Defining European low-intensity farming systems: the nature of farming

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In 1993 and 1994, the Institute for European Environmental Policy conducted a study of low-intensity farming systems in nine European countries (France, Greece, Hungary, Ireland, Italy, Poland, Portugal, Spain and the United Kingdom). The study was commissioned by the Joint Nature Conservation Committee and World Wide Fund for Nature. The objectives of the study were (1) to compile information on the distribution and character of low-intensity farming systems within each country, (2) to assess the way in which these systems are changing and (3) to suggest ways of influencing future change so that their nature conservation value is protected. This paper provides an overview of some of the findings and serves as an introduction to the three country reports which follow.

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INTRODUCTION

This paper provides some brief background information on the report *The Nature of Farming* (Beaufoy, Baldock & Clark 1994; Bignal *et al.* 1994) and serves as an introduction to the next three papers in these proceedings, *i.e.* the three country reports on Spain, Hungary and Italy (Beaufoy 1995; Markus 1995; Petretti 1995).

In 1993 the Joint Nature Conservation Committee (JNCC) and the World Wide Fund for Nature (WWF) commissioned a study of low intensity farming systems in nine European countries. The study, carried out during 1993 and 1994 by the Institute for European Environmental Policy (IEEP), partly emanated from the recommendations of the third meeting of the European Forum on Nature Conservation and Pastoralism (Bignal & McCracken 1992; Bignal, McCracken & Curtis 1994), but was also a continuation and development of the research work on low-intensity farming systems and wildlife already in progress by both JNCC and WWF.

The study had three primary objectives:

- To compile information on the distribution and character of low-intensity farming systems within each country.
- To assess the way in which these systems are changing.
- To suggest ways of influencing future change so that their nature conservation value is protected.

The results of this work are presented in three separate forms: a series of individual country reports, a summary report of these called *The Nature of Farming* (Beaufoy, Baldock & Clark 1994), and a booklet/poster of the same name (Bignal *et al.* 1994). The aim of the booklet is to highlight some key pan-European issues and present some of the main results for a wider audience. It is currently available in English, Spanish and Greek.

This paper summarises:

- The methods used in the study and the definition of low-intensity farming systems.
- The typology and distribution of the systems across the nine study countries.
- Some of the problems and issues encountered during the study and suggestions for future research.

METHODS AND RATIONALE

The research was conducted as a desk-study focusing on seven European Union countries (France, Greece, Ireland, Italy, Portugal, Spain and the United Kingdom) and two in eastern Europe (Hungary and Poland). During the initial stages, it rapidly became clear why nobody had ever done this work before: there is a severe lack of compatible information or data. What information there is ranges widely from agricultural statistics (at varying levels and periods) and land-use and agricultural capability maps (at a variety of scales) to detailed descriptive case studies.

Table 1. Characteristics of low-intensity livestock and crop-based farming systems (from Beaufoy, Baldock & Clark 1994).

Low nutrient inputs. Low output per hectare.	
Livestock systems	**Crop systems**
Low nutrient input; predominantly organic.	Low nutrient input; predominantly organic.
Low stocking density.	Low yield per hectare.
Low agrochemical input.	Low agrochemical input (usually no growth regulators).
Little investment in land drainage.	Little investment in land drainage.
Relatively high percentage of semi-natural vegetation.	Crops and varieties suited to specific regional conditions.
Relatively high species composition of sward.	More traditional crop varieties.
Low degree of mechanisation.	Low degree of mechanisation.
Often hardier, regional breeds of livestock.	Use of fallow in the crop rotation.
Survival of long-established management practices, *e.g.* hay-making, transhumance.	More traditional harvesting methods.
Reliance on natural suckling.	Tree crops tall rather than dwarf.
Limited use of concentrate feeds.	Absence of irrigation.

These 'data' were not consistent between countries and in many cases were not even consistent within countries. To make matters worse the lack of attention that this kind of farmland has received from ecologists has resulted in a relative paucity of information on the wildlife and conservation value associated with it.

