which affect HNV farming systems in the Visegrad countries, since the situation in the Visegrad countries is changing rapidly. Therefore, the Dutch agricultural counsellors in Warsaw, Vienna (which incorporates the Czech Republic and Slovakia) and Budapest are contacted with a request to provide recent information. Besides the papers from the 'EU Expert Seminar, Agriculture and Natura 2000' have been used (Karacsonyi, Tar, and Zdanowicz 1997).

Poland

After the transformation in Poland all subsidies and income-supporting policies are abolished for two main reasons: i) by shock therapy the old system was undone at once (subsidies on inputs used and outputs produced were abolished), ii) currently the Polish government has a lack of resources to support farmers for high natural values. Emphasis therefore is given to the formulation of EU agri-environmental policy measures (Regulation 2078/92).

The economic transformation, which started in Poland in 1989, resulted in a significant decrease in the overall intensity of agricultural production. The use of artificial fertilizers and plant protection products decreased drastically between 1989 and 1993. Whereas the general lower use of inputs in agriculture may have been beneficial to the state of the environment in rural areas, the decrease in the use of inputs is not spread evenly throughout the country. Rapid intensification has occurred in some regions, whereas in other regions abandonment of agricultural land is a major threat. The collapse of state farms, together with the changes in the profitability of production and the withdrawal of the former support system to agriculture resulted in the abandonment of large areas of agricultural land (1.5 million ha of previously utilised arable land which is 8% of the UAA in 1989 and 300,000 hectares of grassland which is 1.5% of the UAA). No compensation is paid to those farmers who do not cultivate their land. The withdrawal of the former support system to agriculture and the liberalization of trade also caused a significant decline in the cattle population and a drastic decline in the number of sheep. Yields have also fallen. The number of farms fell by 4.2 per cent (between 1990-1995) and significant changes were also observed in the farm size structure. Rapid changes in the farm structure might have a negative impact on the biodiversity.

Polish agricultural policy includes some limited measures to enhance the genetic diversity of cultivated plants and domestic animals, support organic farmers, and to develop the technical infrastructure that improves environmental conditions in rural areas (Zdanowicz, 1997). Environmental protection law imposes limitations on the users of agricultural land in some legally protected areas, but there is no system of compensation to farmers in these areas. There are no agri-environmental measures currently applied in Poland. The possibility

of introducing new policy tools, of the type provided by the Regulation (EEC) 2078/92 represents a very important opportunity for improving the interactions between agriculture and the environment. Several factors, specific to Polish agriculture and administration systems are foreseen as sources of problems in the process of the design and implementation of agri-environmental policy measures: first of all the very high number of small farms (about 2 million), secondly, the very small and centralized agricultural administrative structure and finally, there is no system of direct payments to farmers yet. The best ways of assuring successful future application of national agri-environment measures is to test various options through pilot projects.

The Agri-Environment Working Group in the Polish Ministry of Agriculture and Food Economy has identified six major areas in which design efforts for agri-environmental programmes should focus: i) education, training and demonstration projects, ii) maintenance of biodiversity, iii) promotion of organic farming, iv) establishment of small-scale water measures on agricultural land, v) prevention of pollution and vi) prevention of soil erosion. In order to make agri-environmental schemes appropriate for Poland only a few amendments to the existing provisions of the Regulation 2078/92 would be necessary (Zdanowicz, 1997). For example, establishment of belts of trees and bushes is a highly recommended method for preventing both water and wind soil erosion. Provisions for the reimbursement of part of the costs of planting such belts would help to enhance the use of this measure. Currently Regulation 2080/92 (forestry measures) allows reimbursement of the costs of planting trees, but puts certain restriction on the minimal width of the tree belts and does not offer aid for planting bushes.

Czech Republic

According to the agricultural counsellor in Vienna the most important income supporting policy for HNV farming systems in the Czech Republic is a hectare payment, which farmers receive for their activities in marginal areas. The subsidy is paid on the basis of the value of the area. In case the value is less than a certain amount the farmer is eligible for this hectare payment (this could be a system to keep low-intensity HNV farming systems viable). However the current Czech hectare payment regulation is rather arbitrable, because there is no regular 'ground market' in the Czech Republic. Therefore there exists an interest in EU agri-environmental measures. In the Czech Republic working parties arise which study structural policies in the framework of the pre-accession. Information on the Czech Republic summarized below is based on the 'Environmental measures' chapter from the 'Review of Agricultural Policies Czech Republic' (OECD, undated).

The following measures have been used to improve the relationship between agriculture and the environment: i) legislative and regulatory measures, ii) subsidies to support environmentally desirable developments in agriculture, and iii) changes to the tax system.

A crucial part of agricultural reform policies relates to land regulation, the legislative foundations for which were laid down in 1991. They introduced

extensive changes, including the effective restoration of land ownership rights and countryside regulations corresponding to environmental objectives such as combatting erosion, planting more trees and creating meadow in selected areas. Land regulation is also linked to the development of regional systems of ecological stability, based on the environmental protection law.

Prior to 1989, policy compensated producers for farming under stricter environmental conditions in sensitive areas and subsidised environmental investments. The volume and structure of subsidies provided by the Ministry of Agriculture changed substantially between 1991 and 1993. In 1992 the previous policy for protected areas was abandoned, as was support for investment in organic farming. However, in 1993 the Ministry of Agriculture discontinued support for farms in protected areas and instead concentrated on supporting organic farming. In overall terms, there are about 141 organic farms, which cover almost 16,000 hectares of agricultural land.

In the Czech Republic there is a clear need to link the continuous reduction in agricultural activity to effective nature conservation and landscape protection based on the sustainable use of natural and semi-natural resources. To do this, Landscape Management Zones - identical in concept to the Dutch Nature Development Areas - have been identified using criteria and principles applied to Environmentally Sensitive Areas.

Slovakia

Information on Slovakia is based on the 'Environment in Agriculture' section from the 'Report on Agriculture and the Food Industry in the Slovak Republic 1996' (anonymous, 1996).

