

Open Research Online

The Open University's repository of research publications and other research outputs

Conservation on farms: Conflicting attitudes, social pressures and behaviour

Thesis

How to cite:

Carr, Susan (1989). Conservation on farms: Conflicting attitudes, social pressures and behaviour. PhD thesis The Open University.

For guidance on citations see [FAQs](#).

© 1989 The Author

Version: Version of Record

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's [data policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

DX 85264

UNRESTRICTED

**Conservation on Farms:
Conflicting Attitudes,
Social Pressures and Behaviour**

Susan Carr

A Thesis presented to the
Open University
for the Degree of Doctor of Philosophy
Faculty of Technology

April 1988

Author's number: M 7021030

Date of submission: 27 April 1988

Date of award: 26 January 1989

HIGHER DEGREES OFFICE
LIBRARY AUTHORISATION FORM

STUDENT: SUSAN CARR SERIAL NO: _____

DEGREE: PhD

TITLE OF THESIS: CONSERVATION ON FARMS:
CONFLICTING ATTITUDES, SOCIAL PRESSURES
AND BEHAVIOUR

I confirm that I am willing that my thesis be made available to readers
and maybe photocopied, subject to the discretion of the Librarian.

SIGNED: S. Carr DATE: 27/4/88

Abstract

In the late 1970s and early 1980s, conservationists' concern about the loss of wildlife habitat on farmland escalated into open conflict with farmers, the conflict being heightened by controversy surrounding the passing of the Wildlife and Countryside Act in 1981. An improved understanding of the attitudes of farmers and conservationists would help ensure the most appropriate measures are adopted to resolve or avoid such conflict.

This research therefore compared the attitudes of farmers and conservationists in Bedfordshire in two pairs of surveys. In the first, free-ranging interviews were used to establish the range of opinions on farming and conservation held by the two groups. In the second, Fishbein and Ajzen's theory of reasoned action was used as the framework for a more detailed comparison of the differences in attitudes between the two communities. The correlation of attitudes and social pressures with farmers' behaviour was also explored for three conservation-related activities about which there was conflict: hedge management, pesticide use and straw disposal.

The first survey revealed a complex matrix of shared, complementary and conflicting beliefs and values between and within the two communities. Examples of conflicting values included those concerning land ownership and freedom of individual action versus stewardship, and pride in an efficient, productive and tidy farm versus a wilder countryside. The second survey showed that while farmers agreed with conservationists about the advantages of conservation expressed in general terms, once decisions about specific farm practices were involved, attitudes to conservation and wildlife were far outweighed by attitudes to farming and business considerations. Social pressures on farmers from conservationists were minimal; the strongest social pressures came from within the farming community itself and these generally served to perpetuate the dominant farming values.

Although the theory of reasoned action provided a valuable means of exploring the role of attitudes, social pressures and behaviour in the conflict, some limitations in the use of the model in these complex circumstances were found. In particular it did not allow a distinction to be made between self-interested and deeply held values; the recommended method of constructing and scoring a behavioural index was inappropriate where value judgements were involved; and respondents experienced difficulty in distinguishing between beliefs and values when evaluative opinion statements were used. Some suggestions for overcoming these limitations are made.

Contents

| | | |
|----------|---|-----------|
| I | Background | 1 |
| 1 | Conservation and agriculture | 2 |
| 1.1 | Introduction | 2 |
| 1.2 | Background to the conflict | 4 |
| 1.2.1 | Post-war agricultural expansion | 4 |
| 1.2.2 | The conflict with conservationists | 5 |
| 1.2.3 | Efforts to resolve conflict | 6 |
| 1.2.4 | The longer perspective | 8 |
| 1.2.5 | Recent developments | 9 |
| 1.3 | Criticisms of the 1981 WLCA | 10 |
| 1.4 | Alternative proposals | 12 |
| 1.5 | The role of attitude research | 14 |
| 1.6 | Summary of research objectives | 15 |
| 2 | Previous related attitude research | 17 |
| 2.1 | Farmers' attitudes | 17 |
| 2.1.1 | Attitudes in general | 17 |
| 2.1.2 | Attitudes to landscape conservation | 18 |
| 2.1.3 | Attitudes to wildlife habitat | 20 |
| 2.1.4 | Attitudes to wildlife | 21 |
| 2.1.5 | Conservation attitudes in relation to social change | 21 |
| 2.2 | Environmental attitudes | 23 |
| 2.2.1 | General theories | 23 |
| 2.2.2 | Conservationists | 24 |
| 2.2.3 | Attitudes to agriculture | 25 |
| 2.3 | Implications for this research | 26 |
| 3 | Attitude research methodology | 29 |
| 3.1 | Defining attitudes | 29 |
| 3.2 | Methods for studying attitudes | 30 |
| 3.2.1 | Qualitative case-studies | 30 |
| 3.2.2 | Quantitative attitude measurement | 31 |

| | | |
|------------|---|------------|
| 3.2.3 | Content analysis of documentary sources | 34 |
| 3.2.4 | Opinion polls | 35 |
| 3.2.5 | Experiments | 35 |
| 3.3 | Choice of methodology | 36 |
| | | |
| II | First Survey | 38 |
| | | |
| 4 | Organisation of first survey | 39 |
| 4.1 | Preliminary investigation | 39 |
| 4.2 | Land use in Bedfordshire | 41 |
| 4.3 | Farmer interviewees | 42 |
| 4.4 | Conservation interviewees | 44 |
| 4.5 | Interview approach and analysis | 47 |
| | | |
| 5 | Results: attitudes and behaviour | 49 |
| 5.1 | Introduction | 49 |
| 5.2 | Trees and hedges | 50 |
| 5.2.1 | Farmers | 50 |
| 5.2.2 | Conservationists | 57 |
| 5.3 | Pesticide use | 61 |
| 5.3.1 | Farmers | 61 |
| 5.3.2 | Conservationists | 65 |
| 5.4 | Straw disposal | 68 |
| 5.4.1 | Farmers | 68 |
| 5.4.2 | Conservationists | 73 |
| 5.5 | Access and footpaths | 77 |
| 5.5.1 | Farmers | 77 |
| 5.5.2 | Conservationists | 80 |
| 5.6 | Comparison of the views of farmers and conservationists . . . | 82 |
| | | |
| 6 | Results: social pressures | 87 |
| 6.1 | Introduction | 87 |
| 6.2 | Farmers and social pressures | 88 |
| 6.3 | Conservationists and social pressures | 94 |
| 6.4 | Discussion | 100 |
| 6.5 | Implications for the second survey | 101 |
| | | |
| III | Second Survey | 103 |

| | | |
|----------|--|------------|
| 7 | Organisation of second survey | 104 |
| 7.1 | Introduction | 104 |
| 7.2 | Questionnaire construction | 105 |
| 7.2.1 | Variables for the Fishbein-Ajzen model | 105 |
| 7.2.2 | Additional variables | 111 |
| 7.3 | The conservationist questionnaire | 112 |
| 7.4 | Farmer sample | 113 |
| 7.5 | Conservationist sample | 115 |
| 7.6 | Commitment to conservation | 118 |
| 7.7 | Topics involved in conservation | 118 |
| 7.8 | Summary | 120 |
| 8 | Results: attitudes, beliefs and values | 121 |
| 8.1 | Introduction | 121 |
| 8.2 | Statistical analysis | 122 |
| 8.3 | Conservation in general | 123 |
| 8.3.1 | Attitude clusters | 123 |
| 8.3.2 | Attitudes | 124 |
| 8.3.3 | Beliefs and values | 128 |
| 8.3.4 | Belief salience | 129 |
| 8.4 | Hedges | 129 |
| 8.4.1 | Attitude clusters | 129 |
| 8.4.2 | Attitudes | 130 |
| 8.4.3 | Beliefs and values | 135 |
| 8.4.4 | Belief salience | 136 |
| 8.5 | Pesticide use | 138 |
| 8.5.1 | Attitude clusters | 138 |
| 8.5.2 | Attitudes | 139 |
| 8.5.3 | Beliefs and values | 139 |
| 8.5.4 | Belief salience | 143 |
| 8.6 | Straw disposal | 143 |
| 8.6.1 | Attitude clusters | 143 |
| 8.6.2 | Attitudes, beliefs and values | 145 |
| 8.6.3 | Belief salience | 150 |
| 8.7 | General outlook | 152 |
| 8.8 | Summary | 155 |
| 9 | Results: social pressures | 157 |
| 9.1 | Introduction | 157 |
| 9.2 | Farmers and social pressures | 158 |
| 9.3 | Conservationists and social pressures | 165 |
| 9.4 | Summary | 166 |

| | |
|--|------------|
| 10 Results: behaviour | 172 |
| 10.1 Introduction | 172 |
| 10.2 Hedge and tree management | 174 |
| 10.2.1 Behaviour | 174 |
| 10.2.2 Correlation of behaviour with attitudes | 178 |
| 10.2.3 Correlation of behaviour with social pressures | 180 |
| 10.3 Pesticide use | 184 |
| 10.3.1 Behaviour | 184 |
| 10.3.2 Correlation of behaviour with attitudes | 185 |
| 10.3.3 Correlation of behaviour with social norms | 189 |
| 10.4 Straw disposal | 191 |
| 10.4.1 Behaviour | 191 |
| 10.4.2 Correlation of behaviour with attitudes | 192 |
| 10.4.3 Correlation of behaviour with social pressures | 195 |
| 10.5 Relative contribution of beliefs and values | 196 |
| 10.6 Behaviour of conservationists | 198 |
| 10.7 Other correlations | 198 |
| | |
| IV Summary and Conclusions | 203 |
| | |
| 11 Summary and conclusions | 204 |
| 11.1 Contribution to an understanding of the conflict | 204 |
| 11.2 Contribution to environmental attitudes' research | 208 |
| 11.3 Contribution to methodology | 210 |
| 11.3.1 Behaviour | 210 |
| 11.3.2 Attitudes, beliefs and values | 211 |
| 11.3.3 Subjective norm | 213 |
| 11.4 Review of research objectives | 213 |
| 11.5 Practical implications of the research | 215 |
| 11.5.1 Improving effectiveness of social pressures | 215 |
| 11.5.2 Changing attitudes and behaviour | 217 |
| | |
| References | 219 |
| | |
| A Content analysis categories | i |
| A.1 Farmers | i |
| A.2 Conservationists | ii |
| | |
| B Examples of farmer tape transcripts | iii |
| | |
| C Farmer questionnaire | iv |

| | | |
|----------|---|-----------|
| D | Conservationist questionnaire | v |
| E | Frequency data for attitude, belief and value scores | vi |

List of Figures

| | | |
|-----|--|-----|
| 3.1 | Relations among beliefs, values, attitudes, subjective norms and behaviour. Source: Ajzen and Fishbein, 1980, p. 84. | 34 |
| 4.1 | Agricultural land use in Bedfordshire (adapted from MAFF, 1981, p. 22–23). | 43 |
| 8.1 | Farmer attitude clusters for conservation in general. | 125 |
| 8.2 | Conservationist attitude clusters for conservation in general. | 126 |
| 8.3 | Farmer attitude clusters for removing and keeping hedges. | 131 |
| 8.4 | Conservationist attitude clusters for removing and keeping hedges. | 132 |
| 8.5 | Farmer attitude clusters for using pesticides. | 140 |
| 8.6 | Conservationist attitude clusters for using pesticides. | 141 |
| 8.7 | Farmer attitude clusters for straw disposal. | 146 |
| 8.8 | Conservationist attitude clusters for straw disposal. | 147 |

List of Tables

| | | |
|------|---|-----|
| 7.1 | Percentage of farms in each size category for the survey sample compared with Bedfordshire as a whole (1985) | 114 |
| 7.2 | Percentage of farms in each type category for the survey sample compared with Bedfordshire as a whole (1985) | 114 |
| 7.3 | Percentage of farmers in each ownership category for the survey sample compared with Bedfordshire as a whole (1985) | 114 |
| 7.4 | Percentage of conservation sample living in towns and villages | 117 |
| 7.5 | Number of conservationists opposed to shooting | 117 |
| 7.6 | Commitment to conservation (self-assessed) | 118 |
| 7.7 | Topics seen as involved in conservation (unprompted) | 119 |
| 8.1 | Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about conservation in general | 127 |
| 8.2 | Most relevant conservation beliefs | 129 |
| 8.3 | Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about hedge removal | 133 |
| 8.4 | Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about keeping hedges | 134 |
| 8.5 | Most relevant hedge beliefs | 137 |
| 8.6 | Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about using pesticides | 142 |
| 8.7 | Most relevant pesticide beliefs | 144 |
| 8.8 | Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about burning straw | 149 |
| 8.9 | Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about incorporating straw | 151 |
| 8.10 | Most relevant straw disposal beliefs | 153 |
| 8.11 | Comparison of the general outlook of farmers (F) and conservationists (C) | 154 |
| 9.1 | The potential sources of conservation advice perceived by farmers | 159 |

| | | |
|-------|--|-----|
| 9.2 | Sources and direction of influence on farmers (F) about not removing hedges | 160 |
| 9.3 | Sources and direction of influence on farmers (F) about planting more trees | 161 |
| 9.4 | Sources and direction of influence on farmers (F) about reducing pesticide use | 163 |
| 9.5 | Sources and direction of influence on farmers (F) about straw burning | 164 |
| 9.6 | Sources of conservation advice for farmers, as perceived by conservationists | 166 |
| 9.7 | Sources and direction of influence on conservationists (C) about farmers not removing hedges | 167 |
| 9.8 | Sources and direction of influence on conservationists (C) about farmers planting more trees | 168 |
| 9.9 | Sources and direction of influence on conservationists (C) about farmers reducing pesticide use | 169 |
| 9.10 | Sources and direction of influence on conservationists (C) about farmers not burning straw | 170 |
| 10.1 | Reasons given by farmers (F) for hedge removal | 174 |
| 10.2 | Reasons given by farmers (F) for hedge planting | 175 |
| 10.3 | Reasons given by farmers (F) for tree planting | 176 |
| 10.4 | Tree species planted by farmers (F) | 177 |
| 10.5 | Correlation of hedge removal behaviour with attitudes | 179 |
| 10.6 | Correlation of hedge maintenance behaviour with attitudes | 181 |
| 10.7 | Correlation of hedge and tree management behaviour with social norms | 183 |
| 10.8 | Farmers' pesticide use (spray rounds): minimum, maximum and mean use and adjusted variation | 186 |
| 10.9 | Correlation of pesticide use behaviour with attitudes | 188 |
| 10.10 | Correlation of pesticide use behaviour with social norms | 190 |
| 10.11 | Correlation of pesticide use behaviour with social norms (cont.) | 191 |
| 10.12 | Proportion of straw burnt, baled and incorporated on the surveyed farms compared with England and Wales as a whole (on an area basis) | 192 |
| 10.13 | Correlation of straw disposal behaviour with attitudes | 193 |
| 10.14 | Correlation of straw disposal behaviour with social norms | 197 |
| 10.15 | Example of the contribution of underlying beliefs (<i>b</i>) and values (<i>e</i>) to the correlation of attitudes (<i>bxe</i>) with hedge removal behaviour | 199 |

| | | |
|-------|---|-------|
| 10.16 | Example of the contribution of underlying beliefs (<i>b</i>) and values (<i>e</i>) to the correlation of attitudes (<i>bxe</i>) with straw disposal behaviour | 200 |
| 10.17 | Action taken by conservationists to promote conservation . . . | 201 |
| E.1 | Attitude scores of farmers (F) and conservationists (C) for conservation in general | vii |
| E.2 | Belief and value scores of farmers (F) and conservationists (C) for conservation in general | viii |
| E.3 | Attitude scores of farmers (F) and conservationists (C) for removing hedges | ix |
| E.4 | Belief and value scores of farmers (F) and conservationists (C) for removing hedges | x |
| E.5 | Attitude scores of farmers (F) and conservationists (C) for keeping hedges | xi |
| E.6 | Belief and value scores of farmers (F) and conservationists (C) for keeping hedges | xii |
| E.7 | Attitude scores of farmers (F) and conservationists (C) for using pesticides | xiii |
| E.8 | Belief and value scores of farmers (F) and conservationists (C) for using pesticides | xiv |
| E.9 | Attitude scores of farmers (F) and conservationists (C) for burning straw | xv |
| E.10 | Belief and value scores of farmers (F) and conservationists (C) for burning straw | xvi |
| E.11 | Attitude scores of farmers (F) and conservationists (C) for incorporating straw | xvii |
| E.12 | Belief and value scores of farmers (F) and conservationists (C) for incorporating straw | xviii |

Acknowledgements

Grateful thanks are due to:

- Joyce Tait, for her inspiration and support
- Bedfordshire farmers and conservationists, for kindly and patiently answering all my questions, and helping me get to know and appreciate the county
- the Open University's Academic and Computing Service, for always being on call to answer queries, and especially Caryn Loxton for entering all the data
- Mike, Julian and Chris, for their tolerance (most of the time) and especially Amanda for helping me check the data
- and Barbara, for keeping the home fires burning despite Barry's tragic death.

Part I
Background

Chapter 1

Conservation and agriculture

1.1 Introduction

In the early 1980s conservationists' concern about loss of wildlife and wildlife habitat in Britain as a result of continuing agricultural intensification erupted in a series of bitter conflicts with farmers. These occurred soon after the passing of the Wildlife and Countryside Act (HMSO, 1981), which had been intended as a means of reducing the conflict between agriculture and conservation.

The most widely publicised disputes at the time were those over the drainage and ploughing up of wetland on the Halvergate Marshes and Somerset Levels, but there were many other agricultural changes which worried conservationists. Farmers were criticised for their increasing dependence on chemical inputs, particularly insecticides, the enlargement of fields and removal of hedges and other obstructions such as ponds and trees, the agricultural improvement of old pastures by fertilisation or ploughing up and reseeded with temporary grass, the ploughing up and coniferisation of moorland and the neglect or clearance of old woods and coppices. These criticisms were voiced both at the science-based institutional level (NCC, 1977) and at the more personal and emotional level (Shoard, 1980). Closely related to concerns about disappearing wildlife habitat were those about the deterioration in landscape quality (Westmacott and Worthington, 1974) and loss of familiar features (Shoard, 1980). Agricultural intensification and afforestation also fuelled disputes about access to the countryside (Kay, 1983).

In a more general criticism of modern agriculture, some questioned the true efficiency of modern agriculture in energy (Leach, 1975) and economic terms (Bowers and Cheshire, 1983). Environmentalists felt that irreplaceable resources, including those of both energy and wildlife, were being squandered for short-term gains and argued for a 'sustainable utilisation of resources' (O'Riordan, 1982).

At the same time there was a more widespread criticism of farmers among

the general public about the pollution and nuisance caused by straw burning and slurry disposal (Royal Commission on Environmental Pollution, 1979; Department of the Environment, 1983), the cost to the taxpayer of surplus agricultural production (Body, 1982) and the possible health risks from agrochemical residues, including pesticides and nitrate fertilisers (Royal Commission on Environmental Pollution, 1979; Department of the Environment, 1983).

Despite the mounting criticism of intensive agriculture, all attempts to alter the priority given to agricultural expansion in government policy had in the past been strongly resisted by the agricultural lobby and the Ministry of Agriculture, and farming remained remarkably free of statutory controls. Codes of conduct were preferred to compulsion in the case of pesticide use, straw burning, animal welfare and even the management of land designated as of particular conservation interest, the Sites of Special Scientific Interest or SSSIs (Cox *et al.*, 1985b). Conservation on farmland therefore remained almost entirely dependent on the attitude of individual farmers and the extent to which they were influenced by the differing expectations of society, or social pressures. Even though the 1981 Wildlife and Countryside Act gave some protection to the conservation interest of SSSIs, much still depended on the individual landowners' goodwill.

Although several recent surveys have shown that there is considerable interest in wildlife and conservation among farmers (e.g. Macdonald, 1984; MAFF, 1985b), evidence of a continuing loss of some wildlife habitats on farms (House of Commons Environment Committee, 1985; MAFF, 1985b; Countryside Commission, 1986) suggests that farmers and conservationists do not have the same understanding of what conservation involves.

The broad aims of this research project were therefore to examine the social and psychological factors which could account for (i) the apparent discrepancy between farmers' expressed attitudes and their conservation-related behaviour and (ii) the continuing conflict. Such research is needed to complement existing scientific (e.g. Arnold, 1983; O'Connor, 1984; Larkin *et al.*, 1985; Powelson *et al.*, 1985; Hardy, 1986; Rands, 1986; Tapper and Barnes, 1986) and economic studies (e.g. Laurence Gould Consultants, 1985; Potter, 1985) in serving as a guide to the measures most likely to achieve a successful accommodation between conservation and agricultural interests.

Changed circumstances during the course of this study only serve to underline the need for a better understanding of such factors if policy changes are to have the desired effect.

1.2 Background to the conflict

1.2.1 Post-war agricultural expansion

The origins of the current conflict over agriculture and conservation are generally traced back to agricultural expansion after the Second World War. Successive governments since then have encouraged farmers to increase their output and improve productivity. The drive for agricultural expansion begun just before the war was re-inforced by the provisions of the 1947 Agriculture Act, boosted in the late-1960s by the balance of payments' crisis and again in the 1970s by Britain's entry into the European Economic Community (EEC).

The far-reaching consequences of the 1947 Act on subsequent agricultural policy have been discussed, among others, by Winnifrith (1962), Winegarten (1978), Bowers and Cheshire (1983) and Raymond (1984). The extent of support offered to agriculture by the Act and the subsequent close involvement which it allowed the National Farmers Union in government agricultural policy (Cox *et al.*, 1985b) were influenced by many previous years' neglect of agriculture and food shortages during and after the Second World War. The Act sought to provide a secure and reasonably priced food supply for consumers and an adequate income for farmers and farm workers by means of a flexible system of guaranteed prices for most farm produce, annually reviewed in consultation with the Farmers Union.

Other incentives to increased agricultural production, introduced piecemeal in the years leading up to the war and consolidated in the years afterwards, included grants for farm improvements and capital investment, the provision of a free advisory service and increased government spending on agricultural research. In return for these inducements farmers had to accept a measure of policing of their farming methods. Farms were graded according to their standard of husbandry and C grade farmers singled out for special advice and discipline; County Agricultural Committees were empowered with the right to take possession of unproductive and run-down farms, a right which was only finally repealed by the Agriculture Act of 1957 when more plentiful food supplies meant less productive farmers could be tolerated (Donaldson and Donaldson, 1969).

Growing disquiet at the escalating cost to the exchequer of guaranteed prices and over-production of commodities such as milk led to the introduction of some constraints to agricultural production from the mid-1950s onwards, with guarantees limited to 'standard quantities' for some farm produce, but in general government's response to criticism at this time was to redirect subsidies to where it was felt expansion was still necessary.

By the late 1960s and through the 70s, although there was increasing

criticism of the cost and environmental impact of agricultural policy, the emphasis was once again on increasing overall agricultural production, this time as a means of reducing the balance of payments deficit and ensuring stable food supplies during times of wide fluctuations in world prices (National Plan, 1965; HMSO, 1975). In 1973 a further stimulus to production was provided by Britain's entry into the EEC; the Common Agricultural Policy (CAP) of the EEC ensures that farmers receive a good market price for their produce by intervention buying of produce which is surplus to market demand and a system of levies on imported produce to prevent the undercutting of EEC prices.

In the most recent White Paper on agriculture (HMSO, 1979a) the Government continued to pledge its support for agricultural expansion, despite mounting criticism, by concluding '... import prospects and the need for insurance continues to point to the desirability of increased agricultural output in this country'.

It is only since the start of this project that the emphasis on all-out agricultural expansion has come to an end; these more recent developments are discussed in Section 1.2.4 below.

1.2.2 The conflict with conservationists

Although land reclamation for agriculture was already of concern to conservationists before and during the war it was assumed that agricultural expansion would slow down once food shortages eased and that in any case sites of particular wildlife interest would be safeguarded from development by the Ministry of Agriculture (Sheail, 1976). Agricultural development was exempted from the controls of the 1947 Town and Country Planning Act but conservation and amenity interests were recognised by the National Parks and Access to the Countryside Act of 1949. A National Parks Commission (later the Countryside Commission) was established with a brief to facilitate outdoor recreation and enhance the natural beauty of the countryside in National Parks and Areas of Outstanding Natural Beauty while keeping their existing agricultural use. At the same time the Nature Conservancy was given the responsibility of establishing and maintaining Nature Reserves to protect wildlife, of providing scientific advice on their management for conservation, and of notifying local authorities of any sites of particular conservation value (Sites of Special Scientific Interest or SSSIs) in their area (Sheail, 1976).

During the 1960s, as the pace of agricultural improvement gained momentum and loss of wildlife habitat became more evident, the Nature Conservancy set about enlisting greater public support for conservation. It encouraged the re-mobilisation and coordination of the weak and fragmented

conservation movement as an effective political lobby through the Council for Nature and organised a series of 'Countryside in 1970' conferences, promoting the idea that conservation could no longer be confined to Nature Reserves. Over the same period natural history programmes on television stimulated greater public interest in conservation (Lowe, 1983) and adverse publicity about the harmful effects of organochlorine pesticides (Moore, 1962; Carson, 1963; Mellanby, 1967) aroused their concern about the impact of agriculture on wildlife.

1.2.3 Efforts to resolve conflict

The mid-60s are generally seen as the time when conflict between agriculture and conservation first became readily apparent, and by the late-60s steps were being taken to resolve the conflict. A series of meetings in 1967 and 1968 between the Royal Society for the Protection of Birds, the Nature Conservancy, the British Trust for Ornithology, the Society for the Promotion of Nature Reserves and the Ministry of Agriculture and its National Agricultural Advisory Service led to the Silsoe Exercise in 1969, with the additional support of the National Farmers Union and Country Landowners Association, at which 100 farmers and conservationists discussed practical ways in which conservation and profitable agriculture could be reconciled (Barber, 1970; Cox *et al.*, 1985a). This resulted in the formation of the Farming and Wildlife Advisory Group (FWAG) to act as a regular forum for debate between agricultural and conservation interests and as a source of conservation advice for farmers. Initially at least FWAG appears to have had a minimal impact on the farming community and although the Ministry of Agriculture supported it by providing secretarial backup it has been suggested that at the time FWAG provided the Ministry with a means of keeping conservation opinion 'at arm's length' (Cox *et al.*, 1985b).

Reconciliation of agricultural and conservation interests was also sought by the Countryside Commission in their report entitled 'New Agricultural Landscapes' (Westmacott and Worthington, 1974). In this they showed that although progress in agriculture had inevitably resulted in the loss of traditional landscape features, with thought and care an equally attractive new landscape could be created.

In the 1970s space travel and the energy crisis brought about a heightened sense of mankind's vulnerability and earth's finite resources (Meadows *et al.*, 1972). New and more radical environmental pressure groups such as Friends of the Earth joined forces with the conservationists, seeing the conflict over agriculture and conservation as an integral part of a wider and more serious problem, the profligate use of non-renewable resources as a result of economic and population growth (Lowe, 1983). But increased calls

for a change in the priority given by government to agriculture relative to conservation were strongly resisted by the Ministry of Agriculture and the National Farmers Union. Although the 1968 Countryside Act gave authorities such as MAFF a duty to have regard to the desirability of conserving the natural beauty and amenity of the countryside in exercising functions relating to land, this had little noticeable effect (Cox *et al.*, 1985b). The Government White Paper on Agriculture in 1975 (HMSO, 1975) justified continuing priority for agricultural production on the grounds of the high cost of imported food and feedstuffs, merely noting 'The projected increases in output of British agriculture should not result in any undesirable changes in the environment'. The White Paper in 1979 again recommended increased agricultural production as an insurance against fluctuating prices and supplies, although this time it did add 'but not so strongly as to justify seeking the maximum output increase regardless of the cost to the consumer or to the economy at large, or its impact on the environment' (HMSO, 1979a).

Calls for legislative controls to safeguard valued wildlife sites, first seriously discussed during the passage of the 1968 Countryside Act and again at the time of the ill-fated 1979 Countryside Bill, were similarly vigorously opposed by the agricultural lobby. The NFU and CLA countered these threats by promoting the image of the farmer as guardian of the countryside (CLA and NFU, 1977), arguing that legislation for conservation was therefore both unnecessary and counter-productive.

In 1980 the Wildlife and Countryside Bill gave conservation groups a further opportunity to lobby for statutory protection for wildlife sites, but despite their long and hard fought campaign the government remained committed to the voluntary controls favoured by the NFU and CLA and conceded very little (Caufield, 1981; Cox and Lowe, 1983a). The Act, finally passed in 1981 after more than 2000 amendments, obliged the NCC to notify local authorities, owners and occupiers of the existence of Sites of Special Scientific Interest on their land and describe operations which would damage their interest. Owners and occupiers were required to inform the NCC before carrying out any of these operations and the NCC then had three months in which to discuss the proposals with the landowner before work could begin. In a small proportion of sites (40 or 50 'super' SSSIs) the negotiating period was extended to 12 months and the NCC could offer compensation in return for a management agreement, or, if no agreement was reached, offer to buy the land or resort to compulsory purchase. Any applications to the Ministry of Agriculture for an agricultural grant involving an SSSI had to be notified to the NCC, and if as a result of NCC objections the grant was withheld the NCC was obliged to pay compensation. An amendment which would have allowed the Ministry of Agriculture to pay grants for conservation (the Sandford amendment) was overturned in the committee stage of

the Bill, MAFF's obligations being limited to furthering conservation only in so far as was consistent with agricultural production (HMSO, 1981; The Open University, 1985a).

So although the Act gave some additional protection to SSSIs by allowing a period for discussion and negotiation between the NCC and the landowner, its success still depended very much on voluntary agreements and the owner's goodwill. Where this was not forthcoming and conflicts occurred, the owner's co-operation was to be achieved by compensatory payments rather than legal enforcement. The Act made no provision for encouraging conservation in the wider countryside, apart from empowering the NCC to give discretionary grants for activities conducive to conservation and allowing planning authorities to enter into management agreements with landowners.

1.2.4 The longer perspective

Some authors feel that a better understanding of the present conflict between agriculture and conservation can be gained by taking a longer perspective, both from the agricultural (Collins, 1985) and environmental (Adams and Lowe, 1981; Lowe, 1983) standpoint.

From the agricultural point of view, Collins sees the 1870s as a watershed. At this time British agriculture, from being among the most technically advanced and productive in Europe, went into a marked decline as improvements to shipping and refrigeration allowed cheap food to be imported from as far afield as New Zealand and Argentina in return for the export of British manufactured goods. On British farms as a result ploughed land reverted to pasture or was left derelict, bracken and buttercups flourished and hedges, ditches and drains were poorly maintained. The agricultural depression was temporarily alleviated by food shortages during the First World War when the introduction of a guaranteed price for cereals encouraged farmers to produce more, but soon afterwards cheap supplies from overseas once more flooded the market and the government defaulted on its price agreement. British agriculture again went into a decline, later made worse by the general recession of the 1930s. Agriculturalists can therefore argue with some justification that the time from 1870 to the Second World War marked only a temporary, if prolonged, period of agricultural neglect and decay and that conditions at this time should not therefore be used as a benchmark for measuring subsequent habitat loss.

In their historical overview of nature conservation in Britain, Adams and Lowe (1981) and Lowe (1983) also look back to the last century and beyond. They identify four overlapping but distinctive phases in the growth of support for the environmental movement: the natural history/humanitarian

(1830-1890), the preservationist (1879-1940), the scientific (1910-1970) and the popular/political period (1960-present day). They see Darwin's Theory of Evolution as having a profound effect in altering people's perception of nature, from being boundlessly plentiful to being delicately balanced, and of themselves, from being dominant over all other species to a recognition of their kinship and interdependence. This is reflected in the first period in the Victorians' reverence for nature and animals, their passion for collecting and love of rarities. The Royal Society for the Protection of Birds has its origins in this period. The second phase is characterised by anti-industrial sentiments, aesthetic and spiritual identity with the wild, an increasing sense of the fragile balance of nature and man's role as steward, and a patriotic regard for preserving the British countryside. Groups such as the National Trust and the Council for the Preservation of Rural England were founded at this time. The scientific phase is associated with the growth of ecology as a profession and a greater emphasis on the scientific understanding of nature and its management and regulation (as exemplified by the British Ecological Society), while in the most recent phase the value of popular support for nature conservation has been acknowledged and encouraged (a period when local Naturalists Trusts flourished). Lowe (1983) suggests that environmental organisations tend to reflect the dominant values of the time at which they were formed, so accounting for some of the tensions which now exist between the groups—for example over the relative merits of preservation versus managed conservation, scientific exclusivity versus popular access, and the protection of individual rare species versus species diversity.

1.2.5 Recent developments

During 1984 there was a marked shift in the stance of government and the two major farming organisations, the NFU and CLA, in their policy towards agriculture and the environment (O'Riordan, 1985). At this time the cost of supporting structural food surpluses was creating financial difficulties for the EEC, which led to the imposition of quotas for milk production in March 1984 and threats of similar cutbacks in the support for other farm produce such as cereals.

Government concern at the disproportionately high cost of Britain's contribution to the CAP, criticism of the cost of surplus food production to the taxpayer (a cost perceived as particularly intolerable when considered alongside the famine in Africa) and sustained pressure from conservation groups on the shortcomings of the Wildlife and Countryside Act combined to underline the paradox of government policies which through the Ministry of Agriculture gave grants to encourage agricultural development, so adding to food surpluses, and through the Department of the Environment paid

farmers to protect land from such development.

Government's change of heart was signalled by cutbacks in the Ministry of Agriculture grants given for agricultural improvements and the introduction of grants for conservation-linked activities, such as stone-walling, in Less Favoured Areas. Support for agricultural research was also reduced and charges later introduced for most ADAS advice. The National Farmers Union (NFU, 1984) and Country Landowners Association (CLA, 1984) issued statements in which they agreed there should be less emphasis on all-out production and more on conservation. The Wildlife and Countryside (Amendment) Act, passed in 1985, closed the loophole which had allowed farmers to destroy proposed SSSIs before formal notification and extended the negotiating period for such sites from three to four months.

In consultations with government about the future of agricultural grant aid under the CAP the Ministry of Agriculture at first held to their view that EEC regulations did not allow agricultural grants to be used for conservation purposes but this view was challenged by a specialist in EEC law employed by the CPRE (O'Riordan, 1985). Subsequently the government introduced an Agriculture Bill empowering the Minister of Agriculture, in consultation with the Secretary of State for the Environment, the Countryside Commission and the Nature Conservancy Council, to designate Environmentally Sensitive Areas and to pay farmers who agreed to manage them so as to enhance their conservation value. In a more positive way than previous Acts this also gave the Minister of Agriculture the responsibility of providing advice and training on conservation and the enhancement of the natural beauty and amenity of the countryside.

Ten ESAs have already been designated and more are about to be added. Further measures to regulate agricultural production and encourage conservation are being discussed.