As a result, the information varied greatly with regard to quality, quantity and availability. It was therefore not possible to approach the work in a standardised pan-European way. The pragmatic approach adopted was to commission consultants in each country to work from a standardised guidance brief. In essence, the consultants were provided with lists of features and characteristics considered to be indicative of low-intensity systems. The focus of the study was primarily on the farming systems and not on identifying or assessing the nature conservation interest. The characteristics used to define low-intensity livestock and crop-based farming systems are shown in Table 1. It can be seen that there are two common characteristics (low nutrient inputs and low output per hectare) as well as a number of system-specific ones.

In the summary report, the following description is used to describe the management within these farming systems:

> "practices which have been out of fashion for many years and techniques which are not generally part of modern agriculture".

Although subjective this often provides a good description of the management practices on the farmland that we are concerned with. But of course these outdated, more traditional management practices vary across Europe not only because of regional differences, but also because of the more rapid rate of agricultural intensification in some areas. However, in general, the characteristics given in Table 1 do indicate farming systems that have adapted management techniques to integrate with environmental constraints, rather than adapting the environment (and the livestock) to meet standardised (often industrialised) production practices.

The survival of this integrated management has generally been by default, and in most cases because severe environmental constraints have limited the degree to which farming practices could be intensified and mechanised. However, the important point is that for whatever the reasons, farm management practices have survived that we now place value on because of the ecological conditions that they have produced and that they continue to maintain. This was never their primary aim, and in the past ecologists have often taken for granted the fact that certain plants and animals were associated with these practices. This we can no longer do - the widespread and rapid intensification of agriculture over much of Europe is focusing attention on the importance of maintaining at least part of the surviving areas of low-intensity farmland.

TYPOLOGY AND DISTRIBUTION OF LOW-INTENSITY FARMING SYSTEMS

The Nature of Farming identifies the similarities in agricultural practices that exist across the nine study countries. They are grouped according to livestock, arable, mixed and permanent crop systems and, although simplified, they form quite robust groups describing broad types of low-intensity farming found in western and central Europe (Table 2). Using this typology, links have been established between apparently very different systems by identifying common themes. For instance, in the livestock systems there are many common issues, *e.g.* foddering practices, livestock breeds, grazing and pasture management techniques. It is worth noting some of the variation within the four main types.

Table 2. Typology of low-intensity livestock, arable, permanent crop and mixed systems (based on Tables 1 to 4 in Beaufoy, Baldock & Clark 1994).

Livestock systems	Arable and permanent crop systems	Mixed systems
Low-intensity livestock raising in upland and mountain areas.	Low-intensity dryland arable cultivation in Mediterranean regions.	Low-intensity mixed Mediterranean cropping.
Low-intensity livestock raising in Mediterranean regions.	Low-intensity arable cultivation in temperate regions.	Low-intensity, small-scale, traditional mixed farming.
Low-intensity livestock raising in wooded pastures.	Low-intensity rice cultivation.	
Low-intensity livestock raising in temperate lowland regions.	Low-intensity tree crops.	
	Low-intensity vineyards.	