From the viewpoint of environmental improvement and protection of agricultural land, the objectives of the environmental policy in Slovakia are specified in a document entitled 'The concepts and principles of agricultural policy in Slovakia'. This document states the following main goal: 'to cultivate and protect agricultural land, to promote environmental management and to prevent the penetration of alien substances into the food chain.' The priorities are: i) to sow grass on steeply sloping and erosion-endangered arable land, ii) to utilise damaged soil for the production of non-food crops, iii) to implement an organic method of farming on agricultural land and iv) to support entrepreneurial activities aimed at improving the condition of agricultural land. The Ministry managed to fulfil its intentions in the field of environmental protection in 1995. Farmers received subsidies towards seeding steeply sloping an erosion-endangered soils with grass.

In conformity with the agricultural land protection act a methodology for introducing a special regime of agricultural land management was prepared. This special regime applies to agricultural land in protected zones which is endangered or has already degraded in various ways. The Ministry supports farmers' activities in the area of environmental protection and land cultivation. The amount of subsidies for this specific purpose is expected to rise.

Organic farming covered an area of 15,000 ha of agricultural land. In July 1995, the government approved the concept for organic farming development.

Hungary

The agricultural counsellor in Budapest provided information about Hungary. In Hungary there is no income supporting policy in areas with high natural values, there is no relevant legislation. In Hungary this kind of support can possibly be introduced in short term. Agri-environment programmes are in the development state in Hungary. A working group was established which deals with agri-environmental policy. They propose the earliest possible application of agri-environmental measures. Besides they have to secure integration with the National Agricultural Programme which is under preparation. The proposal for the Hungarian Agri-environment programme consists of three levels (nation, regional and local). The basis will include a farm environmental management plan. At the national level further schemes will be applied that target integrated production, organic agriculture and the use of endangered, rare breeds. At the regional level, schemes will be developed where best management methods that take account of regional circumstances are promoted. Finally, at the local level specific targets with associated management practices will be formulated (Tar, 1997).

The implementation of these programmes can most effectively be realised through demonstration projects. During the formation of demonstration projects special attention is to be paid - besides the protection of natural values - to the socio-economic and rural development aspects (Karacsonyi, 1997). According to the plans of the Ministry of Agriculture, the support system for 1998 will include aid for environmental friendly agricultural practices. At present the system gives support to Less-Favoured Areas. Another element of the existing system is the support for organic farming. The formulation of environment and nature conservation policy is in a more advanced stage than agricultural policy. Significant efforts for harmonization have already been made in recent years. IUCN Hungary has published several studies. In this context, a proposal has been made for the nature conservation management of agricultural areas.

8.4 Concluding remarks

1. There is insufficient information available from which to determine precisely which agricultural systems in the Visegrad countries are associated with high natural values. Since the situation is changing rapidly, there is also not much up to date literature available about present policy measures which support HNV farming systems in the Visegrad countries.
2. The present support for HNV farming systems is limited in the Visegrad countries, there exists some support for LFAs and organic farming. However, these countries are gaining valuable experience in developing initiatives that aim to maintain the natural value of agricultural land. They can learn from the positive experience of agri-environmental policies in the

EU. In addition to the further development of HNV farming systems many commercial farms will arise as well because of Western influences.

3. To make CEECs familiar with Regulation 2078/92, a project is started in eight CEECs, in collaboration with the Ministries of agriculture and of environment and Non-Governmental Organizations (NGO's) in these countries. Furthermore Poland and Hungary also already have government working groups on Regulation 2078/92.
4. Although the bulk of CEECs agriculture is currently low-input agriculture, due to a sharp decline in availability of inputs since the beginning of the nineties, the share of real HNV areas, which were already under traditional use earlier, does probably not exceed the share in the EU significantly. Although it may be relatively high in countries where the bulk of agriculture was never collectivised, like in Poland and former Yugoslavia. The relatively low share could imply only modest budget consequences in case the EU is funding agri-environmental programmes in these countries. The future funding of agri-environment programmes is still under discussion. Currently, agri-environmental payments account for up to 5 per cent of the CAP budget. Agri-environmental payments have to be compatible with GATT requirements for production neutral subsidies. There is increasing pressure, for budgetary and equity reasons for compensation payments to be made conditional on environmental cross compliance.

9. EFFECTS OF TRADE LIBERALIZATION ON HNV FARMING SYSTEMS

9.1 Introduction

In this chapter the impact of possible future developments in trade liberalization are described. Trade liberalization can affect production and consequently HNV farming systems. It is therefore interesting to look at the advantages and disadvantages of the integration of markets for those sectors most relevant to nature conservation. In section 9.2 the impact of developments in trade liberalization between the EU and Visegrad countries on trade and the environment will be described. In section 9.3 attention will be paid to the impact of further world trade liberalization on HNV farming systems. Some concluding remarks are presented in section 9.4.

9.2 Trade liberalization between the EU and Visegrad countries

In this section attention will be paid to the impact trade liberalization between the EU and four Visegrad countries (Poland, Czech Republic, Slovakia and Hungary) may have on HNV farming systems. Agricultural trade liberalization between the EU and Visegrad countries could be envisaged as the granting to Visegrad countries of tariff-free access to the EU agricultural market. In order to investigate the effect of trade liberalization for the different sectors, first insight is provided in the protection levels of agricultural products in the EU and Visegrad countries.

Agricultural protection

The CAP of the EU was founded to stimulate the productivity of the agricultural sector in the EU, commodity price uncertainties were diminished by guaranteed prices, subsidies, intervention and stock management. As a necessary complement to the internal price policy, border adjustments in the form of import levies and export subsidies were installed. In terms of food security, the CAP proved to be successful. From a net importer of agricultural commodities, the EU became a net exporter of its main products. In the late 1980s, the CAP began to draw heavily on the Community's budget. EU's expanding shares at international markets raised resistance by the EU's main trading partners, especially the United States of America. There was also an increasing pressure from other countries to reduce protection in the GATT context. The overall level of protection that agricultural policies offer producers can be calculated in a number of different ways. Table 9.1 shows protection levels for a number of agricultural products in 1995 expressed in Nominal Assistance Coefficients

Table 9.1 Protection of agricultural products in 1995 a)

	Wheat	Maize	Other grains	Oilseeds	Sugar	Milk	Beef and veal	Pig-meat	Poultry	Sheep-meat	Eggs	Total
Poland	1.08	1.31	1.02	1.15	1.36	1.15	0.99	1.45	2.55	1.29	2.28	1.26
Czech Republic	0.71	n.c.	0.79	1.06	1.24	1.55	1.31	1.13	1.38	n.c.	1.47	1.32
Hungary	0.57	0.72	0.57	0.91	1.38	1.42	1.14	1.27	1.34	1.89	1.49	1.02
EU 15	1.78	1.87	2.44	2.10	2.05	2.32	2.54	1.11	1.39	2.69	1.09	1.90

a) provisional figures measured in Nominal Assistance Coefficients (NAC); the ratio between the internal price (including payments and other subsidies) and the world market prices. n.c.: not calculated.
Source: OECD, 1997.