1.3 Criticisms of the 1981 WLCA

The 1981 Wildlife and Countryside Act which sought to achieve a compromise between agriculture and conservation instead seemed only to polarise opinions and exacerbate conflict. With sympathetic Conservative MPs excluded from the committee stage during the passage of the Bill, and conservation groups forced to channel their opinions through opposition MPs, political differences became exaggerated (Cox and Lowe, 1983b). Many conservationists viewed the 1981 Act as a victory for the agricultural lobby and an inadequate safeguard for the conservation interest of the countryside (Caufield, 1981; MacEwen and MacEwen, 1982; Cox and Lowe, 1983a, b).

Conservationists were particularly critical of the Act's provision for com-

compensation to be paid to farmers in designated areas when agricultural development was opposed for conservation reasons. They feared that the limited funds available for conservation would restrict the NCC's opposition to agricultural development, as subsequently happened at Walland Marsh in Kent where the NCC decided not to oppose drainage plans in case they were left with insufficient funds to protect more valued sites later in the financial year (Bowers and Cheshire, 1983, p. 148; Cox and Lowe, 1983b).

There was widespread unease among conservationists over the principle of paying someone *not* to do something they considered wrong. Research into the ways County Councils seek to influence farmers has since shown they are often reluctant to enter management agreements for this reason (Friend and Norris, 1985). It was suggested farmers themselves might dislike the idea of payment for 'doing nothing' if their status in the eyes of fellow farmers is associated with the productivity of their farm and not with traditional husbandry skills and 'park-keeping' (Fitton, 1981; House of Commons Environment Committee, 1985, p. xiii).

There was concern that the amount demanded in compensation would escalate, as happened when compensation based on the Act's guidelines was first awarded to prevent farmers draining and ploughing land on the Halvergate Marshes.

The estimation of the amount of compensation involved in management agreements also came in for criticism. Compensation had to be paid not only for any loss of income or value of the land as a result of the agreement but also for any MAFF capital grant aid which would have been available if agricultural improvement had been allowed to go ahead (Bowers and Cheshire, 1983, pp. 143-148). Conservationists feared that in some ways the Act would increase the threat to the sites it was designed to protect. On the one hand agricultural development might be proposed in SSSIs simply in order to attract compensation, as suspected by FoE in the case of a plan to plant conifers on Craig Meagaidn in the Scottish Highlands (Jackman, 1984) and by CPRE on the Halvergate Marshes (Davies, 1984) and strongly hinted at in a study of management agreements by Laurence Gould Consultants (1985). On the other, farmers might take pre-emptive action to destroy the conservation value of their land in order to avoid the restrictions of SSSI designation, as happened at Uddens Heath in Dorset (O'Riordan, 1985).

Payment for conservation might also exacerbate conflict in more subtle ways. The altered balance of power between those who pay and those who receive payment could in itself be a source of resentment (White, 1981). And payments, like legislative controls, encourage people to meet only the minimum requirements necessary, in contrast with actions undertaken voluntarily from personal conviction or for personal satisfaction (Hirsch, 1977). As O'Riordan (1982) said, the Act rendered formal, legal and economic a

conservation ethos which many conservationists felt should be spontaneous.

The singling out of Sites of Special Scientific Interest and National Parks for protection might make farmers feel conservation in the wider countryside is unimportant, whereas many conservationists would argue that it is at least equally important (NCC, 1977; Mabey, 1980; Goldsmith, 1983). Payments involved in management agreements in designated areas devalue conservation voluntarily undertaken elsewhere, encouraging a belief among farmers that conservation is undertaken only for the benefit of others, who should therefore be expected to pay.

1.4 Alternative proposals

The continuing loss of valued habitat (MAFF, 1985b; Countryside Commission, 1986) even in designated Sites of Special Scientific Interest (House of Commons Environment Committee, 1985) led to strong calls for alternative or additional measures to promote conservation on farms. These included planning controls, more extensive designation of conservation areas, reductions in the economic incentives to agricultural production and increases in incentives for conservation.

Those who favoured planning controls (Shoard, 1980; Melchett, 1982, 1983) felt that any major landscape change should be a public, not a private, decision so that activities such as removing a hedge or piping a stream should be subject to planning permission. There should not be compensation if such permission is refused. Critics of planning controls felt they would be too costly and bureaucratic (Bowers and Cheshire, 1983) and that detection of breaches of planning law, especially if undertaken by volunteers, would lead to heightened conflict between farmers and the rest of the community (Raymond, 1984).

Some favoured more modest land use controls, sweetened with incentives and rewards to encourage a conservation ethic among farmers. O'Riordan (1982) felt that there should be less distinction between scientific and landscape related designation of conservation areas and between areas where conservation was considered important and those where it was not. He proposed a simplified system of three countryside categories, Heritage Sites, Conservation Zones and Agricultural and Forestry Landscapes, to which different controls and incentives would apply. Heritage Sites (to include most SSSIs, parts of the National Parks, heritage coasts and some Areas of Outstanding Natural Beauty—approximately 10% of the countryside) would be given the strongest possible protection and managed so as to conserve their special qualities. Conservation Zones would incorporate larger areas of conservation value and here similar safeguards should apply although greater

priority would be given to their social and economic regeneration. Designation as Agricultural and Forestry Landscapes would apply to most of the rest of the countryside (70%); here prior notification of land use change would not normally be required, but a conservation ethos would still be important and conservation, sustainable agriculture and landscape enhancement would be encouraged by appropriate incentives and comprehensive advice. Within these areas local authorities would have powers to identify and safeguard locally valued areas such as hedges and copses. Administration of all three zones would be in the hands of local authorities backed up by a locally administered steering group and project officers.

As far as economic measures to promote conservation were concerned, many felt that a reduction in the level of agricultural protection was essential before other measures could succeed (O'Riordan, 1982; Body, 1983; Bowers and Cheshire, 1983; Potter, 1983). Bowers and Cheshire suggested that an immediate reduction in EEC prices, especially those for cereals, would lead to a decrease in land values and so reduce the incentives to intensive exploitation of the land. They also favoured the abolition of agricultural capital grants and the removal of tax concessions on capital expenditure. Environmentally sensitive agriculture could be encouraged by subsidies but the cost of any agricultural grants forgone should be met from the agricultural, not the conservation, budget.

Others feared that crude reductions in price support would work against conservation, as farmers sought to maintain their income by further expansion and intensification. Potter (1983) argued instead that controls on production should be achieved by such mechanisms as the co-responsibility levy, and recommended that they should be accompanied by alternative subsidies which encouraged conservation, backed up by stronger land use controls in the more sensitive areas. The form of the subsidies, which he called an Alternative Package of Agricultural Subsidies (APAS) would depend on the farm's category. For farms in Less Favoured Areas it would differ little from the agricultural grant system, except that livestock headage payments would be altered to favour the more disadvantaged farmers and to discourage overstocking, and MAFF support would be extended to include tourism and crafts on farms. In Conservation Areas, such as the Halvergate Marshes, where a high conservation value coincides with scope for agricultural improvement, compensation would be more carefully related to degree of hardship than at present and to positive conservation management throughout the farm. In the wider countryside there would be an increase in the scope of MAFF grants, to include supplements for enhancing the conservation value of investment schemes within a management plan for the whole farm. Such schemes would be subject to outline approval from a planning committee and then to financial and environmental appraisal by

ADAS. The main aim of APAS would be to extend the conservation ethic to all agricultural land as an integral part of farm management rather than a cosmetic exercise at the farm fringes.

1.5 The role of attitude research

Despite the strenuous efforts now being made to encourage an accommodation between conservation and agriculture, and the sympathy expressed by many in the farming community, wildlife habitat continues to decline and conflicts still surface. Research into the social and psychological factors which influence farmers' conservation-related behaviour is needed to complement existing scientific and economic studies (see Section 1.1) in guiding the choice of measures most likely to be successful in a given situation and highlighting the factors which provoke or reduce conflict.

Whether conservation is to be promoted by legal, regulatory, financial or persuasive means, much will still depend on farmers' goodwill and sense of social obligation. This research therefore needs to examine the attitudes and social pressures which affect farmers' behaviour. At the same time it should take note of instances where attitudes are not correlated with behaviour, since these might indicate the circumstances when such attitudes would be converted into action, or suggest means of influencing behaviour more effectively.

The research should also examine the underlying differences in the attitudes of farmers and conservationists to help explain why conflicts occur. In discussion such conflicts are usually referred to indiscriminately as conflicts of interest, and so explained by the fact that the farmers' interest in their livelihood conflicts with the conservationists' interest in wildlife. However the intense nature of recent disputes suggests more is involved. Some writers feel that a distinction should be made between conflicts of interest and conflicts of value (The Open University, 1982, p. 14–16; 1985, p. 58). They define conflicts of interest as those driven by conflicts over what is to the protagonists' personal advantage, and conflicts of value as those over the intrinsic worth or goodness of different outcomes—that is to say, involving matters of principle. The significance of making such a distinction is that it affects the approach to conflict resolution; whereas conflicts of interest are usually amenable to solution by economic bargaining, conflicts of value are far more intractable since no amount of money can compensate the loser.

There is much circumstantial evidence to suggest that in the case of agriculture and conservation conflicts of value are often involved. Goode (1984) has pointed out that conservation implicitly involves value judgements about whether the ecological outcomes of different management practices are good

or bad. The historical background to the conflict (Section 1.2) shows how difficult it might be for the farming community, steeped over the years in the value of producing as much from the land as possible, to come to terms with the conservationists' love of wild and infertile areas. Such a difference in farming and conservation values was apparent in the conflict over the draining of the Halvergate Marshes. In describing the Marshes both agriculturalists and conservationists agreed they were wild and open and not particularly valuable for wildlife nor easily accessible to the public. However whereas O'Riordan (1984) said of the area:

Its landscape importance lies in its openness, its subtle mosaic of grass-land features, the derelict and restored windpumps that once drained the marshes, and a feeling of a 'link with the past' that a walk through the area evokes,

one of the farmers involved in the dispute over draining the Marshes dismissed them scornfully as:

... most uninteresting, all sky and thistles and buttercups.

A methodological approach which would seem to provide a promising analytical tool for the detailed investigation of attitudes is the Fishbein-Ajzen theory of reasoned action, described in Chapter 3 (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980). It has previously been used in other resource conservation studies, to examine attitudes to water (Kantola *et al.*, 1982) and energy conservation (Brown and Macey, 1983). It has successfully been used among farmers in this country to examine their pesticide use behaviour (Tait, 1983), and the results from this study suggested it might be further developed to study their conservation-related behaviour. It has the advantage of separating the measurement of attitudes into questions of beliefs and questions of value, so permitting a detailed analysis of the nature of conflicts between conservation and agriculture.

1.6 Summary of research objectives

This research project had the following specific objectives:

- to develop the research methods devised under the theory of reasoned action to analyse the complex interactions between agriculture and conservation;
- to apply these methods to the study of farmers and conservationists in Bedfordshire;

- to investigate the attitudes and subjective norms and worldviews of these two populations and the extent to which they could be correlated with behaviour;
- to study in detail the components of the attitude systems of farmers and of conservationists with a view to assessing the extent to which their views are in conflict and the extent to which any such conflicts could be classified as conflicts of interest or conflicts of value;
- to explore the relevance of the research findings to the various means being proposed to promote a greater emphasis on conservation on agricultural land.

Chapter 2

Previous related attitude research

The first chapter has examined the historical background to the conflict over agriculture and conservation, the limitations of present measures for conflict resolution, the alternative measures being proposed, and the contribution which attitude research could make in guiding the choice of measures most likely to succeed in a given situation. This chapter summarises the literature which already exists on the attitudes of farmers and conservationists, to see if it supports the theory that factors other than economic self-interest are involved in the conflict and to show where gaps in the literature exist.

2.1 Farmers' attitudes

There have been a number of previous surveys of farmers' attitudes. These are discussed under the following headings: attitudes in general, attitudes to landscape conservation, attitudes to wildlife habitat, attitudes to wildlife, and conservation attitudes in relation to social changes.

2.1.1 Attitudes in general

Several surveys have studied the overall motivation of farmers, their goals and values. They support the idea that farmers' motives are seldom purely economic, although they do not examine the extent to which non-economic motives are reflected in behaviour.

In a study of several hundred farmers in East Anglia, Gasson (1973) found that intrinsic values, such as independence and way of life, were consistently rated higher than instrumental (good income, security) or social (prestige, belonging to the community) values, although there was some evidence that the importance of social and instrumental values tended to increase with the size of the business.

In a similar survey of 54 farmers in three parishes of west Somerset (Casebow, 1980) based on Gasson's definitions, 92% of the farmers valued

the intrinsic and expressive (pride in ownership, self-respect from doing a worthwhile job) attributes of farming more than the social and economic rewards. The results were not affected by size of farm, 'innovativeness' of the farmer, or the reference group of friends and relatives, nor were any differences found between different age groups, although younger farmers might be expected to be under greater economic pressure.

Discussions with 41 farmers in two parishes of Cardigan in west Wales to explore their attitudes to farming (LeVay, 1979) showed that although there was a clear division between those who thought of farming as essentially a business enterprise and those who thought of it primarily as a way of life, total motivation usually included considerations other than profit, such as satisfaction derived from good stockmanship or mechanical ability, and the social and environmental benefits of farm life. On the non-viable farms, for example of semi-retired farmers and those who farmed to supplement another income, social and expressive values were always important and often of over-riding importance.

2.1.2 Attitudes to landscape conservation

The Countryside Commission has sponsored several surveys of farmers' attitudes to landscape conservation. These have generally also included objective measures of conservation behaviour although the authors have used only their subjective judgement in describing the relationship between attitudes and behaviour. Westmacott and Worthington (1974) looked at farmers' attitudes to the conservation of hedges, trees, provision of cover for game, public access and attitudes to the responsibility for conservation. Groups of seven or eight neighbouring farmers were interviewed in Cambridgeshire, Huntingdonshire, Dorset, Somerset, Herefordshire, Yorkshire and Warwickshire. At the same time a visual survey of the farm landscape was done, hedge length measured and the position and condition of farm trees recorded. Landscape changes were analysed using 1945 aerial photographs. Those farmers with an active interest in conservation fell into four categories: they were interested in game, pleasant surroundings, wildlife and/or had a social conscience. The report concluded that personal motivation rather than economic loss or gain was a major factor affecting landscape change on farms. If farmers preferred a landscape with cover they would ignore any nuisance or additional cost incurred as a result; conversely if they preferred a landscape without hedges they would ignore economic arguments against hedge removal and justify it on other grounds.

A follow-up survey 11 years later (Westmacott and Worthington, 1984) looked at subsequent landscape changes in the same study areas. Although the farmers were re-interviewed, specifically attitudinal questions were not

asked this time. The report concluded that social conscience had increased in importance as a reason for conservation, but that this in itself was insufficient to ensure successful conservation. Unless accompanied by a keen interest in wildlife it often led to the planting of inappropriate tree species or a poor survival rate as a result of subsequent neglect. Many hedges had been lost since the previous survey, not from intentional hedge removal but from repeated hard cutting too early in the autumn and a lack of positive conservation management.

The Countryside Commission have also surveyed the attitudes of farmers who visit their demonstration farms, which are managed to show that efficient farming and conservation can co-exist (Social Research Consultancy, 1982). Although in 1981 only 14% of the visitors were farmers and landowners, these were exceptional in terms of their interest in conservation, the size of their farms and the percentage of unfarmed land on their farm; they were also an influential and innovative part of the farming community. There was some evidence to show that the demonstrations were more appreciated by those who owned their own farms and were interested in field sports. Installing new features was preferred to retaining the old, possibly because this was seen as doing something constructive and because new features could be sited to suit the existing system of management. Tree and hedge planting were favourably viewed but sacrificing productive land or actions which would have an adverse effect on farm operations were not. The report concluded that more could be achieved by promoting *ideas, methods* and techniques than by attempting to change attitudes. However, reference to theories about attitude change (e.g. Hofstede, 1980, p. 27; Cooper and Croyle, 1984) suggest this conclusion is over-simplified, since exposure to new ideas and methods is fundamental to attitude change.

The steadily increasing trend of investment in land by financial institutions such as insurance companies, pension funds, property unit trusts and life funds during the 1970s (Northfield, 1979) prompted the Countryside Commission to survey the attitudes of institutional landlords to landscape conservation (Worthington, 1979), since it was feared they would have a more commercial and less caring attitude than farming families and the traditional landowning institutions. Forty farms were studied, including new and traditional institutional landowners, private landlords and owner occupiers. The report concluded that the new institutional landowners posed no greater threat to the landscape than any other type of landowner. They had a wide range of attitudes, with some actively encouraging tree planting schemes and others completely unaware of conservation interests and with a policy of selling or clearing woods. Mitigating against conservation in the case of the institutional landowners, management time spent on conservation could be very costly where farm management decisions passed through

several stages for consideration. On the other hand many institutional landlords were sensitive to public opinion; independent small owner occupiers with an uncaring attitude to conservation could possibly do more damage than the institutional landowner with a good public image to maintain. As a general rule land known to contain areas whose use could cause controversy was not bought by investment institutions. The overall impression was that farmers, land agents and landowners had only a superficial understanding of landscape quality, mainly related to tree planting. Older farmers did express regrets at earlier changes they had made. In the case of institutions the attitude of the land agent, advising both the institutional landlord and his manager or tenant, was considered to be of key importance.

2.1.3 Attitudes to wildlife habitat

The Ministry of Agriculture has carried out two surveys of farmers' attitudes to wildlife habitat and conservation on farms, which included self-reports of their past and intended behaviour (ADAS, 1976; MAFF, 1985b). In the earlier survey 300 farmers throughout England and Wales were interviewed personally by ADAS officers. A pro-conservation bias was introduced into the response because farmers were asked not whether but why they were interested in allowing wildlife to exist on their farm; 51% said for personal pleasure, 43% for the balance of nature and 7% for the sporting benefits. The farmers most likely to improve and create habitat were those with more than 300 acres, an interest in wildlife or shooting and an involvement in a conservation group. Most likely to reduce habitat were farmers in the East Midlands and those with moderately large farm businesses of 1200–1800 standard man days. In general there were no differences between the attitudes and intentions of owner occupiers and tenants. As expected, livestock farms had the most semi-natural habitat, particularly those in the uplands, and arable and mixed farms the least. Sixty per cent of the farmers said they would like advice on wildlife conservation, either in booklet form or visits from a wildlife specialist.

In the recent MAFF survey (MAFF, 1985b) 6500 farmers in England and Wales responded to a postal questionnaire about farm hedges, trees and ponds. Of the English farmers, 21% had planted trees in the previous year, half of the conifers and one fifth of the broadleaves for economic reasons. Asked about the advantages and disadvantages of woods and trees on the farm, 60-65% saw major benefits to landscape, amenity and wildlife conservation, 46% saw shelter as a major benefit and 25% game. Over half saw no particular disadvantages and 36% only minor disadvantages. Questions about hedge management over the previous five years showed that 13% of the farmers had removed hedges over that period, 6% had planted

hedges and 4% had both planted and removed them. On balance the length of hedge removed was nearly twice that being planted. The reverse was true of ponds, 20% of the English farmers having created ponds over the previous five years; 9% had filled ponds in and 3% had both created and removed them. Nearly half (46%) of the farmers saw the ponds as of benefit to wildlife and conservation, only 17% regarding them as of practical value, for example for irrigation. Although rich attitudinal data was provided by farmers' comments at the end of the questionnaire and examples were given in a report of the pilot survey (MAFF, 1985a) they were not analysed for the final report. The opportunity to correlate behaviour with attitudes and with farm variables from MAFF census data was not used.

2.1.4 Attitudes to wildlife

The attitudes of farmers to wildlife and conservation have been explored by Macdonald (1984). In two surveys, one of 867 farmers in 10 lowland regions and the other of 100 farmers in the midlands, only 4% of farmers showed no interest in wildlife, 40% saying they were very interested. Of the interested farmers 60% gave their main reason as enjoyment of field sports, but a concern for the balance of nature and aesthetics was also important. However questions about the damage caused by vertebrate pests on the farm showed that an interest in game, while heightening the farmers' appreciation of wildlife, also increased the number of birds and animals they viewed as pests. Nearly half the farmers said they would welcome advice on nature conservation, provided it was economically sound, although only 10% had sought such advice in the past.

2.1.5 Conservation attitudes in relation to social change

Two surveys have explored the attitudes of farmers to conservation in the wider context of social change in the countryside, one in East Anglia (Newby *et al.*, 1977, 1978) and the other in the uplands (Sinclair, 1983). Both used personal interviews.

In the upland survey 287 farmers were interviewed from parishes in the Cheviots, the Pennines, the Peak District, the Lake District, the North York Moors, Exmoor, Dartmoor, Snowdonia, the Cambrian Mountains, South Wales and the Welsh Borders. The survey found an ageing farm population with a trend for smaller holdings to be sold and amalgamated with larger farms rather than passed on in the family. Two types of landscape change were identified: 'negative' change through neglect, such as the encroachment of bracken and scrub, and 'positive' change such as the removal of field boundaries and moorland cultivation. 'Positive' change was par-

ticularly likely to occur when farms were amalgamated, and amalgamating farmers were less inclined to make compromises towards conservation than others. Younger farmers (under 35), those with larger holdings and those farming full-time and relying wholly on farm income for a living were also less sympathetic to conservation. Farmers who held, or had held, regular non-farming jobs were more sympathetic than others. Sixty per cent of the farmers thought they should be prepared to modify their methods for conservation and landscape but 32% said not.

In the East Anglian survey, attitudes to conservation were studied as one aspect of the role of landowners in the rural community. A total of 198 farmers were interviewed: a one-in-two sample of all holdings over 1000 acres, a one-in-three sample of all full-time holdings in 44 parishes in central East Suffolk and the employers of all the agricultural workers interviewed in a previous survey. On the basis of a general question about the effects of farming practice on the environment, 87% of the 1000 acre farmers and 72% of the 44 parish farmers were described as sympathetic to conservation. However the researchers concluded that landscape change in East Anglia generally resulted from economic constraints on farmers rather than from variations in their attitudes and values, with the exception of the large traditional private landowners who could afford to retain a traditional landscape if they so chose. Small family farms also retained traditional features but less from choice than from a lack of funds to undertake large scale changes. This complex relationship between conservation attitudes, family background and farm size led the researchers to propose a typology of four groups of farmers: 'gentlemen' farmers, agri-businessmen, active managerial farmers and family farmers, with the middle two categories being the least sympathetic to conservation. They concluded that financial incentives would encourage conservation among these two groups.

While the upland survey showed a major problem in these areas to be a declining rural population, Newby and co-workers describe how in East Anglian villages the rural working population has been replaced by an urban and overwhelmingly middle-class population, creating problems of a different kind. They suggest that the newcomers have a romantic vision of the countryside and are antagonistic to changes which affect the landscape, such as uprooted hedges, diverted footpaths, new silos and stubble burning. They found that East Anglian farmers almost all felt that outsiders were hostile towards them; only 6-7% thought that people other than locals had a good opinion of farmers.

2.2 Environmental attitudes

Although much has been written about environmental attitudes (see reviews by O’Riordan, 1976; Lowe and Rüdig, 1986), particularly in America, there has been a pre-occupation with general theories about environmentalism as a break-away movement in society rather than with the attitudes themselves, which seem to be taken for granted. Detailed studies of the range of beliefs and values which people have in relation to specific environmental issues are few and limited mainly to such topics as nuclear power (Otway *et al.*, 1978; Eiser and van der Pligt, 1979; van der Pligt *et al.*, 1982) and energy conservation (Brown and Macey, 1983); however these studies pay considerably more attention to advances in formal attitude research methods than do most of the former surveys. Research specifically about attitudes to the impact of agriculture on the environment is restricted to public opinion polls.

2.2.1 General theories

A dominant theme of the environmental literature is that there are two distinct views of mankind’s relationship with nature: the prevailing view in which nature and wilderness is to be tamed by people for their own ends is increasingly being questioned by those who believe that people should live in harmony with nature if they are not to upset a delicate balance. The two alternative views have been variously labelled technocentric/ecocentric (O’Riordan, 1976), materialist/post-materialist (Inglehart, 1977; 1981), human exemptionalism paradigm/new ecological paradigm (Catton and Dunlap, 1980), cornucopian/catastrophic (Cotgrove, 1982) and worldview A/worldview B (Buss and Craik, 1983).

Central to a cornucopian or materialist view of the world are beliefs about the merits of continuing economic growth, nature as a bountiful resource, man’s scientific and technological ingenuity to resolve problems, a hierarchical and ordered society, and individual self-help. In contrast the catastrophist or post-materialist sees earth’s resources as finite, questions the emphasis on economic growth, is more doubtful of the benefits of science, and values small-scale decentralised communities with collective responsibility for individual welfare (Cotgrove, 1982). These core beliefs and values associated with each worldview are thought to influence people’s attitudes to more specific issues, so that there is a tendency for them to develop inter-related attitudes to a range of disparate topics such as women’s rights, foreign policy, chemical pesticides, nuclear power and population growth (Inglehart, 1981; Buss and Craik, 1983).

Research into environmental attitudes has focussed on how and why peo-

ple come to hold different worldviews. American studies reviewed by van Liere and Dunlap (1980) generally show environmental concern to be more common among the young, the better educated and the politically liberal members of society. It is suggested that this is because young people are less inculcated with society's dominant values and more receptive to ideas which challenge the *status quo*, or alternatively that the young are particularly impressionable so that events in the 1960s and '70s led to a particularly ecologically-minded young generation; the better-educated are hypothesised to be comfortably-off and so less concerned with meeting basic needs and more accustomed to living in environmentally pleasing surroundings; and the politically liberal are thought to be more sympathetic than conservatives to environmentalism because it involves criticism of business and industry and because environmental reform entails increased government regulation and often innovative change. There is inconclusive evidence about the association of income, gender and urban versus rural residence with environmentalism.

Inglehart (1981) has proposed a more comprehensive explanation of the origins of environmental attitudes based on two theories, one a scarcity hypothesis—that individuals' priorities reflect their socioeconomic environment, greatest value being given to those things which are in relatively short supply—and the other a socialisation hypothesis—that people's values largely reflect the conditions that prevailed during their pre-adult, formative years. His examination of long-term data on the public's values in Germany and Japan strongly supported socialisation at an early age as the predominant influence, with an individual's current circumstances playing a lesser but complementary part. The data he examined showed no evidence for the theory that people become less idealistic and more materialistic as they age, although Inglehart conceded that such a trend might exist but be completely masked by much stronger socialisation effects. His own data from surveys in six European countries between 1970 and 1979 seem to confirm circumstances, events and socialisation at an early age as a predominant and lasting influence; despite general economic recession during the 1970s only the youngest age-group he studied (15-24) were more materialist than the same age-group ten years before; the 25-34 age-group, with their formative years in the generally more affluent and secure 1960s, had become if anything steadily more post-materialist during the 1970s.

2.2.2 Conservationists

The worldview of members of some British conservation groups has been examined by Cotgrove (1982). Although all the groups he studied (Friends of the Earth, the Conservation Society, the World Wildlife Fund and the

Somerset Trust for Nature Conservation) were alike in their concern about habitat destruction (90% being very aware of the problem compared to 66% of the general public) the conservation groups differed in other respects. Cotgrove distinguished between the new more radical environmental groups such as Friends of the Earth and the Conservation Society, whom he labelled *environmentalists*, and the more traditional conservation groups such as the World Wildlife Fund and local Trusts for Nature Conservation, whom he called *nature conservationists*. The priority given to material goals, such as economic growth, showed the environmentalists to be markedly less materialist than either nature conservationists or the general public, supporting the distinction made between the two types of groups. Support for post-materialist goals, such as greater public involvement in decisions and a society where ideas are more important than money, was greatest among the environmentalists, moderate for the general public and least among nature conservationists.

Cotgrove also showed that a disproportionately large number of the radical environmentalists worked in the non-market, service or creative sector, for example as teachers or doctors (Cotgrove and Duff, 1980; Cotgrove, 1982). Whether values determined occupation or the reverse was unclear, although Cotgrove favoured the first explanation (Cotgrove, 1982, p.44).

2.2.3 Attitudes to agriculture

Research into people's attitudes to conservation, the countryside and farming has so far been limited to public opinion polls, of which there have been three recently (Worth, 1984). A poll by the UK organisers of the World Conservation Strategy asked which factors contributed most to the quality of life; an attractive countryside was ranked second, after safe streets, and wildlife was ranked fifth, below an unpolluted atmosphere and good public transport and just above access to a car and good sports facilities. A Country Landowners Association poll asked what people saw as the benefits of the countryside; 69% said scenery, 54% wildlife and 43% food production. A National Farmers Union poll asked what people saw as the main threats to the countryside; pesticides, mentioned by 13%, ranked third after urban expansion and pollution, and hedge and tree loss, mentioned by 7%, ranked fifth. The CLA poll asked more specifically about changes to the countryside brought about by farming; in reply 34% mentioned hedge removal, 17% chemical/pesticide use, 16% loss of wildlife, 9% landscape in general and 8% larger, more open fields. In the NFU poll, although 75% of the respondents viewed farmers favourably (in marked contrast to the farmers' own view of public opinion—Newby *et al.*, 1977), only 28% felt they cared about conservation.

The polls suggest interest in landscape conservation is more widespread among the general public than interest in wildlife, but also show the vulnerability of opinion polls to the effects of question wording—for example the very different ranking of concern about hedgerow loss relative to concern about pesticide use in the NFU and CLA polls.

2.3 Implications for this research

Apart from these opinion polls the literature on environmental attitudes is very different from that on farmers' attitudes, one being concerned mainly with general theories about how environmental attitudes develop and the other with attitudes specific to practical conservation on farms. Each approach might usefully contribute to the other in an examination of the conflict about agriculture and conservation, one providing greater theoretical rigour and a more comprehensive explanation of attitudes and the other a practical test of the theories' relevance.

The farmer surveys show there is considerable sympathy for, and interest in, landscape and wildlife conservation among farmers, but the extent to which this is reflected in farm management practices is not usually investigated or is not clear. The continuing gradual attrition of landscape features such as hedges (Westmacott and Worthington, 1984; MAFF, 1985b) suggests that the interest may not always be of practical significance, especially when it conflicts with agricultural aims.

In their study of East Anglian farmers, Newby *et al.* (1977) concluded that conservation behaviour was dominated by economic rather than attitudinal factors, at least among the groups they called active managers and agri-businessmen. However, several of the other farmer surveys (Gasson, 1973; Westmacott and Worthington, 1974; LeVay, 1979) suggest that factors other than economic self-interest do play a part in farming decisions. Westmacott and Worthington (1974) found that attitudinal reasons, such as a preferred landscape, often dominated economic arguments, although this could work both for and against conservation. The differences in the two conclusions may be explained partly by regional differences and a greater emphasis by some of the surveys on farmers in the categories Newby *et al.* referred to as 'gentlemen' farmers and family farmers, but this might also be confounded by an increase in the significance of economic factors over time.

Apart from economic and attitudinal factors, three of the surveys showed that social influences can also affect farmers' conservation behaviour (Westmacott and Worthington, 1974, 1984; Social Research Consultancy, 1982) and are becoming increasingly important (Westmacott and Worthington,

1984). But unless accompanied by a sympathetic attitude on the part of the farmer this may not lead to successful conservation in the long term (Westmacott and Worthington, 1984). Two of the surveys showed that farmers would welcome sound advice on conservation (ADAS, 1976; Macdonald, 1984).

Most of the surveys show that an interest in field sports is an important factor in many farmers' interest in conservation but Macdonald (1984) has shown how these two interests are not always complementary.

Several of the surveys suggest that farmers' understanding of conservation is often limited and that what they value in a landscape also differs from conservationists (Westmacott and Worthington, 1974; 1984; Worthington 1979). Newby *et al.* (1977) have suggested how easily differing perceptions such as these can lead to a stereotyping of farmers and village newcomers by each other and increase the likelihood of conflict over countryside issues.

The literature on environmental attitudes extends this conclusion by showing how fundamental differences in values can arise, leading to different worldviews which can colour an individual's attitudes across a whole range of issues. The taken-for-granted and central nature of worldview beliefs and values can lead to major problems of communication and understanding, with those holding opposing worldviews each accusing the other of being irrational (Cotgrove and Duff, 1980). These theories provide further support for the suggestion that differences in values are involved in the conflict over agriculture and conservation, especially as Inglehart (1981) found that, of all the occupational groups surveyed in nine European Community countries between 1976 and 1979 farmers were the least post-materialist, materialist farmers outnumbering post-materialists 7:1 (compared with a ratio of 4:1 for self-employed business people and almost 1:1 among elite management and civil servants).

However, although the worldviews of nature conservationists have been studied, their attitudes to specific environmental issues, and in particular to the effect of agriculture on the environment, have not. Instead it seems to have been assumed that the well-publicised views of environmental group leaders and activists are representative of conservationists as a whole, or that people's score on the material/post-material scale is sufficient indication of their likely attitudes on more specific issues. While this level of information may help in an understanding of the conflict over agriculture and conservation between government and pressure groups at the national level, it is insufficient for the practical resolution of conflict at its grassroots origins in local communities. Yet research has shown that such conflicts can be more easily resolved if contained at a local, personal level (Friend and Norris, 1985), so that this ought to be a more important focus of research. Moreover, Lowe and Rüdig (1986) have questioned the validity and useful-

ness of studying environmental values in a vacuum, as though they were free from any situational context. They argue that more attention should be given to the influence of particular environmental issues in shaping and sustaining values, and to how these correlate with behaviour.

The first chapter discussed the role which attitude-related research could play in explaining the underlying causes of the conflict over agriculture and conservation, so aiding conflict resolution. This chapter, in its examination of previous attitude research, has provided further evidence for the involvement of attitudinal and social factors in the conflict, but has shown that there are important gaps in the relevant attitude literature which further research should address. In particular:

- research into farmers' attitudes has made only limited use of formal attitude methodologies and theories;
- research into conservationists' attitudes has generally been concerned with attitude systems and worldviews rather than with attitudes to specific practical issues;
- there has been no direct comparison of the attitudes of farmers and conservationists;
- there has been insufficient attention to the correlation between attitudes and behaviour.

The following chapter explores the methods available for studying attitudes, in order to select those most appropriate for the objectives of this research (Section 1.5), taking into account the limitations of previous research listed above.

Chapter 3

Attitude research methodology

3.1 Defining attitudes

In much of the attitude research described in the previous chapter terms and concepts such as opinions, attitudes, beliefs, values, intentions and behaviour have been loosely and interchangeably used. While the term attitude describes a hypothetical concept and so has no single indisputable meaning, in practice it is important that attitude researchers make clear their operational understanding of the word and the terms associated with it. This will help ensure that research findings are correctly interpreted, allow better comparisons between surveys, and enable new surveys to build on previous work.

The most extensive literature on the nature of attitudes is that in the disciplines of social psychology and psychology. Here the most generally accepted basis for the definition of attitude remains that of Allport (1935):

An attitude is a mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.

More recent definitions, although similar to that of Allport, place greater emphasis on an evaluative component. The definition adopted for this research is that proposed by Fishbein and Ajzen (1975), who described an attitude as:

a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object.

