3. CHARACTERISATION OF FARMS IN THE SAMPLE NAs

Introduction

3.1 One of the main objectives of Stage 2 of the study was to investigate whether the information that we collected from sample farms would allow us to develop a classification of farms for each NA that reflected opportunities for protection and enhancement of nature conservation value. Potentially, this classification could be the same as the one we developed in Stage 1 to provide the basis for the selection of sample farms in Stage 2. On the other hand, a different classification may be more appropriate.

3.2 The potential value of a classification is that it could be used by EN and others as a means of gauging what measures might be required to achieve nature conservation objectives on any farm in the NA. For example, there may be a category of farms with a specific combination of variables (e.g. relating to enterprise type, size and tenure) that offers good opportunities for changes in moorland management through the provision of specific financial incentives. Where improved moorland management is an important objective, EN staff could target these incentives at farms that fit the category in the classification.

3.3 We used two different methods to investigate whether such a classification can be derived from our findings. The first (Method A) involves the use of indicators of farm character derived from our comparison between the results of the Stage 1 and 2 analyses (see Tables 2.2 - 2.5). It also draws on the experience of those who carried out the farmer interviews and ecological surveys, who were asked to set out what they considered to be the most important attributes that were influencing farm character in the sample NAs. This approach relies to an extent on surveyors' perceptions based on the sum of what they have found out. For this reason, it does not lend itself to quantification.

3.4 The second approach (Method B) was a more rigorous analysis of the attributes of sample farms using statistical cluster analyses to look for linkages between farm attributes and existing nature conservation value and potential.

3.5 The findings from each of these approaches are set out below. The chapter ends with the conclusions that we have drawn about the development of a classification of farm types in relation to farm nature conservation character based on our interpretation of the findings.

Method A

Greater Cotswolds NA

3.6 Other than farm type, the only factors influencing farm 'nature conservation' character that we have been able to identify under Method A are as follows.

- Larger farms may be more likely to have game interests which can have benefits to other wildlife for example through the development of game cover strips alongside hedges or management of rotational set-aside to allow birds to breed successfully.

- Most sample farms had small areas of grassland or scrub which had not been ploughed, often because they were on steep slopes. There is some indication that these areas may be being better managed for nature conservation on larger farms (two of the smaller farms in our sample were not managing remaining areas of grassland or had planted them with conifers). This may be because there is more money available on larger farms to carry out

management that is not essential for agriculture. Another explanation is that larger farms are more likely than smaller farms to have retained a grazing enterprise (e.g. because they have sufficient unploughable areas to make this worthwhile).

- There were also instances where good management was being carried out because it was a requirement of the tenancy agreement.

- Smaller farms appear to be under most economic pressure with the result that land is often being managed intensively. This was well illustrated by two of the dairy farms in our sample.

- There are often good opportunities for nature conservation enhancement on farms where the farmers are moving towards retirement and have no family to take on the holding. This situation appears to be most common on smaller holdings where profits are too low to have encouraged children to take on the family business.

Lincolnshire Wolds NA

3.7 We have identified the following factors as influencing farm nature conservation character (in addition to farm type).

- In general terms, the larger the farm the greater the variety of habitats. The more habitats, the greater the opportunities for nature conservation.

- Larger farms may have more money available for conservation management.

- In years gone by, arable land was fallowed or put to grass ley on rotation and these areas were then grazed. With continuous arable cropping, only unploughable areas remain for grazing and these are often of an insufficient size to retain an economic grazing enterprise. The retention of such an enterprise is influenced by location, which affects the amount of steep land that cannot be ploughed, and farm size (as in the Cotswolds).

North Pennines NA

3.8 We have identified the following factors as influencing farm nature conservation character (in addition to farm type).

- Good moorland management is related to the existence of grouse shooting interests and to designations. Larger farms, and particularly those that are tenanted, are more likely to have shooting interests.

- Part-time farms can provide a good opportunity for nature conservation enhancement. This is because the opportunities for alternative, non-agricultural sources of income on part-time farms in the North Pennines are limited by location and isolation with the result that farmers may therefore welcome the extra money that is available through funding for conservation management.