Table 9.2 Projected export surplus in the Visegrad countries in 2000 (1,000 tonne)

	Export surplus Visegrad countries				Net export to the EU			Net export to non-EU		
	cereals	sugar	milk	cattle meat	cereals	milk	cattle meat	cereals	milk	cattle meat
2000	3,652	-497	1,177	-54	1,424	553	-	2,228	624	-
2007	8,515	-563	2,016	32	3,321	948	15	5,194	1,068	17

Source: Veenendaal et al., 1996.

for three Visegrad countries. This table indicates that the overall level of agricultural protection is considerably higher in the EU 15 compared to the Visegrad countries. The level of protection of beef and veal in the Visegrad countries is about half of the EU's level.

Trade effects of liberalization

In a scenario study of the DLO-Agricultural Economics Research Institute (Veenendaal et al., 1996) projections were made for production, consumption and export surpluses in the Visegrad countries for the year 2000 and 2007. It is assumed that the Visegrad countries will enter the EU by the year 2000 and that all countries will be fully integrated in the EU by the year 2005. Optimistic yearly growth figures for production were used of 3.2 per cent for cereals, 3.1 per cent for sugar, 2.7 per cent for milk and 2.5 per cent for cattle meat between 1994 and 2000 and of 1.9 per cent for cereals and 1.0 for the other products between 2000 and 2007. Table 9.2 shows the export surpluses in the Visegrad countries under such growth rates.

In 2000 the cereal surplus in the Visegrad countries is about 3.5 million tonne and the milk surplus about 1 million tonne. In 2007 the cereal surplus in the Visegrad countries will increase to 8.5 million tonne and that of milk to 2 million tonne. For cattle meat there will be a modest surplus of 30,000 tonne, whereas the Visegrad countries will still be net importer of sugar. The table indicates that the effects, of accession of the Visegrad countries to the European Union, on the Union mainly concentrate on cereals and milk. EU 19 will face an additional supply from the Visegrad countries. The size of this additional supply is the quantity which the Visegrad countries cannot dispose on third markets as a result of the GATT export volume restrictions. The effects of accession of the Visegrad countries are limited with regard to the dairy sector. The increase in the supply of cereals will have more consequences.

The effects of accession of the Visegrad countries to the EU can be roughly traced to two factors. One is obviously the claim laid on part of the budget and the second effect of accession is on trade agreements. Just like the EU, the CEECs are bound by the GATT obligations to reduce support on the basis of their historical level of protection and subsidised exports. In particular the limits on subsidised exports are important.

Environmental effects of trade liberalization

As shown above, trade liberalization between the EU and Visegrad countries may have a considerable impact on agriculture because of the relatively high trade barriers which presently surround the EU. It may have significant consequences for Visegrad countries agriculture when these barriers will be removed. The environmental effects of trade liberalization depend on the impact of liberalization on production and the impact of production on the environment (Oosterhuis and Kuik, 1997). Although there is a large production potential in the Visegrad countries, these countries are still in a process of transformation. Removal of the trade barriers between the EU and Visegrad coun-

tries will encourage production. However, it is not likely that accession of the Visegrad countries to the European Union will increase the production in the Visegrad countries drastically at once. Production in the Visegrad countries will recover gradually from the transition. Currently these countries are not able to produce large quantities of homogeneous quality. The impact of the accession on the prices and production in the EU seems to be modest (less than outlined above, where optimistic yearly growth figures are used) and consequently the accession will have only a limited impact on the HNV farming systems in the EU. An increase of the production in the Visegrad countries will probably have an impact on HNV areas in the Visegrad countries. So, it is very timely to take care of the relationship between agriculture and nature conservation at HNV farming systems in the Visegrad countries. Effects on the environment could be:

- loss of nature and landscape values linked to stress factors or abandonment in the Visegrad countries;
- intensification of agriculture in the Visegrad countries could result in a higher efficiency, but on the other hand existing small-scale, low-input farming practices might be wiped out;
- the expansion in farm production in the Visegrad countries could be realised with a more efficient agriculture and more capital use, with lower-than-average emission coefficients;
- one unit of production may have different environmental effects, depending on local circumstances. A geographical differentiation is required, because of the large differences in vulnerability of the local environment.

So, trade liberalization might result in a more efficient, but also more polluting type of agriculture in the Visegrad countries, as well as in a loss of nature and landscape values. It is desirable to guide the development of agriculture in the Visegrad countries and provide incentives for agricultural practices which are beneficial for the environment. The pre-accession strategy of Agenda 2000 can influence this development. For example farmers can be encouraged to maintain appropriate grazing pressures throughout the holding, rather than to permit a concentration of land use, with heavy stocking on some land and abandonment elsewhere. Another possibility is to stimulate organic farming in the Visegrad countries. At the moment, much of the land in the Visegrad countries seems to be used quite extensively. This would imply that a (partial) shift to organic agriculture is easier than in Western countries. Such a development would be very favourable from an environmental viewpoint (Van Dijk, 1996).

9.3 Trade liberalization between the EU and the world market

World trade liberalization does not simply imply the reduction or elimination of border measures such as tariffs, import quotas, variable levies and export subsidies that directly affect trade. It also requires changes in the domestic

agricultural programmes of which trade measures are an integral part, such as price support as well as input and output subsidies.

Agricultural protection

In section 9.2 the protection levels for agricultural products in the EU for a number of commodities were already presented. The table indicated that the overall level of agricultural protection in the EU is relatively high. Also compared to the EU's main trading partner the USA. In 1995 the overall level of protection expressed in Nominal Assistance Coefficients is 1.90 in the EU, 1.14 in the USA and 1.61 in the Organization of Economic Corporation and Development (OECD).

