

# **APPENDIX A**

## **Stage 1 Report**

**(Number of sides - 82)**

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## **PART A : INTRODUCTION**

## 1.0 INTRODUCTION

### **The Brief**

1.1 Land Use Consultants (LUC) was commissioned by English Nature, in September 1995, to carry out a study into the characterisation of farming in English Nature's (EN's) Natural Areas's (NA's) these being the areas into which EN has divided England based on ecological and other environmental characteristics.

1.2 The study is being carried out by a team led by LUC with significant inputs provided by two sub-consultants, namely Countryside Planning and Management (CPM) to provide the agricultural expertise, and Entec.

1.3 The study is a pilot exercise to develop and test a methodology to:

- characterise farming in a sample of four NA's;
- assess, for the farm types identified, the potential opportunities to achieve nature conservation objectives and any constraints that might hinder their achievement.

1.4 Based on this work, we will make recommendations on how the methodology might be applied to other NA's by English Nature's staff.

1.5 In addition to developing a national methodology, the study will also generate outputs for use by EN staff to achieve nature conservation objectives in each of the sample NA's. These outputs will be:

- a profile of farm character;
- suggestions on how EN staff might assist land managers and others in overcoming potential hurdles to the achievement of nature conservation objectives in their Areas.

### **Approach**

1.6 EN selected the four sample NAs to be included in the study with the objective of representing both upland and lowland areas, and covering a wide geographical spread. The Areas are:

- the Greater Cotswolds;
- Exmoor and the Quantocks;
- the Lincolnshire Wolds;
- the North Pennines.

1.7 For each of these Areas, the Ministry of Agriculture, Fisheries and Food (MAFF) provided parish-based farm census data for the years 1975, 1984 and 1994. This was provided in the form of a composite analysis for each Area.

1.8 In addition to the MAFF data, our analysis of farm character draws on a wide range of other published agricultural data and on information provided by EN teams in each of the NAs. In each area, we also made contact with key individuals involved in agriculture and nature conservation, who were identified by EN staff. Preliminary findings for each NA were issued to the relevant regional EN Teams, and were discussed in depth. Feedback has been incorporated into this report.

- 1.9 A draft of this report was discussed in detail with the Steering Group for this project, in January 1996. Comments from and following that meeting have been incorporated into the text.

### **Limitations**

- 1.10 The NAs cover a wide range of environmental features and farm types. Variation between different farming enterprises is particularly evident in the large, lowland NA's in our sample. There are limitations to the extent that the data can be analysed, and general trends cannot always be identified to farm types or areas.

- 1.11 Furthermore, the trends may obscure variation within a NA. For example, there is evidence from the Greater Cotswolds that there was a decline in the numbers of beef cattle across the NA as a whole between 1975-1994, whilst within the Cotswolds Area of Outstanding Natural Beauty (AONB), that makes up the core of the Natural Area, there has been an increase in numbers.

### **Structure of Report**

- 1.12 This report is structured as follows:

- **Chapter 2 - National Trends.** To set the changes which different NA's might reveal in context, we have briefly reviewed some of the national trends over the period.
- **Part B - The Greater Cotswolds.** This part of the report describes current resources and farming practices in the Area, then described trends and changes over the twenty year study period, setting out direct and indirect potential effects on nature conservation interests, then reviews this to stratify the farm types (Chapters 3-5).
- **Part C, D and E** cover a similar process for the three other natural areas.
- **Part F** provides a full list of **References**.

- 1.13 The source date supplied by the EN at the start of the project is not included with this report, but is drawn upon extensively for the purposes of analysis.

## 2.0 NATIONAL TRENDS

### Modern Agriculture In Context

2.1 Today's farming character and methodology has evolved rapidly over a relatively short period of time. Farming practices were transformed by the enclosure acts, and subsequent industrialisation of Great Britain. Technological advances have resulted in massive changes since the 1940's.

2.2 This study would not be complete if some of the trends were not set in political context. Following the 1939-1945 conflict, there was pressure for Great Britain to increase her home consumption and thereby reduce the risk of shortages experienced over that time of war. Government policy and grant aid sought to increase the amount of agricultural production. Coupled with this, technological advances in plant and animal genetics, and the availability and type of mechanical assistance, have enabled farmers to increase production many fold.

2.3 Until recently, Government and EC policy has been geared towards increasing production. By the mid 1980's, faced with surpluses in some agricultural commodities and a Common Agricultural Policy threatening to be economically unsustainable, policy has changed towards production level control (through subsidy payments and fiscal encouragement) and incentives for environmental improvement practices.