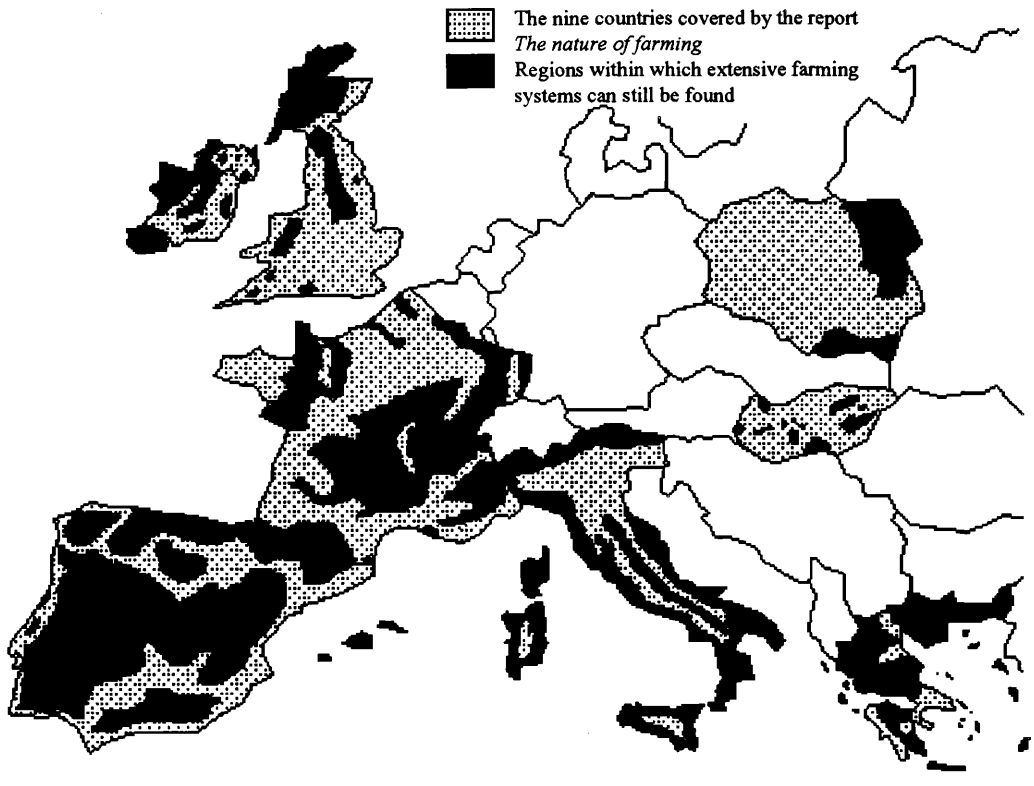

Figure 1. Principal areas within which low-intensity farming systems can be found in each of the nine European countries considered by Beaufoy, Baldock & Clark (1994).

Probably the most variable are the livestock systems which range from semi-wild and largely unmanaged cattle and horses in remote regions of Spain, to dairy farming producing specialist cheeses and incorporating closely managed hay meadows in the French Jura. Low-intensity sheep systems are the most widespread livestock type covering large areas of upland, mountain or dry pasture of grassland and scrub. Many of the livestock systems survive in association with communal grazings.

Arable systems are generally much less widespread but the dryland arable systems of Spain, Portugal, southern Italy and Greece are significant. These are low yielding and use fallowing (in association with grazing) to maintain soil fertility and organic content. They create a 'psuedo-steppe' landscape of great importance for nature conservation (*e.g.* Goriup, Batten & Norton 1991). On a much smaller scale there are local organic or biological systems and traditional rice cultivation.

Permanent crops (such as olives, fruit and vines) are an important component of the Mediterranean lands. Most of this cultivation has been intensified in recent years and the surviving low-intensity systems are generally in the poorer area where farming is less specialised and inter-cropping (for example of olives, almonds, carobs and cereal with livestock grazing) is still practiced.

There are still several areas of Europe where truly small scale mixed systems using far less than conventional inputs still survive. Some are virtually subsistence farming and most are in remote areas where farming is often combined with other occupations such as fishing, forestry or paid work outside of agriculture. In some places the value of these systems as a component of 'pluriactivity' which could help to maintain viable rural communities is being recognised by rural planners (Rennie 1991).

THE EXTENT AND LOCATION OF LOW-INTENSITY FARMING SYSTEMS

The approximate distribution of low-intensity farming systems across the nine study countries is indicated in Figure 1, and more detailed maps of each country are given in Beaufoy, Baldock & Clark (1994). Low-intensity farmland mostly survives in upland and remote areas (especially in the context of distance and difficulty of transport to markets) where there are considerable physical constraints on the development and modernisation (especially mechanisation) of agriculture. Southern Europe (Spain and Portugal in particular) has both the most types and the greatest area of land under low-intensity farming. Although the areas shown on the map are preliminary and indicative, using the more detailed figures available from the country reports it is estimated that there are more than 30 million hectares of land associated with low-intensity livestock systems alone.

PROBLEMS AND ISSUES ENCOUNTERED DURING THE STUDY

Although recently there has been a growing awareness of the value of low-intensity farmland for nature conservation we have had great difficulty convincing others (including some of our colleagues) of this importance. These difficulties have been experienced with both research and conservation bodies as well as with the sectors where a negative reaction would be expected (such as in agriculture, administration and policy). There is no doubt that amongst some there is a growing understanding of the linkages between farmland management, landscape character and biological diversity, and a realisation that without the continuation of many traditional farming techniques and practices the visual and biological character of many areas of Europe would be severely affected. In trying to get to the bottom of this problem, and to understand why we should have had such a difficult task, we have identified a few key reasons:

Perception

Conservationists have done a very good a job in raising awareness of the problems associated with intensive farming, particularly in the more agriculturally developed parts of Europe (such as the United Kingdom, Holland, Germany, Denmark and France). The ecological problems of pesticide and fertiliser use and the physical destruction of semi-natural biotopes and landscape features in these areas has led to a perception that virtually all forms of agriculture are bad.