Trade effects of liberalization

The situation of trade liberalization is more complicated if the country that liberalises is large, since changes in its policies are likely to influence world prices. The pattern of domestic production and consumption adjustments, and the change in trade volumes and internal and international prices, are difficult to determine in advance because the change in policies will affect world market prices, it is an iterative process. Several models exist that reflect these effects: the OECD model (OECD, 1987), the Tyers/Anderson model (Tyers and Anderson, 1992), the United States Department of Agriculture (USDA) model (Roningen and Dixit, 1989) and the International Institute of Applied System Analysis (IIASA) model (Parikh et al., 1988). In several of these studies the effects of complete trade liberalization by the industrial market economies on world prices of major agricultural commodities are assessed. In general, the studies suggest that world market prices of the agricultural commodities would increase if existing protective policies were removed. The studies all agree that world dairy product prices would increase the most with liberalization, and that substantial increases could be expected in the price of beef. Estimates indicate a considerable decrease in the EU production of ruminant meat and dairy products due to liberalization (Tyers and Anderson, 1992). The general consensus is that the percentage change in the price of grains would be modest, with the exception of rice. The price of sugar would increase, although some disagreement exists on whether this increase would be small or large. The different studies generally agree on the direction of the welfare effects of freer trade. The EU would gain through a net increase in economic welfare.

Environmental effects of trade liberalization

As discussed above, trade liberalization between the EU and the rest of the world may have a considerable impact on agriculture because of the relatively high trade barriers which presently surround the EU. It may have significant consequences for EU's agriculture when these barriers will be removed. Changes in the production due to liberalization determine the impact on the environment. As described above a decrease in the EU production of ruminant

meat and dairy products can be expected due to liberalization. This may encourage extensification, which may be beneficial to the environment in rural areas. However, it is possible that the decrease in the production is not spread evenly throughout the EU. Rapid intensification can occur in some regions (with more competitive production), whereas in other regions abandonment of agricultural land may occur. The decrease in the producer prices in the EU can encourage extensive production, since producers will be less dependent on production income. However, a considerable drop in ruminant meat and dairy sector prices can be a major threat to HNV farming systems. Production will become less profitable and land will be abandoned. Drastic price drops are not very likely. The 1992 reform, a shift from price support to direct payments, reduced prices already and made farmers less dependent on prices. A further shift from price support to direct payments proposed in Agenda 2000, will strengthen these developments.

9.4 Concluding remarks

1. Projections from Veenendaal et al. (1996) show that although beef and veal and sheepmeat have the highest level of protection in EU 15, removal of the trade barriers between the EU and Visegrad countries will mainly affect the cereal sector in the EU. This implies that the impact on the three farming types mainly responsible for the maintenance of HNV areas in the EU (namely: specialized dairy farms, specialized cattle-rearing and fattening farms and sheep, goats and other grazing livestock farms) will be limited. The impact of removal of trade barriers between the EU and Visegrad countries on production in the Visegrad countries will, however, have consequences for the further intensification of agricultural practices. HNV areas may be threatened by a loss of nature and landscape values in the absence of adequate agri-environmental policies.
2. On the basis of the relatively high trade barriers which presently surround the EU, it could be expected that trade liberalization between the EU and the world market will affect EU's agriculture considerably. Estimations indicate that trade liberalization will decrease the EU production of ruminant meat and dairy products. This raises the question whether this will encourage extensification. It is also possible that only the intensive farms will survive. A considerable drop in ruminant meat and dairy sector prices can be a major threat to HNV farming systems. Production will be less profitable. However, the dairying product price will probably not change drastically. Besides, the 1992 CAP reform and Agenda 2000 make farmers less dependent on prices, a shift to direct payments can be observed.

10. CONCLUSIONS AND RECOMMENDATIONS

10.1 Introduction

In this study, the question of viability of farming systems in HNV areas in the EU has been approached primarily from an economic perspective. Farms in HNV study areas are divided in two categories: viable farms and farms at risk, in order to provide insight into differences in structure characteristics and subsidies between both groups. The maximum amounts of payments these farms are eligible for on the basis of present and alternative policy measures has been assessed. These allowances in relation to the development of the own financial resources of the farm plus depreciation (viability yardstick) indicate whether supplementary adjustments in policy are required to support HNV farming systems and make farms viable. Attention is also paid to the impact new developments like an EU membership of the Visegrad countries and further trade liberalization can have on the HNV farming systems. Some of the major findings on these assessments are summarized in section 10.2. Finally, some recommendations are provided in section 10.3.

10.2 Conclusions

Aim of the research

The research provides insight into the viability and economic potential of HNV farming systems in the EU. It investigates the role agricultural policy plays and can play in maintaining HNV farming systems in Europe. The HNV farming systems are important in their maintenance of biodiversity and landscape. Further intensification of agriculture and abandonment of agricultural land are main threats to areas with high natural values. The main goals are to maintain land in management and maintain current management practices which are beneficial for the habitat. In other words; to avoid abandonment and further intensification. The support present and alternative agricultural policy measures can provide to HNV farming systems is therefore investigated.

Method used

Quantitative assessments on HNV farming systems in the EU are rather limited so far. In the literature HNV areas are often described qualitatively, whereas this research provides a consistent quantitative assessment based on European data sources. The economic viability of some HNV farming systems in a number of study areas in Europe is investigated, although it is not known

whether under economic viability the habitat is viable as well. However, statistical indicators which give a clear picture of the ecological viability are not available. On the basis of the development of the own financial resources plus depreciation, farms are divided into two groups: the viable farms and farms at risk. It is important to notice that the development of the own financial resources of the farm can be influenced by the farm successor construction about which no further information is available. Both groups are compared to derive differences between viable farms and farms considered to be at risk. The support present and alternative agricultural policy can provide to both groups of HNV farming systems is assessed.

Data available across the European Union

European data sources are used, like the Farm Accountancy Data Network (FADN) and the Farm Structure Survey (FSS). Some of the data are several years old and do not include the Member States which entered the Union in 1995 nor the Neue Bundesländer in Germany. Nevertheless, the data sources contain a relatively consistent and systematic set of data to investigate the economic viability of HNV farming systems in the Union. Direct subsidies received before the 1992 CAP reform are available from FADN. A rough estimate is made of the indirect government payments before the 1992 CAP reform which are funded by the EU Guarantee expenditures. Results on the full implementation of the 1992 CAP reform and the agri-environmental measures are not available yet from the European data sources. Besides, differences in farm management cannot be measured on the basis of the available data.