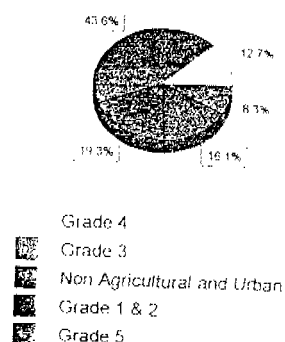
2.4 Hence the period over which this study relates, 1975-1994, covers a marked swing in the thrust of policy. In 1976, the Government White Paper "Food From Our Own Resources"<sup>1</sup> encouraged increased home production, but by 1987 it was recognised that the need had moved towards fostering the diversification of the rural economy<sup>2</sup>. Policy guidance since that time has followed a similar vein<sup>3</sup>. The Government now recognises a need to continue efforts to reform the CAP, with payment directed more towards the encouragement of environmentally beneficial and sustainable farming<sup>4</sup>.

2.5 In this context, changes over the 1950's and 60's seem likely to have continued through to the mid 1980's, after which changing Government policy may have influenced the trends. We therefore, in this introductory section, provide a brief analysis of some of the major trends, drawing on MAFF and other published sources as noted.

### English Agriculture Today

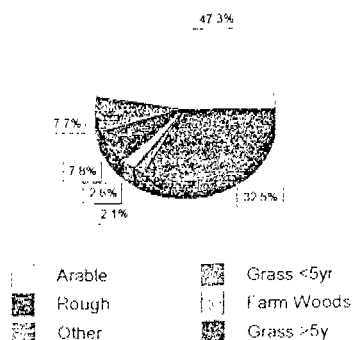
2.6 England is a rich agricultural nation. Some 80.7% of her area is agricultural land<sup>5</sup>. Significant areas are of very good or good quality agricultural land. The Ministry of Agriculture, Fisheries and Food system of Agricultural Land Classification divides farmland into five grades according to inherent versatility for agricultural use - and some 59.7% of the country (74.3% of all agricultural land) is Grade 1, 2 or 3 (excellent to moderate quality) as shown in the pie chart below.

Figure 2.1 : Land Quality of England



2.7 As a consequence, much of the country is in arable or ploughed grassland uses. As shown below, some 55% of agricultural land is ploughed.

**Figure 2.2 : Land Use In England**



2.8 There are 150,000 farms in England, directly employing some 430,000 workers.

**Figure 2.3 : Basic Agricultural Statistics**

Statistic	Number
Farm Holdings	153,426
Farm size average	61ha
Employment	430,900
Percentage of land owned	63%
Percentage of holdings > 50ha	35%
Percentage of full-time holdings	56%

2.9 **Land Use Trends Since 1979**

In 1979 the total farmland area of England (excluding common rough grazing) totalled 9,469,551ha. This area fell to 9,354,314ha by 1994, a decline of 1.2%. The decline is the result many developments, including, urban development, roads, leisure uses and forestry (forestry other than for farm woodlands).

2.10 In addition to the overall decline in farmland area, there have also been significant changes to cropping practices:

- the total grassland area (excluding rough grazing) fell from 4,239,907ha in 1979 to 3,743,049ha in 1994, a decline of almost 12%. The decline was chiefly the result of the greater profitability of arable crops compared to livestock enterprises;
- the area of grassland less than 5 years of age fell from 996,320ha in 1979 to 723,311ha in 1994, a decline of 27%. The fall in the area of short-term grassland was the result of the substitution of grass leys for more profitable break crops in arable rotations;
- the area of grassland older than 5 years of age fell from 3,228,225ha in 1979 to 3,019,738ha in 1994, a decline of 7%. This decline was not as marked as for shorter term grassland, as most long term grassland is located away from traditional cropping areas;

- the area of rough grazing (excluding commons) fell from 758,201 in 1979 to 721,626ha in 1994, a decline of 5%. The decline has chiefly been the result of conversion to grassland and forestry plantings in upland areas;
- the area of woodland on farms rose from 161,374ha in 1979 to 245,303ha in 1994, an increase of 52%. The rise reflects the encouragement of woodland planting on farms over the last twenty years;
- the total area of tillage (crops and bare fallow) rose from 4,178,388ha in 1979 to 4,361,933ha in 1984. However, this area fell to 3,831,355ha in 1994, due in part to the introduction of set-aside. If set-aside is added to the 1994 arable area, the increase in the total arable area between 1979 and 1994 would have been 15%;
- the total number of cattle fell from 8,192,820 in 1979 to 6,780,041 in 1994, a fall of 17%. Over the same period, the total number of sheep and lambs rose from 14,001,596 (1979) to 20,045,276 (1994), a rise of 43%. The fall in the number of cattle is a reflection of the lower profitability of cattle compared to arable enterprises in the lowlands and sheep enterprises in the uplands.