Both these definitions encompass a long-held view of attitudes as having three dimensions: cognitive, affective and conative (e.g. see Breckler, 1984). The *cognitive* has to do with beliefs and ideas about an object, the *affective* with feelings and emotions for or against the object and the *conative*

with a disposition to behave in a particular way with respect to the object. The words *beliefs*, *values* and *intentions* can be defined and distinguished in these terms, referring to cognitions, affects and connotations respectively, with the word *behaviour* restricted to overt, observable actions. The term *opinion* is often used interchangeably with attitude, and sometimes to describe a spoken or written expression of attitude, but here it will be used in a more restricted sense to refer to a single belief statement.

Beliefs are not necessarily factual, but depend on the individual's perception of what is true. Beliefs may therefore range from scientifically proven facts to unprovable assumptions and unquestioning faith. Values may range from a feeling that some entity or behaviour is personally desired to a moral conviction that it is desirable for society as a whole.

3.2 Methods for studying attitudes

Methods used to study and describe attitudes include qualitative case-studies, content analysis of documentary sources, measurement with attitude scales, opinion polls and experiments (The Open University, 1975; Fishbein and Ajzen, 1975; Oskamp, 1977; Whyte, 1977; Converse, 1984). In practice the different methods overlap; opinion polls and experiments often involve attitude scale measures, content analysis may be used with qualitative case studies, and questionnaires may include both qualitative and quantitative questions.

3.2.1 Qualitative case-studies

The qualitative case-study approach is most often used in the disciplines of anthropology and sociology. Attitudes are inferred by observing behaviour, or by becoming a part of the community being studied ('participant observation'). Alternatively the views and perceptions of a community can be sought by discussions with individuals or groups in unstructured interviews.

More formal methods include the use of repertory grids (Easterby-Smith, 1981) and computer-based cognitive mapping programmes such as COPE (Eden *et al.*, 1980). Both these approaches are based on personal construct theory (Kelly, 1955).

Repertory grids are used to examine how individuals distinguish between, and categorise, groups of items. Usually respondents are first asked to distinguish between a group of three items, or 'elements', by saying in what way they think two are alike and one different. For example, in the group shrubs, hedges and trees, hedges might be categorised as useful and shrubs and trees as ornamental. Further elements, typically 12 to 25 in

total, are then classified using the same 'constructs' (i.e. useful or ornamental). The process is repeated until the constructs used to distinguish all possible combinations of three elements have been explored. In practice, the researcher may decide on both the elements and the constructs beforehand or either or both may be generated by the respondent. Completed grids can be analysed subjectively or by factor analysis. There could be problems in using grids to compare people with conflicting attitudes, since they may have few constructs in common; a dual grid approach has been tentatively proposed for this situation (Slater, 1981).

The computer program COPE provides a means of ordering the way people think and feel about problems. Thoughts and ideas about the problem are entered onto the computer, together with perceived options and consequences. Where possible the opposite idea is entered at the same time, to improve understanding of the individual's perception. For example, in thinking about ways of ensuring conservation on farms one might enter:

pay farmers to conserve RATHER THAN rely on goodwill
costly RATHER THAN low cost
encourages greed RATHER THAN encourages conservation ethos.

The computer orders the ideas into logical and hierarchical sequences, so highlighting important ideas and non-obvious linkages. The resulting maps can be studied individually to clarify thought processes or understand individual motivation. Alternatively individual maps can be amalgamated to provide a more comprehensive picture which may generate further ideas or suggest new courses of action.

The advantages of qualitative approaches to studying attitudes are that they allow deeper and more vivid insights than are possible with a structured questionnaire; they allow issues and views to be expressed in the respondents own terms, thus helping avoid the imposition of the researcher's own preconceptions on the research; and they establish the range of views which are held by the community being studied.

Their main disadvantages are that they are costly in time and resources, so usually restricted to small numbers; their flexible structure makes it difficult to compare individuals and quantify results; the views of those studied may not be representative; and it may be more difficult than with quantitative data to avoid subjective bias in the presentation of results, especially in the case of participant observation.

3.2.2 Quantitative attitude measurement

In a search for greater objectivity and scientific rigour in the study of attitudes, psychologists and social psychologists have developed attitude scales.

The scaling methods most frequently referred to are those of Bogardus (1925), Thurstone (1928), Likert (1932), Guttman (1944) and Osgood *et al.* (1957).

Bogardus' 'social distance' scale graded peoples' attitude to various racial groups by the closest relationship they were willing to accept with each group. Scores ranged from 1, 'close kinship by marriage' to 7, 'would exclude them from my country'. The scale has since been used to study attitudes to a wide range of social groups.

Thurstone developed Bogardus' method to give a more precise measure of the difference between attitude scores, in an 'equal appearing intervals' attitude scale. Use of Thurstone's method involves a preliminary stage in which a number of judges are asked to rank more than a hundred opinion statements about a subject (for example, the church) according to how favourable or unfavourable they think they are. A questionnaire is then constructed using only statements over which there is substantial agreement among judges, and which have been judged to indicate approximately equal gradations along an attitude scale from favourable to unfavourable. The attitude score of respondents is taken as the mean or median of the scores for statements with which they agree.

A simpler approach is Likert's 'summated rating' scale. Respondents themselves rate each statement, rather than simply ticking those with which they agree. Each statement might be rated from +2 (strongly agree) through 0 (undecided) to -2 (strongly disagree). The attitude score is determined by adding together the scores for individual statements about a subject.

With both the Thurstone and Likert scales respondents may have differing scores for individual opinion statements and yet the same overall attitude score. To improve the distinction between attitude scores representing different underlying views, Guttman proposed that each scale should be restricted to a narrow uni-dimensional topic, so that respondents agreeing with one opinion statement should also endorse all more favourable statements on the list. Scales are successively refined until only statements eliciting such a consistent and cumulative response are included. The respondents' attitude score then corresponds to the least favourable statement they are prepared to endorse.

Osgood's 'semantic differential' method uses pairs of words to distinguish between feelings. Respondents are asked, for example, to what extent they think the subject is good or bad, fair or unfair, weak or strong, by marking the appropriate position on a scale:

good -:-:-:-:- bad
fair -:-:-:-:- unfair
strong -:-:-:-:- weak.

The often poor correlations between such attitude measures and behaviour led Fishbein and Ajzen (1975) to propose an attitude model which more fully encompassed the cognitive/evaluative/connative definition of attitude and linked attitude more closely to behaviour. Fishbein and Ajzen called their model a 'theory of reasoned action', since it was based on the assumption that people use the information that is available to them to arrive at a reasoned decision, even though their information is often incomplete and may not be factually correct.

Their theory states that a person's intention to behave in a certain way is based on (i) their attitude towards the behaviour and (ii) their perception of the social pressures on them to behave in this way (termed by Fishbein and Ajzen 'subjective norms'). The relative contribution of attitude and subjective norm to their intention may vary with the context and with the individual. Attitude is determined by (i) beliefs about the outcomes of performing the behaviour and (ii) evaluation of those outcomes. Subjective norm is dependent on (i) beliefs about how others feel the person should behave and (ii) motivation to comply with others.

The theory of reasoned action is summarised in Fig. 3.1. This can be further summarised in mathematical terms as:

$$A = \sum_{i=1}^n b_i e_i \quad (3.1)$$

$$SN = \sum_{j=1}^n b_j m_j \quad (3.2)$$

$$B \simeq BI = Aw_1 + SNw_2 \quad (3.3)$$

where A is attitude towards the behaviour, b_i a belief about the likelihood of outcome i , e_i evaluation of outcome i , n the number of salient beliefs, SN the subjective norm, b_j a normative belief (that a reference group or individual, j , thinks the person should or should not perform the behaviour), m_j motivation to comply with referent j , B behaviour, BI behavioural intention and w_1 and w_2 empirically determined weights.

Components of the model are measured by scales similar to those developed by Likert (1932) and Osgood *et al.* (1957). According to Ajzen and Fishbein (1980), behavioural intention will most closely predict actual behaviour when the measure of intention corresponds directly with the behaviour, when the opportunity for the behaviour occurs soon after intention has been measured, and when the respondent is free and able to act according to intention.

Fishbein and Ajzen's model is not without its weaknesses, but criticisms have usually been directed at modifying the model and its use to improve its predictive power rather than at discrediting the model altogether (e.g.

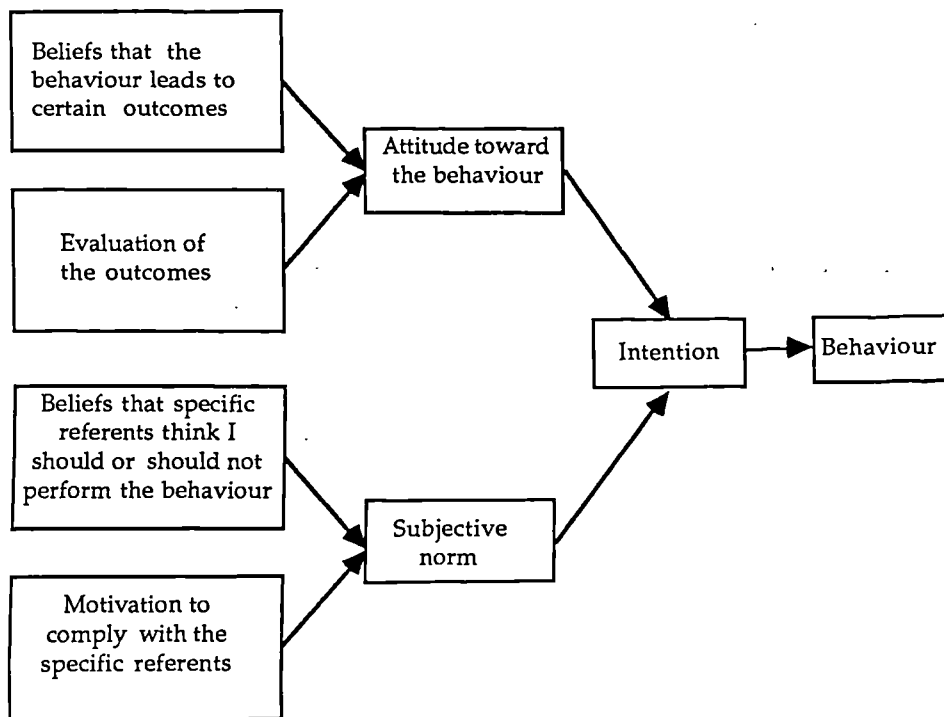


Figure 3.1 Relations among beliefs, values, attitudes, subjective norms and behaviour. Source: Ajzen and Fishbein, 1980, p. 84.

Jaccard and Becker, 1985; Miniard and Cohen, 1979; Towriss, 1984; Wittenbraker and Gibbs, 1983). Fishbein and Ajzen themselves are not fully satisfied with the *SN* component of the model and have suggested modifications to it (Ajzen and Fishbein, 1980, p. 246).

Nevertheless, the theory of reasoned action has been successfully used in a wide variety of practical situations, including the study of conflicting attitudes to nuclear power (Otway *et al.*, 1978) and farmer's attitudes to pesticide use (Tait, 1983). As Schuman and Johnson (1976) have suggested, where poor predictive power is found this may well indicate that there are barriers preventing attitudes being expressed as behaviour which are worth further investigation, rather than being simply a sign of methodological weakness.

3.2.3 Content analysis of documentary sources

Content analysis of documentary sources has been used mainly in studies of the mass media, propaganda, linguistics, history, political sciences and

psychology. It can also be used for coding attitudinal and other information recorded in interviews. The various techniques have been summarised by Whyte (1977) and described in detail by Holsti (1969). Basically they involve a systematic sorting of information into categories. A simple form of quantitative content analysis is possible, using frequency counts of key words and topics. More elaborate techniques include evaluative assertion analysis, in which attitudinal statements are translated into evaluative scores similar to those developed by Osgood *et al.* (1957), and contingency analysis, in which co-occurrences of two or more items are measured.

3.2.4 Opinion polls

Opinion polls have been particularly favoured by political scientists and in market research. They are used to tap the attitudes of large groups of people on social or consumer issues. They usually take the form of short standardised questionnaires, often relying on single belief or intention statements to represent an attitude, which are administered to statistically representative samples of the population of interest.

The advantages of opinion polls are that the interviewers need few specialised skills, the polls require the minimum of effort or commitment by the respondent, data analysis is rapid and the results have a sound statistical base so that in theory they can be taken as representative of the population of interest as a whole.

Disadvantages are that they impose the researchers' own frame of reference on the respondent; question wording may have an important influence on the results, both by directing the answer and in restricting the range of answers allowed; and the topic of the questionnaire may be of little relevance to many of the respondents, in which case the results will be of doubtful value.

3.2.5 Experiments

Experimental methods of studying attitudes are most frequently used by psychologists. They are usually laboratory or class-room based studies involving the manipulation of two or more groups of people for comparative purposes, often in connection with attitude change. For example, the impact of the source of information on attitude change might be studied by exposing different groups to the same message by different means.

Experimental methods usually involve use of the scale measures discussed previously. One further approach to the experimental study of attitudes which has attracted attention recently is that of psychophysiological measurement (reviewed by Cooper and Croyle, 1984). An example is the

measurement of facial muscle activity when respondents are exposed to a persuasive message. Such research might eventually provide support, or otherwise, for more subjective attitude measures.

The principal advantage of experimental methods is that they allow careful control of external variables. Their big disadvantage is that the groups amenable to such disciplined studies, such as students, soldiers and psychiatric patients, are atypical of other populations. As with opinion polls, unless the topic being studied is of interest to the participants the results may not be relevant beyond the restricted circumstances of the study itself.

3.3 Choice of methodology

A decision was taken to base the attitude surveys for this research on the theory of reasoned action (Fishbein and Ajzen, 1975; Ajzen and Fishbein (1980), because of its separate and very specific consideration of beliefs, values and social norms, and their proposed relevance to the conflict over agriculture and conservation (Section 1.5). Because the theory applies to attitudes in relation to behaviour, the use of this approach also takes account of the criticism of previous studies where environmental attitudes have been studied in isolation, free from any behavioural context (Section 2.3).

To obtain the measures required for the Ajzen-Fishbein model (Equations 3.1, 3.2 and 3.3), it is desirable to base questionnaire items on the freely-elicited opinions of the communities being studied, rather than on the researcher's perception of their opinions gleaned from secondary sources of information. The research was therefore carried out in two stages. In the first stage, a series of unstructured interviews with a sample of members of the farming and conservation communities was used to examine their range of opinions on the subject of conservation and agriculture. These are discussed in Part II. In the second stage, a questionnaire with attitudinal and normative items based on these opinions was used for a more detailed and quantitative investigation of attitudes and behaviour. This second, questionnaire-based, survey is discussed in Part III.

The two surveys provided complementary data. The unstructured interviews of the first survey gave rich descriptive data, while the second survey provided the statistical backup for these findings and allowed a more thorough analysis of attitudes, social norms and behaviour.

The other approaches to studying attitudes discussed in this chapter were considered inappropriate for this particular research project, although some might be considered in future for examining particular aspects of the findings in greater depth. Thus observation was not considered a practical option for the qualitative study, because of the dispersed nature of the farming and

conservation populations, although observation of group meetings did provide useful background information initially. In-depth methods for studying personal constructs, such as repertory grids and COPE, were considered too time-consuming for this project but might provide a means of exploring values more fully in future. Opinion polls, on the other hand, lacked the depth necessary for a thorough understanding of attitudes; however existing polls could provide a yardstick for comparing some of the findings from this survey of specific groups with the views of the public in general.

Experimental methods to examine the more theoretical aspects of attitudes and behaviour were also considered inappropriate, although they also might have a use in future, for example in assessing the impact of educational material or financial incentives on attitude and behaviour change.

Part II
First Survey

Chapter 4

Organisation of first survey

As mentioned in Section 3.3, quantitative attitude surveys should ideally be preceded by an unstructured survey to elicit the framework adopted by the survey population(s), to determine the concepts of interest to them, and the language in which they express these ideas. This helps to minimise later difficulties in the quantitative survey, described in Part III, resulting from question wording effects or mis-understanding of questions.

This chapter describes the organisation of the unstructured survey: the choice of study area and interviewees, the interviewing approach and the way in which the resulting tape-recorded interviews were analysed. The results of the survey are discussed in Chapters 5 and 6.

4.1 Preliminary investigation

Preliminary discussions about the research proposed were held with national farming and conservation organisations, and with their regional representatives in the Bedfordshire and Cambridgeshire area. The organisations and people contacted included:

- The National Farmers Union
 - HQ: Secretary to the Parliamentary Committee
 - Bedfordshire and Huntingdonshire County Branch: County Secretary
- The Country Landowners Association: Economics and Land Use Adviser
- The Ministry of Agriculture, Fisheries and Food
 - Regional Office, Cambridge: Regional Surveyor
 - Divisional Office, Huntingdon: Land and Water Service

- Area Office, Bedford: Horticultural and Agricultural Advisory Officers
- The Farming and Wildlife Advisory Group: National Adviser
- The Countryside Commission
 - National HQ: Conservation Branch
 - Eastern Region, Cambridge: Regional Officer
- The Nature Conservancy Council: Regional Officer, Cambridge
- The Royal Society for the Protection of Birds: Conservation Planning Department
- Bedfordshire County Council
 - Planning Department
 - New Agricultural Landscapes Project Officer
 - Forestry Officer
- Bedfordshire Rural Community Council: Countryside Officer, and
- Bedfordshire and Huntingdonshire Naturalists Trust: Field Officer.

Further background information about the organisations and their view of the issues involved in the conflict over agriculture and conservation was obtained from their published literature, by attendance at local meetings of the NFU and FWAG and from national and local newspapers.

As a result of the information gathered, it was decided that the research should concentrate on ordinary lowland farms, rather than those in areas of designated conservation interest, for several reasons. There was some concern that the focus on SSSIs in the Wildlife and Countryside Act ignored the importance of conservation in the wider countryside (NCC, 1984; House of Commons Environment Committee, 1985). It is in the wider undesignated countryside that conservation most depends on the individual landowner's attitude. To most people the local countryside is generally of equal or greater importance than areas of outstanding beauty or wildlife interest they may rarely if ever visit (Goldsmith, 1983); a national survey of countryside recreation by the CC (1985) showed that only 25% of trips into the countryside were to special sites set aside—most were to the wider working countryside. Also, in designated areas heightened conflict at the time of the Wildlife and Countryside Act may have resulted in polarised attitudes and hasty actions which would be difficult to monitor and interpret.

It was considered that more could be learned by studying one area in detail than several contrasting areas more superficially. Bedfordshire, chosen for the preliminary investigation mainly for convenience, seemed an appropriate study area for several reasons. Its intermediate position between the predominantly arable farming and open landscape of East Anglia and the more mixed farms and smaller fields of the Midlands means there is still much scope for landscape change. The area is relatively flat and scarred in parts by quarrying, so that the removal of landscape features can have a considerable adverse impact, and conversely positive conservation can make a valuable contribution visually. Bedfordshire County Council's planning department is keen to encourage conservation (it was one of only five counties to employ a Countryside Commission New Agricultural Landscapes project officer) and offered its support for the research project. The county is neither predominantly urban nor predominantly rural, so that conflicting attitudes might be expected to surface rather than be repressed as Newby *et al.* (1978) suggested they were in their East Anglian study.

4.2 Land use in Bedfordshire

Land use and the conservation interest in Bedfordshire are described in two landscape and wildlife documents published by the County Council (BCC, 1980a, b); its agriculture is described in a report by MAFF (1981).

With a total of 123 517 ha, Bedfordshire is one of the smallest counties in England. The broad categories of land use are:

| | |
|------------------|-------|
| Farmland | 77.0% |
| Urban land | 10.0% |
| Woodland | 4.0% |
| Water | 2.5% |
| Unfarmed land | 2.5% |
| Mineral workings | 1.0% |
| Remainder | 3.0% |

A total population of 502 164 (Office of Population Censuses and Surveys, 1983) makes it more densely populated than most non-metropolitan counties. The two main urban centres, Luton/Dunstable in the south and Bedford/Kempston further north, account for 60% of the population; 13% live in the smaller towns of Leighton Linlade, Ampthill, Flitwick, Biggleswade and Stotfold, and the remaining 27% in hamlets and villages in the rural areas.

The landscape and land use are strongly influenced by the underlying geology. Most of north and central Bedfordshire is low-lying (less than 200

feet) and on predominantly clay soils. To the south of Bedford this flat area is bounded by a greensand ridge or scarp running diagonally (from NE to SW) across the middle of the county. Beyond this, further south, is a terrace of gault clay (300–400 feet), bounded by the chalk hills which form the tail end of the Chilterns in the south of the county (500–600 feet). The overlying drift geology accounts for further local variation in soil type.

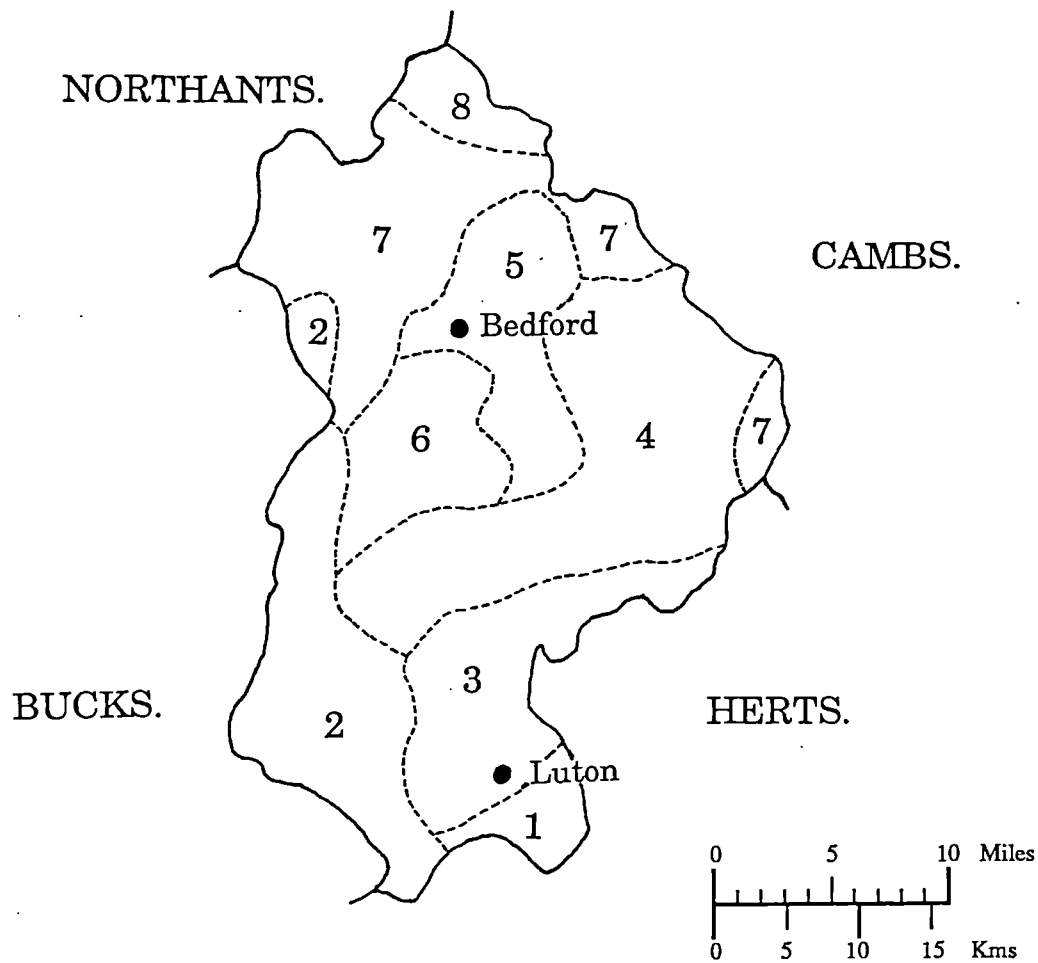
Areas considered by the county council to be of particular landscape value are the chalk downs, the greensand ridge and the river valley of the Great Ouse. The chalk downs are at present designated as part of the Chiltern Hills Area of Outstanding Natural Beauty, although this designation is currently the subject of debate for the Bedfordshire section. The greensand ridge is the most wooded part of the county and owes much of its interest to previous landscaping on the large traditional family estates of Woburn, Wrest Park, Old Warden and Southill which were established on the greensand.

The mineral workings with the most impact on the landscape are those associated with the brickworks south of Bedford. Other workings include sand pits on the greensand ridge, gravel workings in the river valleys and chalk quarries on the downs.

Elsewhere the landscape is determined mainly by agricultural practices. Much of the land in the county is of very good, and some of it the best, agricultural quality: 40% is classed as Grade II and 4% as Grade I according to the MAFF land classification scheme. The main farming patterns existing in 1981 are summarised in Figure 4.1. From this it can be seen that the predominant farm type is cereals and general arable. Dairy cows and other livestock occur mainly on the heavy clay soils in the west and on the flinty soils in the extreme south, and intensive horticulture is associated with loamy areas on the greensand ridge and gravel terraces in the river valleys. The impact of farm modernisation and hedge removal has been greatest in the north and east of the county.

4.3 Farmer interviewees

A total of 24 farmers were interviewed in the winter and early spring of 1983. The initial interviews were held with the chairman of the local NFU and several NFU committee members, including those involved with the local FWAG committee. Although these interviews were helpful in setting the scene, these farmers were probably more articulate and aware of conservation issues than average. The remaining farmers were randomly selected from the NFU membership list, excluding farmers with addresses outside Bedfordshire. Since the NFU claims that 93% of the farmers in the area are



1. Clay-with-Flints: Grade III: cereals, dairying: medium to large units.
2. Heavy Clays: Grade III: dairy and other cattle, pigs: small to medium units.
3. Chalkland: Grade III-II: cereals and general arable: medium to large units.
4. Gravel Loams and Greensand: Grade II-I: vegetables: mainly small units.
5. Boulder Clays: Grade II-III: general arable: units of varied size.
6. Heavy Clay: Grade III: cereals and dairy: medium to large units.
7. Boulder Clay Loams: Grade II-III: cereals and general arable: medium units.
8. Low Clays and Silts: Grade II-III: cereals and general arable: medium to large units.

Figure 4.1 Agricultural land use in Bedfordshire (adapted from MAFF, 1981, p. 22-23).

NFU members, this list was considered adequately representative. The list included an approximate indication of farm size, since the membership fee is related to this, but not of farm type. Holdings smaller than 20 ha were excluded since, although they make up 48% of all holdings, they only form 4.4% of the land area (MAFF *et al.*, 1984); it was felt more important to concentrate on larger holdings with a greater impact on the countryside.

The farmers were initially contacted by letter and appointments subsequently arranged by telephone. Ex-directory farmers were asked to respond by letter or phone and in all cases they did so. Interviews were tape recorded, unless the farmer objected; this happened only once. The advantages and disadvantages of using tape recorders are discussed by Young and Mills (1980). In practice, however, the advantages outweighed any possible disadvantages; the recorder used was unobtrusive, it provided an accurate record of what was said in the respondents' own terms, and respondents seem to feel reassured that all their opinions were valued and put extra effort into clarifying their thoughts because of the recorder.

4.4 Conservation interviewees

Because 'conservationist' is a much less distinct label than 'farmer', the decision about whom to interview for the non-farmer point of view was less straightforward. A sample of the general public from parish registers was considered but rejected, because public opinion polls (such as that for the NFU quoted by Worth, 1984) suggest that, while many people enjoy the countryside, too many people would need to be screened to make up a sample with sufficient interest in farming and conservation to make a detailed attitude survey worthwhile.

It was decided the best way to obtain the non-farmer viewpoint was to speak to members of conservation organisations. Opinions differ as to how much note should be taken of the views of members of pressure groups as representatives of public opinion (e.g. Lowe, 1975; Kahalas and Groves, 1978). However Katz and Kahn (1978) have justified the tendency of researchers to study the attitudes of group members, rather than the general public, by saying that public attitudes and policy decisions are more often derived from the views of organisations than is generally recognised.

The organisations were selected with the help of advice from the County Council planning department, on the basis of the groups they circulate for comments on environmental matters such as countryside aspects of their structure plan. Those chosen were:

- The Bedfordshire and Huntingdonshire Naturalists Trust (BHNT—now called the Wildlife Trust, BHWT)

- The Bedfordshire Natural History Society (BNHS)
- The Bedfordshire Preservation Society (BPS)
- The Royal Society for the Protection of Birds (RSPB)
- The Ramblers Association (RA)
- Friends of the Earth (FoE) and
- The Conservation Volunteers (CV).

The Bedfordshire and Huntingdonshire Naturalists Trust is linked with other county trusts through a national organisation, the Royal Society for Nature Conservation. At the time of the survey (1983) the BHNT had one paid administrative officer and a field officer but was otherwise staffed by volunteers. An executive committee of members was responsible for running the Trust. Total membership (including corporate, joint and family membership) was estimated to be 2–4000. Members had access to the Trusts' reserves in Bedfordshire and neighbouring counties, and occasionally guided walks or open days were held on the reserves. A few of the more committed members helped with the maintenance of the reserves. The four members interviewed for the first survey were randomly selected from the list of committee members.

The Bedfordshire Natural History Society is an autonomous group, not associated with a national parent organisation, run by elected officers and council members. It has a number of recorders who take a lead in recording observations of their own specialist group of flora or fauna in the county. These records are published in the society's own academic journal, the *Bedfordshire Naturalist*. At the time of the survey there were approximately 400 members. Frequent indoor meetings and talks were arranged at six different venues in the county in turn. Regular field trips to study different habitats and wildlife were also organised. Those interviewed were the chairman and three randomly chosen council members. An indoor meeting was attended and the opportunity taken to talk to other members.

The Royal Society for the Protection of Birds has three local groups in Bedfordshire; these are the Bedford, East Bedfordshire (Biggleswade-based) and South Bedfordshire (Dunstable-based) groups. At the time of the survey approximately 10% of the 4000 Bedfordshire members of the national RSPB belonged to the local RSPB groups. Whereas membership of the Bedford and South Bedfordshire groups was separate from membership of national RSPB, the East Bedfordshire group circulated all RSPB members in the area about its activities. The committees of each group organised regular illustrated talks and occasional outings to RSPB reserves and bird sanctuaries for the members. The leaders of the three groups were interviewed.

The Bedfordshire Preservation Society is unusual among county preservation societies in not being affiliated to the national Council for the Protection of Rural England, although it does have informal links. At the time of the survey it had a total membership of about 1000 and was made up of a number of almost independent local groups:

- The North Bedfordshire Preservation Society (Bedford-based)
- The South Bedfordshire Preservation Society (Dunstable and Luton)
- Leighton Buzzard Preservation Society
- Woburn and District Preservation Society
- Clifton Preservation Society
- Blunham Preservation Society
- Biddenham Preservation Society and
- Ampthill Preservation Society.

Meetings of the Bedfordshire Preservation Society, the overall parent organisation, were only held about three times a year. The constituent groups were responsible for recruiting their own members and for campaigning on local issues. Membership numbers and the activity of the groups tended to fluctuate with causes; some groups had more regular meetings, talks and social activities than others. The five people interviewed were the chairs of the North Bedfordshire, South Bedfordshire, Leighton Buzzard and Blunham Societies, and a member with a special interest in the countryside nominated by the chair of the Ampthill Society. These interviews showed that farming and conservation were generally of peripheral concern to the Preservation Societies, except regarding footpaths, so members of the remaining, less active, groups were not interviewed.

The Ramblers Association has two local groups in Bedfordshire, the North and South Bedfordshire groups. These belong to the Southern area of the national Ramblers Association. At the time of the survey their total membership was about 160. Regular guided rambles were organised. The honorary secretaries of each group were interviewed. An AGM of the South Bedfordshire group was attended to provide further information.

Friends of the Earth encourages its members to set up local groups and conduct their own campaigns independently of the parent organisation. At the time of the survey there were 40 members of national FoE in Bedfordshire, but Bedford's local group had been disbanded as young active members had become more involved in the peace movement, the setting up

of a health food co-op in Bedford and family commitments. Three Bedfordshire members of national FoE were therefore interviewed. One was listed as a 'Countryside Campaigner' by national FoE, and he supplied the names of two other members he knew to be particularly involved in countryside matters.

The Conservation Volunteers in Bedfordshire are affiliated to the national British Trust for Conservation Volunteers. At the time of the survey the Bedfordshire group was small (30–40 members). They carried out active conservation tasks for the County Council, the Naturalists Trust, landowners and farmers in return for expenses and a minimal fee. There was secretarial back-up from the Rural Community Council. Informal social events were also organised by those involved. Apart from a leader, the structure of the group was informal, everyone being expected to participate in running it. Those interviewed were the group leader and three randomly chosen members.

A total of 25 conservation group members was therefore interviewed in the spring and summer of 1983. Contact was initially made through the secretary or co-ordinator of each organisation. Those interviewed were usually the chair or other members actively involved in the groups' organisation. Although not a random sample, they were in a position to provide the most information. How well their views reflected those of the general memberships could be assessed at a later stage from the more representative sample used in the follow-up survey. As with the farmers, interviews were first sought by letter and appointments then arranged by phone. As before, the interviews were tape-recorded.

4.5 Interview approach and analysis

For the purposes of the Fishbein-Ajzen model, it is necessary to ask respondents to list what they consider to be the advantages and disadvantages of the behaviour of interest (to establish the salient beliefs) and the people or groups they think would approve or disapprove of this behaviour (for the subjective norms). Where the behaviour is complex and involves a range of possible actions as in the case of conservation behaviour, rather than a single act, respondents should also be asked to list the behaviours they consider relevant.

However in this particular survey the interviews were more probing and free-ranging than required for the purposes of the model, in order to explore more fully respondents' own perceptions of conservation and the conflict, and to avoid imposing a preconceived framework which might turn out to be inappropriate. Each interview lasted between one and two hours and the

questions were deliberately general, encouraging respondents to do most of the talking. Farmers were asked what they understood the word conservation to mean, what could be done on farms in the way of conservation, what the advantages and disadvantages of conservation were, what factors made some farmers more sympathetic to conservation than others, whether anyone else influenced their views on conservation, and whether they felt under any pressure to conserve, had ever had any complaints from the public or had ever sought conservation advice. Conservationists were asked similar questions where relevant, and if they expressed concern about any aspect of farming they were asked whether they attempted to change things or make their feelings known. Questions required for the purposes of the model were thus used as general prompts during the course of the interviews but were not necessarily all included if the conversation led elsewhere.

This approach to attitude surveys, using in-depth and relatively unstructured interviews, is described in *Social and Community Planning Research* (1972). Unstructured surveys of this nature can provide fascinating insights into the motivations underlying specific aspects of human behaviour. They are also a fruitful source of hypotheses about the nature and extent of the relationships among specific variables of interest, which can subsequently be tested in a quantitative survey, as described in Part III.

Interviews from the unstructured survey were therefore analysed more thoroughly than required for the purposes of the model. Ajzen and Fishbein (1980) suggest that all the beliefs elicited from respondents should be listed and organised by grouping together beliefs that refer to similar outcomes or norms. The most frequently occurring beliefs, which they termed the modal salient beliefs, are then used as questionnaire items. In this survey the analysis was not restricted to opinions appropriate for the model; instead a more extensive analysis of the interviews was carried out, using the content analysis approach recommended by Belson (M. Belson, Survey Research Centre, London, personal communication). The tape-recorded interviews were transcribed verbatim and recurring words, subjects, themes and ideas marked and copied so that they could be studied together. The categories which emerged in this analysis are listed in Appendix A; two examples of farmer interview transcripts (with references to local people and places deleted to preserve anonymity) and their analysis form Appendix B.