In addition, in these areas the only 'rear-guard' actions that conservationists could take has often focused on specific sites or areas peripheral to the main farming operation rather than to the farmland matrix. So in England there has been great emphasis on the wildlife value of small 'islands' of semi-natural biotope in a 'sea' of rather dull farmland. Ponds, hedges and woodland copses fall into this category.

There is nothing intrinsically wrong with this approach in the areas where it has developed. It has, however, coloured our perception of the possibilities for achieving nature conservation objectives on other types of farmland in other geographical regions where a more integrated approach over the entire farmland matrix would be more appropriate.

Scale

For many years (and particularly since 1981 in the United Kingdom), conservation bodies have focused on site issues rather than those affecting the countryside. This in part reflects conservation legislation but also the highly fragmented character of semi-natural biotopes in the more developed countries. In a pan-European context a significant stimulus for the development of a more holistic approach was the accession of southern European countries to the European Community. As the effects of the Common Agricultural Policy on the countryside of these nations (particularly Spain and Portugal) began to

take effect, it helped raise awareness of the importance both of traditional regional agricultural practices and also of the need for conservationists to understand processes on a wider scale.

Experience

Partly for the reasons mentioned above, many agriculturists and ecologists have developed their expertise on issues associated with intensive farming. It is quite remarkable that such little attention has been directed at the farmland of Europe that is managed less intensively. This really is quite staggering since many of the biotopes that conservationists value are integral parts of the matrix of traditional farmland, and many of the habitats essential for the survival of rare and uncommon plants and animals are created by farming operations in these areas. The list of examples is long, and many are discussed in other papers in these proceedings and in previous Forum proceedings (Bignal, McCracken & Curtis 1994; Curtis, Bignal & Curtis 1991; Bignal & Curtis 1989).

Ironically some ecologists concerned with nature conservation and biodiversity in the UK still regard many areas of Europe as wilderness or wasteland rather than farmland, *e.g.* Hambler & Speight (1995) referring to grasslands and orchids. In addition, there is a need for more research into the functional relationships on low-intensity farmland. Mike Pienkowski (in his Preface to these proceedings) mentions the problem of developing demonstration of these relationships on the ground to generate wider understanding.

Politics

We should not be naïve about the other agendas that are involved in the area of agriculture and environment policy. Although some policy-makers do appreciate the wider social and environmental benefits of supporting low-intensity farming, they are not always convinced of the justification for continued support for agricultural production in these areas (particularly at a time when there is still surplus production within the EU).

Equally it is clear that some in the agricultural sector (both in research and policy) see the environmental "bandwagon" as a novel vehicle for directing funds to themselves or to farmers. Certainly in parts of the United Kingdom, schemes under the Structural Funds (*e.g.* the Agricultural Business Investment Scheme in the Highlands and Islands Objective 1 area) and Regulation 2078/92 are being sold to farmers on the basis of being an easy way of maximising additional financial support for little or no effort or inconvenience.

Finally, an area in particular which we feel needs better explanation surrounds the functional and habitat reasons why low-intensity farming systems are important. It occurs to us that one of the key points that we need to get across to a wide array of people is the concept of the 'farmland biotope' or 'farmland matrix' itself having ecological value. We need to develop much more the concept of low-intensity farmland being the biotope within which a range of habitats for plants and animals is created by seasonal management operations. We should think not of "remnants of habitat being left amongst farmland" and more of a farmland biotope for which optimum management practices need to be developed. At the same time we should be dropping the site-based mentality and considering much more the wider issues that affect management decisions in the countryside.