Differences between viable farms and farms at risk

Of all farms selected in this research about 70% is classified as viable and 30% is considered to be at risk. Farms considered to be viable did not turn out to be larger than the farms at risk, contrary to what was found in other studies like 'Farming at the margins' (Baldock et al., 1996). The intensity of farming seems to be a more determining factor for the viability of farms. However, further intensification is not desirable at HNV farming systems. It is important to notice that the representativeness of the data source used (FADN) for these assessments differs largely among the farming types and study areas selected (the representativeness is mainly low in Spain). Farms which are not represented by FADN might have been determining for the average farm structure of the category viable farms or farms at risk. Differences in farm size between viable farms and farms at risk are therefore not out of the question. The results presented in this report are based on an absolute division of the represented farms into two groups, which is nevertheless an appropriate approach.

Subsidies before the 1992 CAP reform

There are very large differences in the share of direct subsidies in the Family Farm Income (FFI) among study areas. In some study areas the FFI only remains positive because of the direct subsidies received. So, in these study areas direct subsidies are essential for HNV farming systems. The share of direct subsidies in the FFI is higher at the category farms at risk compared to the category farms considered to be viable. The absolute amount of direct subsidies, however, is higher at the category of farms considered to be viable compared to the category at risk. Most viable farms also receive a higher level of indirect government support compared to the farms considered to be at risk, due to a higher production value. The category farms at risk also receive less subsidies on investment, which might imply that they invest less than the category viable farms.

Subsidies after the 1992 CAP reform (present policy measures)

Direct subsidies (mainly the ewe premiums) make a considerable contribution to the viability of HNV farming systems. Market and price policy changes of the 1992 CAP reform do not assist the viability in the study areas or only to a limited extend, in terms of support provided. These changes have a negative impact at all specialized dairying farms selected in the study areas and in the Pindos Mountains. Market and price policy changes of the 1992 CAP reform seem to be too general to support HNV farming systems. The conditions to receive premium are not very specific.

Alternative agricultural policies

Support provided by the assessed alternative agricultural policies is also limited in most study areas. Agri-environmental payments could potentially (theoretically) be a big source of support in most study areas. Although these payments are mainly compensations. Agri-environmental payments are very suitable to support HNV farming systems, environmental requirements are attached to these payments. Only farms which meet these environmental requirements are eligible for these payments.

Agenda 2000

It is likely that HNV farming systems will benefit from the proposed adjustments in the CAP, described in Agenda 2000. These systems are often the more extensive systems, which will be eligible for headage premiums since they fulfill the livestock density requirements. Losses due to the termination of the maize for silage premium will be modest, since the area under this crop is limited. Besides, it is likely that HNV farming systems will benefit from the increase in the budget for agri-environmental measures. Finally, Agenda 2000 also proposes to transform the support scheme of LFA into an instrument to maintain and promote low-input farming.

Support and viability

Direct subsidies (mainly the ewe premiums) and agri-environmental payments are (potentially) the biggest sources of support for HNV farming systems. The other allowances assessed are limited in relation to the development of the own financial resources plus depreciation in most study areas, especially at dairy farms at risk. This implies that other adjustments in agricultural policy are required to maintain these HNV farming systems. For example a higher level of agri-environmental payments can contribute to the viability of HNV farming systems.

Qualifications to the calculations

There are a number of qualifications to the allowances assessed in the study. The payments are calculated in a rather normative way based on structure characteristics available from FADN. The calculated allowances are the maximum amounts farms are eligible for although not always maximum amounts will be received for various reasons. Besides, there are constantly changes in the regulations, like in the level of premiums and requirements to receive premiums. Finally, the calculations do not account for any monetary developments which were important the last few years nor for developments in the market like changes in world market prices. For example due to high world market prices, farmers did not face the calculated decrease in the production value of arable crops. If this is the case farmers are better off than indicated in this study.

In the assessments made on agri-environmental payments no specific environmental requirements are attached to the payments made per hectare of Utilized Agricultural Area (UAA) per farm. It aims to compensate farms for any increase in costs or decrease in output for the part they play in improving the environment, whereas there is not accounted here for any increase in costs nor for a decrease in output. It is assumed that HNV farming systems already fulfill the environmental requirements, which is a strong assumption.

It is not clear how farms in HNV areas will adapt to adjustments in support. Private expenditures could increase and income generated from outside the farm could decrease in response to higher levels of support farms receive. Nevertheless, it is likely that higher levels of support have a positive impact on the viability of HNV farming systems.

It is also important to recognize in this respect that intensification and marginalization occur as a result of decisions taken by individual farmers in response to personal circumstances. Not only economic, but a wide range of social, cultural, health and employment issues may influence their decisions. These concerns stretch beyond agricultural policy to rural life and development in a much wider sense (Baldock et al., 1996). Therefore insight is also provided into the rural and regional situation in the study area in this research. For example it is important to consider the availability of off-farm employment. This can allow low-intensity farming to continue on a part-time basis and support income from activities outside agriculture.

Visegrad countries

The situation in the Visegrad countries is changing rapidly. Traditional relatively extensive agricultural systems in the Visegrad countries still occur in part of these countries, they have in general high natural values. However, there seems to be insufficient information available from which to determine precisely which agricultural systems in the Visegrad countries are associated with high natural values. Besides, there is insufficient data available on income and structure characteristics for a quantitative assessment. The structure of farms is changing constantly. Currently, the support for HNV farming systems is limited in the Visegrad countries; there exists some support for LFAs and organic farming. However, these countries are gaining valuable experience in developing initiatives that aim to maintain the high natural value of agricultural land. Working groups are established which develop agri-environmental programmes. The future funding of agri-environmental programmes is still under discussion. The Visegrad countries face budgetary constraints and there is no guarantee yet that the EU will provide financial assistance for agri-environmental schemes. Although the bulk of CEECs agriculture is currently low-input agriculture, due to a sharp decline in availability of inputs since the beginning of the nineties, the share of real HNV areas, which were already under traditional use earlier, does probably not exceed the share in the EU significantly. The share of real HNV areas may be relatively high in countries where the bulk of agriculture was never collectivised, like in Poland. This implies only modest budget consequences in case the EU is funding agri-environmental programmes in these countries.