As described in the following two chapters, the qualitative information gathered in the unstructured interviews could be conveniently sub-divided into that related to (i) specific conservation issues, such as trees and hedges, chemicals, straw burning, and access and footpaths (discussed in Chapter 5) and (ii) matters relating to conservation in general, such as the social pressures involved (discussed in Chapter 6).

Chapter 5

Results: attitudes and behaviour

5.1 Introduction

Analysis of the interviews from the unstructured survey showed that the farm practices most frequently mentioned in connection with conservation were similar for farmers and conservationists, although their perception of the issues was very different. Most people from both groups mentioned trees and hedges (20 conservationists, 17 farmers) and many also mentioned access (15 conservationists, 14 farmers) and straw burning (14 conservationists and 14 farmers). The most striking difference was that whereas agrochemicals were mentioned by 18 conservationists they were only mentioned by two farmers without prompting.

Other topics less frequently mentioned were wetlands and meadows (9 conservationists, 1 farmer), ponds (2 conservationists, 5 farmers), farm surpluses (9 conservationists, 5 farmers) and animal welfare (1 conservationist, 4 farmers). The conservation of resources was only mentioned by one person, a conservationist.

Both groups therefore viewed conservation in relatively narrow terms, those of nature conservation. But whereas the conservationists' concerns centred on the loss of wildlife and wildlife habitat, the farmers' concerns tended to focus on the restrictions which conservation might place on them; farmers usually only mentioned wildlife in terms either of game or farm pests.

This chapter presents in detail the comments made by respondents about their beliefs and values (and, where mentioned, behaviour) concerning the four main issues raised: trees and hedges, chemical use, straw burning, and access and footpaths. Comments relating to conservation in general and social pressures are presented in the following chapter.

The quotes selected have been chosen either because they summarise the comments of several respondents particularly well, or because they express the strength of beliefs or values. Generally terms such as few, several or

many have been used rather than more precise quantification, since no two interviews were directly comparable; the main purpose of this first survey was to examine the range of beliefs and feelings, leaving quantification for the second survey. 'Several' in this context therefore refers to two or three respondents expressing a similar view, 'many' refers to at least six, and 'most' to at least three-quarters.

For farmers, the quotes are those of arable farmers (the predominant type) unless otherwise mentioned. For conservationists, BHWT refers to a member of the Bedfordshire and Huntingdonshire Wildlife Trust, BNHS to the Bedfordshire Natural History Society, RSPB to the Royal Society for the Protection of Birds, PS to the local preservation societies, FoE to Friends of the Earth, RA to the Ramblers Association and CV to the Conservation Volunteers.

In the analysis of the comments, this thesis concentrates on the social and psychological aspects of people's beliefs and behaviour. Considerable research effort has already been directed into scientific and economic investigation of the issues raised. For example the advantages and disadvantages of hedge removal are examined in Sturrock and Cathie (1980) from the farming point of view and in papers such as Arnold (1983) from the conservation viewpoint. But controversial issues such as these usually involve conflicting scientific opinion and uncertainty. In such circumstances the sources of information which people choose to rely on and the way in which their beliefs are affected by their interests and values are of particular interest. This analysis therefore examines differences in respondents' perceptions and how these differences exacerbate conflict, in order to suggest ways in which conflict can be minimised. The justification for taking this approach is the theory of reasoned action: that people's behaviour is governed by their own perceptions of what is true and right and socially acceptable, whether these perceptions have a scientific basis or not.

5.2 Trees and hedges

5.2.1 Farmers

Most farmers mentioned trees in connection with conservation. Many were planting trees, leaving saplings to grow or owned established woodland or spinneys which they valued. One farmer was actively managing his woodland by coppicing, both for sale and to provide additional fuel for a straw burner which heated the farmhouse, but in other cases the woods were not maintained.

Attitudes to trees were generally favourable. Apart from the commercial use of some woodland, trees were appreciated for their appearance and as

shelter belts for houses and livestock. Several farmers mentioned Dutch Elm disease as the trigger for much tree planting now. Their benefit to game was obviously an important factor for several farmers and a move by the county council to ban field sports on their property was seen as counter-productive:

You've always got to dangle a carrot in front of people see, and if you stop people from being allowed to shoot game you'll stop people from wanting to preserve their woodland.

The few reservations expressed about trees mainly came from tenant farmers. On tenanted farms trees remain the landlord's responsibility. A tenant on a well-wooded estate said:

Trees are very nice but they can get a little bit overbearing. . . . A tree in a hedgerow in the middle of two fields costs me £100 a year in lost crop If you've got one in the middle of a field it's nothing but a nuisance with all this big tackle.

Two other tenant farmers confirmed this problem with trees and spinneys in arable fields. However, on another estate the landlord encouraged tenants to plant trees by not charging rent for any planted areas.

Two farmers mentioned vandalism as a reason for not planting trees near villages, and one or two mentioned problems with establishing trees:

You can plant a tree but not everyone can keep it alive, maintained. It's terribly important to keep the rubbish down for the first five or six years.

There is a problem getting trees established with the high powered tackle we've got. We subsoil quite near the trees and I think that strikes their roots and restricts growth.

Opinions varied about the availability of grants and who should bear the cost of tree planting:

There have been grants and incentives for some of the plantations but to start with they weren't worth the hassle of getting them. They're now much easier . . . but . . . one year I spent about £6500 hoping to get a 75% grant and they'd run out of money so I got nothing.

You have to maintain the new plantations for five years until they start to grow away . . . [The grant's] a tremendous boost but it's not the be-all and end-all. If the public requires these things to be done I think they should pay the full cost.

If I choose to knock a tree down it's my business. Likewise if I choose to preserve a hedgerow or tree I expect to pay for it, I don't send the bill. (Arable and vegetable farmer).

Grants—it's a joke—you don't get them. They're given to the great big farmers like in industry. The bigger you are the more grant you get. (Livestock farmer).

Hedges and hedge removal were also commonly mentioned in connection with conservation. There was considerable variation in behaviour and attitudes among farmers, the most distinctive differences lying, as would be expected, between those keeping livestock or growing vegetables, for whom hedges still served a useful function, and arable farmers, for whom they did not.

Several arable farmers mentioned they had removed some or all of their hedges, or all but boundary hedges, and one was about to remove a gappy one at the time. Few of these had any reservations about removing hedges if they considered it necessary, and several farmers mentioned that any loss from the conservation point of view could be made good by planting trees.

One or two mentioned that hedges and small fields only dated from the time of the Enclosures. Some parishes in Bedfordshire were never enclosed (Bigmore, 1979) as farmers in those areas pointed out:

Our fields were always fairly large. These people are always on about an ancient pattern, it isn't an ancient pattern, it was all open.

This field is 202 acres, it's never been enclosed, you're looking at medieval farming landscape.

Arable farmers mentioned field sizes between 30 and 100 acres as their preferred field size. Referring to the large fields of Hugh Batchelor, the Kent farmer who had been gaoled for removing trees, one said:

A 450 acre field gets a bit boring really because it takes such a long time to finish a field.

The main reason given for hedge removal on arable farms was to adapt field size to suit modern machinery, particularly combines, to improve efficiency:

By the time I get the combine in and turn it round, by the time I get the sprayer in there, I've finished What was a nice field of 15 acres, now owing to the size of modern tackle has got to be 50 acres, so three hedges have got to come out.

For the same reason hedges had been taken out to remove awkward corners and amalgamate odd pieces:

That's the other thing, an awkward shape. The ideal field would be 50 acres square but they don't just come like that.

The time and labour needed for hedge maintenance were also mentioned as factors in their removal, particularly in the past before mechanical hedge-cutters were widely used:

Had hedge-cutting machines been as efficient 20 years ago I think we would have far more [hedges] still on the farm.

With the switch to autumn cereals the time needed for maintenance may still cause problems on large cereal farms where access for the hedge-cutter may be limited to a short busy period between harvest and re-drilling:

If you're on heavy soil as soon as harvest is finished you want to move on and farm the land, you don't want to be hedge cutting.

Other reasons given for removing hedges included to make it easier to clean ditches and to clear out hedges which were considered unsightly or overgrown and full of dead elm:

I had to clear a lot of hedges, they were 20 yards wide in places, a lot of them were dead elm sucker-type hedges and the others were traditional thorn, but all overgrown with brambles and the only way to deal with it economically was to clear the lot.

One farmer had removed hedges to discourage trespass:

I've taken two hedges out. They encouraged people to keep wandering where they shouldn't.

Hedges, particularly large ones, were seen by some arable farmers to be a source of weeds, diseases and vermin such as rabbits, pigeons, magpies jays and crows:

Big hedge birds, like magpies and jays, they moved off and we weren't sorry to see them go because they were predators on game birds anyway.

The same farmers thought small hedges encouraged a better class of bird:

A proper trimmed hedge will encourage small birds, hedge sparrows and blackbirds. Nice neat trimmed hedges will encourage more small birds to nest than big ones. (Livestock farmer).

Small birds that use grasses and small hedges for their habitat, like the buntings, they're still there.

Three farmers mentioned that hedges encouraged sparrow damage to grain, especially near houses.

Most arable farmers aimed to trim their hedges every year:

Since the coming of mechanical cutters, you get these hedges to shape and it's a bit like a garden hedge, the more you cut it the more it will thicken out.

Tall hedges were said to shade the crop, keep the ground wet and create pockets of stagnant air where disease flourished. Two farmers mentioned that if they let hedges get overgrown along the roadside they were asked by the council to cut them back, and one farmer thought tall hedges along the road were a traffic hazard. However, another had come to the conclusion that it was a good idea to leave hedges tall along the roadside:

If the townsperson sees nice hedges on the roadside you can have big fields inside and nobody worries about them. (Arable and vegetable farmer).

For arable farmers the only positive statements made about hedges concerned their use as a boundary.

Livestock farmers and those growing vegetables intensively were more likely to keep small fields and leave hedges. They were also likely to be critical of those who were removing hedges:

I'm very anti pulling all these hedges out and making one great big field. (Livestock and arable farmer).

Where they've been making these fields into larger areas that's what's wrong in my opinion. (Vegetable grower).

Livestock farmers were also more likely to allow hedges to grow up or trim them at a greater height. All gave their principal reason for keeping hedges as shelter; a livestock farmer also mentioned shade:

It's amazing what a hedge can do to break the wind and give shelter. (Livestock farmer).

That's for shelter for the crops. If it all lays open when the wind starts that'll cut right across. (Market gardener).

One or two farmers mentioned they let certain hedges grow up for conservation reasons, and one suggested hedges were sometimes kept for fox-hunting.

For those who considered hedges an asset the problems mentioned by arable farmers, such as maintenance and rabbits, were dismissed:

We usually have a hedge-cutter come round and they soon whip along. It's not all that expensive. (Market gardener).

You may get uneven ripening and some rabbit damage at the edges but hedges and trees near a crop make only a marginal difference to crop profitability. (Arable and vegetable farmer).

In talking about trees, hedges and the landscape in general, many farmers used value-laden words. The majority of farmers preferred a tidy, controlled landscape. Wild, unfarmed areas were often described in terms which implied they were *bad*: derelict, wasted land, a wilderness, neglected, a disgrace, disorder, a mess, overgrown, and revoltingly untidy. Whereas farmed land was described as: tidy, neat, clean, presentable, orderly, productive, and decent. Several farmers described tall hedges as 'inefficient' and 'not very good farming'.

The influence of the agricultural depression of the 1930s (referred to in Section 1.2.4) in shaping such attitudes was referred to by one:

During the 30s the whole of north Bedfordshire was derelict, all bushes . . . dereliction, starvation and bankruptcy in the whole of the countryside on the heavy land . . . There was 75 years of depression, it took a fearsome grip on the community in the late 1890s.

Some appreciated that their view differed from other people's:

It doesn't strike me as open. I think of it as tidy I must admit, that's a farmer's eye I suppose, but to me it's attractive because it's neat, presentable and it looks tidy. Alright, that's not the way the countryside's supposed to be I suppose. Certainly when I start to see hedges getting up very high . . . I always think they look more of a mess than they do an attraction, but it's a job to say because you look at it in a different light altogether.

Two farmers felt that the public shared farmers' preference for a tidy landscape, but others thought the public had a romantic view of how the countryside should be:

I think people have this idealistic ideal of the lovely pond with ducks swimming on it, it's all beautiful and a few rushes round the edge, but the majority of ponds aren't like that, they're deep with mud and they've got sludgy old water and in hot weather they've got flies. (Livestock farmer).

His wife added:

We all remember when we were children, the sun was always shining . . . and the fields were full of wild flowers, primroses along the bank in spring.

The remarks about hedges being a source of weeds, diseases and vermin showed that there were also different values concerning wildlife. Plants viewed as wildlife and *good* by conservationists were seen as 'weeds' and 'rubbish' and therefore *bad* by many farmers:

I don't like nettles—I know they're good for butterflies but of all weeds they're the ugliest.

As noted before, much animal wildlife was seen by farmers as vermin, including magpies, jays, crows, pigeons, sparrows and rabbits.

There were a few farmers with a different point of view, in particular two of the older livestock farmers:

He [the neighbouring farmer] wants to see everything neat and tidy, the grass [verge] will be mown with a machine and it will look like parkland I suppose. People like me would rather see it how it used to be with all the—well, they call it rubbish, but to me there's a certain amount of attractiveness to nettles and hemlock, it's a home for insects and butterflies. (Livestock farmer).

This farmer suggested a fundamental difference in values might explain this difference in attitudes:

Probably I prefer that [wildlife] to people, and they [others] prefer people. (Livestock farmer).

The more commercially aggressive farmers, at the other extreme, referred disparagingly to those with what they considered to be run-down untidy farms as 'dog and stick farmers'. They might be put off conservation if it was seen to be associated with 'bad' farming as this farmer suggested:

The people who are best at conservation are the three-handed farmers; those who have a left hand, a right hand and a little behind hand. They fail to trim their ditches and they fail to tidy up their field boundaries and they fail to grow very good crops so they grow weeds as well. (Arable and vegetable farmer).

However this farmer went on to say that attitudes were changing and for leader farmers 'Good conservation is now good farming'.

Pride in productivity underlay some of the attitudes to hedge removal and landscape in general, for example:

The way a lot of farmers work, if there's a little wet patch on the farm it's a challenge to put it into a condition where they can produce something from it.

However again there was a feeling that attitudes were changing, and that the new demands being made on the farming community were beginning to undermine their pride and satisfaction in farming:

We've made the land more productive ...if you consider producing food a benefit to the country, and if you don't ...well, I don't know what we're doing here, it's as simple as that.

A strong sense of land as private property underlay some of the attitudes to the removal of landscape features on the farm:

I think it's dreadful if you own something . . . that somebody else should dictate you shouldn't do this, that and the other. (Livestock farmer).

I'll consent to the point where I think it's to the benefit of the farm . . . , if someone came along and said 'That's a soggy piece of ground, it's got to stay there' I would say 'No, get off mate, that's my piece of ground, I do what I want to run my business'. (Arable and vegetable farmer).

However others emphasised the transient nature of land ownership:

Any farmer's tenure of his land is a very transient thing. (Arable and vegetable farmer),

and several quoted the farming saying 'Live as if you'll die tomorrow, farm as if you'll live forever' as an indication of their stewardship and commitment to the long-term good of their land.

5.2.2 Conservationists

Although conservationists acknowledged that many farmers were now planting trees, some criticised the species being used, making a distinction between 'good' and 'bad' trees. Good trees were those that supported a greater wealth of wildlife. Conifers were generally seen as bad. Sycamore was seen as good by one person, presumably by comparison with conifers, and bad by another.

The neglect of much woodland was also commented on, and new plantings were not considered nearly as valuable to wildlife as old woods:

To walk through a really old wood is a joy, from a scientific point of view, because you'll find things you'll never find in new woods Destroy them and you've destroyed the species altogether. (BNHS).

Several conservationists expressed concern at the felling of isolated mature trees, as well as the clearing of woods:

I'm very fond of trees . . . I think a tree gives so much to nature, it gives so much to the landscape . . . there's so much in the outline of a tree . . . it's seldom a tree doesn't have a beautiful silhouette . . . and after that you have everything from beetles to squirrels living in it, so it's a little zoo in itself. (CV).

However, most conservationists mentioned hedge removal as one of their main concerns about farming:

Looking around you and seeing the hedges disappear, the countryside disbanded almost. (CV).

Among the more committed and knowledgeable conservationists, the older, species-rich hedges were the most highly valued:

Hedges that were originally planted with the Enclosure Act tend to be one species hedges, say hawthorn, and are therefore of less importance to wildlife than old parish boundaries which tend to be, not always, the remains of ancient woodland edge and therefore they have a greater woodland species diversification and ground flora. (CV).

This distinction between relatively recent hedges and much older species-rich hedges had not been mentioned by farmers, many of whom were possibly unaware of its significance to conservationists. As boundary hedges these old hedges may be less vulnerable to removal than internal ones. Even so, some conservationist were concerned that unsympathetic management would reduce their interest.

Conservationists from all the organisations studied valued all hedges as habitat for wildlife, particularly for birds. Hedges were seen as providing a woodland-edge type of habitat, combining the benefits of shelter and light. They also provided 'corridors' through which wildlife could move safely, protected to some extent from farming practices and predators:

Often with the loss of woods and so on [hedgerows] are the last spot where species are hanging on. (BHWT).

I like to think of hedgerows as being corridors or roadways for wildlife—it's one of the few remaining habitats they've got. (RA).

Ramblers too missed the corridors provided by hedges:

They're such giant field systems now. You've got to use a compass to find the old courses of the paths. (RA).

Conservationists pointed out the disadvantages to the farmer of hedge removal. Several mentioned soil erosion:

You'll see the dust blowing off the fields straight across the road, whereas if they'd got a hedge that would at least have stopped it a little bit. (PS).

The value of hedges as shelter for crops and gamebirds, as well as wildlife, was mentioned and two people also mentioned their value in preventing snow drifts.

Three people referred to the 'balance of nature' and the fact that by removing hedges farmers were also removing beneficial species:

They're losing probably, maybe unknown to themselves, far more than they're gaining. They're losing the diversity of life on the farm, and it's the diversity that helps keep a balance You're upsetting the balance. (BNHS).

They've done away with the natural wildlife habitat which was beneficial to their cropping. We know there were rabbits and things about but there were a lot of other birds and creatures that do infinite good. (PS).

Apart from hedge removal, remarks were also made about the lack of sympathetic hedge management. Flail cutters were particularly disliked. Ploughing right up to the hedge damaged the roots and cutting in spring disturbed nesting birds:

It's much better to see a healthy layed hedge than it is to see one that's just been hacked away with a flail, but I don't think it makes that much difference to the amount of wildlife that's in it. Provided they don't do it in the spring of course, which they do—they'll go through it even May and June, hack the birds' nests, birds and all if they're stupid enough to stay on the nest. (BNHS).

Layed hedges were very much admired, both for their appearance and for the caring attitude they indicated, as well as for their benefit to wildlife:

That's lovely to see, because it strengthens the hedge and it's very caring. (FoE).

. . . layed a hedge. Beautiful! It really is lovely. (PS).

An A-shaped hedge was also considered good from a conservation point of view.

The farmers' point about the time needed to maintain hedges properly was countered in two ways. One conservationist thought it was a poor excuse for hedge removal, given the arable farmers' reduced workload:

Farmers now must have more time than they ever had. I know they probably don't employ as many people, but they must have no end of time to take a bit of trouble on the hedges. (CV).

Conservation Volunteers suggested it was the kind of work they would be only too willing to do.

Despite their concern about hedge removal, many conservationists appreciated the disadvantages of hedges from the farmers' point of view, in trying to manage farms with small fields using large machinery. Some also appreciated the problems caused by vermin, mentioned the need for greater productivity and self-sufficiency and were aware of the historical background to present patterns of land use:

...that was only 200 years old. Before that there were open fields with the allotment strips, the mediaeval system, so what we tend to think of as traditional is a recent tradition and you cannot run modern farming with six acre fields when you've got combines with an 18 foot swathe on the front. (PS).

Some conservationists talked about compromise; they accepted hedge removal as inevitable, but felt boundary hedges could be kept and small copses planted in awkward corners to compensate for their loss:

...I suppose we can't really beat them too hard, the farmers, because they're trying to get a living aren't they. The thing is to work with them, and try and get them not to cut down too many hedges, leave trees if they will, and if they have dug up too many, to try and make a little copse-type area, re-plant if possible. (BNHS).

However others were less sympathetic to the farmers' point of view, or found it difficult to reconcile this with their own different values. Some couldn't understand the farmers' obsession with tidiness:

I don't like the way they 'cleared up' the countryside. There's not enough rough and tumble that we used to have, nor the wildlife. (BHWT).

It's often put forward by farmers as good husbandry, tidying the countryside up, and sometimes of dubious value. I'm thinking in some cases of hedgerow removal, scrappy little bits of woodland in corners of fields disappear. (RSPB).

Others questioned the value of ever-increasing productivity, mentioning food surpluses and greed:

Now he's literally put three fields into one. It's putting people out of work. It wouldn't matter if the end product was doing the people of the country any good, but it's not. The stuff is going into intervention. (PS).

They plough up woods knowing damned well they can't sell the stuff ...they do it just for greed ...they do it for productivity and it all goes into a mountain or something at the end doesn't it. (CV).

Is there really a need for more food, or, which is probably my own feeling, a demand for more profit on the part of many farmers and this is where you get most conflicts with conservationists. (RSPB).

And there was frustration at farmers' lack of a sense of the countryside as a shared asset:

I think we ought to get over to them that they are just custodians of the land, they're holding it for our future generations so they shouldn't mess around with it too much. (BHWT).

His arguments are it's his land, he can do what he wants with it . . . I'm a person that feels that Britain really belongs to the British people and yet 2% of the population can more or less say what they're going to do with it, and that I think is wrong. . . . How on earth do we get it across to farmers like that that perhaps they have got a duty to the people whose country this is, it's not just theirs. . . . The obvious answer is to have no private ownership of land, and lease it all out to farming. (RSPB).

5.3 Pesticide use

5.3.1 Farmers

Despite the concern of the conservationists about agrochemicals in general and pesticides in particular, few farmers mentioned this subject unless specifically questioned. Two voiced what others apparently felt:

I don't think high inputs has much relation to conservation. (Arable and vegetable farmer).

Most farmers felt that chemical inputs were now an essential part of farming, there to be used. Higher inputs meant better yields and larger profits. The labour saving benefits of chemical inputs were also mentioned by one.

One or two suggested it would put them at a financial disadvantage compared with other farmers if they reduced inputs; the price incentives for organic produce were not considered sufficiently attractive at the time. One farmer said that low input farming might increase the cost of food and another that although it would reduce surpluses these might be only a temporary phenomenon.

However a minority (three) expressed clear reservations about high input farming:

I used to grow some decent crops without a lot of high inputs . . . I used to fallow, I still believe it saves a lot of chemical use on some of the weeds which are endemic now, but finances dictate I can't do that now.

They're using all this nitrogen, whether that's going to affect the soil in time, and the sprays eventually poison the soil, I don't know . . . A lot of this ground doesn't really like to be arable, cereals every year. I think yields are dropping off. (Livestock farmer).

On the subject of pesticides in particular, as opposed to chemicals in general, remarks were again made about their use being essential for good yields. In the current economic situation it made sense to use them to safeguard other costly investments:

We're in a system of farming now where we can't not do it, there's enough money in growing the crop to use the chemicals. If the price of the crop comes back we might have to seriously consider altering our systems, but that is something we face and adapt to when the time comes.

We use insecticides if necessary. We're out to produce as much corn as possible, we've got to, the rent of the land, the value of the land, the cost of growing it, machinery, seed and fertilizer, is colossal. (Livestock farmer).

One said pesticides prevented a build-up of weed problems on the farm. Many said they only used them as necessary, and criticised those who routinely used them as a preventative measure. Three said they rarely used insecticides:

Apart from blackfly on beans we don't spray any other insecticide. The wheats get these bugs every few years but I never use them. (Arable and livestock farmer).

We don't have any occasion to use pesticides. Aphids tend to go for wheat, certain varieties and certain stages, but I don't grow any.

I make a note of those varieties which I think don't get attacked by aphids and tend to go for those.

However, fungicides were more likely to be used as a routine measure:

Fungicides are the ones that people put on as a preventative measure, whether there's anything there or not. Fungicides are normally that much cheaper and a lot of people who spray against fungal disease aren't quite sure what they're looking for.

Fungicides were also considered to be harmless:

I'll admit I use a fair dollop of spray. Some people grumble at me in the village 'You're dropping spray from the sky'; I say any spray that I spray from the sky it'll do good, because it's a fungicide.

Three others expressed confidence in the safety testing of all pesticides:

It's very good that they keep an eye on the dangerous chemicals because being a spray operator you don't want to breathe too much horrible toxic stuff.

In general most chemicals, whatever they say, could be drunk almost. They might give you the heebie-geebies but nothing really serious, providing you're sensible.

However, this farmer did follow his remark up with two instances where people had been overcome by pesticide fumes; in one case empty containers had been left in the confined space of a Land Rover on a warm day, and in another a bearded farm worker who had been spraying in still warm conditions failed to wash thoroughly when he had finished.

One or two farmers suggested hazards were a thing of the past, with spraying techniques being continually improved. But another admitted tighter controls might be a good thing, and one suggested that the recommended safety procedures might not always be followed.

While some farmers used pesticides without hesitation and the majority, although not wholeheartedly in their favour, considered them essential for economic reasons, a minority had stronger reservations. They questioned their economic advantages, effect on beneficial insects and safety:

If you've got time it's cheaper to control your weeds and annual disease by natural means and by cultivation rather than by chemical methods, but the bigger chaps haven't the time.

I'm anti-pesticide because I think the predators can do as much good as the pests do damage.

It's cancer that worries me. Alright, everything is tested, but it's not all tested in one human being is it. The number of additives is alarming. I still don't know what residues of spray are left over in the plant. (Arable farmer's wife).

You've got to use them or you won't have any crop. Not that I necessarily agree with all this here spray, everything you eat is all treated, you don't know what effect it has over a period of years. (Market gardener).

One or two were concerned about particular pesticides:

I'm a little bit against burning off the fields with paraquat, I wonder if it does have an effect on the cereals and end up in our system. (Livestock farmer).

This organo-phosphorus one is nasty if you don't follow the rules. Metasystox, that's quite a nasty one.

Several remarked that despite chemicals, pest and disease problems were as bad as ever. Some blamed it on new less-resistant varieties, others on shorter rotations and one saw it as an example of nature's resilience:

It makes you wonder—a few years ago when there were no sprays you didn't get the amount of fly about as what you get nowadays. (Market gardener).

Pesticides are to an extent counter-productive, you have to have a new one next year, they become immune to it. (Livestock farmer).

We have sprayed blackgrass for 17 years and we are no nearer controlling it than we were when we started. Nature balances itself. Either things adapt or drop out.

One thought the apparent need for more sprays might be simply because farmers now had more time to examine the crop for pests and disease.

Nine farmers spontaneously mentioned the effect of pesticides on wildlife. The remarks almost all concerned wildlife of particular interest to the farmer: bees, predators of pests (e.g. ladybirds), earthworms, hares and game birds. Of these farmers, five said this affected the type of pesticides they used or the way they used them, but four others said it wouldn't stop them using the best chemical for the job. Three farmers mentioned the effect of gramoxone on wildlife; two of them thought it was harmful, affecting birds and hares, but the third said the decline in hares was more likely to be due to the loss of pasture for grazing than to the use of gramoxone. Other farmers doubted that pesticides seriously affected wildlife, or used the best chemical for the job regardless.

Only one farmer mentioned nitrates as an issue without prompting. Most considered it not worth worrying about, at least for the time being. Most seemed to think it was a temporary and exaggerated scare, other pollutants being far worse. Others felt it wasn't a problem for them, either because they were on heavy soil less susceptible to leaching (three farmers) or because they used relatively low doses of fertiliser at any one time (four farmers).

Among the remarks about chemical inputs there were several value-laden statements which suggested that high inputs contributed to pride in ever-increasing productivity:

The majority of farmers, the main reason to produce more is not to gain more money but to prove to themselves they can do better next year than they did this year.

It's difficult now we've got in this frame of mind to stop because the benefit is seen in the yield. I think we do become overgreedy, this is just competitiveness, you try to be as good as your neighbour.

The increase in productivity in the agricultural world, if it was met by a like increase in industry we should be a very wealthy country.

5.3.2 Conservationists

The use of chemicals, both pesticides and fertilisers, was mentioned by all except three of the conservationists surveyed. Two of these exceptions had close farming connections and the third had formerly worked for a pesticide company. When prompted on the topic, these three expressed views similar to the majority of farmers: that sprays were essential, their impact on wildlife not serious and their safety now adequately monitored. One said much the same as the farmers when prompted, that he thought the subject of pesticides was only loosely connected with conservation.

However, for the majority of conservationists, pesticide use was a major concern, although some coupled this with an appreciation of the farmer's point of view:

Well, of course I'm against pesticides and so on being used at great length, but on the other hand it's very easy to say that but you've got to bear in mind that the farmer wants the best crop he can get. . . . They have a hard time, they're always working at a loss so they've got to try and increase their income somehow, and if it means cutting off a bit of land or increasing their pesticides, . . . or fertilisers and so on I can completely understand it. I find it very hard. (CV).

The major concern about pesticide use was its impact on wildlife, in particular on birds of prey and other creatures at the end of the food chain:

. . . I think particularly the *chemicals that are used in farming are of concern*. . . . The pesticides and so on, obviously that's going to have an effect on particularly the carnivorous species, birds of prey and so on. . . . The main problem is if you kill insect pests, other things will eat them, they get concentrated in the food chain. (BHWT).

Generally, people did not distinguish between different pesticides, and often fertilisers were included in an overall concern about the use of agrochemicals. DDT was most often singled out:

The worst ones are the chlorinated hydrocarbons, DDT and those ones, but DDT's banned anyway for farming, but there are other things. (BNHS).

Herbicides were also mentioned by one or two as being of particular concern; their use to improve pastures and the spray drift through hedge bottoms damaged the wild flower interest. Fungicides were only mentioned by one person. Like the farmers, he considered them relatively harmless, but thought that even they might be having unseen ecological effects by destroying fungal micro-organisms responsible for breaking down plant debris and recycling nutrients.

As well as concern about the effects of pesticides on wildlife, four people also expressed concern about their effect on human health. Usually this concern extended to chemicals in general:

Basically I have a distaste for chemicals because it's a bit like the pill, you kill one thing but you encourage who knows what. . . . I suppose we're going to die in the end anyway. We'll all get cancer because there are so many things rushing around in the air, water, and food we eat, everything. (CV).

Pesticides is a thing I don't like. They're designed to kill and they're sprayed around; at one time it used to be spring and autumn they usually sprayed but now it can be as much as once a fortnight or even once a week . . . they don't care about the wind direction, blowing all over the houses, they don't give a damn. And for a few days after they've done it all the children in the area are usually ill . . . adults as well . . . it's health hazards, and you also have to eat the poison on the food that you buy in the shops. (FoE).

However one of the three people unconcerned about pesticides was scornful of the public's mistrust of chemicals just because they were synthetic, saying that many plants contained chemical compounds which were highly toxic.

The unknown long term effects of agrochemical use were referred to by several people, implying a lack of confidence in the testing procedures used, and one person was concerned that chemicals were being used by people without any chemical knowledge or any thought of the consequences.

Aerial spraying was particularly disliked by one or two people for its indiscriminate effects on the wildlife in unfarmed areas adjoining fields. A rambler was worried that those aerial spraying did not consider people who might be walking on footpaths below. On the other hand, one of those unconcerned about pesticides was quite happy to put up with aerial spraying:

There are times when . . . you'd think you were in the Battle of Britain . . . the spraying aircraft work very close to the ground and they're noisy little things . . . but you get used to it. (PS).

Fertilisers, hardly referred to by farmers in connection with conservation, were mentioned by six of the conservationists. They were particularly concerned about fertilisers and water pollution:

You get the artificial fertilisers flowing into ditches and streams, the rivers get an excessive growth of vegetation and it clogs the rivers up and causes untold problems. (BNHS).

. . . you look in the streams here you won't hardly see a fish It's that fertiliser, nitrates, it's a white crystal thing. I heard that it causes

the destruction of the ozone layer What they do to the water, they fertilise to such an extent all the oxygen is burnt up, there's an algae like a brown slime which propagates itself because of the nitrates in the water, it chokes out all life such as plant life; you look into the streams you don't see any weed like you should do. (FoE).

Several people questioned the true benefits of both pesticides and fertilisers to farmers. Their arguments included doubts about the real costs of high input farming, the diminishing returns over the years, the over-dependence on chemicals, the harm to beneficial wildlife, the build-up of resistant pests and the effect on soil structure and stability. For example:

. . . you've got these two trends, more fertiliser required, more and more every year, gradually but definitely decreasing yield all the time from the ground. If you extrapolate that to it's conclusion you're going to end up with barren ground which won't respond to fertiliser at any price. . . . As far as I know you don't get this situation with organic fertiliser. (FoE).

I did some work on a farm not far from here, I think it was 16 different sprays they were using on one field in one season, a cereal crop. That seems to me a heavy dependence on chemicals.(RSPB).

. . . the use of sprays, which are not terribly accurately placed, go through the hedgerows, . . . they often harm things that do good, the most obvious one is the ladybird feeding off aphids. (BHWT).

. . . we're provoking worse strains of disease and pests so we're making a worse situation.(CV).

You're getting dust blowing . . . and it's purely because in our opinion there's no humus put in the soil today, they all rely on chemical fertilisers. (PS).

Attitudes to pesticides in general appeared to be coloured by averse publicity about the harmful effects of DDT, and the link between some chemicals and cancer. The views of this FoE member may represent in an exaggerated form the connotations which pesticides have for many others:

. . . they don't tell you what's in these sprays, there's a brand name and that's it. It doesn't tell you what it contains. It could contain DDT, 2,4,5-T, all sorts of terrible things which have absolutely devastated the wildlife in some places. DDT nearly exterminated the peregrine falcon, 2,4,5-T was used in Vietnam as a defoliant, and it caused birth defects, cancers and all sorts of things and I dare say a lot of these chemicals do contain 2,4,5-T. (FoE).

Only a few people mentioned the benefits of pesticides:

I'm aware that masses of chemicals are used, I'm also aware that without them you couldn't grow half as much food, food prices would therefore be a lot dearer, or at least the food that is grown, so I'm aware there's a direct conflict of interest altogether. (RSPB).

...on the other hand unless it was for the pesticides the roses would be damaged with greenfly and other things, they are very useful things. My weedkiller—that drive and the bit at the front—I put weedkiller down next month on that and I'm more or less weed-free for the whole season, whereas it would be endless weeding without it. (PS).

A Naturalists Trust member also admitted the advantages of pesticides for spot-spraying invasive weeds on the Trust's reserves.