## 2.11

### Management Practices

- Since 1975 there has been a decrease in the number of individual agricultural machinery pieces. For example, UK wheeled tractor registrations fell from 34,487 in 1975 to 19,349 in 1994<sup>7</sup>, a fall of 44%. This is despite an increase in sales during the early 1990's;
- This fall may partly be explained by the increase in power and size of remaining machinery. For example, between December 1984 and December 1987 the number of English tractors less than 60kW power fell by 7%, while the number of tractors greater than 60kW rose by 20%<sup>8</sup>;
- Between the cropping years 1975/76 and 1994/95 the amount of nitrogen fertiliser used in the UK rose by 28%, from 1.059 million tonnes to 1.356 million tonnes<sup>9</sup>. However, in 1985/86 the amount used was 1.572 million tonnes, 22% more than in 1994/95. The fall since the mid-80s was due to the introduction of set-aside, greater awareness over the use of fertilisers and the need to cut costs;
- The use of chemical sprays in agriculture has experienced similar trends as nitrogen fertiliser. For example, in 1974 9,757 tonnes of active ingredients were used on cereals in the UK. This increased to 15,690 tonnes in 1988, a rise of 61%<sup>10</sup>.
- However, usage fell in the 1990s: UK sales of total active ingredients for all uses fell from 24,375 tonnes in 1990 to 22,276 tonnes in 1994, a decline of 9%<sup>11</sup>. The Association believes the fall has been due to formulation technology change, new products, set-aside and the development of Integrated Crop Management;



- Due to its better quality and less dependency on good weather for quality production, silage has largely replaced hay as the main means of conserving fodder. Between 1976-89, the amount of silage produced in England and Wales rose from 10 million tonnes to over 30 million tonnes, an increase of more than 200%.
- The intensification of farming practices and increased use of silage saw a rise in farm pollution incidents over the 1970's and 1980's. Between 1979 and 1988, the number of reported farm pollution incidents in England and Wales rose from about 1,500 to over 4,000, an increase of over 150% (National Rivers Authority). However, stiff penalties for polluters, grants for pollution control measures and guidance to farmers has seen a decline in farm pollution since 1988. Between 1988 and 1995 the number of substantial incidents fell from 4,141 to 2,733, a decline of 34% (Environment Agency)<sup>40</sup>.

## 2.12

### **Farm Business Structure**

- Due to tax and restrictive landlord and tenant legislation, the area of tenanted land has fallen significantly over the last 20 years. In 1979 the area of land rented (excluding seasonal lets) was 4,187,912ha. This fell to 3,356,783ha in 1994, a decrease of 20%;
- The number of holdings also fell, due to the pressures on smaller holdings and the advantage of economies of scale for larger farms. In 1981 there were 155,484 holdings in England. By 1994 this number had fallen to 153,426 holdings;
- Between 1984 and 1994, average farm size in the UK grew from 105ha to 110ha, a increase of 5% (MAFF);
- Due to economic pressures, increased mechanisation and the decline of livestock enterprises, the number of workers employed in farming has fallen steadily since the 1970s. In 1979 the total labour force (including farmers and their wives) was 517,702. By 1994 this had fallen to 410,809, a decrease of 21%.

**PART B : GREATER COTSWOLDS**

## 3.0 DESCRIPTION OF FARMING IN THE GREATER COTSWOLDS NATURAL AREA

### Physical Characteristics

3.1 The Greater Cotswolds Natural Area covers a wide range of topography, geology and soils, resulting in a wide diversity of farm types.

3.2 The south and centre of the NA is dominated by Jurassic oolitic limestone. Around Bath the slowly permeable, calcareous clayey soils of the **Evesham 1** soil association predominate and are suitable for dairying, with some winter cereals and stock rearing<sup>12</sup>. The shallow, well drained, brashy **Elmton 2** and **Sherborne** soils are the dominant soil types further north around Cirencester and into Oxfordshire. These soils are suitable for cereals, with some stock rearing and dairying.

3.3 Further north the largely limestone geology changes to Lias clay and glacial drift, with areas of limestone and ironstone. The varied geology results in a greater variation of farm types than further south in the NA. The major soil type is the **Denchworth** association, a slowly permeable, seasonally waterlogged, clayey soil, suitable for arable cropping in drier areas and dairying on wetter land<sup>13</sup>. Localised areas soils such as the **Aberford** and **Bardsey 1** associations allow potatoes, sugar beet and vegetables to be grown.

3.4 The Agricultural Land Classification of the Greater Cotswolds Natural Area reflects the moderate quality of its farmland; 81% is Grade 3 land (defined as land with moderate limitations on cropping), with only small areas belonging to other grades. This percentage is significantly higher than the percentage for England as a whole (44%). Approximately 5% of the NA is Grade 1 and 2, 6% Grade 4 and 8% is urban or non-agricultural land (national average 19%).