- It will be difficult to persuade farmers with smaller family farms to reduce their stocking levels to benefit nature conservation. This is because they are often pushing their land hard, in many cases to support more than one generation. Reducing enterprise size is therefore alien to their thinking.

Exmoor and the Quantocks NA

3.9 We have identified the following factors as influencing farm nature conservation character (in addition to farm type).

- Smaller family farms, especially where family members are planning to take on the holding, offer little potential for nature conservation enhancement (especially where this involves reducing stocking rates) as they are likely to be intensifying, or have intensified, management to maximise profits.

- Entry into the ESA scheme or Countryside Stewardship appears to be taken up most often where it will not greatly affect the existing farming regime (four of eight farms), where there is pressure from the landlord to enter the scheme (one farm), where there are no family members to take on the holding (one farm) or where they have other sources of income (two farms).

- Part-time farms provide a good opportunity for nature conservation enhancement. This may be because of personal interest or lack of financial pressure (where farm income is supplemented by non-farming employment)..

Overview

3.10 The findings set out above indicate that there are some common themes running through all of the sample NAs. These are explored further in Paragraph 3.23.

Method B

Methodology

3.11 The approach that we adopted for this more rigorous analysis was to distil the information that we collected about each farm under the following headings, which it was considered might help to inform a farm classification:

1. Farm type
2. Ownership
3. Farm size (using four size categories)
4. Full-/part-time
5. Trends over the past 20 years (e.g. in arable area, livestock numbers)
6. Habitats present
7. Achievements relevant to nature conservation (e.g. management of specific habitats)
8. Attributes that are responsible for these achievements
9. Opportunities for the enhancement of the farm's nature conservation value
10. Factors that are preventing the achievement of these opportunities ('blockages')

11. The triggers needed to remove these blockages

12. Countryside schemes that have been entered

3.12 The next step was to compare the findings within and between Natural Areas to look for any similarities between different elements of the data. Given the large volume of data, we decided to use a statistical hierarchical cluster analysis to assist us in identifying similarities between farms (this analysis was carried out using the 'average between groups' method to cluster data).

3.13 Data for each of the attributes 5-12 above were interrogated to identify similarities between farms. The product of this analysis was to identify groupings or 'clusters' of sites. For example, if there were three farms with the same combination of triggers needed to achieve conservation opportunities (attribute 11), these would appear as a cluster when this attribute was assessed.

3.14 We then compared the clusters of sites relating to different attributes with one another to see whether there were any similarities which might suggest a link between the attributes that we had measured. We also looked for any evidence of a link between the clusters and attributes 1-4 (farm type, ownership, size and whether full- or part-time).

Findings of the Analyses

3.15 Our analyses did not reveal any basis for classifying farms in relation to their nature conservation character although, as with Method A, some patterns did emerge in relation to particular farm attributes.

3.16 The most notable of these was that, when looking at the data for nature conservation opportunities (category 9 above), the farms clustered together by Natural Area (other than for some intermingling of Exmoor and North Pennines farms). This shows that, for opportunities, there is a level of similarity within each NA. This finding is perhaps not unexpected given that the opportunities relate to specific habitats and that there are clearly similarities between the habitats that are present in any Area. For example, there are many stone walls and areas of limestone grassland in the Cotswolds whilst in the North Pennines, stone walls and moorland are common components of the landscape.

3.17 Looking at data on opportunities in the Cotswolds alone, shows that the farms cluster together by size, with the largest farms having most opportunities and the smallest having fewest. This finding can perhaps be explained on the basis that the larger the farm, the wider the range of habitats that are likely to be represented and hence the greater variety of opportunity for nature conservation enhancement. The data for the Lincolnshire Wolds under Method A also suggest a link between farm size and opportunity.

3.18 No such link has been identified for the two upland NAs. This might be because there is a limited range of habitats in these areas and hence less variation between farms of different size.