Two people had moral objections to the use of pesticides, one being concerned about the depletion of the world's resources and the other against the killing of any living thing:

Animals have got equal rights with people as far as where they live and you should not destroy animals. (FoE).

5.4 Straw disposal

5.4.1 Farmers

The majority of farmers raised the subject of straw-burning in connection with conservation and public pressures; only two felt it was a separate issue. Dry weather conditions during the previous two harvests had increased the nuisance and damage caused by fire, smoke and ash and there was considerable public pressure for a ban on straw burning both nationally and locally at the time of the survey.

As with the hedge issue, there was a clear distinction between the views of the arable farmers and those with livestock or market gardens. Most of the arable farmers had little use for straw themselves and no economic outlet for it:

You've probably talked to quite a few farmers who are good businessmen and I think if they could find a better use for it and make something out of it they'd do it, they wouldn't be burning it.

One sold his straw for a nominal value to a neighbouring livestock farmer, or for transport to the west country or Wales, but most were overwhelmingly in favour of burning at the time of the first survey. Several mentioned that there might be a market for compressed straw as fuel in the future although they didn't consider it feasible yet. One cereal farmer had installed a straw-burning stove to heat the house but he said it created a lot of ash and used only a fraction of his surplus straw.

Livestock farmers on the other hand were likely to need all their own straw. Some baled for neighbouring cereal farmers as well, especially where burning posed them problems near thatched houses and main roads; others found difficulty in acquiring enough straw:

We grind the cereals and use the straw and hay. It all goes away as beef or milk We've been buying straw in this time, because we've been rather desperate for straw really . . . most of them want to burn it as quickly as possible. They spread it about so it's impossible to go in and bale it. They're not very keen to sell it really, they want to burn it. (Livestock farmer).

If anything, livestock farmers suffered more from straw burning than the general public because they were so close and risked losing baled hay and straw when pieces of smouldering straw drifted down.

The market gardeners interviewed grew only small acreages of cereals. Their straw was baled by contractors and used, for example for strawing up rhubarb, or sold locally for horses or other livestock.

Most cereal farmers acknowledged the annoyance caused by straw burning, since they and their families suffered the same inconvenience as the general public, but most also felt it was something that had to be tolerated:

It must be terribly frustrating if you've just painted the greenhouse and smuts float down on it, it must be equally frustrating if you've just hung out four or five sheets to dry.

I appreciate how people must feel about it because we don't like smuts in the house and we cause the problem, so people that don't have anything to do with it must get very, very mad about it.

Several mentioned in their defence that it was only for a brief period of the year and others that other forms of pollution such as lead in petrol and litter were far worse.

Arable farmers considered that burning had several benefits over and above simply removing a waste product. Burning was seen as a hygiene measure, clearing the ground of weeds and disease. But a farmer who baled doubted whether burning was an effective way of destroying weeds:

How much of the seed it really burns I don't know. If it's left it always comes through green afterwards doesn't it. (Livestock and arable farmer).

Two farmers, one arable and one livestock, also mentioned the control of insect pests but felt that burning might do more harm than good in this respect, by killing beneficial insects and upsetting the balance.

Most of the arable farmers considered that burning was essential to ensure timely drilling of the next crop; either baling or straw incorporation would slow things down, especially in a wet autumn:

You have to take burning straw in the context of a changed pattern of farming. Now 90% I should think of cereal acres are drilled in the autumn—winter wheat, winter barley, oilseed rape drilled in July or August. Traditionally before that one was growing spring crops, a proportion of spring crops, . . . now we have only six weeks really to turn that land round. (Arable and vegetable farmer).

. . . It's the time involved in getting all that stuff off the ground and the weather comes into it, you can have as much machinery as you like to do it, you get a night's rain you'd mess the ground up too much to get drilled up . . . this ground can be like concrete one minute and a night's rain it's just like a lot of grease.

Burning straw and early autumn sowing allowed drilling in 'dry perfect conditions.' But one cereal farmer said timeliness was a problem only for those with large acreages of cereals:

I always plough . . . it's the bigger people that are tending to flout the conservation laws if you like, cut corners to try and get more work done in a little time. The workload through August, September, October, November is a mad rush to try and get everything in.

Several farmers mentioned that straw-burning minimised the damage to soil structure which resulted from working on the land in a wet autumn, and one mentioned that this also saved fossil fuel.

Burning was seen as an efficient and cost-saving means of straw disposal by its advocates, and several suggested the increase in costs if burning were banned would mean higher prices for the consumer. But one arable farmer denied that burning was a cheap option, and those who baled and ploughed dismissed the value of straw burning.

Despite the perceived advantages to arable farmers of straw-burning, many said it was a job they disliked doing:

A lot of farmers I know, the majority of them, none of them like burning They hate the job. Anybody that's responsible's got to be frightened of it—it frightens me.

The fire hazard to buildings and traffic were also mentioned:

I've got a terrific problem, I've got houses one end of the field and a road this side—I do take a lot of care in trying to get it right.

Three mentioned hazards to wildlife but only one of them felt concerned, the other two assuming that most wildlife would escape:

If you do get these raging fires wildlife can't get out of it—you do see the odd hare that's been singed.

Permanent damage to hedges was considered to be rare and restricted to maverick farmers or the occasional unavoidable accident.

Arguments against straw incorporation were even more forcefully expressed than those for burning. The heavy clay soils were given as the main reason why incorporation would be very difficult, because the straw would take so long to rot down. Although several were prepared to admit there might be advantages to incorporation on lighter soils, where breakdown would be quicker and the additional organic matter beneficial, this did not apply to heavy soils:

To say incorporate it, it's not on on heavy land. There's a case for it on lighter lands, where they're easier working and getting some humus back in is a good thing, but this land, we don't plough an acre now. In the days we did, two years later, five years, ten, you could still turn straw up that had been turned in, so you see it doesn't break down.

Several mentioned the poor bacterial activity in clay soils, although one thought this might gradually improve if straw were incorporated:

Maybe after eight or ten years of good incorporation . . . the bacteria will then work more efficiently but who can afford to stand the ten years of low production.

Another said low soil temperatures slowed down straw decomposition, making incorporation a less feasible solution here than in warmer countries on the continent where burning was banned. A farmer on chalky soil said that incorporation to the recommended depth risked bringing up the chalk subsoil. Related arguments against straw incorporation were that the presence of rotting straw created unfavourable soil conditions for the following crop, and released toxins which affected germination.

Two farmers mentioned the likelihood of slug problems with straw incorporation and one of them also mentioned leatherjackets (*Tipula* spp.). One farmer mentioned that straw incorporation meant using extra nitrogen, and so increased costs. Another said that incorporation affected the action of autumn sprays, although others in the subsequent survey argued that the ash left after burning would have a greater effect.

Apart from the difficulty of incorporating straw on heavy soils, the main argument against incorporation was the extra cost associated with an increased workload, with the need for more powerful machinery and with reduced yields:

It would reduce my income by at least £15 000 a year . . . simply because I've got to buy equipment to deal with the straw, I've got to put a chopper on the back of my combine, I've got to work the stuff in, and you look at all the . . . figures about loss of crop yield because of

the incorporation of straw into heavy clays, it's just disaster, it really is.

Five farmers mentioned that incorporation would lead to reduced yields, both as a result of poorer winter cereals and a switch to spring sown crops. Most added a defensive rider about cereal surpluses, saying that this situation could soon change:

We were at Letcombe last year and where they'd incorporated straw into the soil the seedlings were nothing, it looked as if you might produce a 30% crop from it. If you're going to be forced to produce that type of yield, well the world is going to be short of food. There's a surplus of cereals at the moment but it could drastically change.

Six farmers mentioned the risk of accidental fires or arson if they were not allowed to dispose of the straw quickly by controlled burning:

I think if they're going to ban it they better pray, and I mean pray, that someone doesn't drop a match. There's nothing to stop it between the River Ouse and the M1, and it wouldn't be the odd 100 yards of hedge and the odd two or three trees that would go.

A livestock farmer suggested that unscrupulous farmers might themselves stage accidents:

There's going to be a lot of people who still burn their straw but don't admit that they've burnt it. You can throw a match in and go away and say there was an accident. (Livestock farmer).

Those who burned saw no practical alternative at present, although most were resigned to a ban in the long run. A switch to other enterprises such as peas, beans or rape was rejected as unprofitable.

Suggestions for reducing the nuisance caused by burning included the introduction of a licencing system, mentioned by three farmers, to encourage the irresponsible ones to take more care:

I think most farmers, the majority of sensible ones, would be quite happy to see a licence system where if somebody starts a fire that gets out of hand, give them four points, the same as you would a driving ban.

Another suggested burning at night would be better, because the dew would help dampen the flames. The same farmer suggested staggered burning followed by immediate cultivation to bury the ash, both measures which have subsequently been included in the Straw Burning Code. One mentioned a chemical might be developed to rot down the straw, but not until a burning ban ensured a good market. Two expressed the feeling that it was unfair to impose a ban when scientists themselves had no alternative to offer.

The main value conflict involved in the straw burning issue seemed to be to do with the threat of regulation, as observed by this farmer:

You've got strands of politics—whether you want a conservative type, laissez-faire or a socialist, controlled, ordered society. . . . I am for personal liberty, and against compulsion and interference by government—sound like a tory right-winger don't I! (Arable and vegetable farmer).

He felt the calls for increased regulation derived partly from a deep-seated envy and a dislike of privilege:

. . . whether it's just simply you don't like black things descending from heaven or you intrinsically think farmers are a privileged class and are milking the taxpayer and the Common Market. That lies at a different level. . . . A definite attitude of 'look at them in their big houses, surrounded by all their land, they don't have to live poked up in a semi-detached like I do'. A certain amount of envy comes in—it goes back to the class thing 'The lord in his castle and the poor man in his cottage'. . . . Urban man . . . he's now linked the two together in his mind: 'We've got these damn smuts falling from the sky, palls of black smoke *and* they're producing too many cereals, nobody wants them, we could be sending all the grain to India, the third world' or 'we don't need it anyway, and they're damaging the environment and turning the country into a dustbowl and a prairie'. They're justifying their own interference with fellow man . . . not only indignation but *righteous* indignation. (Arable and vegetable farmer).

5.4.2 Conservationists

Whereas most farmers were concerned about the public outcry over straw burning and usually mentioned it in connection with conservation, the majority of conservationists considered it of marginal relevance, more of a nuisance than a threat:

It's only a marginal conservation matter. I think sprays and uprooting hedgerows, changing of woodland and old pastures into arable are far, far more disturbing. (BHWT).

It's mildly offensive compared with pesticides . . . it's not too bad. (FoE).

Straw burning? Well straw burning does [concern me] but it's not—it's a separate subject, it's only very vaguely to do with conservation . . . It's a nuisance, rather than a danger to wildlife. (BNHS).

However there were objections to careless burning. Opinions differed as to how careful farmers usually were, and to what extent accidents were avoidable:

They're pretty good, even with their stubble burning, they seem to wait until the wind blows in that direction. (PS).

It's not purposeful destruction, it's accidental destruction. (RSPB).

I don't think in the main—farmers don't stubble burn to cause damage. I think it gets out of hand, I think kids take a hand in quite a lot. (BNHS).

They're not always careful are they. They are a bit more careful than they used to be but there's still a lot of damage, there again to trees and hedgerows, often you can see a farmer's burnt all the hedgerows, singed, and the trees are singed, they're never the same again. (CV).

... a lot of the farmers have never done the ploughing round the outside of the fields they should have done. (PS).

... the blighter up here ... he says—he had a terrible blaze up there straw burning—his story is a spark flew over the hedge. (PS).

The thing is, it's destroying hedgerows, in some cases it's being done on purpose, they've got an excuse then to plough them up. (FoE).

The main concern about careless burning was the damage caused to hedges and trees:

I've seen photographs taken last summer in Bedfordshire, lots of damage, hedges, edges of woods, from burning ... permanent damage. (BNHS).

Two people mentioned how this damage spoilt the appearance of the countryside:

You've still got another month of summer left and the countryside looks as though it's late autumn with the trees scorched and the hedgerows turned brown. (RSPB).

But four others felt like most of the farmers that any damage was probably only temporary.

Two people mentioned the loss of habitat as a result of the damage to hedges:

... run out of control and let it burn oak trees, particularly oak trees because they're so valuable as habitat for so many species, or any trees for that matter. (BHWT).

One mentioned the loss of hedgerow berries for birds because of scorching, and four people felt that straw-burning could have direct effects on animal wildlife:

They can't all [get out of the way], they can't possibly. Eggs laid in the ground can't get out of the way, earthworms can't burrow down fast enough to get away from the heat . . . then the good the earthworm does is lost Possibly farmers don't ever stop and consider what's going to get burnt underneath the field . . . little voles and shrews, which again are helping by keeping the soil aerated. (BNHS).

However, another felt the damage to wildlife was normally minimal:

It's effect on wildlife is a minor thing . . . I doubt if any damage to wildlife is irreversible. A very rapid scorch probably doesn't affect anything below 1 centimetre; it may kill fungal spores but there won't be any damage to the flora. (BHWT).

And another mentioned that fire was a useful management practice on nature reserves:

. . . we have used burning as a management tool . . . certain things become unlocked after a fire and can only flower after the outer casing's been burnt. . . fire isn't an unnatural thing. It's more natural than ploughing in fact. (BHWT).

While the majority thought straw burning was not a serious problem from a conservation point of view, the annoyance caused by smuts was often referred to:

It's just a nasty practice, that's all. In towns, in Bedford, in the book shop all the shelves were covered with dust. . . . Same with people's houses, they shouldn't be subjected to that. (BHWT).

Although one or two of these obviously felt strongly about smuts, others thought such complaints were trivial and self-centred:

. . . most people report it because it gets in their washing, they're so self-centred. (FoE).

His wife added:

Yes, they don't care two hoots about destroying all the wildlife, the trees.

Four people referred to the pollution:

. . . no other industry would be allowed to create that amount of smoke and pollution. (RSPB).

But one of them did not consider it serious compared with other pollutants:

As far as pollution, there obviously is pollution, but it's not as hazardous as oil and radiation and all the other types of pollution. (FoE).

Apart from the smuts and pollution, some people were concerned about the hazards to traffic, people and property caused by straw burning:

It's frightening. It roars across the field at a terrific rate, and the noise, and the smoke. (PS).

...not to mention ...we were coming down from Yorkshire back in September, it was daylight but there was a tremendous amount of smoke going right across the motorway and a fire engine there was putting it out. (PS).

However, another felt the safety aspect was under control and blamed accidents on the carelessness of the public and arson:

The regulations are pretty stringent aren't they and I think from the safety point of view it's probably OK. (PS).

As with hedge removal and chemical use, many tried to look at it from the farmers' point of view. They mentioned the lack of economic uses for the straw at present, the benefits of burning in terms of destroying pests and diseases, adding nutrients to the soil and saving the farmer time and money, and the adverse effects of incorporation on the following crop. For example:

...there's no current process by which one can convert it into something useful, like burning bricks or making some other kind of food or cellulose ...they can't plough the stuff in because it ruins the crop for next year. (BHWT).

Isn't it meant to do the land good? ...It gets rid of all the diseases and vermin, I forget what goes back into the ground. (CV).

But others felt the farmers were taking the cheap and easy way out. They felt it was a wasted resource and were unconvinced by arguments about the lack of alternative solutions:

While they've got an easy solution they'll use it, but if it is banned I think they'll come up with another solution... I'm not convinced it's the only way to do it. If there was an economic market for the sale of the stubble they wouldn't burn. (BNHS).

...it ...is wasteful from the nation's point of view, especially if you've got to clean the mess up. It's burning a resource, throwing it away. (BHWT).

Alternatives suggested were to bale it, plough it in, use it as a fuel or feed it to livestock.

Several people expressed moral judgements against straw burning, seeing it as destructive and selfish:

It's just the whole thing, it seems so totally mindless and destructive. (FoE).

Straw burning as such is a rather selfish act. (BHWT).

5.5 Access and footpaths

5.5.1 Farmers

More than half the farmers raised the issue of footpaths and access in connection with conservation, and others expressed strong views when prompted on the subject. The link between conservation and access was made in two ways; some were concerned that conservation would lead to an increased demand for access, while one or two mentioned that public access disturbed wildlife.

Some of the bitterness about footpaths seemed to stem from the way in which they had been designated:

...the Access to the Countryside Act impinged very unfairly on farmers. The way it was written it allowed everybody else the right to do and say and designate whatever they wished but ...didn't give a requirement for these people ...to ...contact the landowners and say 'how about this'.

I don't think County Hall is at all fair about footpaths. Once the line's on the map, whether it's recorded rightly or wrongly, in the eyes of the County Surveyor that is God. (Livestock farmer).

In Beds. there have been masses of court cases because there was this one particular person ... who ... put in footpaths and bridleways everywhere. And also we had ... the County Treasurer ... an ardent conservationist ... or is he the County Surveyor—he was sitting in judgement over these small claims, totally biased.

Most of the farmers said they had no objection to serious walkers and organised parties of ramblers who kept to the paths, it was the mis-use of paths that annoyed them:

The organised rambling parties, they've got their maps, they're clued up and know where they're going ... they're not really the ones that cause the trouble. (Livestock farmer).

The sort of trouble referred to included people, dogs, horses and motorbikes straying off the paths (mentioned by nine farmers), gates left open, dogs running loose, and litter. For example:

Footpaths, yes, it's nice for people to walk out across the countryside, I've got no objection to it whatsoever providing they keep animals, pets, under control, don't leave litter, shut the gates after them and don't abuse the privileges of the countryside. After all, we are getting a living, it's our livelihood and people should learn to respect it.

There were many more similar statements, some heated, some resigned. However two farmers had a more relaxed attitude to access, feeling that children need somewhere to let off steam:

It's easier to some extent to leave a rough corner and just let them play in there. If they haven't anywhere to play they'll just play out in the field.

Three others thought that the more formal areas of access were adequate:

... they've got their parks and leisure centres, so I'm not quite in agreement with what's known as rambles. (Livestock farmer).

Three farmers mentioned problems with sponsored walks across the farm, and another, school cross country runs. They felt that even though public footpaths were being used it would be courteous to discuss the event beforehand with the farmer:

The other day there must have been two or three hundred kids out on a sponsored walk—who or what they were I've no idea ... they had to cut across the field of barley and it was like a herd of elephants coming down there. ... The other thing I object to is the litter that's left behind, coke cans, sweet packets, ice cream wrappers, cigarette—perhaps not fag packets so much with kids, but the rubbish that's left behind.

Another case of assumed right of access which annoyed one farmer was that glider pilots and balloonists carry maps with all meadows marked for emergency landings.

Six farmers made remarks about how footpaths had outlived their original purpose, to get to work and church:

All the people that use footpaths today, it's for pleasure. What they were first for was going to work and church.

Three farmers pointed out the risks to the public of walking across farms, such as contact with recently sprayed crops or unpredictable livestock.

Several farmers felt that since the purpose of footpaths had changed and so had farming methods, rationalisation of the footpath system was to everyone's advantage. But three said when they had applied to re-route or close paths they had met with objections, not from local people but from national organisations objecting on principle:

We have offered this path through the wood and it's acceptable to 95% of the users, but there's always one or two, and I don't mean the Ramblers in general, but the big noises belonging to the Ramblers Association, either the secretary or something, that keeps objecting . . . they object in principle without ever coming to have a look. (Arable and livestock farmer).

If you want to change a footpath it's a dickens of a job, even though it's entirely sensible what you want to do. But to change a footpath is hardly worth the aggravation. Because I can show you footpaths that without a shadow of a doubt no-one's walked on for 20 years. But if I wanted to close it, which I think you can do, say nobody uses it, as soon as I publish that in the London Gazette I shall have 50 people down here wanting to walk it. The general public is bloody minded in my opinion. (Arable and livestock farmer).

Yet another farmer had had no difficulty in getting permission to re-route his paths round the edge of fields. One or two admitted they intended to go ahead and re-route paths without going through the hassle of the formal procedure.

Strong value-laden feelings about land as private property, as opposed to access to the countryside as a communally-held resource, seemed to underlie some of the more antagonistic views:

Footpaths? Damned nuisance. It's the people on them . . . they're there to be used. It's the abuse one gets you see. This is the crucial dilemma, conflict, between the town and the country, is the awareness of who owns the countryside, and the farmer's point of view is, I own this land, cost a fortune to buy, spent a lot of time, a lot of effort to develop it, this is my business. (Arable and vegetable farmer).

Farmers resented the public's assumption that they had rights of access to all the countryside, and several felt the least they could do was ask permission to walk across the farm:

People assume because there's a track that it's a footpath which isn't necessarily true . . . I don't mind anybody using it, provided they come and ask me, but when they demand it as their right . . . I get annoyed. (Arable and livestock farmer).

Another farmer, who had had problems with people dumping stolen property and with gypsies, was more emphatic:

No, I'm coming now, if anybody . . . comes along I out them quickly . . . if the community wants to serve me that way they're not going to have access to my property. (Livestock farmer).

Four made remarks of the often-quoted kind:

The same people wouldn't like you just to walk through their back garden.

The fact that the farmer is responsible for maintaining the paths was an additional grievance, and in some ways served to reinforce a sense of ownership:

I think it is wrong that the onus is on the person who owns the ground over which the path crosses to keep that path free and accessible. (Livestock farmer).

Other value-laden remarks made in connection with access concerned law and order:

...I think they've lost all discipline and respect. Part of society today, and that's why we're in such a hell of a mess with everything. (Livestock farmer),

and population control:

The big problem in this country is there are too many people in it and it's getting worse, the state of multiplication . . . (Arable and livestock farmer).

5.5.2 Conservationists

Apart from the remarks of members of the Ramblers Association, most conservationist comments about public access to the countryside showed some ambivalence. Public access to sites with wildlife interest was felt to be harmful in some ways, as shown by the following remarks:

about County Council woodland:

...they [the County Council] do have problems because once they've bought it the public have bought it. When you've got plants or animals that are very shy or very rare, the more people you get the more chance you get of having it picked. (BHWT);

about redundant gravel pits:

If you convert it into a marina and there's lots of people dashing about in boats and fishing and all the rest of it, the birds aren't going to go there, so you've lost another little patch. (RSPB).

One or two remarks about vandalism on nature reserves by the public echoed those made by the farmers:

There's a lot of kids riding cycles and a lot of other folk. A lot of the boarding we put down [to stop sand erosion] has been taken up . . . a lot of horses go across there as well. (CV).

Only three of those interviewed, all keen walkers, seemed to have strong feelings about the problems of access on farmland. They felt access was important because for many people it was their only opportunity for close contact with the countryside, and walking a form of enjoyable relaxation freely available to anyone. One described footpaths as a 'lung', allowing those cooped up in offices all week to escape into the countryside at the weekend. The farmers' attitude to walkers was felt at best to be one of toleration and at worst open hostility:

A lot of them do, they may not physically stop you but they do everything to discourage you. They may be ploughed up with a deep plough, there may be a missing bridge which he might himself have taken away, I do know cases. The signpost has probably walked or been turned to point the wrong way and the majority of cases it isn't because it's been vandalised by normal, what you would say was a vandal, because the farmer's done it. (RA).

The ramblers emphasised that the footpaths were public rights of way and farmers were not entitled to prevent their use. The ploughing out of footpaths, and the fact that the Council rarely enforced their re-instatement, was commented on by several people.

The ramblers felt that neither the farmers nor the council seemed prepared to accept their responsibility for footpath maintenance, and yet ramblers were often refused permission to do the maintenance work themselves. They said they took care to follow the country code when using paths and felt the farmers' complaints about vandalism were exaggerated. They felt trespass would be avoided if all footpaths were more clearly waymarked.

The three people who expressed opinions on the rationalisation of footpaths had differing views. One, interviewed as a member of the BHWT but also a founder member of the PS, said there was a case for closing those which served no purpose and thought the Ramblers Association's insistence on retaining all footpaths was ridiculous. But the Ramblers Association members backed their group's stance, explaining that rationalisation to the farmer usually meant reducing the network, and that future needs for access might be very different so that rights of access needed to be safeguarded:

Who knows what will be the requirements or even the pattern of things in the year 2000 ... another generation could well mourn 'I wish dad didn't let that footpath go'. ... especially with fewer jobs around there's going to be a different pattern of leisure life. ... an increasing corps of people will have to occupy themselves one way or another ... if there are too many restrictions, and there are quite a number of restrictions in the countryside, it could be ... a contributory factor to raising steam in the country. I think the countryside is going to be used more and more in the future. (RA).

5.6 Comparison of the views of farmers and conservationists

The comments made by respondents during the unstructured interviews suggested that there are many areas of potential conflict. The remarks illustrated how differences in interests and values among respondents could give rise to considerable variation in their beliefs. There was an overall difference between farmers and conservationists in the way the 'problem' of conservation was viewed. The main concern of conservationists was in the loss of wildlife and wildlife habitat, so that for them the issues of hedge removal, neglect and loss of old woodland, pesticide use, and the drainage of wetlands were seen as the most serious. For the majority of farmers, on the other hand, the problem of conservation was seen as the threat it posed to their freedom of action; they were thus more concerned about issues where this threat was seen as most serious, such as straw burning and access. It is perhaps for a similar reason that they had favourable attitudes to positive and highly visible conservation activities such as tree planting, because they helped diffuse criticism and deflect threats of regulation.

Within the specific issues, there were many examples of conflicting attitudes, not only between farmers and conservationists but also between different groups within the two communities, and occasionally even between members of the same family or within an individual. These could be categorised as conflicts of values (concerning ideals and matters of principle) or conflicts of interest (concerning what is advantageous for personal interests), and thus more or less amenable to resolution, according to the definition used in setting out the aims of this thesis (Section 1.5).

For example, in the case of trees the farmers' interest in game and the conservationists' interest in wildlife meant that to some extent interests were at least complementary, if not shared, so that the potential for conflict was reduced. But conflicts of values could be expected to occur between farmers and conservationists where conservationists had moral objections to shooting; the same conflict could also occur between and within conservation groups and even cause a struggle of conscience within an individual where interests and values were at odds. Conflicts of values were also apparent in the conservationists' distinction between good and bad trees; those considered good by the farmers for amenity or game purposes were sometimes considered less good for wildlife by conservationists. A conflict of interest between tenant farmers and their landlords was shown by the tenants' less favourable attitude to trees, but there was also an example of its relatively simple resolution by economic bartering.

With hedges there were some complementary interests between conservationists, livestock farmers and market gardeners in that hedges provide

shelter for wildlife as well as for livestock and crops. But there were obviously conflicting interests between conservationists and arable farmers since hedges impeded machinery and took time to maintain. The issue of hedges also revealed several examples of conflicting values between farmers and conservationists, many farmers preferring an orderly and open landscape to a more natural appearance with some wilder areas and a more restricted view. Farmers saw hedges as harbouring 'rubbish' and 'vermin' rather than wildflowers and animals. In some cases there was evidence of a more extensive difference in values, amounting to a difference in worldview of the materialist/non-materialist kind discussed in Section 2.2.1, with some conservationists criticising farmers for their emphasis on ever-increasing productivity and profit. Unlike many other conservationists, those expressing such strongly value-laden views were unlikely to preface their remarks by sympathy for the farmers' interests.

In the case of chemicals, the central conflict appeared to be one of interests, between the conservationists' interest in encouraging wildlife and the farmers' interest in controlling pests, weeds and diseases to maintain an economic return from the crop. A minority of conservationists mentioned a shared interest in the use of pesticides to produce cheap food and save time weeding. The interest of some farmers in encouraging game and beneficial insects such as bees was also complementary to conservation interests, although in the case of game the conflict of values could remain. There were a few examples of more extensive differences in values: the farmers' faith in science and scientists as opposed to some conservationists' mistrust; a moral objection from one conservationist to the killing of any living thing; and a conservationists' remark about the finite nature of earth's resources in relation to fertiliser use. But the relative importance of conflicting interests for this issue, even within individual farmers in some cases (e.g. health concerns versus economic benefits), suggests this issue is likely to be amenable to resolution by economic means, whereas increased regulation might introduce elements of a conflict of value concerning freedom of individual action versus regulation.

The straw burning issue revealed a complex pattern of conflicting interests, plus some examples of conflicting values. The main conflict of interest was between arable farmers, for whom burning was a quick and cost-effective way of dealing with unwanted straw, and all other members of the community who had to cope with the resultant smuts. For conservationists this was generally of minor interest compared with their interest in wildlife, and most considered that straw burning only affected wildlife when it was carelessly done. In some ways the conflict of interest within the farming community, between arable and livestock farmers, was potentially more significant since to some extent a conflict of values was also involved, one group seeing straw

as a waste product and the other as a valued resource. This conflict could be contained so long as arable farmers appreciated the livestock farmers' point of view sufficiently to supply them with the straw they needed and prevent smouldering straw drifting across their buildings; this appreciation was probably helped by other interests and values which were shared as well as by effective channels of communication. For the same reasons, the conflict of interest within farming families between the farmer and farmer's wife about smuts would be minimal. There were some instances of conflicting values between arable farmers and conservationists. For example some conservationists viewed burning as a destructive act, whereas arable farmers, and one conservationist, saw it as a natural cleansing process. Many conservationists saw burning as a wasting of resources, although not necessarily in the more extreme worldview-type value-laden terms of finite resources.

For access, as with straw-burning, there were complex patterns of complementary and conflicting interests and values. The main conflict of interest was between RA and PS members' interest in walking across the countryside, and farmers' interest in preventing disturbance and damage to crops, livestock and game. Members of the RSPB and BHWT, groups which themselves managed land as nature reserves, were more likely to share the farmers' interest in restricting public access. However they were unlikely to share the farmers' values, in that they viewed people's role in relation to land as one of custodianship rather than ownership. In the case of members of the Ramblers Association, both interests and values were likely to conflict with the farmers, whereas with Preservation Societies it seemed that values were more likely to be shared so that compromise in the form of a rationalisation of the footpath network was possible.

There was thus few examples of shared interests between the farming and conservation community except over the issue of restricted access. There were however examples of complementary interests (for example, game and wildlife in the case of tree planting and pesticide use). Even in cases where interests coincided, conflicting values could prejudice consensus (for example, moral objections to shooting, land custodianship versus ownership).

There was a small minority of people in both the farming and conservation communities who, despite being fully exposed to the opinions of their colleagues, genuinely seemed to share the the dominant beliefs and values of the other group. An example in the farming community was the livestock farmer who said he preferred to see nettles rather than mown verges (Section 5.2.1), and in the conservation community the members of the Preservation Society (one interviewed as a member of the BHWT) whose views coincided with the dominant farming views on most issues, including pesticides.

However the majority of respondents appeared to fall in the category where both interests and values conflicted with the other group to varying

degrees. There were several examples of people with fundamental differences in values amounting to a difference in worldviews of the materialist/post-materialist type discussed in Section 2.2.1. It was among these that the greatest potential for open conflict seemed to exist. Examples were the farmers who felt strongly about the value of high productivity compared with the conservationists who felt resources ought to be conserved (mentioned in remarks about hedge removal, pesticide use and straw burning); those who felt strongly about landownership versus those who believed in stewardship (mentioned in connection with hedge removal, straw burning and access); and the farmers who expressed faith in science and technology to solve their problems versus those conservationists who expressed doubts (mentioned in connection with pesticide use and straw burning). Less frequent examples in the same category were values concerning the domination of nature by people versus harmony with all living things (mentioned in connection with hedge removal and pesticide use); values concerning law and order versus a more liberal system (access); and population control (access). Overlying the individual issues was the farmers' value-laden perception of conservation in general as a problem concerning individual freedom of action versus increased regulation.

In a few cases attitudes were dominated by values to an extent which made specific beliefs almost irrelevant:

I don't really know enough about it. I think I have basic moral feelings about it. (CV).

I don't really know that much about it but I do care about what's happening I suppose I'm basically concerned about the society we live in, in general. The countryside is one side of it. . . . My interest in nuclear power was first People that tend to be anti-nuclear power tend to be conservation-type people, so then you get on to other topics when you're talking to them, for instance general resources. (CV).

This last remark is an example of the formation of inter-related attitudes to a range of issues noted by Inglehart (1981) and Buss and Craik (1983) and mentioned in Section 2.2.1. It may explain why several farmers raised the subject of nuclear power and CND during the course of their interview; they tended to associate the two causes with the same people.

The difficulties in resolving conflicts based on gut feelings about the way the world should be were recognised by this RSPB member:

You can't obviously resolve everybody's disagreements because there are people on both sides who are extremely bigoted and people who hold strong opinions based on nothing more than what might be described as a gut feeling. They don't base it on any information or sound fact, they just simply hold that view. (RSPB).

The conservationists who seemed least likely to come into conflict with farmers were members of the PS, because they shared many of the farmers' values, and members of BNHS, because those interviewed did not seem to hold strongly value-laden views as far as wildlife and conservation were concerned. Conservationists whose values conflicted with the dominant farming values to varying extents were RA, RSPB and BHWT members. Groups within the two communities most likely to have diametrically opposed values were the arable farmers on the one hand and members of FoE and CV on the other.

This examination of the differences in attitudes of farmers and conservationists at the grassroots level has revealed a complex array of interactions with many foci for potential conflict. It provides support for the hypothesis (Section 1.5) that valuable insights, and pointers for conflict resolution, can be achieved by distinguishing between conflicts of interest and those of value. However a more quantitative approach is needed to indicate the generality of the various views expressed, the strength with which they are held, how they relate to one another, and to what extent they are reflected in actual behaviour. This is the purpose of the second survey, described in Part III.

From the description of the sustained drive for agricultural productivity in Section 1.2 and theories of the way in which values are inculcated (Section 2.2.1) it is not difficult to see how the dominant farming values have developed. The next chapter examines the social pressures revealed by the first survey and suggests how these values have been sustained in the face of shifting values in the wider community, accentuating differences to the point where value conflicts can occur. At the same time it suggests reasons why, despite considerable differences in attitudes among the two communities, open conflict between farmers and members of local conservation groups is rare.

Chapter 6

Results: social pressures

6.1 Introduction

As mentioned in the introduction to the previous chapter, conservationists' concerns centred on the loss of wildlife habitat so that when interviewed they tended to discuss the impact of specific farm practices on wildlife. Farmers on the other hand were more concerned about the threat of increased restrictions on farming as a result of public pressure, so that many of their remarks concerned conservation in general rather than being issue-based.

Most farmers expressed support for the idea of conservation in principle:

I think most farmers do—well, I know they do—have conservation at heart. (Arable and livestock farmer).

I think farmers appreciate that conservation is the right kind of thing.

I think the average farmer, all farming friends of mine, are all very, very concerned with the countryside on the whole. (Livestock farmer).

This last farmer's wife added:

They love the land, don't they, most of them. They're in it because it's the job they want to do . . . they love nature and they love growing things so they're not going to destroy their environment.

But they went on to discuss their main reservations: the changed nature of the rural community, the lack of understanding among outsiders of the farmer's point of view, and fears about outside (non-farming) interference in the way they ran their farms.

Paradoxically the conservation interviews showed that many conservationists had considerable sympathy for the farmers' point of view, as noted in the previous chapter, and that most felt themselves almost powerless to influence farmers' actions except indirectly by supporting their group.