3.5 Grade 3 land is subdivided in the MAFF ALC system into Grade 3a (good quality) and Grade 3b (moderate quality). Nationally about one third of Grade 3 falls into Grade 3a. There are no published sources of information to break down the extent of Grades 3a and 3b, however, which requires detailed survey on site. As such this analysis cannot be used further in the assessment.

### Agricultural Land-Use

3.6 In 1994 :

- 56% of the NA's agricultural land was arable, including set aside. Wheat was the most common crop (47% of the cropping area) and barley, oilseed rape and pulses were also grown;
- 8% was grassland less than 5 years old;
- 29% was grassland older than 5 years old (such as long-term leys, permanent pasture);
- 2 % was regarded as rough grazing; and
- other land-use types together made up 5% of agricultural land.

### Farm Types

3.7 Out of 4,055 holdings in the NA in 1994:

- 56% were part-time;
- 17% were full-time cattle and sheep farms;
- 10% were dairy farms;
- 11% cropping farms; and
- 6% other farms.

Part time farms are defined by MAFF as those holdings with an estimated labour requirement of less than 200 Standard Man Days (SMDs). 1 SMD is equivalent to 8 labour hours per year. The division between full and part-time farms throughout this report, is based on this MAFF definition.

3.8 From 1994 MAFF have analysed farm types based on EC Farm Type data. These can be used for cross-referencing between the two breakdowns, although caution must be exercised. EC analysis is based on Standard Gross Margin analysis of the Census data. By cross-referencing it can generally be concluded:

- about 16% of part-time farms are cattle and sheep (370);
- there are of the order of 580 part-time cropping farms, and 400 part-time mixed farms;
- most dairy, pig/poultry and horticultural holdings are full-time enterprises;
- over 40% of part-time farms have not been categorised into one of the main farm type headings.

This cross-analysis explains some of the difference between the number of cropping farms (25% in the EC analysis) and the area of the NA in arable use (56%). It can be concluded that arable farms are generally large in size, and that many of the other farm types also have arable cropping.

### Farm Tenure

3.9 In 1994, 32% of the agricultural area was rented and 68% owner-occupied. This is close to the 1994 national average for England of 36% rented and 64% owner-occupied.

### Farm and Enterprise Size

3.10 Farms in the NA were evenly distributed between the five farm size categories used in the census, reflecting the diversity of farm types in the NA (see **Table 3.1**):

**Table 3.1 : Farm Sizes**

Farm Size Category	Number of farms in each category as a percentage of all farms
Less than 5ha	19
5ha and <20ha	24
20ha and <50ha	21
50ha and <100ha	18
100 ha and greater	19

3.11 Farm labour requirements (measured by Standard Man Days or SMDs) provide valuable information about the size and intensity of farming enterprises. A full time farm worker is usually assumed to be able to provide labour worth between 250-300 SMDs annually including overtime<sup>14</sup>. This figure may be used as a **general** indication of the number of full-time workers needed by an enterprise. MAFF's part-time farm analysis is based on a figure of 200 SMD/year. Some farms may employ full-time workers even though the theoretical labour requirement is less than these figures. Other farms may meet the labour need by the work of two or more part-time or contract labour inputs.

3.12 The SMD data suggests that 56% of farms in the NA (2,265 farms) were too small to provide full-time employment, which would appear to be confirmed by the analysis of farm types in paragraph 3.7, 56% (2,260 farms) of which were part-time. Most of the remaining farms have a labour input ranging from 1-3 full-time workers (see **Table 3.2**).

**Table 3.2 : Enterprise Size By SMD**

Holding Size by SMDs	Approx. No. Of Workers	Percentage
0-249 SMD	0 - 1	56
250-499 SMD	1 - 2	17
500-999 SMD	2 - 3	15
1000-1999 SMD	3 - 7	8
1000-1999 SMD	>7	4

3.13 Unfortunately cross analysis of farm type and sizes with land use is not possible. It is not possible, therefore, to conclude on the area of farmland occupied by the different farm types, eg dairy, part-time etc.

**Labour Force**

3.14 The NA's agricultural workforce totalled 9,406 people in 1994. 61% of this workforce were full-time workers, 28% part-time workers and 10% casual workers. The 1995 Census Guidance Notes define a full-time worker as one whose main occupation is farming and who devotes about 40 hours a week to running the holding. Casual workers are defined as those who are not regular workers ie not employed on the holding for some part of each month throughout the year. Part-time workers are those workers who are not full-time workers or casual workers.

**Summary of Farm Types in the Greater Cotswolds**

3.15 From the above analysis it is possible to draw a number of general conclusions about the main farm types in the NA:

- 1) Cropping farms (450 full-time, approximately 550 part-time) cover the greatest area (56%) of the NA, yet make up just 25% of farms. They predominate in the central area from Tetbury to Evesham and across to Banbury. The large number of part-time farms (based on the SMD analysis) is surprising, and may reflect the low levels of labour input/ha required to operate arable holdings with modern machinery.