3.19 The only other finding to emerge was in relation to factors that could potentially block the implementation of conservation work (attribute 10 above). For each farm, potential blockages were noted as being 'relevant' or 'not relevant'. The data suggest a cluster of part-time farms (four of the five in the sample) where a willingness to undertake nature

conservation work and the availability of labour were not constraints to carrying out nature conservation work. This was the case on only three of the 37 full time farms in the sample. This finding lends some weight to the prediction from Stage 1 that the recorded increases in the number of part-time farmers might have led to opportunities for nature conservation enhancement as a result of increased environmental interest and lack of financial dependency on farming.

Conclusions

3.20 The analyses described in this chapter were aimed at determining whether the farm survey information from Stage 2 would allow us to develop a classification of farm types that reflects the opportunities for protection and enhancement of nature conservation value on different farms (see Question 4 in Paragraph 1.17).

3.21 The work that we have carried out provides no evidence for there being a means to classify farms at the NA level in the way that EN had hoped. We believe that the main reason for this is that there is a wide range of variation in farming within the sample NAs, reflecting the range of factors that have an influence on farm character. We have divided these into three categories, all of which are to some extent inter-related.

- Physical and historical factors, including soil type, drainage, topography and land use history.
- Enterprise type.
- Personal and financial factors, including farm size, tenure, whether full- or part-time, whether there is any family succession, financial demands, alternative sources of income and personal environmental interest.

Of these, we believe that physical and historical factors are the primary influence on farm character insofar as they have such a fundamental bearing not only on the nature of the farm enterprise but also on personal and financial factors.

3.22 To develop a workable classification of farms, one strategy might therefore be to study 'sub-areas' within NAs, selected on the basis that they share common physical characteristics. Furthermore, because they will cover confined geographical areas, they will often have a common land use history. Thus, by adopting the sub-area approach, physical and historical variables will have been largely 'controlled', such that the character of farming is influenced by a smaller number of variables. This will allow it to be more easily classified.

3.23 Our second conclusion draws on the detailed findings from Method A and to a lesser extent Method B. These reveal some common factors that are influencing the opportunities for the protection and enhancement of nature conservation value on sample farms. Farm type, farm size, tenure and family succession appear to be particularly important, having broadly the same influence irrespective of the NA within which the farm is located. We believe that these variables provide the basis for developing a simple means of assessing the 'susceptibility' of farmers on different types of farms to proposals for changing their farm management to benefit nature conservation.

4. APPLICATION OF OUR FINDINGS

Introduction

4.1 In this chapter, we seek to identify what can be learnt from our findings that may be helpful to EN in pursuing its objectives for NAs (see Question 5 in Paragraph 1.17). Building on the findings from Chapter 3, this involves:

- developing a framework for assessing susceptibility to nature conservation change on farms (see Paragraph 3.23); and
- using this information to develop a methodology to classify farms in sub-areas within NAs (see Paragraph 3.22).

4.2 If this methodology is to be helpful to EN, it is important that it can be used in the process of achieving NA objectives. Many of these will best be achieved through the use of targeting. We therefore briefly review the process of targeting before going on to integrate it into the methodology.

Susceptibility to Change

4.3 Based on our findings, we have ranked farms in order of their susceptibility to change using a scale of low/high susceptibility in relation to different enterprise types (see **Table 4.1** overleaf). For example, on a farm ranked as of high susceptibility, the farmer may be open (and willing) or actively seeking changes which may be desirable for nature conservation (e.g. because the farmer is about to retire, or the enterprise is struggling). On a farm with low susceptibility, it may be difficult to persuade the farmer to adopt change (e.g. because the farm is very profitable under its current intensive regime).

4.4 This ranking must be treated with caution. This is both because it is derived from a small sample of farms and because every farm is a unique product of the wide range of variables referred to in Paragraph 3.21. As such, it is not possible, with any degree of confidence to infer from one or two characteristics, how a particular farmer will respond to an opportunity for change. Despite these reservations, the ranking provides some useful clues to susceptibility.