6.2 Farmers and social pressures

Farmers repeatedly mentioned the changed nature of the rural community as the main cause of the conflict over conservation. Fewer and larger farms, high labour costs, increasing mechanisation and, on the other hand, more attractive jobs elsewhere meant few people living in the villages nowadays had any contact with, or understanding of, the farming industry the farmers said. Many of the comments were similar to those reported by Newby *et al.*, (1977) in East Anglia:

We find that the people who come out of the towns and buy up properties, they're the ones that make the fuss, they're the ones that moan about the burning, they know this is here when they buy but they only want the bit of the country that suits them.

The original village people were described as 'salt of the earth' and the newcomers as 'townies', 'Joe public', 'townspeople' and 'Londoners'. The special category of 'flat-capped townies' was accorded by one farmer to those who buy up former farm houses with a few acres to keep a couple of horses and lead 'the good life'. The ignorance of most townspeople, and by implication the village newcomers, about farming was often commented on.

The farmers realised that the changed nature of village communities meant the farmers now had little power or influence over the villagers, since they neither provided them with work nor were they any longer seen as essential to an adequate supply of food. Larger farms and fewer farms per parish meant that even though farmers still sat on, and often chaired, parish councils they were usually outnumbered by people without farming connections (cf. Self and Storing, 1962).

The overall impression from the farmer interviews was of little contact between farmers and the rest of the community:

Farmers stay very remote from everybody Most of my friends are involved in farming, and those that aren't have quite a lot to do with people that are.

On the other hand a few farms, particularly the bigger horticultural enterprises, continued to employ large numbers of people and some farmers took an active part in village life, serving as school governors, church wardens and parish councillors and allowing their land to be used for local events. One farmer described how he welcomed any opportunity to foster good relations with the village:

I buy my peace in a way. I'm always glad when some snow falls in winter because I can take the JCB through the village and clear the road and they all say 'Thank you', then when I take mud on the road they don't moan too much.

The generally diminished contact between farmers and the rest of the community served to heighten the potential for conflict in several ways. Only people who felt very strongly about conservation-related issues (such as those with strongly value-laden feelings, as described in the previous chapter) would approach the farmer directly, and these he would probably dismiss as cranks, or at least impractical idealists, and take as representative of conservationists as a whole:

I'm anti-*conservationists*. Most of them that I've come across that would call themselves staunch conservationists drive me nuts They all strike me as left wing fanatics, or maybe right wing fanatics, but fanatical.

I thought, he's got a grievance, let's sit and talk it out . . . but he saluted me with two fingers and didn't stay.

When people ring me up to complain, some people you can talk to, reason with, others you don't get a word in. They say what they want to say and won't listen.

I'm not saying all we do today is right and it couldn't be better, but it's very good to have ideals but we've got to stay in business.

Similarly, approaches by strongly anti-farming members of the public during farm open days were likely to reinforce the farmers' jaundiced view:

We had about three people [come up to us] all day and none of them wanted to talk to us, they just wanted to abuse us . . . we had one going off about shearing sheep, didn't know how we could be so cruel.

Other contact with the general public might be limited to those who cause damage while walking across farmland, as noted in Section 5.5.1.

The minimal direct contact with conservationists meant that most farmers formed their impression of conservation and conservationists through the media, where the message may be exaggerated as the conservationists' only means of making an impact on public opinion and government. Also, because media attention tends to focus on sites of national importance, the local farmer could dismiss the criticism as irrelevant in his case.

The farmers' overall impression was therefore of extreme conservationists, cranks and fanatics, and also of extreme farmers such as Hugh Bachelor (Parry, 1983), compared with whom they felt very conscientious about conservation. This strong perception among farmers of a lack of sympathy and understanding among the general public and conservationists partly explains why many of the farmers feared outside interference in the way their farms were run:

The wrong people are becoming involved in it; leave the countryside to the country people. (Livestock farmer).

I still think that no matter what public opinion is the majority of farmers have a better understanding and a better feel for what happens around them than the majority of people who complain about what they do. There's not much you wouldn't soon notice if something was awry.

Conservation was seen by some as the thin end of a wedge of restrictive controls:

I'd be surprised if you'd find many farmers that are against it [conservation] but I'd be surprised if you don't find a lot that are frightened of what will happen if a minority get control, who want straw burning banned completely and it goes from there, once they've got that under control they say 'right, we'll have another block of trees planted here, we'll have all these hedges planted ...'.

Some felt that by preserving or creating conservation areas on the farm they risked attracting conservationists' attention, resulting in restrictions on the future management of these areas:

I know farmers who would not allow naturalists onto their farm because they are aware that they have something of interest and value and are afraid that control over their own farming decisions will be taken out of their hands. (Arable and dairy farmer).

Tree Preservation orders were quoted as an example of one such restriction:

We have a Preservation Order on a little copse of trees. Now I'd never dream in a million years of taking that copse of trees out. It wasn't necessary. I don't want to be told to do that. I do it because I want to do it, not because somebody comes in waving a bit of paper, saying don't you dare touch that copse of trees. I like that copse of trees. (Arable and vegetable farmer).

For the same reason some farmers were simultaneously proud and yet cautious about showing areas of the farm which they felt would be of interest to conservationists and first asked for assurances that they would not be publicised.

Despite these generalised fears of outside interference and increased regulation few farmers seem to have experienced any direct conservation criticism or pressure. One farmer, asked if he felt there was now pressure on him not to remove hedges replied after a long pause:

That's a good one. Who should I feel pressure from? (Arable and vegetable farmer),

but at the same time he gave the impression that although legally there was nothing to prevent him removing a hedge which was in the way, some indefinite pressure was causing him to give it a good deal of thought first. Another farmer, the manager of a company farm where an environmental officer was employed to encourage conservation, acknowledged that a certain amount of pressure was necessary to get things done:

It's only human nature to do what you can get away with. You can have good intentions to do these things and you want a little bit of a push to keep you up to it.

Similarly, another farmer felt that public pressure was the only way of making large business concerns more conservation-minded:

When you start talking about business concerns then you start thinking about 5000 acres . . . I don't think you can expect them to have the same feel; anything they do towards conservation is only through public opinion and pressure.

Another felt he might have been influenced by public opinion to the extent that he at least had to pay lip-service to conservation:

Obviously I would say that conservation is a good thing; I'm not sure if I say that nowadays because the majority of public opinion says that conservation is a good thing and if you don't fall in line you get an even worse name as a farmer.

A few farmers were more exposed to criticism and so more aware of public opinion than most. These included those actively involved in the NFU committees, those with strong non-farming connections and those representing public companies such as London Brick. For example:

They've been at me for weeks over this bloody strawburning. My mother goes to the hairdresser, she's been moaned at. Father goes to the Rotary, we're being moaned at. Everywhere—go to the village shop you're moaned at. . . . We feel a beleaguered species sometimes. Not that it worries me unduly.

Some felt it was only common sense to heed public criticism:

It's plain good business not to antagonise the customer.

One is asking for trouble if one does not pay attention to these people who live in the village. We all have a right to live.

You can't work against public opinion for ever; you're forced to stop and take note of it sometime, as with straw burning.

But others felt the criticism was ill-informed and not worth listening to:

There is a small minority who wherever they lived and whatever you did would complain.

People come and say you've got the bull in that field and you shouldn't and all that sort of tripe but we just ignore it.

The problem is that some of their so-called facts don't rate listening to, even some of the national press.

Farmers felt the media were very influential over conservation issues, but that this influence affected the public's view of farmers, rather than the farmers' view of conservation:

The media is very unkind, both TV and the local press. Harvest Gold¹ some of it was wrong and some right. These sort of programmes make it worse for the farmer in his dealings with people.

It frightens me to see a programme like Harvest Gold on the television because I'm aware what a colourful medium in influencing public opinion the television is. I heard nothing else but Harvest Gold from other people working on the farm, and from people I met in the next few days 'You bloody farmers'

However, the farming press and farming programmes on television were looked on more favourably and could have a more direct influence on farmers' attitudes to conservation.

Pressure groups were viewed in much the same light as the media, acting indirectly on the farmer by stirring up public feeling:

Ninety five per cent of people don't care a jot about the country, they're totally urban Any pressure group stirs up a lot of noise and gets far more coverage in the press, in parliament, on TV and everywhere else.

Direct pressure on farmers to conserve from local conservation groups seemed to be non-existent, even though the RSPB has its national headquarters locally, at Sandy. The BHWT owns and manages several areas of farmland in the county, but neighbouring farmers did not sense any conservation pressure from the Trust's officers:

The people who actually run the reserve, who really know about it, understand our problems.

Members of the farmer's own family seemed to be one of the few possible sources of direct conservation influence:

¹ITV World in Action programme in 1983 which criticised farmers for ignoring conservation.

One of our sons is very interested in wildlife. (Livestock farmer).

My wife is extremely interested in plants, knows them all or just about all. She has classified all the wild plants and flowers on the farm.

We get more criticism from mother than from anyone else.

With tenant farmers, the views of the landlord might also be expected to have some influence:

My landlord has got views on conservation, again because he's a shooting man and he can afford it.

The NFU were seen by a committee member to be trying to influence farmers' attitude to conservation, because as he said they are:

...concerned that the political direction of farming will otherwise be forced on the industry and that they therefore better put their house in order.

When asked whether they had ever been given advice on conservation, or would consider asking for it, many farmers again said no. One said:

We've got one piece that I wouldn't mind doing something with, it's only very tiny, but I don't know what you'd do I wouldn't know who to go to ... ADAS I suppose. (Livestock farmer).

However, several spoke highly of the advice given by the County Council's Forestry Department in connection with their tree planting scheme, and one mentioned the Countryside Commission as a source of advice. Only one of the interviewed farmers lived in the County Council's New Agricultural Landscape's project area and had received advice from the project officer.

In general, despite their concern about outside interference, farmers felt their views and behaviour in relation to conservation were little affected by social pressures. Several remarks however suggested that social pressures within the farming community which reinforced entrenched farming values were far more significant. For example, one farmer mentioned the role of the agricultural representative and neighbouring farmers in encouraging increased chemical use:

You try to be as good as your neighbour. You get the ICI boys coming round saying 'Your crop isn't looking so well, you want to use more nitrogen'.

Another mentioned the teasing he got for leaving land fallow and using few inputs:

I grew some fairly good crops quite cheap ...I got a lot of leg-pulling over it...

There was a suggestion that the bank manager's influence could also be counter to conservation:

The bank manager doesn't thank you if you say 'I've made a bit of a loss this year but I've planted 75,000 trees'.

6.3 Conservationists and social pressures

The changed nature of rural communities, so central to the farmers' perception of the conservation issue, was scarcely mentioned by conservationists. When referred to, it was with quite the opposite emphasis, that of 'commuter' farming concerns:

There's no farming to speak of going on based in the village ...the land is belonging to an empire based elsewhere, and the tractors and lorries come in, do the work and go away. (PS).

The minimal opportunity for contact with farmers was also commented on:

There isn't even a local farm where you can go and buy the local Brussels sprouts. If you were associated with the farmers and with the food in some way then you'd associate not only with that but with the whole environment. (FoE).

This remark was accompanied by one about how much better it would be if communities were small and more self-sufficient, indicating a non-materialist worldview of the type described in Section 2.2.1. The same person commented about his farmer neighbour:

You can't get through to him because he's either in a helicopter or he's on a tractor with his earmuffs on.

The observation made by one farmer about the advantages of fostering good relations with the village was borne out by conservationists' comments:

He's actually planted a lot of trees. Mind you, he's also cut off a footpath but I waiving that for a little while—I think you have to weigh up the two things. (PS).

He's now planting little copses of trees in corners of fields and so on, and I think this is a very positive move. (FoE).

The reasons for the almost total lack of personal conservation pressures felt by most farmers became more apparent after the conservationists' survey. Most people felt powerless as individuals to influence farmers. This was partly because at the local level they found it difficult to pinpoint the causes of their concern:

...major alterations there are pressures which can be brought to bear, but it's this local removal of very small features which over a long period of time will have a lasting effect, a very big impact. It's so difficult to monitor. (RSPB).

It seems a bit of a cheek when you have to pay the farmer to plough up a nice place where you could have walked, and next day he's charging twice as much or getting a subsidy for something you don't want, which is even more aggravating. You try to bring it down to a local level, it's not so easy to identify, it gets hidden in the mists of facts and figures, and people get put off very easily. (BHWT).

Many felt the blame lay with national and international policies rather than with the individual farmer:

It's the system more than anything. How the hell can one fight the system? (BHWT).

Partly also it was the lack of opportunity for contact with farmers, a feeling of powerlessness and fear of being ridiculed which stopped people talking to individual farmers:

I feel as if there's not a great deal I can do personally. Whether to have a word with farmers locally, I don't know. I'm frightened what they might say. ...Not that they'd take any notice of me anyway. (CV).

There's not much you can do about it. If they take it into their heads to chop a hedge down you can't do anything about it. (BHWT).

I'm not that type of fanatic. There are people who'll go straight away and create one hell of a fuss but I'm not that sort of person. I'm pleased there are fanatics around ...those are the ones that end up helping achieve something probably. (RSPB).

A few had however had opportunities to discuss their concerns when farmers had been invited to talk at group meetings, but the importance of an approach sensitive to the farmer's pride, interests and values was recognised:

You have to be careful when you talk to people you don't try to be the 'I am right' attitude. You've got to be prepared to listen and talk and compromise. ... It's difficult sometimes, we tend to get a bit hot under the collar and say the farmers shouldn't do that, but you've got to listen to their point of view, otherwise they're not going to listen to yours. (RSPB).

They feel rather harrassed by the popular press and by TV as well and therefore they tend to go onto the defensive immediately you start to talk about conservation, but in fact when you get to know and talk to people, and really get to know what they believe and think, their ideas are not so far removed from the ideas that true conservationists may hold. (RSPB).

They have a pride in their knowledge of their home patch so if they do get information from somebody else they'll claim it was their own . . . they say 'Oh yes, that's been in the back of my mind for some time'. (CV).

Open criticism usually achieved little:

You can't argue with farmers, I've found that, they think they know the countryside better than anybody else does . . . which of course they don't. (BNHS).

A Conservation Volunteer felt that more could be achieved by encouragement and help than by criticism:

You can't expect the farmer to do it off his own bat, without help, because that's a bit unfair on the farmer because he's got other things to worry about and he needs an injection of enthusiasm . . . to get him moving in the right direction. (CV).

One or two people with close farming connections, either through family or work, had few qualms about contacting farmers directly. One Preservation Society member said, about a footpath matter, 'We get on the phone and say you really can't do this'.

Mostly, people did not attempt to influence farmers directly, but only indirectly through supporting the activities of their group. The members' comments showed how each group differed in its efforts to achieve a more conservation minded approach to land management.

Only the two smallest groups, the Conservation Volunteers and Friends of the Earth, encouraged direct action. The Conservation Volunteers' approach was supportive, carrying out conservation tasks on farms in response to requests from farmers. But as a small group they are not well known by local farmers. Friends of the Earth's approach was more confrontational:

First of all they ask them nicely not to do it, then if they carry on they have a demonstration . . . it gets in the local papers and they don't like it obviously. (FoE).

This FoE member had petitioned all his neighbours to write to the Department of the Environment and complain about frequent spraying of an adjacent field:

I put leaflets through people's doors asking them to report it to the Department of the Environment if they're spraying because I've just about had enough of it.

Friends of the Earth members were advised by their group where to direct their complaints for maximum effect, so channelling some of their frustration at individual powerlessness into effective action. Publicity and media

attention, used by FoE as a means of influencing others to influence farmers, ensured that most farmers had heard of FoE even though they dismissed them as fanatics.

Members of the BHWT promoted conservation by contributing money towards the purchase of land which was then managed for nature conservation, or the Trust might come to a management agreement with sympathetic landowners (another example of how, provided values coincide, conflicts of interest can be resolved by negotiation):

If we see a site that's very interesting in Bedfordshire, orchid sites and so on, we have a reserve and pay the farmer to manage it, he has the grazing and we pay him enough not to put spray on. (BHWT).

The BHWT were used by other groups to channel their views to the farming community because they felt the Trust had the closest contacts and the most practical knowledge:

The Beds. and Hunts. Naturalists Trust is one of the most important ones in the area because they actually do have areas which they look after. They are a very strong group. They've been going for some time, and also people respect them, they tend to have people who really know what they're talking about, who are not just people like me who care. (FoE).

You'll find that we're all related [the groups] and you'll find it difficult if you're trying to find out who does which . . . we rather leave the more professional touch to the Naturalists Trust . . . of course we work closely with each other over these matters or go to *each other for information*. (PS).

What we've decided to do this year is to write a short article for the Naturalists Trust magazine It won't get to the people concerned at this stage but it will probably prompt other people to pass it on . . . by bringing it to the notice of other groups, like the Naturalists Trust in particular. They do have contacts with the farming community and it may be that would have some effect. (RSPB).

Like BHWT members, members of the RSPB also supported conservation by contributing money towards the purchase of land for wildlife conservation, although the RSPB concentrate on nationally rather than locally important sites. The RSPB group leaders felt that whereas national RSPB had formerly ignored the contribution which local groups could make, they were beginning to be better appreciated now. Group leaders were being encouraged to promote the RSPB point of view and mobilise public support for changes at policy level:

Basically we cannot do anything other than attempt to educate, as a charity we're not allowed to have any political bias. Obviously we can talk to our MPs and our representatives on our local government but we have no power to take any action, we can only educate the people. (RSPB).

The BNHS was seen as a more academic society, its members being primarily interested in wildlife for its own sake. The distinction between the BNHS and the BHWT fits them neatly into the two categories of groups described by Wootton (1978), the first group being *of* and the other being *for*. In the terms used in this thesis, the members of BNHS might be described as united by their interests and of BHWT as united by values as well. For some members of the BNHS this interest inevitably led to an interest in promoting conservation, and membership of the BHWT as well, but the BNHS's own role was seen as providing scientific information for others rather than promoting conservation as such:

There are two completely different viewpoints, the Trust and the Natural History Society. The Trust is there to conserve what the Natural History Society finds, basically. The Natural History Society owns no property at all and doesn't manage any but is willing to give information about what's on property and how best to manage it. (BNHS).

The chairman of the Natural History Society confirmed this view, seeing the society's main aim as:

...providing, apart from providing pleasure for the members, sound scientific data on the fauna and flora of the county for the use of the Naturalists Trust or the County Council or the Nature Conservancy or anybody else who wants to use it. We have been and are pretty active in our recording and publishing our findings.

The Preservation Societies were generally more concerned with local planning issues rather than with the broader issues involved in farming and conservation:

It isn't normally us against the farmer, it's very often us and the farmer against the authority. (PS).

The one farming-related issue which did bring the Preservation Societies into conflict with farmers was footpaths, as the local arm of the Commons, Open Spaces and Footpaths Society.

The members of the PS tended to exert their influence by cultivating good relations with local government officers and the local press:

We found that local authorities, planning authorities, are all in favour of these preservation societies, it lends more power to the planners' elbow. (PS).

We're very friendly with their legal departments Also the local press are very good. I sometimes go in and say 'Please would you play this story as I would like it to be done'. Other times I would go in and say 'This is a bit of information, I suggest one of your reporters go and look at so and so, don't say we sent you and don't quote me'. (PS).

The local Ramblers Association groups appeared to lack any such influential links:

Unfortunately we have no representatives on any other committee as far as I am aware in this area I have . . . been asked to go to a particular parish meeting because they want to hear our views or they want to ask us some questions regarding footpaths or bridleways . . . but that is only one occasion. (RA).

The farming bias on some councils meant that even given this opportunity to air their views RA members felt the odds were often stacked against them. However the local groups did have regional representatives on the national Ramblers Association committee and some influence was exerted at this level:

We do work in collaboration with the Countryside Commission. We put our views to them, we go and discuss things with them in committee, I'm talking nationally now, and we get their views on things, and if there are one or two things we're not very happy about we will try and resolve it. The Countryside Commission has promoted a number of long distance footpaths and is going to promote some more. (RA).

Although most conservationists felt powerless to influence farmers except indirectly by supporting their groups, the reverse influence, that of the farmers on conservationists, was obvious from the sympathy expressed by many for the farmers' point of view. The powerful influence of the media on the conservationists' views, remarked on by farmers, was confirmed by conservationists:

We watch all the wildlife programmes and it's amazing, you never get to the end of a programme without some pessimistic point of view coming over. (RSPB).

It must be about eight or ten years ago the media started showing more and more wildlife programmes and I think that has brought wildlife into everybody's home . . . I think it had a tremendous impact on societies . . . all . . . suddenly had a boom in membership . . . definitely media has had a big impact on people. (BNHS).

6.4 Discussion

The farmers' strong feeling of being a persecuted and misunderstood minority, as indicated also by Newby *et al.* (1978) in their survey of East Anglian farmers, contrasted strangely with the sympathy for farmers expressed by many conservationists (and also shown by a recent public opinion poll - MORI, 1983) and the powerlessness felt by others.

At the same time, the farmers seemed unaware of the strength of local feeling about certain farm practices except concerning straw burning; in particular they seemed unaware that their pesticide use was a conservation issue. Values forcibly expressed by many farmers, especially those concerning freedom from regulation, land ownership, and efficient (tidy and productive) farming, were likely to be in direct conflict with conservationist values concerning stewardship and wilderness, and yet open conflict seemed rare.

The data suggest two possible reasons for the lack of open conflict. The first is the apparent isolation of the farming community, or as Stern (1980) has termed it in a different context, its 'impermeability'. The only conservationists who appear able to penetrate the farming community's barrier are those with close farming ties and who share farming interests and values (e.g. some PS members), or those whose interests and values conflict so strongly that they are prepared to confront the farmer (e.g. some FoE members). Neither group seem likely to make much impact on farmers' attitudes or behaviour. Apart from being few in number, the first group share farming interests and values too closely and the second have such different values that they are dismissed as cranks. The resulting insulation of the farming community from other points of view means that entrenched farming values are likely to be continually reinforced by norms within the farming community.

The other possible reason for the lack of open conflict at local level is that the majority of conservationists, with few opportunities for direct contact with farmers and realising that farmers are only doing what is in their economic interest, direct their efforts at a higher level. By supporting their group's activities, donating money, writing to the media and MPs and attempting to promote their views widely among the general public, they aim to influence farmers' behaviour indirectly by achieving policy changes.

A further possibility is that the qualitative data give a misleading impression. Because the two samples were not completely random, and because there is a tendency to select the more vivid remarks to quote, the impression of considerable differences of opinion may be more apparent than real, being in fact restricted to a relatively small proportion of the two populations.

6.5 Implications for the second survey

The data from the qualitative survey support the hypothesis that differences in values play a significant part in the conflicting attitudes of farmers and conservationists. However the second, quantitative survey is needed to examine the extent of these differences, to determine how widely the views expressed are shared by other members of the two communities and to investigate how well attitudes corresponded with actual behaviour.

The quantitative survey is also needed to examine the reasons for the lack of open conflict, in particular the apparent isolation of the farming community and the social pressures to which the farmers respond.

For these purposes, the quantitative approach initially suggested, based on the theory of reasoned action (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980), still seemed the most appropriate, for the reasons already given (Section 1.5). However the first survey led to some doubt about whether the models' component *e* (evaluation) would allow differentiation between powerful values of the materialist/non-materialist type (ideals) and the less intense 'good/bad for me personally' type. It was therefore decided to add a 'worldview' section to the questionnaire (Appendix C, p. 22), using an abbreviated list of the items used by Cotgrove (1982, p. 129-131). Direct questions were also added to check the extent of contact between farmers and conservationists (Appendix C, p. 24; Appendix D, p. 2). Further questions about personal variables were added to describe the sample and allow comparison with other surveys.

On the basis of the results of the first survey, the number of groups to be interviewed in the second survey was reduced to three. These were the RSPB, BHWT and FoE. The RSPB and BHWT were chosen because their members were amongst those most centrally concerned with nature conservation. While FoE members' interests extended more widely to encompass resource conservation in general, FoE was included as an example of the more recent, radical, environmental groups distinguished by Cotgrove (1982) and Lowe (1983, p. 347), since their members seemed most likely to highlight differences in value systems between farmers and conservationists. Those members of the BNHS and CV who were particularly interested in conservation were also likely to be members of the BHWT, so that their views were covered in this way. Members of the PS and RA were excluded because their main interest lay in local planning issues and access, respectively, rather than conservation.

The number of specific conservation-related issues to be covered by the second survey was also reduced to three: hedge removal, pesticide use and straw burning. These were chosen because in the first survey both farmers and conservationists frequently mentioned hedges; conservationists had

strong views on pesticides; and farmers felt strongly about straw burning. Although strong views were also expressed by farmers about footpaths, this issue was not included in the final survey as it was not so central to the generally accepted view of conservation and, unlike straw burning, was not of immediate topical interest at the time. A section on conservation in general was included because some of the attitudinal statements made in the first survey did not relate to specific practices.

Although the issue of access was not included in the second survey, the strong feelings it aroused among farmers may impinge considerably on their feelings about conservation in general. Footpaths are also significant because they are one of the few features which physically brings the two communities into contact with one another, so increasing the opportunity for open conflict. A clear policy on access and footpaths, reached by negotiation with all interested parties, needs to be established. Discussions would need to give particular consideration to changed needs, and implicit values about property rights. Some form of overall rationalisation (but not necessarily a reduction) is needed, with compensation for individuals who lose out for the benefit of society as a whole. Farmers might be paid an annual maintenance grant, or receive a tax concession in lieu, if footpaths were properly maintained and way-marked. More radical solutions might include a form of set-aside, with a wide path left round every 10 hectare block of land, which would also serve as a barrier during straw-burning and as a refuge for some forms of wildlife.

Part III
Second Survey

Chapter 7

Organisation of second survey

7.1 Introduction

The qualitative survey was followed up by a larger questionnaire-based survey. Whilst the unstructured interviews of the first survey had provided a vivid insight into individual attitudes, they had several important limitations. Since no two interviews were alike, none was directly comparable with any other. It could not be assumed because respondents did not express an opinion about some topics that the subjects were irrelevant to them, so that conclusions about the proportion of people who held the same view could only be tentative and subjective. And in conversational interviews about people's feelings, questions to obtain straightforward background information about things such as age or educational level could disturb the necessary rapport. The limitations of qualitative surveys, but also their great value in providing a sound basis for more quantitative surveys, is fully discussed in *Social and Community Planning Research* (1972).

The results from the descriptive survey were therefore used as the basis of the questionnaire for a larger follow-up survey. The purpose of this was to find out how representative were the views expressed in the earlier survey and to examine in greater depth its main findings, in particular the apparent lack of communication between conservationists and farmers and the differences in their values, worldviews and conception of conservation-related behaviour.

A review of the literature on more quantitative approaches to studying attitudes (Section 3.2.2) had initially suggested that the Fishbein-Ajzen model could provide an appropriate quantitative framework. This had been kept in mind during the unstructured interviews and subsequent analysis, with the proviso that another approach should be sought if it seemed inadequate. However most remarks, whether spontaneous or prompted, could readily be categorised into the various components of the model, namely: behaviour, behavioural intention, attitude, belief, value, subjective norm,

normative beliefs and motivation to comply. The use of these categories helped provide a means of ordering the information from conversations which were individually very different. Doubts about the model related more to previous criticisms of its precise method of use in practice (see Section 3.2.2 and below), rather than to its theoretical validity.

It was therefore decided to use the model for the main framework of the questionnaire as originally planned, but to include additional questions both as a check on the model's reliability and to provide further information. As is usually the case, it was necessary to make some minor modifications to the model as specified in theory, in order to suit the practical circumstances of the survey. Attention is drawn to these modifications where they occur. They can be justified because the main interest of the survey was not to test the model's predictive powers but to provide as full an understanding of attitudes, behaviour and social norms as possible; moreover there is still some controversy over how the measures should be used and whether they are all necessary (see, for example, Kantola *et al.*, 1982; Tait, 1979; Tait and Fraser, 1983; Towriss, 1984).

The final questionnaires, slightly different for farmers and conservationists, are shown in Appendices C and D. Their construction is discussed below.

7.2 Questionnaire construction

7.2.1 Variables for the Fishbein-Ajzen model

The Fishbein-Ajzen model provided the basis for four sections of the questionnaire: those on conservation in general, hedge removal, pesticide use and straw burning. As mentioned at the end of Chapter 6, these last three issues were selected as the ones about which people felt most strongly; public access was excluded because it was not so central to the generally accepted view of conservation and, unlike straw burning, was not of immediate topical interest at the time. A section on conservation in general was included because some of the attitudinal statements made in the first survey did not relate to specific practices.

Full use of the model requires, for each behaviour of interest, measures of actual behaviour (B), behavioural intention (BI), beliefs about the outcomes of the behaviour (b_i), evaluation of each outcome (e_i), beliefs about the expectations of others regarding the behaviour (b_j) and motivation to comply with those expectations (m_j). In testing the predictive power of the model it is also necessary to include an overall attitude measure (A). The way in which these measures relate to each other in Fishbein and Ajzen's model of reasoned action has been shown in Equations 3.1, 3.2 and

3.3 (Section 3.2.2).

Behaviour and behavioural intention

The behavioural measures used can be found in the farmer questionnaire (Appendix C) on pages 5-7 (for hedges and trees), 10-12 (for pesticide use) and 15-16 (for straw burning).

The predictive power of the model is highest when the measures of behaviour and behavioural intention correspond closely to the attitude and subjective norm measures in specificity and context (Ajzen and Fishbein, 1977). For hedges, since most remarks concerned hedge *removal*, this seemed the obvious behavioural measure to use. However, although some farmers may still intend to remove hedges, generally it is a once and for all behaviour, so that lack of intention to remove hedges will not necessarily be an indication of an attitude sympathetic to conservation. Similarly the extent of previous hedge removal or the complete absence of hedges on the farm is not necessarily an indication of present attitude; the hedges may have been removed by a previous owner, the farmer may now regret past removal and have a changed attitude, or the farm may never have been enclosed in the first place.

In circumstances such as these, Ajzen and Fishbein (1980, p. 31) suggest the use of a number of behavioural categories, which can be used collectively to form a behavioural index. So in the case of hedges, farmers were asked a group of questions about hedge removal behaviour. These included: past removal, intention to remove and intention to plant hedges. A further group concerned hedge management behaviour, including questions about hedge height and shape. While each behaviour taken alone might not be a good indication of attitude to hedge removal or maintenance, taken collectively a greater number of sympathetic hedge management practices is likely to indicate a more favourable attitude to conserving hedges.

The behavioural questions therefore were not restricted to a single measure of behavioural intention, and included a mixture of past and habitual behaviours as well as intended ones. Both Triandis (1977) and Wittenbraker and Gibbs (1983) have suggested that in some circumstances habit can be a better predictor of behaviour than intention, although Fishbein and Ajzen (1975) dismissed the role of habit in decisions about behaviour as of significance only in trivial decisions. The range of behavioural questions provided information which was of interest in its own right, and if necessary the index could be restricted to the most appropriate measures for the purposes of the model at the stage of data analysis.

The scoring system for the hedge behavioural items was based on the conservation practices recommended by such organisations as ADAS (1986),

CC (1980), FWAG (1983), NCC (1979) and RSPB (1986) in such a way that a high score denoted a more conservation-minded behaviour. Thus for the item about hedge height, those who kept all their hedges below 4'6" scored 0, those who allowed some to grow taller scored 1 and those whose hedges were all above 4'6" scored 2. Higher scores were also given for those who cut their hedges less frequently than every year, cut them to an A shape or layered them, avoided cutting them in the spring and summer, had removed fewest hedges in the past, had not removed boundary hedges and had planted or intended to plant new hedges.

Because several farmers mentioned that tree planting could compensate for hedge removal, considering it to be an alternative conservation-minded behaviour to maintaining hedges, questions about tree planting were included in the hedge behaviour section. The Fishbein and Ajzen model has been criticised for its lack of consideration of behavioural alternatives (e.g. by Jaccard, 1981); decisions about behaviour often involve choosing between alternative behaviours rather than whether to perform a particular behaviour or not.

For pesticides, the behavioural questions concerned farmers' herbicide, fungicide and insecticide use. Because of the number of topics covered by the questionnaire, the questions were restricted to those pesticides used on the three main crops on the farm. Full use of the model requires measures of both behavioural intention and actual behaviour. In practice, a repeat survey to obtain both measures was beyond the scope and time scale of this project; pesticide use over the previous season was therefore chosen as the more reliable measure. It was intended to use this information to provide a standardised score of pesticide use for each farmer (Tait, 1977) but, again because of the scope of the questionnaire, it was not possible to collect the detailed information necessary or to fulfill all the necessary conditions (such as that all farmers should be likely to experience similar pest pressures). A simpler indicator, allowing comparison between farmers of the number of spray rounds of herbicides, fungicides and insecticides used on each crop, was therefore used in this study. For each type of spray used, one spray round was taken to be the recommended rate used once on the entire crop. If the rate was more or less than recommended the spray round figure was adjusted accordingly. It was similarly adjusted if not all the crop was sprayed. Headlands were taken to be 10% of the crop area, so if the crop was sprayed once at the recommended rate leaving the headlands unsprayed, the spray round figure would be 0.9. Slug pellets, seed dressings and straw shorteners were excluded from the analysis since they were mentioned by only a few farmers. Scores for herbicide, fungicide and insecticide use were summed to give a behavioural index of total pesticide use for each main crop.

For straw disposal, as with the other two issues, no single measure could be taken to indicate conservation behaviour. Again a number of questions about straw disposal behaviour, based on remarks from the earlier survey, were asked with the intention of using them collectively as a conservation index. Farmers were asked about the proportion of wheat and barley straw they burnt, baled and incorporated. They were also asked if they had ever had accidents while burning, and questions about soil type because this affects the ease with which incorporation can be carried out.

The section on conservation in general did not include behavioural questions, since appropriate behaviours could be expected to vary according to each farmer's understanding of the word conservation.

The remarks of both farmers and conservationists were taken into consideration in constructing the behavioural indices for the questionnaire, in order to explore behaviour as fully as possible.

The behavioural measurements relied on the farmers' own reported behaviour. It is possible that this could lead to the under-estimation of some items, such as the proportion of hedge removed if this was perceived to be a socially undesirable behaviour (although in practice it did not seem to be). The self-reports of pesticide use were generally based on written records and so can be considered more reliable. Although direct measures of behaviour are obviously preferable, in this case they were not possible because of the infrequent and spasmodic occurrence of the behaviours concerned and the dispersed nature of the community. Farmers might also have been less cooperative if they had felt their behaviour was being checked.

The behavioural questions were asked before the attitudinal questions to reduce the risk of respondents tailoring their reported behaviour to be consistent with their attitude answers.

Beliefs and their evaluation

The belief measures used can be found in the farmer questionnaire (Appendix C) on page 2 (for conservation in general), page 8 (for hedge removal), page 13 (for pesticide use) and pages 17–18 (for straw disposal).

The lists of beliefs about the outcomes of each behaviour included all such remarks mentioned in the first survey by more than one person. As far as possible the items were couched in the respondents' own terms, but in as brief and unambiguous a form as possible.