Trade liberalization

On the basis of the relatively high trade barriers which presently surround the EU and the large production potential in the Visegrad countries, it could be expected that trade liberalization between the EU and Visegrad countries may have a considerable impact on agriculture. However, it is not likely that removal of the trade barriers between the EU and the Visegrad countries will increase the production in the Visegrad countries drastically at once. Production in the Visegrad countries will recover gradually from the transition. Currently, these countries are not able to produce large quantities of homogeneous quality. The time path is an important aspect in this respect. The impact on the three farming types mainly responsible for the maintenance of HNV areas in the EU (namely: specialized dairy farms, specialized cattle-rearing and fattening farms and sheep, goats and other grazing livestock farms) will be limited. The impact of removal of trade barriers between the EU and Visegrad countries on production in the Visegrad countries will, however, have consequences for the further intensification of agricultural practices. HNV areas may be threatened by a loss of nature and landscape values in the absence of adequate agri-environmental policies.

On the basis of the relatively high trade barriers which presently surround the EU, it could be expected that trade liberalization between the EU and the

world market will affect EU's agriculture considerably. Estimations indicate that trade liberalization will decrease the EU production of ruminant meat and dairy products. This raises the question whether this will encourage extensification. It is also possible that only the intensive farms will survive. A considerable drop in ruminant meat and dairy sector prices can be a major threat to HNV farming systems. Production will be less profitable. However, the price of dairy products will probably not change drastically. Besides, the 1992 CAP reform and Agenda 2000 make farmers less dependent of prices, a shift to direct payments can be observed.

10.3 Recommendations

To develop a strategy for the maintenance of farming systems in HNV areas requires both policy and research debate. Some of the priorities for policy and research might include:

Policy recommendations

- Further elaborate regional agri-environmental measures as an instrument to support HNV farming systems. These measures can provide targeted support.
- Provide more targeted support directed towards a particular sector. Allowances are limited in relation to the development of the own financial resources plus depreciation at all specialized dairy farms at risk. Adjustments in policy which support these farms are required to make them viable and to maintain the high natural value of the area.
- Ewe premiums contribute considerably to the viability of HNV farming systems. It is recommended to maintain these payments at HNV farming systems.
- Set production quotas at a regional level, this allows to control transfer of production from less competitive to more advantaged regions.
- Attach environmental conditions, based on regional circumstances, to direct subsidies in order to receive premium. It is important to take care of the way environmental aspects are incorporated in policies; they can provide wrong incentives. For example the livestock density at the farm might increase in case the livestock density threshold required for premium exceeds the actual livestock density at the farm.
- A possibility to integrate ecological viability is to take account of the 'carrying capacity' of the area in the development of policies. Farmers can be encouraged to maintain appropriate grazing pressures by means of premiums attached to some management requirements. For example minimum and maximum livestock density limits, based on the 'carrying capacity' of the area can be set, which need to be met to receive payments. These kinds of tailor made requirements have to be defined on a very local level, based on specific characteristics. The size of the study areas of

this research seems to be too large for general requirements. It is recommended to attach specific requirement to parts of the regions.

- Appropriate policies to meet decreasing prices are important in the light of future developments like further trade liberalization which might affect prices. There is a tendency in the 1992 CAP reform as well as in Agenda 2000, to provide less indirect payments and more direct subsidies. This makes farmers more depend on subsidies and consequently depend on policy, which makes them vulnerable. It is important to be aware of this dependence, since the durability of subsidies is an exogenous factor for farms.
- An increase of the production in the Visegrad countries will probably have an impact on HNV areas in these countries. So, it is very timely to take care of the relationship between agriculture and nature conservation at HNV farming systems in the Visegrad countries. It is recommended to guide the development of agriculture in the Visegrad countries and provide incentives for agricultural practices which are beneficial for the environment. Visegrad countries can learn from the positive experience of agri-environmental policies in the EU.

Research recommendations

- Other management forms of land like nature conservation through public organizations rather than through agriculture by private farm holders can play a role in the maintenance of HNV areas. Investigation of alternative management forms of land is recommended.
- Detailed evaluation of how farmers in HNV areas will adapt to adjustments in support.
- Investigation of future prospects of farms in HNV areas.
- Investigate a larger number of highly productive agricultural regions with a rich natural potential to gain insight into the kind of processes taking place in such HNV areas, which might differ from extensive regions.
- Investigate the impact of Agenda 2000 on HNV areas in more detail.
- Elaborate the 'carrying capacity' of the area on the basis of indicators like climate conditions, length of the growing season, altitude and livestock occupation during the year.
- Monitoring of the ecological value of HNV farming systems.
- Compensation payments can be attached to the results achieved, like the number of nests and species. It is recommended to investigate how the results can be monitored.
- Study the impact of changes in land use on HNV areas as a result of i) an increasing production per hectare, ii) accompanying measures like afforestation and iii) environmental legislation.
- Identify HNV farming systems in the Visegrad countries for a more quantitative assessment.
- It is recommended to investigate the option to convert the support scheme of LFA into an instrument to maintain and promote low-input farming systems.

- It is also recommended to study the developments taking place at viable farms. To what extend does this influence HNV farming (does this exceed the 'carrying capacity') and how can this if necessary be corrected, f.i. by a subsidy.

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LIST OF SYMBOLS AND ABBREVIATIONS

0	Data less than half the unit used
.	No data available or sample less than 15 farms
AWU	Annual Work Unit
CAP	Common Agricultural Policy
CEC	Commission of the European Communities
CEEC	Central and Eastern European Countries
EAGGF	European Agricultural Guidance and Guarantee Fund
ECU	European Currency Unit
EECONET	European Ecological Network
ESU	European Size Units
EU	European Union
EU 12	European Union from 1986 until 1995
FADN	Farm Accountancy Data Network
FFI	Family Farm Income
FNVA	Farm Net Value Added
FSS	Farm Structure Survey (Eurofarm) of Eurostat
FWU	Family Work Unit
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GVA	Gross Value Added
HA	Hectare
HNV	High Nature Values
IIASA	International Institute of Applied System Analysis
IUCN	International Union for the Conservation of Nature, London (UK)
LEI-DLO	Landbouw-Economisch Instituut (Agricultural Economics Research Institute), The Hague, the Netherlands
LFA	Less Favoured Areas
LU	Livestock Unit
M	Metre
NAC	Nominal Assistance Coefficients
NGO	Non-Governmental Organizations
OECD	Organization of Economic Corporation and Development
SGM	Standard Gross Margin
UAA	Utilized Agricultural Area
USDA	United States Department of Agriculture
WTO	World Trade Organization