Table 4.1 : Levels of Susceptibility to Positive Nature Conservation Change

Level of Susceptibility	Cattle and Sheep Farms	Dairy Farms	Arable Farms	Other Farms
Low	Medium sized family farms, with succession where more than one generation is dependant upon income from the farm.	Intensively run, family farms with succession, well equipped with buildings, equipment and quota. The income needed to give a return on such investment may force intensification.	Small-medium sized family farms, with succession.	Horticultural units, especially where land use is very intensive. These are often small and highly capitalised.
	Tenanted farms, where the landlord has no sporting or other non-agricultural interests. Income to the farmer is reduced through rent, and there may be contractual barriers in the tenancy agreement to change.	Tenanted farms where the landlord has no sporting or other non-agricultural interests.	Tenanted farms, where landlord has no sporting or other non-agricultural interests. Farms where a high percentage of farm income is from high value crops, e.g.. potatoes, sugar beet. Farms with a high capital investment in buildings and equipment, especially if there are high bank borrowings.	Pig and poultry farms, which often have limited land and are highly capital intensive. Disposal of manure may mean high nutrient inputs to the land, which cannot be avoided.
High	Part-time farms, either with off-farm income or spare time, or needing a financial boost.	Large farms, with a range of habitats, where financial security or land type offer opportunity.	Farms located on marginal arable land, where crop viability is questionable.	Hobby farms of all types. Usually relatively small in extent.

	Farms with non-agricultural sources of income, and where farming income is of lesser importance.	Farms without succession, where the farmer is approaching retirement.	Farms (usually smaller enterprises) that are highly dependant on Arable Area Payments for viability, and thus likely to suffer if prices fall (as predicted).	
	Large farms/estates with a range of habitats.	Farms that are struggling to remain viable, due to their small size, poor buildings, inadequate pollution control infrastructure and limited owned quota.	Large farms/estates with a range of habitats.	
	Tenanted farms, where the landlord has strong sporting/non agricultural interests. This interest may guide change.		Farms with substantial areas of grassland with which they can do little other than graze, but where livestock income is marginal as against costs. Here they may welcome financial options.	
	Farms without succession, with the farmer approaching retirement. Here any change that adds capital value, e.g. landscape enhancement, may appeal.		Farms/estates with strong sporting interests. Farms without succession, with the farmer approaching retirement.	
	Farms with labour problems, and/or struggling viability and/or high dependence on livestock support. Economic triggers may help.		Farms with low capital investment in buildings and equipment.	

Achieving Nature Conservation Objectives - Objective Setting and Targeting

4.5 One of the criticisms that has historically been levelled at nature conservationists is that they have often failed to define the objectives for what they want to achieve. This failing has long been recognised and over recent years considerable effort has been put into rectifying the situation. Of particular note at a national level, are the objectives that have been set for key habitats and species through the Biodiversity Action Plan Steering Group Report (1995); objectives for other habitats and species are currently under development. At the NA level, EN is continuing to develop the objectives that were first set in 1993.

4.6 Another recent development is that EN and other organisations are increasingly using the concept of targeting as a basis for achieving nature conservation objectives. The two key elements of targets are as follows.

- Quantitative measures, for example relating to the creation of a certain area of a particular habitat. The Biodiversity Action Plan Steering Group Report provides such targets for the key habitats and species that it includes.

- Geographical measures, reflecting the fact that the best way to achieve an objective is often to focus resources on specific areas rather than disperse them more widely. The Biodiversity Action Plan Steering Group Report include some such geographic targets but, for most habitats and species, it will be the role of local biodiversity action plans, prepared with the involvement of EN, to develop such targets that reflect the objectives that have been developed for NAs.

4.7 At present, however, few local biodiversity action plans have been prepared or are in preparation. In their absence, targeting within NAs will therefore need to be led by EN staff. This will require a clear definition of both the quantity of each habitat or species that is to be brought into positive management or re-created in each NA (which should be a sub-set of national targets) and the geographic areas at which these quantitative targets should be directed.

4.8 Three key criteria that should influence the selection of these geographic target areas are:

1. the existence of the right physical conditions, such as sandy soils for heathland development or, for the creation of wetlands, low lying areas which, at least historically, had a high water table;

2. the likelihood of farmers being prepared to undertake the required management;

3. the existing distribution of key habitats or species.