LOW-INTENSITY, SMALL SCALE, TRADITIONAL MIXED FARMING: THE FARMLAND BIOTOPE

The typology presented in *The Nature of Farming* provides a good starting point for developing these ideas. To illustrate our thinking in a very general way we have chosen an example from the small scale traditional mixed farming systems that two of us (EMB and DIMcC) know best from the Scottish Hebridean island of Islay. The island supports 108 breeding, 183 passage and 121 overwintering bird species including 17 listed on Annex 1 of the European Community Wild Birds Directive. Many of the Annex 1 breeding birds (such as the Corncrake *Crex crex*, Chough *Pyrrhocorax pyrrhocorax*, Merlin *Falco columbarius*, Hen Harrier *Circus cyaneus* and Golden Eagle *Aquila chrysaetos*) and wintering birds (such as Greenland White-fronted Goose *Anser albifrons flavirostris* and Barnacle Goose *Branta leucopsis*) have been shown to be closely associated with farmland and farming operations (Bignal, Curtis & Matthews 1988).

Crofting in the Scottish Highlands and Islands is a form of farming which strictly speaking only occurs on holdings which have the legal status of being a "croft" (Crofters Commission 1991). Crofts are mostly worked as a part-time occupation by crofters whose family incomes are supplemented by other activities (such as fishing, forestry or professional work). The pattern of mixed livestock rearing practiced by crofters (utilising an in-field system of cultivated land, meadow and pasture and a larger expanse of communal grazing land), is however widespread in western Scotland. This includes much of the Hebrides, where farms are relatively small and still to a high degree self-sufficient. So our description is of a style of farming which is not strictly "crofting" but which includes crofts, small farms and some parts of larger mixed enterprises.

Central to all these farms is the rearing of livestock, mostly regional breeds of cattle and sheep (or first crosses of these breeds), producing calves and lambs by natural suckling to be marketed each autumn. These are sold as 'stores' to be fattened on better land before being ready for slaughter. A traditional cropping pattern of the in-field area produces roots, cereals and hay (or silage today) to be fed to the breeding stock during the winter.

Summary of the conservation/ecological value of the annual farming cycle on Scottish croftland

Spring

Spring is the time for spreading manure and ploughing land in the arable rotation, sowing grass leys and moving stock off the in-fields that will be used for hay-making. Any winter-housed livestock (usually young stock) are put out to pasture. In some fields breeding ewes are concentrated together for lambing, whilst others lamb in the hills.

Ploughing provides ephemeral feeding opportunities for many birds and, after harrowing and sowing, nesting sites for Skylarks *Alauda arvensis* and waders. The grassland management produces heavily dunged short grass swards rich in invertebrates used by feeding Choughs, waders and small passerines. The herbaceous vegetation beginning to grow in the stackyard provides cover and shelter for Corncrakes which arrive in late April, and uncultivated patches in the arable fields (together with fallow fields) provide cover for Hares *Lepus capensis* and small mammals. During lambing there is an abundance of afterbirths and mortalities for Ravens *Corvus corax* to exploit and live prey for Golden Eagles.

Summer

During summer the arable rotation produces a mosaic of small fields, or parts of fields, with crops at different stages of development. Livestock numbers are boosted by the birth of lambs and calves. Stocking densities on the grazing pastures rise because other fields are closed for growing crops and hay. Hay-making begins. Sheep are sheared and dipped.

Field margins grow a dense vegetation cover and the low-intensity pastures of semi natural scrub, heath and grassland provide nesting sites for ground nesters such as Hen Harrier, Merlin, Short-eared Owl *Asio flammeus*, Curlew *Numenius arquata*, Red Grouse *Lagopus lagopus*, Skylark and Meadow Pipit *Anthus pratensis*. Corncrakes move into the growing crops for nesting and the hay fields are also the habitat for wild flowers which in turn provide food for butterflies and insects. Barn Owls *Tyto alba*, Hen Harriers, Peregrines *Falco peregrinus* and Sparrowhawks *Accipiter nisus* are attracted to hunt the abundance of small mammals and breeding passerines in these fields. Choughs feed in the soils of the closely grazed pastures. Corncrakes raise their first broods. This is the key time for the development of the fauna of the dung of domestic livestock. The traditional field boundaries (drystone walls and earth banks) provide shelter and breeding places for birds, mammals and insects.

Autumn

The harvesting of oats using the reaper binder is done in September and October. Some are cut green for feeding in whole sheaves to cattle during the winter whilst a smaller amount is cut fully ripened for threshing. The traditional harvest is very labour-intensive and involves setting up of sheaves to dry (stooking), then building these into huts to protect them from wet weather. Finally the sheaves are stacked and the completed stacks are thatched with rushes. Grazing continues on the pastures and gradually begins to reduce the seasons growth. Hay aftermaths are used as clean grazing for lambs.