- 2) Cattle and sheep farms are common throughout the NA, but may be limited to those areas too steep or poorly drained to allow cropping or dairying. On 1988 Census analysis they are mainly in the northern part of the NA;
- 3) About one tenth of the farms in the NA are dairy. Dairy farming dominates the wetter clay lands found in the south and parts of the north of the NA, and is more extensive on 1988 mapping than indicated by analysis;
- 4) A large number of farms are part-time;
- 5) Two thirds of farms are owner-occupied;
- 6) Farms are evenly distributed between a range of farm sizes and most full-time farms have a labour requirement of between 1-3 workers.

## 4.0 CHANGES IN FARMING IN THE NATURAL AREA, 1975 TO 1994

4.1 This section analyses the changes in agriculture over the period 1975-1994, looking firstly at the main structural changes to the industry within the NA, followed by the changes within farming enterprises. The causes of these changes and their effects on nature conservation are then described.

4.2 In reading our findings it is important to recognise that the parish census data does not provide a comprehensive guide to changes to farming. For example, improved grassland and unimproved calcareous grassland may both be categorised as grassland older than 5 years, despite their very different nature conservation interest. Nevertheless, the census data still provides a general indication of the changes that have taken place.

### Summary of The Principal Structural Changes

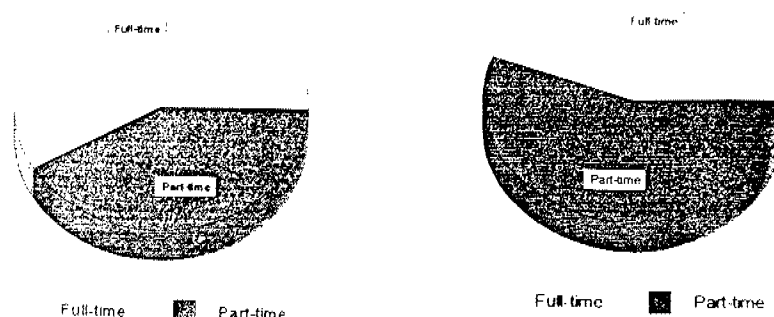
4.3 Land Use. Principal changes are as follows:

- A major change has been the increase in the total arable area (including set-aside) by 18%, from 140,823ha to 165,572ha (increase of 24,749ha). This increase will have been influenced by financial support under the EU's Common Agricultural Policy (CAP), which encouraged the conversion of even relatively marginal land to cropping. With set-aside, the area actually being grown for crops has little changed over the twenty years:
- Due in part to the overall increase in the arable area, grassland less than 5 years old fell by 49% (46,014ha to 23,626ha) and grassland older than 5 years by 17% (104,765ha to 86,559ha). Rough grazing increased slightly (by 272ha) to 5,671ha. In total the grassland/grazed area fell by some 40,322ha.
- The 15,500ha fall in grazed land not accounted for by arable area increases is accounted for by increased woodland (5761ha), increased "other land" (2996ha) and an overall decrease in the total agricultural area of 6816ha (2.2%);

4.4 Farm Holdings. The total number of holdings in the NA fell from 4,145 in 1975 to 3,832 in 1984, then increased to 4,055 by 1994. There has been a swing towards part-time holdings, as illustrated below:

- full-time holding numbers fell by 26% from 2,431 to 1,795, a fall of 636;
- part-time numbers increased by 32% from 1,714 to 2,260, an increase of 546.

Figure 4.1 : Holdings By Type 1975 (left) and 1994 (right)



4.5 Farm size. By 1994, there were 285 more farms of less than 20ha, with 375 farms fewer in the >20ha bracket. The trend towards fewer larger farms may be due to economies of scale, coupled with the lotting of farms to maximise very strong capital values (particularly from the residential market) in the 1980's. The increase in small farms occurred between 1984 and 1994 and reversed the trend of the previous decade. The figures suggest an increase in the number of "hobby" farms:

**Table 4.2 : Farm Size Changes**

Size (ha)	1975	1984	1994	Change 1975-1994
<5	591	555	750	+27
5 - <20	854	799	980	+15
20 - <50	947	851	860	-9
50 - <100	813	710	715	-12
100+	940	917	750	-20
<b>Total</b>	4145	3832	4055	-2

4.6 Employment. The total agricultural workforce declined by 15% between 1975-1994, with:

- full-time farmers falling by 20% from 3,226 to 2,572;
- full-time workers by 46% (drop of 2,074 to 2,443);
- and casual workers by 10% (drop of 104).

In contrast, part-time workers have increased by 69% (to 1,731) and family workers and working spouses by 39% (to 1,686). The decline in the full-time workforce and the increase in part-time workers is probably a result of increased farm mechanisation, an increase in less labour intensive arable enterprises, financial pressures on many farms to reduce labour costs, the introduction of set-aside, and the increased number of hobby and "lifestyle" farms in the area.