Of these, the first criterion would normally be the starting point in the process of identifying target areas.

4.9 Given that physical conditions are often the prime influence on farm character (see Paragraph 3.21) as well as on the definition of geographical target areas, we believe that there is the potential for our proposed methodology for classifying farms to dovetail neatly with the concept of targeting. In so doing, we believe that it can be used to address the second criterion above relating to the likelihood of farmers undertaking the required management.

4.10 In the remainder of this chapter, we therefore present a methodology that integrates a classification of farms with a target-based approach to achieving objectives. The methodology relies on clear objectives with sound quantitative targets that are derived from national targets, such as those in the Biodiversity Action Plan Steering Group Report.

Achieving Nature Conservation Objectives - Proposed Methodology

Step 1 - Physical Information

4.11 Information about geology, soils and topography can be obtained directly from geological, soil survey and Ordnance Survey maps, or from secondary sources. These might include landscape assessment studies which often entail extracting geological and topographical information, and presenting it in a simplified form.

4.12 The landscape character areas defined through these studies are sometimes a direct reflection of a combination of geology and topography and may therefore assist in defining areas with common physical characteristics. In other instances, they are more of a reflection of land use and field pattern. Where this is the case, the character areas may still provide some clues for defining sub-areas.

4.13 Other useful information includes MAFF agricultural land classes, which reflect a combination of physical information including soils, geology, topography and drainage.

Step 2 - Defining Sub-areas for Detailed Study

4.14 The physical information that has been collected should then be used to define sub-areas within the NA where specific nature conservation objectives might be achieved (e.g. sandy soils for heathland creation). It may then be appropriate to consider whether the existing distribution of the habitat or species concerned should be used to select sub-areas that are a priority for action. This was the approach that was used in a study to develop heathland targets for the Suffolk Coast and Heaths NA (LUC, 1994).

4.15 At this stage, we envisage that a map of the NA could be prepared which shows the Area containing discrete sub-areas, each of which has common physical characteristics. It is likely that some parts of the NA may not be allocated to such sub-areas, for example in areas where physical conditions do not lend themselves to the achievement of any NA objectives. One or more nature conservation objectives may be attached to each of the sub-areas.

Step 3 - Agricultural Analysis

4.16 The next step in the process should be to make an assessment of the likelihood of being able to achieve the desired change in the context of the existing agricultural activity in each sub-area. To obtain information about every farm in each area would be too costly and hence it is necessary to adopt an alternative approach.

4.17 This could involve the use of MAFF statistics for the group of parishes that fall within the sub-area. Two sets of statistics should be obtained. One should cover all parishes relevant to the area. This will include some parishes for which only a small amount of their land area falls within the sub-area. The second set should just cover the smaller number of parishes that are more or less wholly within the sub-area.

4.18 If financial resources mean that only one set of data can be purchased, we would generally recommend that the smaller parish group is selected as this is likely to be more representative. Even so, the way in which the data are collected means that the results for the smaller parish group cannot be assumed to be an accurate reflection of agriculture in the sub-area. The main reason for this is that the parish within which the farm is recorded is dictated by the location of the farmhouse rather than the associated farmland. It is partly for this reason that it can be helpful to have the analysis for the larger parish group, as this may give some clues to 'inaccuracies' in the smaller group statistics.

4.19 As well as purchasing data for the most recent year that is available, it would also be useful to obtain historic data for comparative purposes. The oldest data that are available for specific groups of parishes is for 1988. For more historic information, reference should be made to the results of the MAFF statistics for the entire NA (see Paragraph 2.11). These will give a broad indication of change from which it may be possible to draw some tentative conclusions about what has occurred within the sub-area under consideration.

4.20 The MAFF statistics for the parish groups should then be analysed in much the same way as we did for the NA-wide statistics in Stage 1 of this study (see the methodology in LUC et al., 1996). This will produce a wide range of information about existing agricultural character as well as changes that have taken place over recent years. They will, though, give few clues to factors such as family succession, farmers' environmental interest or economic pressures.