Grain and 'weed' seeds spilt during the harvest result in feeding opportunities for seed-eating birds and small mammals. These attract predatory birds such as peregrines, merlin, hen harrier and barn owls. The invertebrate rich dung on the pastures provide an abundant food source for Choughs, Starlings *Sturnus vulgaris*, Lapwings *Vanellus vanellus* and other waders as well as corvids. Hay aftermaths provide a short-lived bonanza of insects revealed during mowing. Rush *Juncus* spp. pastures which have been ungrazed during summer are cut for thatching rush and this produces the micro-habitat for next years nesting Snipe *Gallinago gallinago* and the open conditions needed to favour flowering marsh plants.

Winter

Cereal stubbles remain unploughed over the winter. Young livestock are sold and any kept for replacement breeding stock are housed. The breeding cows are not housed and are fed a ration of oat sheaves (two each per day) and hay. Breeding sheep overwinter on the low-intensity pastures with only mineral enriched feed-blocks to supplement the natural grazing. Every day the sheaves are taken out of the stack and carted to the pastures where they are fed to the animals on the ground. A different area is used for feeding each day to prevent permanent damage to the pasture.

During feeding there is spillage of some grain and also of the thousands of weed seeds that have been harvested into the sheaves with the corn. This attracts many birds, including Reed Bunting *Emberiza schoeniclus*, Chaffinch *Fringilla coelebs*, Yellowhammer *Emberiza citrinella*, Greenfinch *Chloris chloris*, Twite *Carduelis flavirostris*, Rock Dove *Columba livia*, Rook *Corvus frugilegus*, Hooded Crow *Corvus corone* and Jackdaw *Corvus monedula*. Some grain passes through the cattle entire and into the dung. This is exploited by Choughs, Starlings and Rooks and in the process they effectively spread the dung across the pastures. The stubbles attract wintering Barnacle and Greenland White-fronted Geese and also Whooper Swans *Cygnus cygnus*, corvids and Rock Doves. The abundance of small birds attract predators such as Golden Eagle, Peregrine and Hen Harrier.

It would be very useful to research and describe the functional relationships in greater detail, using objective data and for more of the farming systems listed in Table 2. For instance the pattern of relationships between the annual farming cycle in dryland arable areas, low-input tree crops (particularly olives) and low-input vineyards would be possible using existing information. This would help us develop our current understanding of the biological importance of farm management, a clear

perspective of future research needs and the management incentives needed to maintain (or perhaps mimic) the traditional management system. It would also help to build the linkages between farm management and ecological value and to make exposition of this more convincing.

THE HUMAN DIMENSION

Another important issue that has been raised during this and earlier studies (*e.g.* Bignal, Curtis & Matthews 1988) is the human dimension. Having satisfied ourselves that low-intensity farming systems are important for nature conservation and that their future is in the hands of farmers, we need to ask ourselves why do these farmers continue to farm in these particular ways? For example, does a Portuguese farmer plough with mules because he wants to, or simply because he cannot afford a tractor? Do traditional techniques survive because farmers prefer to use them or are they caught in an economic trap from which there is no escape? The answers to such questions are fundamental to understanding how the system works and more importantly how the system can be supported into the future.

We need policies that allow a way of life which is socially and economically attractive to the farmers involved and maintain land management practices which are beneficial to the wildlife. The human element cannot be divorced from nature conservation issues in the European countryside, but we must avoid appearing to encourage rural poverty and low standards of living because they are associated with high natural value farmland. We must understand the processes that make the 'traditionally' farmed countryside biologically rich and diverse, but also find mechanisms to make life easier and more rewarding for the people that manage it.

In 1949 Aldo Leopold wrote:

> "Conservation is a state of harmony between man and land. Despite nearly a century of propaganda conservation still proceeds at a snail's pace; progress still consists largely of letterhead pieties and convention oratory. On the back forty we slip two steps backward for each forward stride."

The authors and sponsors of *The Nature of Farming* hope that the report will help us to proceed faster than a snail's pace and to translate our knowledge and understanding into policies and actions on the ground. We are optimistic that the European Forum on Nature Conservation and Pastoralism will make an important contribution.

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