4.7 Labour Inputs. The decline in the labour force has been most keenly experienced on the larger holdings. There has been a general decrease in the number of holdings requiring labour inputs of more than 3-4 men. Farms with labour requirements of more than 7-8 men declined by 81% from 747 to 145 over the 1975-1984 period, for example. The number of farms of more than 100ha fell by a lesser extent, indicating increased mechanisation and less labour intensive farming methods are now required to run many holdings.

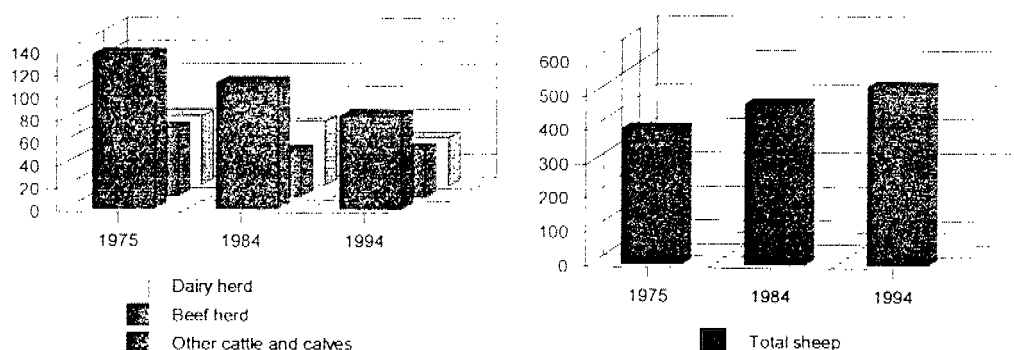
4.8 Tenure. Rented land fell by 30%, probably due to tenancy laws and inheritance tax rules which discouraged landlords from letting land. It is too early to assess whether the new Farm Business Tenancies (introduced in September 1995) and the current 100% inheritance tax relief on let land will reverse the decline of the tenanted sector.



## Summary of Principal Changes to Farm Types

- 4.9 Cropping Farms. The 18% increase in the arable area and the 15% fall in number of cropping farms suggests many of the remaining cropping farms have increased in size. This trend is due to the increased economies of scale for large farms and more recently as a response to set-aside. Set-aside reduces a farm's cropping area, resulting in a smaller area to generate income and spread fixed costs. Some farms, therefore, may very recently have acquired other land as a means of compensating for this loss. The dramatic increase in break crops (oilseeds increased by 863% and pulses by 12,172%) has also largely been a consequence of CAP support, while the 47% rise in the wheat area has been due to improved market conditions, husbandry and seed varieties. At least some of the increase in these areas has been at the expense of the less profitable barley crop, which has fallen by 61%. There is likely to have been increased planting of Autumn sown (rather than Spring sown) varieties over the period.
- 4.10 Dairy farms. The number of dairy farms declined by 48% between 1975-1994, with dairy cattle numbers falling by 31%. This decline may be due to the financial pressures on smaller dairy units, such as the imposition of milk quota in 1984 and the high capital costs required for buildings, parlours and pollution control equipment. The decline of the grassland area suggests much of the land previously in dairy use may now be used for arable cropping, while other dairy land may now be used for stock rearing.
- 4.11 Cattle and Sheep. Cattle and sheep farms increased by 16% between 1975-1994. This increase would appear to be largely through farms leaving dairying, but unable or unwilling to move to arable enterprises. Despite the increase in stock farms, the overall decrease in grassland has resulted in the beef suckler herd falling by 12% and the number of other cattle older than 1 year falling by 42%. However, sheep numbers increased by 31% over the same period, perhaps due to improved market conditions for lamb, the smaller capital investment associated with sheep and the increase in the arable area (sheep enterprises have more flexibility in fitting into arable rotations than cattle and may have replaced cattle on some farms). This broadly followed the national trend.

**Figure 4.3 : Cattle and Sheep Number Changes (in thousands)**



- 4.12 Part-time farms. Part-time farms have increased by 40% over the last 20 years and now make up more than half of all farm types (56%). The increase may be the result of some farmers having to supplement their income with work off the farm. It may also be a consequence of an increase in hobby farms, as those with urban based employment move into rural areas, and some previously full-time farms (using MAFF's SMD analysis) now being classified as part-time because of increased mechanisation which has resulted in decreased labour requirements for some enterprises, especially cereals.

## Effects on Nature Conservation

4.13 The changes to agriculture in the NA over the last 20 years will have had a number of direct and indirect impacts on nature conservation.