4.21 To help fill these gaps, it will be very important to work in partnership with the local Farming and Wildlife Group (FWAG) officer and others with an involvement in agriculture and nature conservation in the area (such as the CLA, the NFU and private farmer co-operatives). Their detailed knowledge will be critical to developing a meaningful classification of farms (see Step 4 below) and in achieving targets.

4.22 Other sources of agricultural information that are relevant to the sub-areas should also be reviewed. These might include, for example, socio-economic and landscape studies.

Step 4 - Developing a Classification of Farms

4.23 We were unable to develop a classification of farm types for entire NAs (see Paragraph 3.21). But by defining sub-areas, the physical parameters that are the primary influence on farming character are standardised so that there is much less scope for variation between farms. We believe that this will often allow the development of a simple classification of farm types for each sub-area, with the categories reflecting the likelihood of being able to achieve the desired nature conservation objectives.

4.24 In developing such a classification, use should be made of the information about susceptibility to change in Table 4.1 and on the local knowledge of staff in EN and partner organisations, as well as information from the analysis of the parish group statistics.

4.25 We do not imagine that the results will give a precise picture of what measures are needed to achieve objectives in different areas. They will, though, provide some useful clues that may indicate those sub-areas in which it is likely to be easiest to achieve targets and which should therefore be taken forward as priority target areas.

4.26 As an example, there may be two low lying areas that have the right physical characteristics for the creation of wetland habitats. In one, most farms might be large dairy holdings (which would be shown by the MAFF statistics), which local knowledge suggests are generally

intensively managed family enterprises with children to take on the farm in due course. On the other hand, the second area may comprise largely small family run dairy units, where profits are generally low and there is no family succession. Of these two, the second is likely to be most susceptible to change (see Table 4.1) and may therefore be the preferred target area.

Step 5 - Achieving the Targets

4.27 The achievement of specific targets that have a part to play in meeting those that have been set for the UK as a whole, cannot be left to chance; otherwise there is a significant risk of the UK targets not being met. There is little point, for example, in *hoping* that farmers in a target area will take up the incentives on offer; there must be some degree of confidence that they will.

4.28 What is needed in the first instance, therefore, is to explore whether the incentives on offer (financial, advisory or other) are up to the job of delivering what is wanted. If they are, it is then necessary to encourage farmers to adopt them.

4.29 We therefore recommend that 'market testing' of farmers is needed in each short-listed target area in order to determine whether the available incentives are sufficient to stimulate change. If they are not, the only options to achieve the targets will be to:

- develop specific mechanisms targeted at the individual sub-areas (e.g. through the provision of a project officer to provide the necessary advice and encouragement or, perhaps, sub-area specific top-up payments to countryside schemes); or

- go back a stage and investigate sub-areas that had previously been dismissed as being less susceptible to change.

Conclusions and Recommendations

4.30 Other than the use of policy instruments such as conditionality, the achievement of nature conservation objectives on agricultural land that lies outside of SSSIs depends to a large extent on the combination of advice, information and incentives that are on offer to farmers.

4.31 Our work indicates that farm character in NAs is more complex than was anticipated at the outset of the study and points to the need to focus on smaller sub-areas if information about farm character is to be used to help achieve nature conservation objectives. On this basis we have developed a relatively straightforward methodology that uses existing data combined with local knowledge (e.g. from FWAG, CLA and the NFU) to point to geographic target areas where nature conservation objectives might most readily be achieved. It provides a sound basis for initiating a dialogue with farmers and taking this through to the achievement of objectives.

4.32 Some nature conservation objectives do not, however, lend themselves to geographical targeting based on physical characteristics (e.g. ancient hedgerows might fit in this category). For such objectives, geographical targets might be developed in other ways (e.g. for hedgerows, the targets might be led by landscape interests). In such cases, EN might be able to use the general information on susceptibility to change in Table 4.1 coupled with the sum of the findings from the sub-areas that are investigated in relation to other objectives, to help define the farm types where effort might be focused.

4.33 In the light of the above, we recommend that the methodology should be piloted within one or more NAs in order to test its effectiveness. The pilot should use habitats that lend themselves to geographical targeting based on physical parameters.

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