In general, the minimum of change was required to adapt the remarks to the form required by the model, that is, as outcomes of the relevant behaviour. For example, the outcome 'shades the crop and weakens it' about keeping hedges was derived from the remark 'The shadow draws the crop up and it's inclined to grow weak and lie down' (referred to in Section 5.2.1).

However four types of statements caused problems. Prescriptive statements, such as 'The public should pay for conservation', could not be re-phrased to suit the model, although they did express an opinion. Not all opinion statements were about outcomes, e.g. 'Straw burning is selfish'. Some opinion statements seemed to be used as counter-arguments rather than as beliefs affecting behaviour, e.g. 'The use of pesticides keeps thousands of chemical workers in jobs'. Also the re-phrasing of positive statements about alternative behaviours as negative statements about the main behaviour of interest, in order to minimise the number of behavioural sections in the questionnaire, was not always possible. Negative statements cannot always be assumed to have a single positive version with precisely the opposite meaning, but for practical reasons of questionnaire length it was only possible to include each statement in one form. Thus most hedge remarks, whether they referred to removing or keeping hedges, were re-phrased and accommodated under the one heading 'Removing hedges ...'. But a few statements only made sense in relation to the opposite behaviour, 'Keeping hedges ...'. Similarly, remarks had to be grouped under two headings in the straw section, since although the principal behaviour being considered was straw burning, many of the remarks about burning concerned the disadvantages of an alternative behaviour, straw incorporation. These remarks would not have had the same significance had their meaning been reversed and added to the list of advantages to straw burning. Again this points to a weakness in the theory of reasoned action in not considering decisions which involve a choice among alternative behaviours.

On the subject of the number of belief statements included in each list, Ajzen and Fishbein (1980, p. 63) suggest that although an individual may have many different beliefs about a topic, only a relatively small number affect attitude at any one time. Ajzen and Fishbein call these the 'salient beliefs' and suggest there are unlikely to be more than nine. Theoretically their model implies that the salient beliefs should be elicited separately for each respondent, and this approach has been tried (e.g. Towriss, 1984). But it is a time-consuming practice, and as a compromise Ajzen and Fishbein recommend the use of the ten or twelve most commonly occurring beliefs, termed the 'modal' salient beliefs.

When groups have conflicting attitudes, the salient beliefs and constructs for each group may be mutually exclusive. This has been found in the case of the attitudes of pro- and anti- groups to nuclear power (Eiser and van der Pligt, 1979) and in an examination of conflict between psychotherapists and their patients (Slater, 1981). Although this suggests the use of separate sets of modally salient beliefs for farmers and conservationists, no more than nine items long, this seemed to risk losing much valuable information. For example, the farmers' response to conservationists' beliefs might suggest

whether attempts to alter belief salience could prove worthwhile. Also it cannot be assumed that all farmers and conservationists have conflicting attitudes; the extent of overlap is of interest. So it was decided both farmer and conservationist questionnaires should include a complete list of beliefs, with farmer and conservationist beliefs intermingled so that they could not be readily identified as the views of the 'opposition'. However as a check on the role of individually salient beliefs in determining behaviour, respondents were also asked to tick the three beliefs most relevant to them in each list.

A five-point scale, from very unlikely (-2) to very likely (+2), was chosen for measuring belief strength. Although seven-point scales are often used, this would have involved extra time and effort for the respondent with no guarantee of improved precision. Belief statements were dogmatic, for example, removing hedges 'reduces local wildlife' rather than 'can/may reduce local wildlife', in order to encourage respondents to make full use of the five points on the scale.

For belief evaluation, each belief statement was then re-phrased in an evaluative form, for example 'reduces local wildlife' was re-phrased as 'reducing local wildlife is ...', and respondents asked to score it again on a five-point scale from very bad (-2) to very good (+2). The belief evaluation measures can be found in the farmer questionnaire (Appendix C) on page 3 (for conservation in general), page 9 (for hedges), page 14 (for pesticide use) and page 19 (for straw disposal).

Subjective norm

The measures of subjective norm can be found on pages 20–21 of the farmer questionnaire (Appendix C).

Groups of people or individuals who were mentioned in connection with any of the principal behaviours during the first survey guided the list of salient referents for this part of the model. The list included such groups as ADAS and the County Council. Although none of the conservation groups had been mentioned by farmers in the first survey, it was hard to believe that conservation groups had so little direct influence on farmers, so they were included in the list to check this.

For each referent, respondents were asked how likely they were to act on the referent's opinion (their motivation to comply, m_j) on a three-point scale from unlikely (0) to very likely (+2). As suggested by Tait (1979) and Kantola *et al.* (1982, p. 77) negative scores were omitted from the scale since they imply a determination to do the opposite of what an influential referent wants, an illogical and 'bloody-minded' response that would only be likely in cases of severe conflict with an important referent, such as that of rebellious teenagers with their parents.

To determine farmers' beliefs or perceptions of how referent groups expected them to behave (normative beliefs, b_j) they were asked how likely it was on a five-point scale from very unlikely (-2) to very likely (+2) that the referent thought farmers should: not remove hedges, plant more trees, reduce their pesticide use, and not burn straw. The negative statements were cumbersome but unavoidable. Because the questionnaires were personally administered, misunderstandings were avoided.

7.2.2 Additional variables

Worldview

One advantage of the Fishbein-Ajzen model for this research into the underlying reasons for the conflict is that it is explicit in its distinction between beliefs and values. Even so, it is generally used to measure values in a fairly trivial sense, rather than all-encompassing worldview-type or moral values. In theory it should be possible to examine a hierarchy of attitudes and values (such as described in Gray, 1985, p. 125) using the model, by altering the level of specificity of the behaviour. For example, questions about 'conservation in general' are likely to elicit more deeply held values than specific questions about the practicalities of removing hedges. However this approach to using the model has not been tested, and relatively few worldview-type statements were elicited during the pilot survey, so it was decided instead to explore the relation between worldview-type values and conservation attitudes and behaviour more fully by adapting the well-tested list of worldview measures used by Cotgrove (1982). These are contained in the section of the questionnaire headed 'General outlook' on page 22 of the farmer questionnaire (Appendix C).

Farm and farmer variables

The Ajzen and Fishbein model attempts to explain behaviour by measuring the minimum of variables. Ajzen and Fishbein (1980, p. 82-86) argue that other variables such as age and education are mediated through beliefs, values and social norms and so do not need to be considered separately.

However in this survey the aim was to provide as much information about factors contributing to attitudes and behaviour as possible. On the basis of remarks made in the earlier survey, and to provide comparability with the agricultural census and previous attitude surveys, additional questions were therefore asked on: farm size and type, number of employees, form of farm ownership, membership of conservation and other groups, interest in shooting, extent of dependence on the farm for a living, links with the non-farming community, age, education and upbringing. These questions

can be found on pages 1 and 23–24 of the farmer questionnaire (Appendix C).

7.3 The conservationist questionnaire

The basic questionnaire was modified slightly for the conservationist survey (Appendix D). Behavioural questions about conservation on farms were omitted, since few conservationists were expected to be in a position to take farming decisions. Ajzen and Fishbein (1980) do not consider such situations, although their model has been used by others to study attitudes in other circumstances where respondents were virtually powerless to translate their attitudes into action, in studies of attitudes to nuclear power (Eiser and van der Pligt, 1979; Thomas *et al.*, 1980). The extent of active involvement in measures to promote conservation among farmers seemed to be the closest approximation to behaviour corresponding to the attitudes being measured. A list of such actions, mostly indirect such as writing letters to the press or fund-raising, was therefore drawn up for the questionnaire from remarks made in the earlier survey. Membership of conservation groups was itself seen as a behavioural measure of this type. These questions might reveal the extent to which people felt they could influence farmers, even if not strictly speaking fulfilling the requirements of the full model.

For the same reasons, the subjective norm measure for conservationists referred to referent groups or individuals who influenced their attitudes to farmers' behaviour rather than influences on their own behaviour. Previous studies where respondents were not in a position to act have used only the attitudinal part of the model and ignored the measures of subjective norm and behaviour.

One or two belief statements were slightly re-phrased in the conservationist questionnaire to make them more relevant, for example 'Conservation on the farm makes it a nicer place to live and work' was changed to 'Conservation on the farm makes the countryside a nicer place to live in and visit'. A group of more technical beliefs about straw disposal were omitted, since they were thought unlikely to be salient to conservationists; however one or two were left in to check that this was so. Questions on farm size and type were omitted but questions to examine the extent of involvement in farming were added (Appendix D, p. 2).

Since shooting seemed to be an important factor in many farmers' interest in conservation, but was also counter to many conservationists' ideals, a question was added on the extent to which people were prepared to tolerate shooting if it encouraged conservation on farms.

7.4 Farmer sample

The questionnaire-based interviews were conducted between February and April in 1985. A random sample was selected from the Bedfordshire and Huntingdonshire NFU membership list, omitting members with addresses outside Bedfordshire and holdings smaller than 20 ha. Those listed as partners were also left out since in the previous survey they had all turned out to be non-farming partners. Because the membership list did not include accurate information on farm type it was decided not to attempt to include a particular proportion of livestock, cereal, mixed and horticultural holdings.

As in the earlier survey, respondents were first contacted by letter, followed by a phone call to arrange an appointment. The questionnaires were personally administered, and answers tape-recorded to pick up any difficulties with questionnaire wording and extra information volunteered.

A total of 49 farmers completed the questionnaire, a response rate of 77%. Between them they were responsible for 9952 ha, 10.7% of Bedfordshire's farmland (MAFF *et al.*, 1986). Individual farm sizes ranged from the chosen base of 20 ha up to 760 ha. By comparison with MAFF census figures for Bedfordshire in 1985 (MAFF *et al.*, 1986) it can be seen that smaller farms were under-represented in the sample (Table 7.1). It is possible that small farms were also under-represented in the list of NFU members from which the sample was taken, and that more of the non-respondents were smaller farmers with little time to spare for surveys. Since it is the larger farms which make the biggest impact in conservation terms, and the trend is towards the amalgamation of smaller farms by larger units (HMSO, 1979, p. 40), this bias in the sample, once recognised, was not considered important.

The farms in the sample were mainly arable, very few falling into the other categories of horticulture and field crops, dairying, cattle and sheep, or mixed cropping and livestock as defined in the EC typology for agricultural holdings (Official Journal of the European Communities, 1984). From a comparison with MAFF census data, horticultural and cattle and sheep farms were under-represented in the sample, and cereal and dairy farms over-represented (Table 7.2). However the census data includes all farms over 6 ha and these smaller farms, not included in the survey, are likely to be predominantly horticultural or livestock holdings. Horticultural and sheep farmers also accounted for most of the non-respondents, because the survey was done at a busy time of year for these farm types.

The proportion of owner and tenant farmers in the sample is shown in Table 7.3. Three of those interviewed (6%) were farm managers, one for a family estate and the other two for institutional landowners. Given the blurred divisions between the many different forms of ownership, the sample probably reflects the pattern in the county as a whole reasonably well.

Table 7.1 *Percentage of farms in each size category for the survey sample compared with Bedfordshire as a whole (1985)*

| | Farm survey | MAFF census |
|-----------------|----------------|----------------|
| 20-99.9 ha | 41 | 63 |
| 100-299.9 ha | 41 | 29 |
| 300 ha and over | 18 | 8 |

Table 7.2 *Percentage of farms in each type category for the survey sample compared with Bedfordshire as a whole (1985)†*

| | Farm survey | MAFF census |
|---------------------------|----------------|----------------|
| Mainly cereals | 47 | } 53 |
| Cereals and field crops | 33 | |
| Hort. and field crops | 4 | 19 |
| Mainly dairying | 6 | 3 |
| Mainly cattle and sheep | 2 | 8 |
| Mixed crops and livestock | 8 | - |
| Unclassified | - | 9 |

† The MAFF figures include all holdings of 6 ha and over whereas the survey was restricted to 20 ha and over.

Table 7.3 *Percentage of farmers in each ownership category for the survey sample compared with Bedfordshire as a whole (1985)*

| | Farm survey | MAFF census |
|--------------------------|----------------|----------------|
| Owners | 37 | 47 |
| Tenants | 24 | 24 |
| Part owners/part tenants | 33 | 29 |
| Managers | 6 | - |

The majority of the farmers interviewed (63%) were in their 40s and 50s; 18% were in their 30s, 6% under 20 and 12% over 60. Most (83%) had left school at 16 or younger. Only two had degrees, one an HND, five a national diploma, eight a national certificate and one a City and Guild qualification. Most (71%) had been brought up on a farm. Four of those interviewed were women, three farming in their own right and one in partnership with her husband.

A large proportion of the sample had an interest in shooting, either being shots themselves (53%) or letting or giving the shoot on the farm (25%). This total of 78% corresponds closely with the 80% shown by Piddington's survey for 1971-76 in the Eastern region, being much higher than that in other regions of the country (Piddington, 1981, p. 33).

All the farmers were NFU members, the sample having been selected from their membership list, except one farm manager whose employer was the member; 20% were also NFU committee members. A third (33%) were members of CLA (plus the employers of two of the farm managers) and 14% belonged to the Game Conservancy (plus one manager's employer).

Few of the farmers belonged to any of the conservation organisations. Only one was involved with FWAG as a committee member, although a manager's employer formerly had been; at the time Bedfordshire FWAG did not have associate members. There were three RSPB members, two BHNT members (one belonging to both organisations), one contributor to WWF and one manager's employer was a member of RURAL; one or two had close family who were members of some of these organisations. None was a member of BNHS, the preservation societies, FoE, Greenpeace or the Soil Association, although one or two mentioned that they sympathised with the aims of some of these groups.

7.5 Conservationist sample

The conservationist interviews were conducted between April and July in 1985. On the basis of the earlier survey the number of conservation groups was reduced to a more manageable three, the BHWT, RSPB and FoE, for reasons discussed in Section 6.5.

A total of 50 people was interviewed, 20 each from BHWT and RSPB, and 10 from FoE as the smallest group. Members of the BHWT were randomly selected from the membership list, excluding addresses outside Bedfordshire. Those of FoE were randomly selected from the Bedfordshire list of national FoE members. Those of the RSPB were randomly selected from the Bedfordshire list of national RSPB, but because the RSPB was keen to respect its members' privacy, the initial approach to members was made

by the RSPB who then passed on the names of people who agreed to be interviewed.

The response rate for the BHWT was 71%, including replacements for two elderly people who felt unable to finish the questionnaire. Several people on the FoE list had either moved or were away at college; the response rate for those still living in the county was 100%. The exact response rate for the RSPB was uncertain, since some names were eliminated by the RSPB. If these were assumed to be four, from the gaps on the RSPB typed list, then the final response rate was 69% since four more people subsequently said no and one could not be contacted.

The sample showed considerable overlap in membership between groups, 46% being members of more than one group. Members of BHWT were most likely to have multiple memberships, 70% supporting at least one other organisation—mainly RSPB or WWF. Fifty percent of the FoE sample also supported other groups—again mainly RSPB or WWF. There was less multiple membership among the RSPB sample (20%). Bull (1986, p. 51) in a study of local naturalists trusts that included BHWT also showed that reciprocal membership between trust members and the RSPB was particularly likely, but that few trust members had links with the more radical conservation groups such as FoE. In this survey none of those sampled as members of RSPB or BHWT was a member of FoE, although three out of ten in the FoE sample were members of either RSPB, BHWT or both, so that Bull's finding may be a reflection of the much smaller membership numbers of FoE compared with the other two organisations.

A surprisingly high proportion of the conservationist sample (40%) had close family relatives who farmed; one of the sample was a retired farmer and two were former growers, one still being an NFU committee member. Sixty eight percent had farming friends and only 18% of the sample had never worked or stayed on a farm. It is possible that those with farming links were more likely to agree to take part in the survey, but given the relatively high response rates this seems at most only a partial explanation of the strong farming connections of many in the conservationist sample.

Only about one fifth of the sample (22%) came from Bedfordshire's larger towns (population over 10 000, Table 7.4).

The age spread of the conservationist sample was more evenly distributed than that of the farmer sample. Only 6% of the sample were under 30 but the remaining decades to 70 were fairly evenly represented (30–39 14%, 40–49 9%, 50–59 13% and 60–70 11%).

Those in the conservationist sample were more highly educated than the farmers. Although 32% had left school at 16 or under, 28% had a degree or higher qualification, a further 10% had begun degree courses, 4% had an HND, 12% a college diploma, 4% an HNC and 4% a City and Guild

Table 7.4 *Percentage of conservation sample living in towns and villages*

| | |
|------------------|----|
| Open countryside | 8 |
| Population <1000 | 12 |
| 1000-3000 | 30 |
| 3000-8000 | 12 |
| 8000-10 000 | 16 |
| >10 000 | 22 |

Table 7.5 *Number of conservationists opposed to shooting*

| | BHWT N=20 | RSPB N=20 | FoE N=10 | Total (%) |
|---------------------------------------|--------------|--------------|-------------|--------------|
| Against shooting | 4 | 1 | 5 | 20 |
| Accept shooting for pest control only | 3 | 2 | 0 | 10 |
| Accept it for conservation | 8 | 8 | 3 | 38 |
| Neither for nor against | 2 | 6 | 2 | 20 |
| In favour of shooting | 3 | 3 | 0 | 12 |

qualification.

The sample consisted of almost equal numbers of men and women (23 men, 27 women). Where the membership was a family one, the person most involved elected to respond. Although no direct question was asked about occupation, many of those who offered the information were lecturers, teachers or former teachers (26%); this has important implications for improving relations between farmers and the rest of the community, especially as many of the teachers incorporated conservation into class projects even if they were not directly involved in teaching related subjects. Long-term school farm links now being established in Bedfordshire and neighbouring counties thus provide an excellent opportunity for improving understanding and information exchange between farmers and conservation groups as well as the wider community.

On the question of shooting, one fifth of the conservationists were against it under any circumstances, but the majority were either prepared to accept it if it encouraged conservation, had no strong feelings either way or actually favoured shooting (Table 7.5).

Table 7.6 *Commitment to conservation (self-assessed)*

| | Score† | | | | |
|----------------------|--------|----|----|----|----|
| | -2 | -1 | 0 | +1 | +2 |
| Farmers (%) | 0 | 10 | 41 | 39 | 10 |
| Conservationists (%) | 0 | 2 | 20 | 44 | 34 |

† Scored -2, a lot less than average; -1, a little less; 0, average; +1, a little more; +2, a lot more.

7.6 Commitment to conservation

All respondents were first asked a general question about their commitment to conservation. Half the farmers interviewed (49%) felt they had an above average interest in conservation compared with other farmers; only 10% felt their interest was a little less than average (Table 7.6). As would be expected, most of the conservationists (78%) felt they had an above average interest compared with other people; only one (2%) admitted to a less than average interest.

7.7 Topics involved in conservation

The questionnaire survey provided a further opportunity to examine people's perception of what was meant by conservation. In response to an open-ended question on the topics involved in conservation, the majority of farmers mentioned trees (76%) and hedges (69%, Table 7.7). Nearly half (41%) mentioned ponds, and a quarter (22%) mentioned pesticides—more than might have been expected from the earlier survey, possibly because of publicity given to the Cereal and Game Birds Project (Oliver-Bellasis and Sotherton, 1986) and the Boxworth Experiment (Hardy, 1986). Several mentioned wildlife, game, straw burning, landscape, habitat and fertilisers. One or two mentioned access, varied cropping, public relations, ducks, fish and land reclamation.

For the conservationists, hedges came top of the list (mentioned by 68%), sprays and maintaining a diverse wildlife joint second (38%) and trees third (36%). Other topics often mentioned were access (26%), ponds and drainage (22%) and wild areas (18%). The full list of topics mentioned by conservationists was more extensive than that of farmers, but for both groups it was almost entirely restricted to nature conservation. Landscape, access and

Table 7.7 *Topics seen as involved in conservation (unprompted)*

| Farmers | | Conservationists | |
|----------------------|----|---------------------------|----|
| | % | | % |
| Trees | 76 | Hedges, retain | 68 |
| Woodland | 22 | Hedges, replant | 14 |
| Hedges | 69 | Hedges, manage | 8 |
| Hedges grow up | 8 | Sprays in general | 38 |
| Ponds | 41 | Not spray hedges | 6 |
| Pesticides | 22 | Aerial sprays | 4 |
| Unsprayed headlands | 4 | Trees | 36 |
| Wildlife | 16 | Copses, woods | 20 |
| Game | 14 | Diverse wildlife | 38 |
| Straw burning | 12 | Access | 26 |
| Landscape | 10 | Ponds, drainage | 22 |
| Habitat, leaving | 6 | Wild areas | 18 |
| Habitat, general | 4 | Mixed cropping | 12 |
| Habitat, creating | 2 | Ditch maintenance | 10 |
| Fertiliser, nitrates | 6 | Meadows | 8 |
| Access | 4 | Fertilisers | 6 |
| Varied cropping | 4 | Straw burning | 6 |
| Public relations | 4 | Encourage nesting | 6 |
| Duck, ponds | 4 | No conifers, foreign spp. | 6 |
| Fish stocking | 2 | Landscape | 4 |
| Land reclamation | 2 | Good management | 4 |
| | | Stewardship | 2 |
| | | Blood sports | 4 |
| | | Game | 2 |
| | | Leave dead trees | 4 |
| | | Factory farming | 4 |
| | | EEC, surpluses | 4 |
| | | SSSI protection | 4 |
| | | Buildings | 4 |

Other topics, each mentioned once by conservationists, were: soil fertility, habitat creation, subsidising marginal areas, consulting the local community, badger setts, game, rare breeds, protecting breeding sites, stone walls, sewage and verges. Multiple responses were encouraged so that each total is over 100%.

the maintenance of rural communities were scarcely mentioned, resource and energy conservation not at all.

7.8 Summary

The first survey was followed up with a larger questionnaire-based survey in the spring and early summer of 1985. Forty-nine farmers, members of the NFU, and 50 'conservationists', members of the BHNT, RSPB or FoE, were interviewed. The theory of reasoned action (Ajzen and Fishbein, 1980) was used as the main framework for the questionnaire to provide information about respondents' attitudes, behaviour and social influences concerning four main farming-related conservation topics: conservation in general, hedge removal, pesticide use and straw burning.

The majority of those in the farmer sample were arable farmers in their 40s and 50s and most had left school at 16 or before. Only four were women. Few belonged to any conservation organisation.

The conservationist sample was more evenly spread across all age ranges. Men and women were equally represented. Many were highly educated and a surprising number had close family links with the farming community, although not necessarily locally.

Chapter 8

Results: attitudes, beliefs and values

8.1 Introduction

As described in the previous chapter, opinion statements from the first survey were used to compile four lists of belief items, one each concerning conservation in general, hedge removal, pesticide use and straw burning. Respondents were asked to score each statement on a five-point scale from -2 to +2 according to, first, how likely they thought it was to be true (giving the belief score, b) and, second, how good or bad that would be (giving the evaluation score, e).

According to the Fishbein-Ajzen model, multiplying the belief score by the evaluation score gives a measure of attitude towards the individual item. Summing the individual attitude scores over all the items about the behaviour in question then provides a measure of overall attitude towards that behaviour (A):

$$A = \sum_{i=1}^n b_i e_i. \quad (8.1)$$

Fishbein and Ajzen suggest that behaviour depends on social pressure or norms as well as attitude, and relate behaviour (B) and behavioural intention (BI) to overall attitude in the following way:

$$B \simeq BI = Aw_1 + SNw_2 \quad (8.2)$$

where SN is the subjective norm, a measure of perceived social pressure, and w_1 and w_2 are weights describing the relative contribution of attitudinal and normative components.

This chapter describes the attitudinal component of the model, as summarised in Equation 8.1; the subjective norm component is discussed in the following chapter (Chapter 9), and the correlation between behaviour and these two components in Chapter 10.

8.2 Statistical analysis

Previous researchers have used the Fishbein-Ajzen model in a variety of different ways. Some have used the full model in its aggregated form (Equation 8.2) to study its power to predict behaviour (e.g. Ajzen and Fishbein, 1980, p. 208) and the relative contribution of attitudes and normative influences to behaviour (e.g. Macey and Brown, 1983). However full use of the model in this way involves multiple regression analysis and the related assumptions that the scales used are true interval measures and that the scores for an individual form part of a normal distribution, so that parametric techniques can be used to analyse the data. In practice it seems doubtful whether these assumptions are valid, even when scales are pre-tested, and many researchers have preferred to use the model in a disaggregated form, to study the pattern of individual beliefs and values among groups of people (e.g. Otway *et al.*, 1978; Towriss, 1984, p. 72; Tait, 1983).

The disaggregated approach is used here. Scores for individual beliefs (b_i), values (e_i) and attitudes ($b_i e_i$) are treated as ordinal data only and the statistical methods used are those appropriate for such data. Differences between the median belief, evaluation and attitude scores of the farmers and conservationists are examined for each opinion statement. The inter-quartile range (IQR) is used to describe the extent of deviation of individual scores from the median value; the IQR is the value on either side of the median within which 25% of all cases fall—it thus eliminates the distortion which can be caused by outliers if the whole range is used to describe variation (see Gregory, 1978, p. 30) and, unlike the standard deviation, is a valid measure even when the population is not normally distributed.

The Mann-Whitney U test is used to examine the significance of differences between the scores of farmers and conservationists; although the median test can also be used for non-parametric data it is less likely to pick up differences since it only examines differences in relation to the median score, whereas the Mann-Whitney U test examines the rank order of every score in one group (e.g. farmers) relative to those in the other (e.g. conservationists) (Siegel, 1956). The median test cannot be performed at all in cases where the majority of scores coincide with the median score and the rest lie to one side, because it compares the differences in the number of scores on one side of, or equal to, the median with the rest.

Groups of items which elicited a similar response are identified by elementary linkage analysis (McKennell, 1970). This is a simple clustering technique, appropriate for the non-parametric nature of the data. The attitude scores of each item in the list are correlated with those of every other item, using the Spearman correlation coefficient (Siegel, 1956), and the most highly correlated items grouped together. The resultant clusters

of items may indicate different attitude dimensions, particularly when they form discrete groups with relatively low correlation between the groups.

8.3 Conservation in general

8.3.1 Attitude clusters

In order to simplify the presentation of the results, the groups of similarly scored items revealed by cluster analysis are discussed first.

For farmers there were two main attitude clusters about conservation in general (Figure 8.1A and B). Farmers who had more favourable attitudes to the outcomes 'makes the farm look nicer' and 'is all part of farm management' also tended to have more favourable attitudes to 'attracts wildlife' and 'benefits game' and to discount 'the farm being less productive' and 'being at a disadvantage with competitors'. It follows that the reverse was also true. It should be emphasised that the clusters do not imply, for example, that most farmers had a favourable attitude to all these items. The proportion of respondents with favourable or unfavourable attitudes to each item can be seen by referring to the frequency tables in Appendix E (in this case Table E.1).

The second attitude cluster (B) concerned public relations; farmers who were in favour of the outcome 'makes for good relations with the public' tended to have a favourable attitude to 'attracting attention to the farm' and also felt favourably towards conservation 'costing the farmer money', and vice versa. The distinction between the two groups of items seems to be that cluster A concerned feelings internal to the farm and farmers themselves whereas cluster B concerned their relationship with the outside world. It is interesting that the outcome 'costs money' falls into the second group, suggesting that it is only when conservation is perceived as a public rather than a private good that cost is considered.

Farmer attitude scores for the statement 'makes everywhere look overgrown' were not significantly correlated to any other item. This may have had to do with erratic scoring caused by difficulties respondents had in separating belief and value scores for a belief item which included an evaluative element ('overgrown' in this case). This and other problems encountered in the practical use of the Fishbein-Ajzen model are referred to again in the concluding chapter (Section 11.3).

Cluster analysis of the attitude scores of conservationists showed somewhat different groupings from the farmers (Figure 8.2). One group concerned conservation considerations, another farm business considerations while in the third group attitudes to 'improving public relations' were linked with those about 'making everywhere look overgrown' which could be taken to

imply that a less tidy approach on the part of the farmer would improve public relations, in the view of conservationists.

There was some overlap in the clustering between farmers and conservationists, the main difference being that for farmers, attitudes to conservation ideals such as attracting wildlife tended to be linked with farming considerations such as being less productive, as is only to be expected, whereas for conservationists they were separate considerations.

The correlations among statements about conservation in general, although significant, were relatively low compared with those for more specific issues such as hedge removal, emphasising the fact that 'commitment to conservation' is a diffuse and poorly defined concept. Some researchers stress the importance of using groups of opinion statements which achieve a consistent response in constructing an attitude scale (Gray, 1985; Cronbach, 1951). In practice very high correlations between the scores for different items are usually only achieved by using statements with similar meanings. While this may be satisfactory with a captive group of respondents such as psychology students, in a field situation it can cause annoyance. It also risks ignoring the rich and varied dimensions which can contribute to an attitude. For the greatest practical relevance it is therefore preferable to base the attitude scale on the terms of reference that are prevalent among the respondents, as elicited during an unstructured pilot survey.

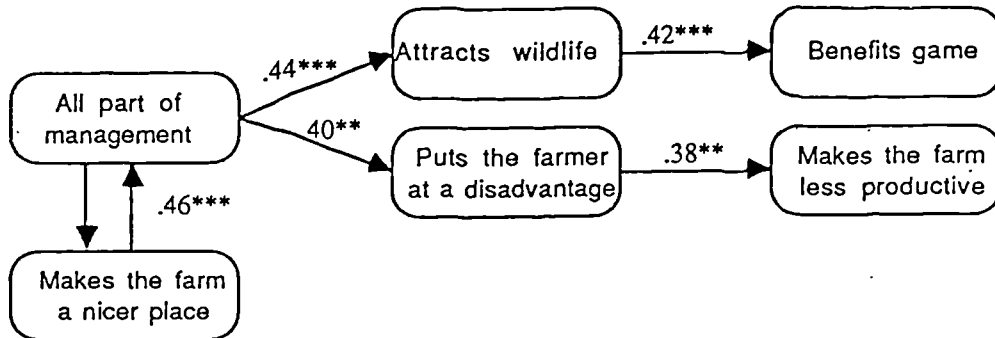
8.3.2 Attitudes

Almost all respondents had a positive overall attitude ($\sum bxe$) to conservation in general (Table 8.1); there was no significant difference in the median score between farmers (+12, IQR +7 to +15) and conservationists (+14, IQR +9 to +20).

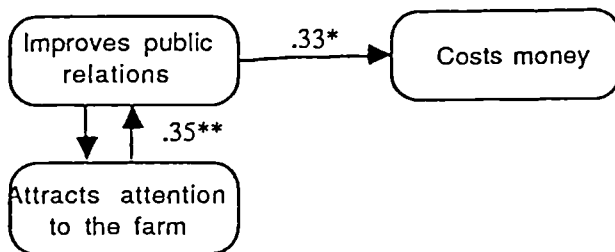
To examine in greater detail the individual attitude statements which contributed to the overall attitude score, attitudes were most positive towards the conservation outcomes 'makes the farm/countryside a nicer place', 'attracts wildlife', 'benefits game' and 'improves public relations', as illustrated by the median attitude scores in Table 8.1. Although both farmers and conservationists had favourable attitudes on these four counts, conservationists' attitudes were significantly more favourable than farmers' to 'attracts wildlife' and 'makes the farm/countryside a nicer place'. (The wording of some attitude items has been abbreviated in the tables; the full wording is shown in the questionnaires in Appendices C and D.)

Attitudes tended to be neutral or divided towards the conservation outcomes 'puts the farmer at a disadvantage with competitors', 'makes the farm less productive', 'costs the farmer money' and 'makes everywhere look overgrown', with no significant differences between farmers and conservationists.

Cluster A



Cluster B



C

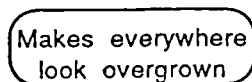
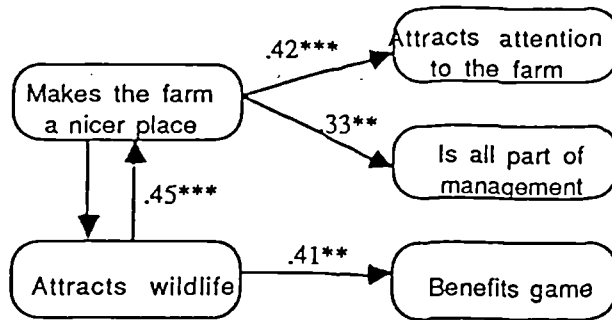
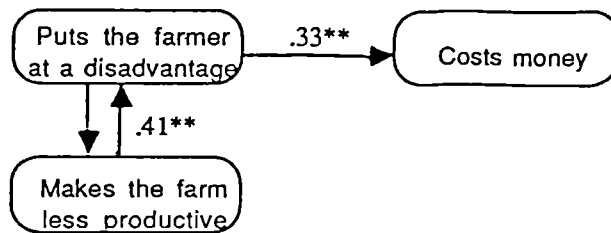


Figure 8.1 Farmer attitude clusters for conservation in general. (Arrows link items which tend to be scored in the same way by individuals, to an extent described by the correlation next to the arrow; *, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels respectively. Double arrows link the most highly correlated pair of items in each cluster. Arrows point from the stronger correlations to the weaker ones.)

Cluster A. Conservation benefits



Cluster B. Farm business considerations



Cluster C

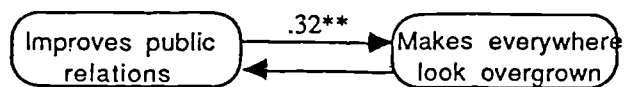


Figure 8.2 Conservationist attitude clusters for conservation in general. (Diagramming conventions as in Figure 8.1.)

Table 8.1 Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about conservation in general

| A commitment to conservation: | Attitudes (bx _e) | | | Beliefs (b) | | | Values (e) | | |
|----------------------------------|------------------------------|----|--------------|--------------|----|-------------|--------------|----|-------------|
| | Median score | | | Median score | | | Median score | | |
| | F | C | Sig.† M-W | F | C | Sig. M-W | F | C | Sig. M-W |
| A | 2 | 4 | ** | 2 | 2 | * | 2 | 2 | ** |
| " | 1 | 2 | ** | 1 | 1 | ns | 1 | 2 | *** |
| " | 2 | 4 | *** | 2 | 2 | ns | 1 | 2 | *** |
| " | 2 | 2 | ns | 2 | 2 | ns | 1 | 1 | ns |
| " | 0 | 0 | ns | -1 | 0 | ns | -1 | -1 | ns |
| " | 0 | 0 | ns | 0 | -1 | ns | -1 | 0 | * |
| B | 2 | 2 | ns | 1 | 1 | ns | 1 | 2 | ns |
| " | 0 | 1 | ** | 1 | 1 | ns | 1 | 1 | ns |
| " | 0 | 0 | ns | 2 | 1 | *** | 0 | 0 | ns |
| C | 0 | 0 | ns | -1 | -1 | ** | -1 | 0 | *** |
| Overall attitude ($\sum bx_e$) | 12 | 14 | ns | | | | | | |

A-C refer to the farmer attitude clusters shown in Figure 8.1.

† Significance of the difference in the distribution of the scores of farmers and conservationists on the basis of the Mann-Whitney U test (M-W); *, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

Farmers also tended to be neutral or only weakly favourable to the conservation outcomes 'is all part of farm management' and 'attracts attention to the farm', whereas conservationists had significantly more favourable attitudes to conservation on these two counts.