4.14 Direct Effects. These will include:

- *woodland planting.* The 110%, some 5761 ha, increase in the farm woodland area may have benefited wildlife, providing the sites for the new planting were not valuable habitats beforehand and the new woodlands receive sympathetic management. The rate of increase is approximately twice the national average. Farm woods still only cover 4% of the NA. It is not possible to identify which farm types have planted most woodland. It may be a mixture, with the most extensive areas planted by the large farms and estates. Farm woodland areas do not include all woodland in the NA. It is reported that much of the planting in the 1970's was coniferous, and there has been decreased management of traditional woods affecting landscape and ecology<sup>15</sup>;
- *the increase in the arable area* will have seen the loss of those species associated with grassland over large areas of the NA. Many hedges and walls will have been removed to increase field size to accommodate machinery, with the remaining field boundaries neglected. Wheat is a cereal crop which over the last two decades has become overwhelmingly sown in the autumn, with numerous associated chemical and management changes (see Chapter 2). The increase in the wheat area suggests a general increase in autumn sown crops, with an associated increase in fertilisers and sprays and a loss of winter stubble for many bird species to forage in. However, the introduction of compulsory set-aside, with a number of beneficial management options, will have benefited nature conservation on some of the most intensively farmed holdings in the NA. As noted, the area of crops excluding set-aside is little changed;
- *the decrease in the grassland area* and continued changes in its use will have affected wildlife and the landscape. The major loss of grassland has taken place since 1940. Within the Cotswolds AONB, some 40-42% of the area was permanent (largely unimproved) grassland in 1935, yet this had declined to just 2% by 1983<sup>16</sup>. This study suggests that the loss of traditional sheep walks in the central part of the NA (within the AONB) may account for the greatest areas of grassland losses, with the dairy and cattle areas of the north and south of the NA changing less;
- *the decline of dairying* may not only have led to the loss of grassland to arable but the remaining grassland area may now be used more intensively. As the percentage fall in dairy cow numbers is less than the fall in dairy units, some of the remaining farms may have increased stocking to increase viability, resulting in more intensive grassland use, the introduction of forage maize and greater risk of water pollution. In 1975 the average number of dairy cows per holding was 77, which had risen to 101 in 1994, a 31% increase;
- *the fall in cattle numbers* may have both advantages and disadvantages for nature conservation. While the fall may be largely associated with the decrease in grassland, it may also suggest reduced stocking rates and extensification on some farms, perhaps due to the imposition of stocking limits on livestock premia or the take-up of ESA agreements. There may be disadvantages, however, as cattle grazing may have been concentrated on better pasture with

a drop in the grazing of the commons and poorer grassland areas. The varied landscape and the extent of the NA may hide more localised trends, however. Whilst the bald statistics indicate a large drop in the numbers of beef cattle, within the Cotswolds AONB there is a reported increase of 59%<sup>17</sup>. This suggests that the changes are on the periphery of the NA:

- *sheep numbers.* The consequences of the rise in sheep numbers are also mixed; increased sheep grazing of many unimproved calcareous grasslands would help control scrub and rank vegetation. However, the reported neglect of many calcareous grasslands suggests most sheep are being grazed on improved grassland or on arable aftermaths, not on land where their grazing would be most beneficial to nature conservation, such as the commons. Lack of grazing is reported as a disbenefit for calcareous grassland in the Cotswold AONB and north into Warwickshire<sup>18</sup>, suggesting that sheep may be concentrated on better pasture land. Scrub invasion is a reported problem<sup>15</sup>.

4.15 Indirect Effects. These will include:

- *decreased labour.* The fall in the numbers of full-time workers and farmers may have led to less labour availability for management of wildlife habitats. Conversely, there may be an increase in those sympathetic to wildlife habitat management and creation from part-time and hobby farmers;
- *watertable/wetlands.* There has been a loss of wetlands, in part a direct effect of agriculture but also due to lowering of water tables. As few crops in the NA are likely to be irrigated, this is an effect of other human activity;
- *grant schemes.* The existence of payments under CS and ESA schemes may have effects. For the Cotswold Hills ESA (one of two in the NA), figures produced by EN<sup>19</sup> suggest that 57% of potential land in tiers IA, IB and IC<sup>20</sup> had been entered by the closing date for 1995 applications. Of particular importance, some 75% of tier IC (extensive permanent grassland) had been entered. Some 59.6km of walling was grant aided in 1994, and 47.4km of hedging.

5.0

## STRATIFICATION OF FARM TYPES: GREATER COTSWOLDS NA

5.1

The analysis of farm census data in the previous chapter allows farms to be categorised according to their impact on nature conservation over the last 20 years. This will allow those farms most vulnerable to change, or which present the greatest opportunities for nature conservation, to be identified and targeted.