APPENDICES

Appendix 1 Study areas with corresponding country, region and subregion(s)

Table A1.1 Study areas with corresponding country, region and subregion(s) and the chosen areas in the different tables

Study area	Country	Region	Subregion(s)
Black Forest	Germany	Baden-Wuerttemberg	Freiburg
Pindos Mountains	Greece	Thessalia	Karditsa, Trikala
Asturias	Spain	Asturias	Asturias
Spanish Drylands	Spain	Castilla-León	Palencia, Valladolid, Zamora
Dehesas	Spain	Extremadura	Extremadura
Jura	France	Franche-Comté	Jura
Limousin	France	Limousin	Limousin
Lozère	France	Languedoc-Roussillon	Lozère
Valle d'Aosta	Italy	Valle d'Aosta	Valle d'Aosta
Calabria	Italy	Calabria	Calabria
Dutch Peatlands	Netherlands	Nederland	Noord-Holland
Scottish Highlands	United Kingdom	Scotland	Scotland northwest

Study area	Table 3.1	Table 3.2	Table 3.3	Table 3.5	Tables 3.6-3.8 Chapter 4-7
Source	REGIO	FSS	FSS	FSS FADN	FADN
Black Forest	R	S	S	Rt	Rtk
Pindos Mountains	R	S	R	Rt	Rt
Asturias	R	R	R	Rt	Rt
Spanish Drylands	R	S	R	Rt	Rtk
Dehesas	R	R	R	Rt	Rt
Jura	R	S	S	Rt	Rtk
Limousin	R	R	R	Rt	Rt
Lozère	R	S	S	Rt	Rtk
Valle d'Aosta	R	R	R	Rt	Rt
Calabria	R	R	R	Rt	Rt
Dutch Peatlands	S	S	S	Rt	Rtk
Scottish Highlands	R	S	S	Rt	Rtk

Source: LEI-DLO.
R) Region
S) Subregion(s)
t) Farming type
k) Key variable

Appendix 2 Landscape types and biogeographic regions

Stanners and Bourdeau (1995) show maps of the landscape types distinguished by Meeus (map 8.1, p.176) and biogeographic regions distinguished by EECONET (map 9.33, p.250). The landscape types and biogeographic regions of the study areas are summarized in table A2.1.

Table A2.1 Typology of the regions

Study area	Landscape types	Biogeographicregions
Black Forest	partly a continental open field and an enclosed landscape	Continental region
Pindos Mountains	open fields; Mediterranean open land	Mediterranean region
Asturias	semi-bocage or enclosed landscape	Atlantic region
Spanish Drylands	Mediterranean open land	Mediterranean region
Dehesas	regional specific landscape	Mediterranean region
Jura	semi-bocage or enclosed landscapes	Continental region
Limousin	semi-bocage or enclosed landscapes	Continental region
Lozère	Mediterranean semi-bocage or enclosed landscape	Alpine region
Valle d'Aosta	upland; mountains	Alpine region
Calabria	open fields; Mediterranean open land.	Mediterranean region
Dutch Peatlands	artificial landscape; a polder	Atlantic region
Scottish Highlands	uplands; northern Highlands	Atlantic region

Source: LEI-DLO.

Appendix 3 FADN farming types

Main farming types (9)	Principal farming types (17)	
1 Cereal farms	Type 11	specialist cereal
2 General cropping farms	Type 12	general field cropping
	Type 60	mixed cropping
3 Horticultural holdings	Type 20	specialist horticulture
4 Vineyards	Type 31	specialist vineyards
5 Permanent crop holdings	Type 32	specialist fruit and citrus fruit
	Type 33	specialist olives
	Type 34	various permanent crops combined
6 Dairy farms	Type 41	specialist dairying
7 Drystock farms	Type 42	specialist cattle-rearing and fattening
	Type 43	cattle-dairying, rearing and fattening combined
	Type 44	sheep, goats and other grazing livestock
8 *Granivore farms*	Type 50	*specialist granivores*
9 Mixed farms	Type 71	mixed livestock, mainly grazing livestock
	Type 72	mixed livestock, mainly graivores
	Type 81	field crops-grazing livestock, combined
	Type 82	various crops and livestock, combined

Source: CEC, 1989:14.

Appendix 4 Description of the farming types selected in the study areas (based on FSS)

Black Forest About 20% of the total of around 111,000 farms in Baden-Wuerttemberg are classified as specialist dairying (type 41). About 32% of these farms are located in Freiburg.

Pindos Mountains The principal farming type in Thessalia is general field cropping (type 12). About 35% of the 90,000 farms are classified as this type. More than 60% of the farms of this farming type is located in the subregions Karditsa and Trikala. Sheep, goats and other grazing livestock (type 44) is important as well in Thessalia. About 55% of the farms of this farming type can be found in Karditsa and Trikala.

Asturias Over 40% of the farms in Asturias is classified as specialist dairying (type 41) and over 25% as sheep, goats and other grazing livestock farms (type 44).

Spanish Drylands About a fourth part of all farms in Castilla-Leon are specialized cereal farms (type 11). Around 40% of these farms is located in the subregions Palencia, Valladolid and Zamora.

Dehesas In Extremadura there is not one main farming type. About 11% of the 92,000 farms are classifies as specialist cereal (type 11), another 11% as mixed cropping (type 60), 16% as specialist olives (type 33), 16% as sheep, goats and other grazing livestock (type 44) farms and 16% as mixed farms (type 71, 72, 81 and 82; referred to as type mixed). The last two farming types (type 44 and type mixed) are selected, because according to the literature both types are of importance for the high nature value.

Jura Over 40% of the farms in the Franche-Comté is classified as specialist dairying (type 41). About a fourth part of these farms is located in the subregion Jura.

Limousin More than half of the total number of 27,000 farms in Limousin are classified as specialized cattle-rearing and fattening (type 42) farms.

Lozère In the subregion Lozère, about 30% of the total of 4,000 farms is classified as specialized cattle-rearing and fattening farm (type 42) and a fourth part is classified as sheep, goats and other grazing livestock farms (type 44). About 78% of the specialized cattle-rearing and fattening farms and 44% of the sheep, goats and other grazing livestock farms in Languedoc-Roussillon are located in Lozère. The principal farming type of Languedoc-Roussillon is specialist vineyards, which is not considered here.