**Table 5.1 : Summary of Farm Type Effects**

Farm Type	Farming Change	Possible Impact on Environment	Importance to NA
Cropping	increase in arable area	loss of grassland, removal or neglect of field boundaries	HIGH
	increase in autumn sown crops	more fertilisers and sprays, less winter stubble leading to decline in birds and weeds	HIGH
	set-aside	opportunities for conservation	HIGH
	fall in number of full-time workers	neglect of wildlife habitats and beneficial activities	MEDIUM
Dairying	Fall in number of dairy units and cows	loss of some grassland to arable	HIGH
	increased stocking on some remaining units	more intensive grassland use	MEDIUM
	increase herd size and intensity	increased pressure on wet pastures and risk of water pollution	MEDIUM
Cattle & Sheep	increase in holdings	less intensive grassland use where replace dairying on some farms	MEDIUM
	fall in cattle numbers	decreased grazing of marginal land	HIGH
	rise in sheep numbers and grazing management	sheep grazing beneficial to calcareous grassland. Lack of grazing leads to scrub encroachment. Some decreased grazing of marginal areas	HIGH IN LOCALISED AREAS

Part-time	increase in part-time farms and farmers	neglect of wildlife features on some farms  misguided management practices  increased opportunities for wildlife on other farms	MEDIUM
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5.2

As well as categorising the general farm types, those farms most vulnerable to change or offering greatest potential within these general categories may be identified. From the analysis of farm census data these farms would appear to be as follows:

- *Cropping Farms Greater Than 100ha*  
Despite the increased arable area, cropping farms greater than 100ha decreased in number between 1975-1994, while labour requirements on the largest enterprises have also fallen. Cereals and arable cropping account for the largest land-use in the NA. Many cereal farms are likely to have developed onto land which was grassland up to the 1940's. Many of the larger farms may include farm woodland planting. Reduced labour may result in lack of woodland and wetland management, and grazing of banks and rough grazing may have declined;
- *Cropping Farms 20-99ha*  
Small to medium cropping farms have also decreased in number. As the arable area has increased, this suggests the farms have been selling land or amalgamating, while increasing labour inputs on small to medium enterprises suggests farms have intensified their enterprises. This may have consequences for wildlife, although set-aside may also provide nature conservation benefits. Small cropping farms may be attracted to extensification through conservation schemes;
- *Dairy Farms*  
The NA's remaining dairy farms may have intensified their enterprises to increase output, leading to more intensive grassland use. Smaller dairy farms, with their more limited resources, may be particularly vulnerable to financial pressures to intensify grassland use (<50ha), but larger farms cover the greatest land area. Switches in the way winter feed is produced (silage and maize cropping) may have effects (Chapter 2 refers);
- *Cattle and Sheep Farms*  
The decline of cattle numbers and the rise in sheep numbers will have a number of consequences for wildlife, especially on those farms with areas of unimproved grassland. Farms on the Cotswold scarp and the periphery of the NA are most likely to have changed, with indications that the trends are different in these areas. Despite increased numbers overall, there are indications that changed sheep grazing techniques are detrimental to wildlife;

- *Part-time Farms*  
The increase in part-time holdings may lead to the neglect of features important to wildlife, as part-time farmers may not have the resources required to properly maintain these features. Other farmers may have a strong interest in nature conservation and may be attracted by less intensive farming methods and conservation schemes. Some will have misguided management but be enthusiastic. Whilst over half of farms are termed part-time, the extent by area of these farms is not known.

### Sample Structure

- 5.3 The Greater Cotswold NA covers some 298,000 hectares, with height variation from 10m AOD to 300m AOD, and wide climate and soil changes across the area. Farming types are very varied, as the data shows, and reference to other studies makes clear that the trends in the NA may be reversed if smaller areas are studied (eg overall decline in beef cattle in the NA but reported increase in the Cotswold AONB area). This makes representative sample section of a small number of farms impossible.
- 5.4 Accordingly, we suggest a sample which aims to target farms of greatest need for conservation targeting, and those of greatest potential for enhancement. We therefore suggest the following sample structure.

**Table 5.2 : Suggested Sample Structure**

Farm Type	Reason for Inclusion	Sample number
Large Cropping Farms	By area, very important. Great potential for increasing diversity. Many include under grazed banks and rough grazing, and will have been areas ploughed since 1940's. Sample should target Cotswold scarp to identify grassland effects, and include one large farm/estate from where woodland planting has been important for landscape/sporting	4
Small Cropping Farms	Farms under financial pressure for survival. Offer enhancement opportunities, as well as some changes as for larger farms. Will include part-time farms	2
Dairy Farms	Small dairy farms (<50ha) under greatest pressure, but all dairy farms in the south of the NA have potential to affect grassland and wetlands. Existence of semi-natural grasslands limited	2
Cattle and Sheep Farms	Our study identifies farms in the western and northern part of the NA as experiencing most change, with different trends. Localised under grazing of commons and improvement of semi-natural grasslands of greatest concern	3