Valle d'Aosta About 18% of the 7,500 farms in Valle d'Aosta is a specialized dairy farm (type 41).

Calabria In Calabria about 40% of the total of 181,000 farms is a specialized olives farm (type 33).

Dutch Peatlands About a quarter of all farms in the subregion Noord-Holland is classified as specialized dairy farm (type 41). This subregion contains only a small part (6%) of the total number of farms of this farming type in the Netherlands. An additional key variable is

needed to subdivide the specialized dairy farms in the Netherlands in farms at peatlands and farms at other soil types.

Scottish Highlands About 45% of the total of around 30,000 farms in Scotland are classified as sheep, goats and other grazing livestock farms (type 44). About 37% of these farms is located in the subregion North West. In North West 66% of the total 7,500 farms is classified as this farming type.

Table A4.1 Key variables used to select the farms in the FADN region which are of importance for the HNV of the subregion

Study area	Key variable used for selection
Black Forest	Livestock density is less or equal to 1.3 LU/ha UAA
Spanish Drylands	Some area is left fallow at the farm
Jura	Livestock density is less or equal to 0.75 LU/ha UAA
Lozère	The altitude exceeds 600 m at sheep, goats and other grazing livestock farms
Dutch Peatlands	Only grass is grown and the dairy cow density is less than 1.4 LU/forage crops
Scottish Highlands	The altitude exceeds 300 m

Source: LEI-DLO.

Appendix 5 Agri-environmental programmes in the study areas

Table A5.1 Main agri-environmental schemes and premiums in the study areas

Black Forest
(Baden-Wuerttemberg) MEKA; Programme to support Market Relief and Landscape Conservation.
The use of permanent grassland according to specific rules (17-136 ecu/ha); Maintenance of scattered traditional orchards and vineyards with a high gradient slope (85 ecu/ha); To rear animals of local breeds in danger of extinction (43-85 ecu/LU); To apply extensive production methods on arable land - environmental practices (43-85 ecu/ha); To maintain biotopes on wetlands and on oligotrophic grassland communities (85-128 ecu/ha); Extensification of single plots or of strips of arable land (average 384 ecu/ha); Upkeep of abandoned farmland (average 246 ecu/ha); To set aside farmland for natural conservation purposes (average 511 ecu/ha); Training of farmers in environmentally friendly practices (1.33 mecu)

Asturias
To maintain the landscape by extensive farming to prevent fires stimulate the use of local breeds (157 ecu/ha or 78 ecu/LU)

Spanish Drylands (Castilla y Leon)
To convert arable land into grassland; extensification of grassland; reduction of livestock density (max 105-305 ecu/ha); To protect flora and fauna through extensive farming systems - environmental practices and set-aside (24-213 ecu/ha); To maintain abandoned agricultural or forests land -landscape preservation; extensive grassland (71-252 ecu/ha); To set aside agricultural land for more than 20 years (158-525 ecu/ha);
Cereal Steppes of Castilla y Leon; to protect avifauna and certain areas against agricultural decline; 4 contracts: Contract 1: to lie fallow 34% of the land - to improve fallow land (58 ecu/ha); to improve pastures (141 ecu/ha); to reduce fertilizers (29 ecu/ha); to preserve landscape elements (250 ecu/ha); additional practices (6.3 ecu/ha) to protect original vegetation and biodiversity; Contract 2: to lie fallow 24% of the land - idem contract 1; additional practices (4 ecu/ha)
Contract 3: set aside land (158 ecu/ha); Contract 4: to conserve biological diversity (250 ecu/ha)

Dehesas (Extremadura)
To convert arable land into grassland; extensification of grassland; reduction of livestock density (max 105-305 ecu/ha); To protect flora and fauna through extensive farming systems - environmental practices and set-aside (24-213 ecu/ha); To combat against erosion -environmental practices (53-682 ecu/ha)

Jura
Programmes are specified per area (valley): main programmes for Jura: landscape preservation on greenwards or in orchards which are not be mechanically cultivated (100-138 ecu/ha), and in valley land (100-125 ecu/ha); to preserve the landscape and to maintain abandoned land (34-88 ecu/ha)

Table A5.1 (continue)

Lozère
Programmes are specified per area: main programmes for Lozère: to prevent brushwood coverage on pastures (38-75 ecu/ha), to manage pastorals (13-63 ecu/ha) and pastorals in wooded areas (63-138 ecu/ha); to improve terraces (138 ecu/ha); to protect chestnut-groves (138 ecu/ha); to maintain pastorals (25-88 ecu/ha); to protect biotopes (100-138 ecu/ha); to improve the landscape of the near steep river bank (50-125 ecu/ha)

Limousin
Programmes are specified per area: to maintain environmental fragile areas (26-103 ecu/ha); to restore meadows (75-111 ecu/ha); to improve the landscape (75-120 ecu/ha); to maintain pastures along river banks (75-90 ecu/ha); to manage special sites (75 ecu/ha) ; to maintain pastures and dry land (75-133 ecu/ha); to protect wetlands (63-133 ecu/ha); to maintain wetlands and dry land (75-113 ecu/ha)

Valle d'Aosta
Fodder programme (250 ecu/ha); to use manure instead of chemical fertilizers (100 ecu/ha); Vine programme (700 ecu/ha); Fruit tree programme (580 ecu/ha); Mountain cultivation programme (54 ecu/ha); To rear animals of local breeds in danger of extinction (100 ecu/LU)

Dutch Peatlands (The Netherlands)
Demonstration projects concerning a more 'environmentally and nature friendly' management (56 mecu); Agri-environmental contracts (two categories: 'light' (maximum 250 ecu/ha) and 'heavy' management contracts (maximum 350 ecu/ha); to introduce (227-842 ecu/ha) or to maintain (91-182 ecu/ha) organic agriculture on arable land, in horticulture and fruit growing; Training courses (16.7 mecu); Aid to farmers who give public access on farming land along the network of footpaths (2,025 ecu/ha for a period of ten years)

Scottish Highlands (Scotland)
Habitat Scheme: to encourage farmers to create or develop waterside habitats (135-391 ecu/ha); Set Aside Access Scheme: to (59-118 ecu/ha); Public Access to Environmentally Sensitive Areas (66-223 ecu/ha)

Source: De Putter, 1995.