The items in Table 8.1 are listed in order of the groups revealed by cluster analysis of the farmers' attitude scores, and it can be seen that farmers generally had more favourable attitudes to the items in the first group (cluster A, private goods) than to those in the second (cluster B, public goods). The raw frequency data on which Table 8.1 and other similar tables are based are shown in Appendix E.

8.3.3 Beliefs and values

The only significant differences in beliefs about conservation in general between farmers and conservationists concerned the outcomes 'costs the farmer money', 'makes everywhere look overgrown' and, to a lesser extent, 'makes the farm a nicer place'. Farmers believed more strongly than conservationists that conservation cost the farmer money, but like the conservationists had divided views about whether this was a good or bad thing. Neither group believed conservation need mean everywhere looking overgrown, particularly so in the case of the conservationists, but significantly more farmers than conservationists thought this would be bad if it were true. When these subtly different perceptions were combined in an attitude score, only the belief 'makes the farm a nicer place' contributed to a difference between farmers and conservationists.

The significant differences in attitude between farmers and conservationists were more closely related to evaluative differences than to differences in beliefs. Conservationists evaluated 'making the farm/countryside look nicer', 'being all part of farm management' and 'attracting wildlife' more highly than farmers. There were also significant evaluative differences between farmers and conservationists over 'making everywhere look overgrown' and 'making the farm less productive', but the differences were not reflected in overall attitude.

It will be noted from Table 8.1 that occasionally median scores which are the same can result in significant differences; this occurs when the distribution of scores around the median differs, as can be seen from the original frequency data in Appendix E. For example, in evaluating the item 'makes the farm a nicer place', 90% of conservationists gave it a score of 2 compared with 65% of farmers; thus the median score for both groups was 2 but there was a significant difference in the distribution of scores. This is also an example of a case where the median test cannot be used.

Table 8.2 *Most relevant conservation beliefs*

| <i>A commitment to conservation:</i> | Farmers | | Cons. | |
|--------------------------------------|---------|------|-------|------|
| | % | Rank | % | Rank |
| Makes the farm a nicer place to live | 59 | 1 | 78 | 1 |
| Improves public relations | 49 | 2 | 44 | 3 |
| Benefits game | 41 | 3 | 12 | 6 |
| Attracts wildlife | 37 | 4 | 74 | 2 |
| Is all part of management | 18 | 5 | 30 | 4 |
| Costs money | 12 | 6 | 2 | 9 |
| Makes the farm less productive | 10 | 7 | 4 | 8 |
| Attracts attention to the farm | 8 | 8 | 16 | 5 |
| Makes everywhere look overgrown | 2 | 9 | 4 | 8 |
| Puts the farmer at a disadvantage | 0 | - | 6 | 7 |

8.3.4 Belief salience

The most salient beliefs about the outcomes of practical conservation were similar for farmers and conservationists (Table 8.2). Both ranked 'makes the farm/countryside a nicer place' and 'improves public relations' in the top three, but while conservationists ranked 'attracts wildlife' second, farmers ranked it fourth and instead ranked 'benefits game' among the top three. Interestingly, cost came relatively low on the list for farmers (sixth) and none considered the item 'puts the farmer at a disadvantage with competitors' to be relevant.

It should be noted that those outcomes which respondents ranked most highly correspond to the items with the highest attitude scores in Table 8.1.

8.4 Hedges

8.4.1 Attitude clusters

In the cluster analysis of correlations in the attitude scores for the different items about hedges, items about hedge removal and those about keeping hedges were examined together, to detect any links between the two groups of items.

The attitude scores of farmers for the different items showed four main clusters (Figure 8.3). The most strongly correlated group (A) concerned attitudes to improving farm productivity. Those who had strongly favourable

attitudes to the hedge removal outcomes 'makes the farm more productive' also felt least concerned about 'destroys an ancient pattern' and 'removes markers for ditches and boundaries'. The second attitude cluster (B) involved the conservation-type disadvantages of hedge removal, such as reducing wildlife and shelter. A third cluster (C) concerned the effect on the crop of keeping hedges; there was also a weak negative correlation between this group of attitudes and that to 'encourages people to dump rubbish'. The fourth attitude cluster (D) concerned remarks to do with maintenance and tidying up the farm; favourable attitudes to removing hedges to reduce maintenance were also associated with a lack of concern about soil erosion. There was a strong and highly significant negative correlation between overall attitude to removing hedges and that to keeping them ($r = -.60$, $P \leq 0.001$). While this was only to be expected, it is methodologically reassuring that it occurred despite possible distortions involved in summing scores across a pool of attitude items which was far from uni-dimensional.

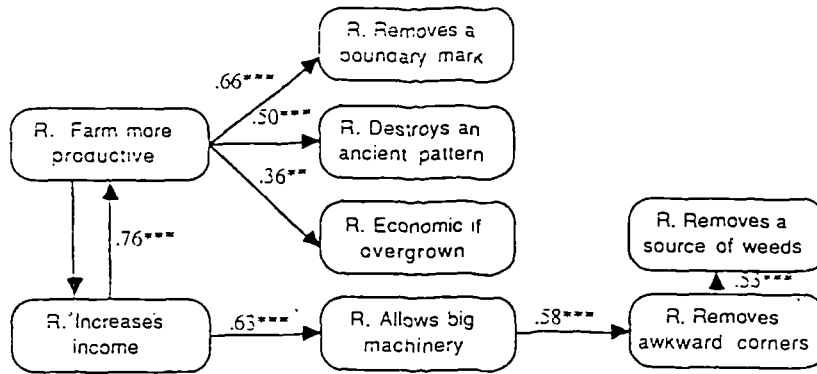
For conservationists the most highly correlated cluster of attitudes had to do with wildlife and shelter (Figure 8.4A), and was similar to the farmers' wildlife cluster. There was a large group of attitudes (Figure 8.4D) which seemed to involve items which were non-salient to many conservationists, such as hedge removal 'tidies up the countryside'; but it also included beliefs which were evaluated neutrally, 'saving time spent hedgecutting' and 'harbouring vermin'.

8.4.2 Attitudes

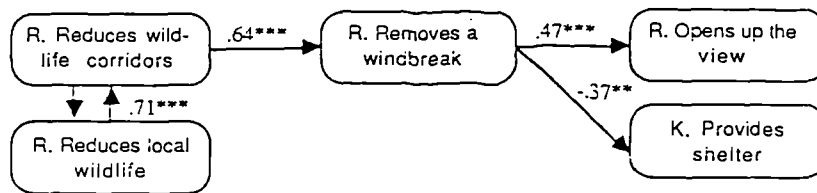
Whereas both farmers and conservationists had favourable attitudes to conservation in general, once attention was focussed on specific conservation-related farm practices such as hedge removal, considerable differences in the attitudes of the two groups became apparent. For hedge removal (Table 8.3) the overall median attitude score of farmers was +6 (IQR 0 to +15), whereas for conservationists it was -16 (IQR -21 to -11). For keeping hedges (Table 8.4) the median attitude score for farmers was -5 (IQR -8 to 0) and for conservationists +3 (IQR +2 to +6). Both differences were highly significant ($P \leq 0.001$).

To look in detail at the attitude scores for individual outcomes (Tables 8.3 and 8.4), it can be seen that farmers felt most positively about the hedge removal outcomes 'allows the use of big modern machinery', 'removes awkward corners', 'removes a source of weeds' and 'saves time hedgecutting'. They felt most negatively about hedge removal for 'reducing local wildlife', 'reducing wildlife corridors' and 'removing a windbreak', and correspondingly positive about keeping hedges for 'providing shelter'. Conservationists felt strongly negative about hedge removal for 'reducing local wildlife',

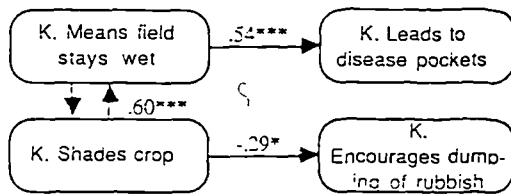
Cluster A. Productivity



Cluster B. Wildlife/shelter



Cluster C. Effects on crop



Cluster D. Tidyness

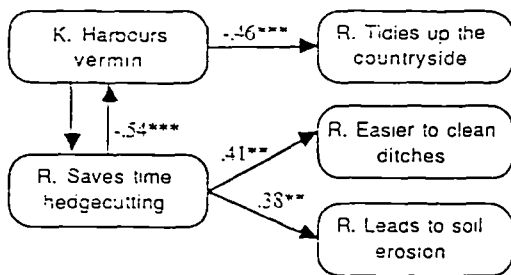
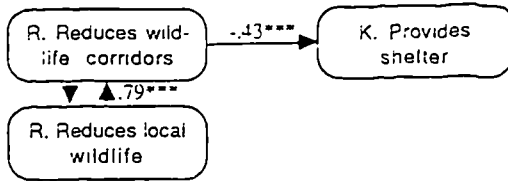
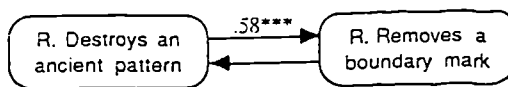


Figure 8.3 Farmer attitude clusters for removing and keeping hedges. (Diagramming conventions as in Figure 8.1. R denotes items about hedge removal, K items about keeping hedges.)

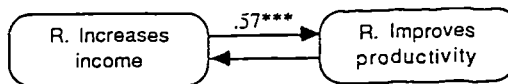
Cluster A. Wildlife/shelter



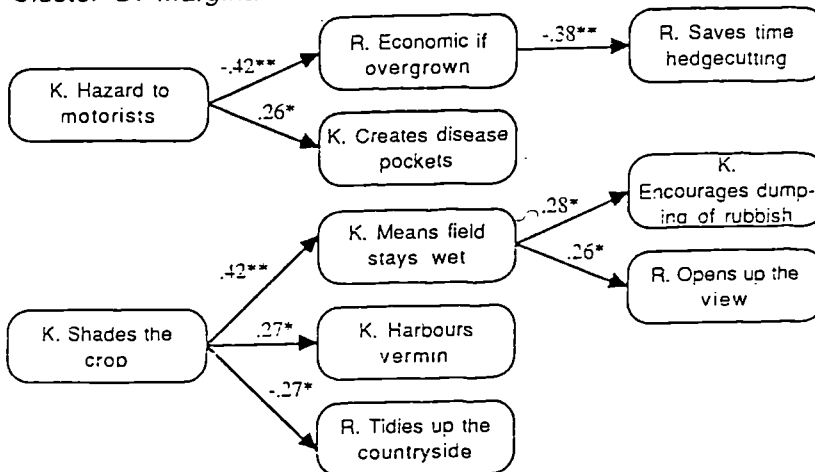
Cluster B. Physical feature



Cluster C. Productivity



Cluster D. Marginal considerations



Cluster E. Obstruction

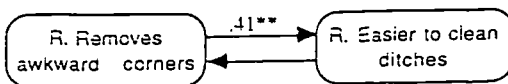


Figure 8.4 Conservationist attitude clusters for removing and keeping hedges.

(Diagramming conventions as in Figure 8.1. R denotes items about hedge removal, K items about keeping hedges.)

Table 8.3 Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about hedge removal

| | Attitudes (bxe) | | | | Beliefs (b) | | | | Values (e) | | | |
|---------------------------------|-----------------|-----|-------|--|--------------|----|------|--|--------------|----|------|--|
| | Median score | | Sig.† | | Median score | | Sig. | | Median score | | Sig. | |
| | F | C | M-W | | F | C | M-W | | F | C | M-W | |
| <i>Removing hedges:</i> | | | | | | | | | | | | |
| A | 1 | 0 | ns | | 1 | 1 | ns | | 1 | 0 | ** | |
| " | 1 | 0 | ns | | 1 | 1 | ns | | 1 | 1 | ns | |
| " | 2 | 0 | *** | | 2 | 2 | * | | 1 | 0 | *** | |
| " | 2 | 0 | *** | | 2 | 2 | ns | | 1 | 0 | *** | |
| " | 2 | 0 | *** | | 2 | 0 | *** | | 1 | 0 | *** | |
| " | 0 | -2 | *** | | 1 | 2 | ** | | 0 | -1 | ** | |
| " | -1 | -2 | ** | | 1 | 2 | *** | | -1 | -1 | *** | |
| " | 0 | 0 | ns | | 0 | -1 | *** | | 0 | 0 | ** | |
| B | -2 | -4 | *** | | 2 | 2 | *** | | -1 | -2 | *** | |
| " | -2 | -4 | *** | | 2 | 2 | *** | | -1 | -2 | *** | |
| " | -2 | -4 | *** | | 2 | 2 | *** | | -1 | -2 | *** | |
| " | 0 | 0 | ns | | 1 | 1 | ns | | 0 | -1 | ns | |
| D | 2 | 0 | *** | | 2 | 2 | ns | | 1 | 0 | *** | |
| " | 0 | 0 | n | | 0 | -2 | *** | | 0 | -1 | *** | |
| " | 1 | 0 | * | | 1 | 1 | ns | | 1 | 0 | *** | |
| " | 0 | -4 | *** | | -1 | 2 | *** | | -1 | -2 | *** | |
| Overall attitude ($\sum bxe$) | 6 | -16 | *** | | | | | | | | | |

A-D refer to the farmer attitude clusters shown in Figure 8.3.

† Significance of the difference in the distribution of the scores of farmers and conservationists on the basis of the Mann-Whitney U test; *, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 8.4 Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about keeping hedges

| | Attitudes (bx _e) | | | | Beliefs (b) | | | | Values (e) | | | |
|-------------------------------------|------------------------------|---|-------|---|--------------|----|----------|---|--------------|----|----------|---|
| | Median score | | Sig.† | | Median score | | Sig. M-W | | Median score | | Sig. M-W | |
| | F | C | F | C | F | C | F | C | F | C | F | C |
| <i>Keeping hedges:</i> | | | | | | | | | | | | |
| B Provides shelter | 2 | 4 | *** | | 2 | 2 | * | | 1 | 2 | *** | |
| C Shades the crop | -1 | 0 | *** | | 1 | -1 | *** | | -1 | 0 | ** | |
| " Means part of the field is wet | -1 | 0 | *** | | 1 | -1 | *** | | -1 | 0 | *** | |
| " Creates disease pockets | 0 | 0 | ** | | 1 | 0 | *** | | -1 | -1 | ns | |
| " Encourages people to dump rubbish | -2 | 0 | *** | | 2 | 0 | *** | | -2 | -1 | * | |
| D Harbours vermin | -1 | 0 | *** | | 1 | 1 | *** | | -1 | 0 | *** | |
| Is a hazard to motorists | 0 | 0 | ns | | -1 | -1 | ** | | 0 | 0 | ns | |
| Overall attitude ($\sum bx_e$) | -5 | 3 | *** | | | | | | | | | |

B-D refer to the farmer attitude clusters shown in Figure 8.3.

† Significance of the difference in the distribution of the scores of farmers and conservationists on the basis of the Mann-Whitney U test; *, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

'reducing wildlife corridors', 'removing a windbreak' and 'encouraging soil erosion'. They also felt more strongly than farmers about the benefits of keeping hedges to 'provide shelter'. The differences between farmers and conservationists on all these counts were highly significant.

Remarks which were generally scored 0 on the attitude scale, with no significant difference between farmers and conservationists, concerned hedge removal 'being the only way to deal with overgrown hedges economically', 'opening up the view' and 'tidying up the countryside', and those about keeping hedges 'creating disease pockets' and 'being a hazard to motorists'.

As with Table 8.1 the items in Table 8.3 are listed according to the groups determined by cluster analysis of farmer attitude scores. From this it can be seen that items in the group relating to productivity (Cluster A) contributed most to the favourable attitude of farmers to hedge removal. Although farmers had unfavourable attitudes to hedge removal for wildlife reasons (Cluster B), they were not as concerned as the conservationists.

8.4.3 Beliefs and values

Median belief scores for hedge removal were generally similar for farmers and conservationists, but there were significant differences in the spread around the median between the two groups. The greatest difference in belief score concerned the hedge removal item 'encourages soil erosion'. From the comments farmers made, it was obvious that this difference was partly a result of using the theory of reasoned action in a situation where only one group was in a position to act. Whereas conservationists were scoring the belief in a general context, farmers were relating it specifically to conditions on their own farm. Apart from those farming on sandy soil, few farmers believed their removing hedges encouraged soil erosion. They understandably did not evaluate it as negatively as the conservationists.

Conservationists were significantly more emphatic than farmers in their belief that hedge removal 'reduces local wildlife', 'reduces wildlife corridors', 'removes a windbreak', 'destroys an ancient pattern' and 'removes a marker for ditches and boundaries'. They were significantly less likely than farmers to believe that hedge removal 'removes a source of weeds', 'is the only way to deal economically with overgrown hedges' and 'tidies up the countryside'. They were also significantly less likely to believe that keeping hedges 'shades the crop', 'means part of the field is always wet', 'creates disease pockets' and 'encourages people to dump rubbish', considering these issues to be untrue or of only marginal significance. Although conservationists conceded that hedges were likely to 'harbour vermin', their ambiguous feelings about what might be classed as vermin meant this belief was less strongly held than for farmers. This difference in attitude was also apparent in the median evalu-

ation score for 'harbouring vermin', which was neutral for conservationists and negative for farmers.

Only four items showed no difference in evaluative response between farmers and conservationists. Perhaps the most surprising was the response to hedge removal 'making the land more productive', which tended to be evaluated as 'quite good' by both groups. The conservationists' moderately favourable score reflected their tendency to sympathise with the farmers' need to make a living. But for farmers not to score it more highly suggests that the dual public pressure against hedge removal and surplus production had moderated the value they placed on maximum production at any cost. Several farmers asked whether the evaluation referred to increasing productivity in general or specifically by removing hedges; they were less likely to consider the specific instance good. There is debate about the appropriate level of specificity for evaluations in the use of the Fishbein-Ajzen model. Fishbein and Ajzen (1977) recommend that all the components of the model should have the same context and that this should be personal, but Tait (1979) has shown that in certain cases evaluation scores based on a personal and specific context can differ greatly from those which are impersonal and context-free and can be less useful in predicting behaviour.

The hedge removal outcomes 'increases income', 'allows the use of big modern machines', 'removes awkward corners', 'removes a source of weeds' (Cluster A), 'saves time hedgecutting' and 'makes ditches easier to clean' (Cluster D) were all seen as good by farmers, whereas conservationists were more divided about whether they were good or bad. For example many conservationists felt that it was better not to remove awkward corners but to leave them and plant them up with trees. Some also felt that weeds were good for wildlife and that farmers could afford to spend time maintaining their hedges.

Farmers agreed that 'reducing local wildlife', 'removing wildlife corridors' and 'removing a windbreak' were bad (Cluster B), but did not feel as strongly about these disadvantages as conservationists.

8.4.4 Belief salience

The most relevant beliefs about hedges (both removing and keeping) for each group are shown in Table 5. Farmers ranked 'allows the use of big modern machinery' first (chosen by 41%), 'removes awkward corners' second (27%) and 'removes a windbreak' third (20%). It can be seen from this last choice that relevant beliefs included those which were considered bad, as well as those considered good, showing that in selecting their most relevant beliefs respondents were integrating belief and value.

Two farmers added their own most salient belief to the list, 'hedges look

Table 8.5 *Most relevant hedge beliefs*

| <i>Removing hedges:</i> | Farmers† | | Cons. | |
|---------------------------------------|----------|------|-------|------|
| | % | Rank | % | Rank |
| Allows the use of big machinery | 41 | 1 | 10 | 5 |
| Removes awkward corners | 27 | 2 | 6 | 6 |
| Removes a windbreak | 20 | 3 | 36 | 4 |
| Reduces local wildlife | 18 | 4 | 74 | 1 |
| Makes the land more productive | 12 | 5 | 6 | 6 |
| Is a way of increasing income | 10 | 6 | 2 | 8 |
| Is destroying an ancient pattern | 10 | 6 | 46 | 2 |
| Removes corridors for wildlife | 10 | 6 | 40 | 3 |
| Makes it easier to clean ditches | 8 | 7 | 2 | 8 |
| Opens up the view | 6 | 8 | 2 | 8 |
| Saves time hedgcutting | 6 | 8 | 4 | 7 |
| Removes a source of weeds | 6 | 8 | 2 | 8 |
| Removes a marker for ditches | 4 | 9 | 2 | 8 |
| Tidies up the countryside | 4 | 9 | 2 | 8 |
| Encourages soil erosion | 2 | 10 | 36 | 4 |
| <i>Keeping hedges:</i> | | | | |
| Encourages people to dump rubbish | 12 | 5 | 0 | - |
| Provides shelter | 8 | 1 | 12 | 1 |
| Means part of the field is always wet | 6 | 2 | 0 | - |
| Shades the crop and weakens it | 4 | 3 | 0 | - |
| Provides a harbour for vermin | 4 | 3 | 2 | 2 |
| Creates disease pockets | 2 | 4 | 0 | - |

† Two farmers added their own most relevant opinion: 'hedges look nice'.

nice'. This is the type of obvious taken-for-granted belief that sometimes does not get put into words by respondents; it was not mentioned in the pilot survey. It also does not fit comfortably into the form required by the model. To rephrase it as an outcome risks losing its meaning—a further example of the constraints of the model.

Only two items were considered irrelevant by all the farmers: 'deals with hedges economically when they are overgrown' and 'is a hazard to motorists'. The farmers who mentioned them in the first survey may therefore have been using them as counter-arguments rather than mentioning them because they were sincerely held beliefs.

For conservationists, the most relevant hedge beliefs were 'reduces local wildlife' (chosen by 74%), 'destroys an ancient pattern' (46%) and 'removes corridors for wildlife' (40%). There was thus no overlap between farmers and conservationists in their most relevant beliefs. However there was some overlap in less highly ranked beliefs; 'reduces local wildlife' was an important consideration for 18% of farmers, and 'destroys an ancient pattern' and 'removes corridors for wildlife' for 10%. However 'encourages soil erosion', considered relevant by 36% of conservationists, was only considered relevant by one farmer (2%). In both groups 'removes a windbreak' and 'provides shelter' were ranked fairly highly, and farming considerations such as 'allows the use of big modern machinery' and 'removes awkward corners' were also considered important by a number of conservationists.

As with attitudes to conservation in general, there was considerable agreement between the opinion statements ticked as most relevant by respondents (Table 8.5) and those scored most highly (whether in a positive or negative direction) on the attitude scale (Tables 8.3 and 8.4). This supports Ajzen and Fishbein's argument (1980, p. 67–68) that the *importance* of items does not need to be considered separately since it is covered by the extent of polarisation of the belief and value scores.

8.5 Pesticide use

8.5.1 Attitude clusters

Cluster analysis of farmer attitude scores for pesticide use showed three distinctive and significantly correlated groups of items, one to do with the agricultural benefits of pesticides, one about health hazards and one about the effects of pesticides on wildlife, including pest species (Figure 8.5). For conservationists, the attitude scores for most items were highly intercorrelated (Figure 8.6). The principal cluster for conservationists included both farming and conservation disbenefits of pesticide use, centred around the two most strongly correlated items 'harms beneficial insects' and 'leads to a

build-up of pesticides in the food chain'. The third cluster concerned farming benefits of pesticides such as 'allows farmers to keep on top of pests, weeds and disease' and 'ensures quality crops'. But the common thread to the second cluster ('being used by people without a specialist knowledge of chemicals', 'affects our health' and 'provokes worse strains of pests and disease') was not readily apparent, although it may have been that there was a greater spread of attitudes for these items, some people viewing them unfavourably and others being less certain.

8.5.2 Attitudes

The attitudes of farmers and conservationists to pesticide use were even more sharply divided than those to hedge removal. The overall median attitude score was +11 for farmers (IQR +4 to +20) and -22 for conservationists (IQR -34 to -12), the differences between the two groups being highly significant (Table 8.6).

There were significant differences between the attitude scores of farmers and conservationists on almost every count. The only item on which there was agreement was that using pesticides 'wastes money if used on a routine basis'.

Farmers were particularly favourable towards the use of pesticides for 'ensuring high yields' and also for 'increasing income', 'recovering growing costs', 'using high input systems', 'ensuring quality crops', 'keeping on top of pests, weeds and disease' and 'being restricted to carefully tested chemicals'. These were all items in cluster A, farming considerations (Figure 8.5A).

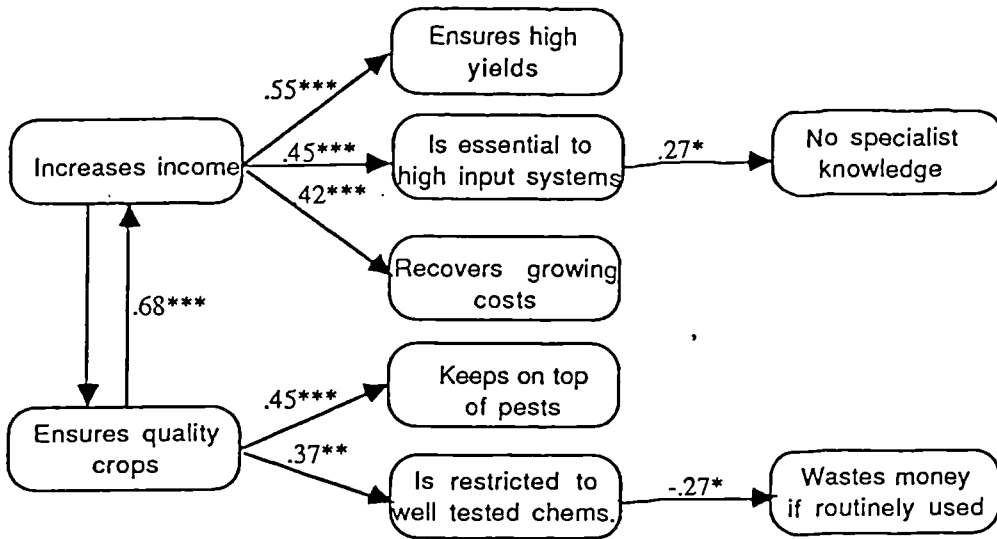
Conservationists on the other hand tended to be neutral or only moderately favourable towards these outcomes of pesticide use. They felt most strongly about quite a different set of items and their feelings about these were all negative. The items were 'leaving toxic residues', 'building up *in the food chain*', 'having unknown long-term effects', 'harming beneficial insects' and 'harming wildlife', all part of the cluster of attitudes about the farming and conservation disadvantages of pesticide use (Figure 8.6A).

For the group of items about wildlife (farmer attitude cluster C, Figure 8.5) both farmers and conservationists had negative attitudes, but conservationists more so than farmers.

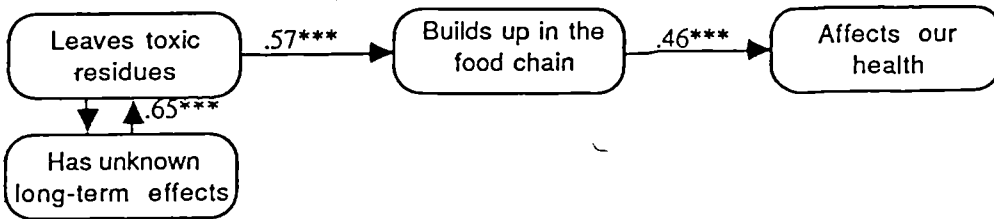
8.5.3 Beliefs and values

Closer examination of the beliefs and values underlying the differences in attitudes shows they almost all varied in degree, or in belief salience, rather than conflicting completely. For the group of items about farming benefits (Group A in Figure 8.5), farmers generally thought these outcomes more

Cluster A. Farming considerations



Cluster B. Health Considerations



Cluster C. Wildlife considerations

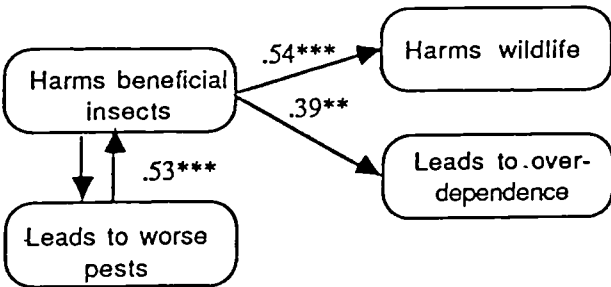
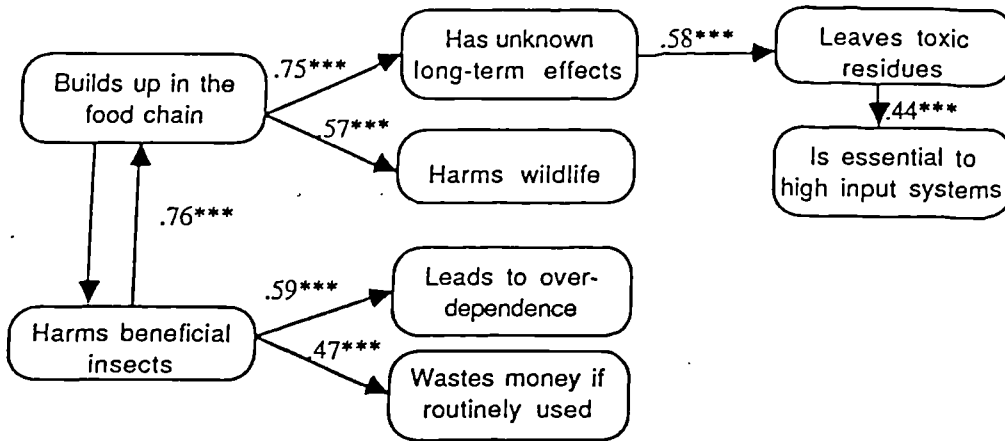
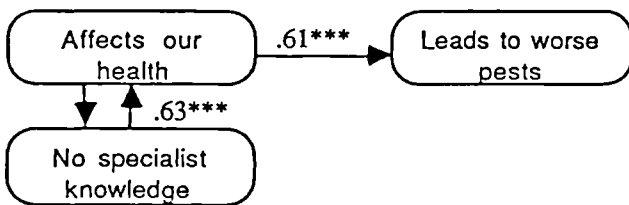


Figure 8.5 Farmer attitude clusters for using pesticides.
(Diagramming conventions as in Figure 8.1.)

Cluster A



Cluster B



Cluster C. Farming benefits

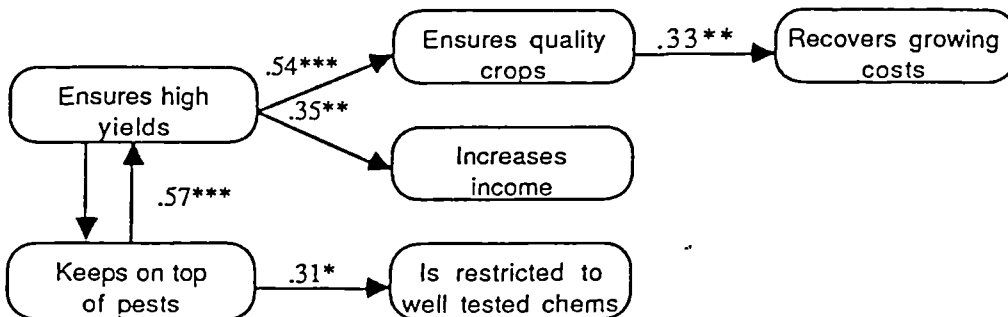


Figure 8.6 Conservationist attitude clusters for using pesticides. (Diagramming conventions as in Figure 8.1.)

Table 8.6 Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about using pesticides

| | Attitudes (bx _e) | | | | Beliefs (b) | | | | Values (e) | | | |
|----------------------------------|------------------------------|------|-------|--|--------------|---|----------|--|--------------|----|----------|--|
| | Median score | | Sig.† | | Median score | | Sig. M-W | | Median score | | Sig. M-W | |
| | F | C | M-W | | F | C | M-W | | F | C | M-W | |
| <i>Using pesticides:</i> | | | | | | | | | | | | |
| A | 2 | 1 | *** | | 2 | 1 | ns | | 2 | 1 | *** | |
| " | 4 | 1 | *** | | 2 | 1 | *** | | 2 | 1 | *** | |
| " | 2 | 0 | *** | | 1 | 0 | *** | | 2 | 1 | *** | |
| " | 2 | 0 | ** | | 2 | 1 | *** | | 1 | 0 | *** | |
| " | 2 | 0 | *** | | 2 | 1 | *** | | 2 | 1 | *** | |
| " | 2 | 1 | *** | | 2 | 1 | *** | | 2 | 1 | *** | |
| " | 2 | 0 | *** | | 2 | 0 | *** | | 2 | 2 | * | |
| " | -1 | -1 | ns | | 1 | 1 | ns | | -2 | -1 | ns | |
| " | 0 | -2 | *** | | -1 | 2 | *** | | -1 | -2 | *** | |
| B | 0 | -4 | *** | | 0 | 2 | *** | | -2 | -2 | *** | |
| " | 0 | -4 | *** | | 0 | 2 | *** | | -1 | -2 | *** | |
| " | 0 | -2 | *** | | 0 | 1 | *** | | -2 | -2 | ** | |
| " | 0 | -4 | *** | | 0 | 2 | *** | | -2 | -2 | *** | |
| C | -1 | -4 | *** | | 1 | 2 | *** | | -1 | -2 | *** | |
| " | -1 | -4 | *** | | 1 | 2 | *** | | -2 | -2 | *** | |
| " | -1 | -2 | *** | | 1 | 2 | ** | | -1 | -2 | ** | |
| " | 0 | -2 | ** | | 1 | 1 | * | | -1 | -2 | *** | |
| Overall attitude ($\sum bx_e$) | 1.1 | -2.2 | *** | | | | | | | | | |

A-C refer to the farmer attitude clusters shown in Figure 8.5.

† Significance of the difference of the scores of farmers and conservationists on the basis of the Mann-Whitney U test (M-W); *, ** and *** denote significance at the 0.05, 0.01 and 0.001 significance levels, respectively.

likely and evaluated them more highly than conservationists. For the group of items about toxicity and health (Cluster B), farmers tended to be non-committal in their beliefs and therefore attitudes, whereas conservationists thought these outcomes quite or very likely and as a result had very negative attitudes towards pesticides for those reasons. But conservationists and farmers seemed to differ in their understanding of this set of items, farmers relating such items as 'builds up in the food chain' more to people whereas conservationists related them to wildlife. Conservationists viewed the item specifically about 'our health' less unfavourably than the other items in this group, not being so convinced it was true. The items they related to wildlife were more strongly believed and evaluated than they were by the farmers.

Farmers and conservationists agreed in their belief that using pesticides 'increases farmers' income'.

8.5.4 Belief salience

For farmers the most relevant beliefs about using pesticides were those associated with their farming benefits (Table 8.7): 'essential for high yields' (chosen by 59% of farmers), 'increases income' (33%), 'allows us to keep on top of pests, weeds and disease' (22%), 'is now restricted to carefully tested chemicals' (20%), 'is an essential part of using high input systems' (20%) and 'ensures good quality crops' (18%). For conservationists, on the other hand, the most relevant beliefs were all about the hazards associated with their use: 'has unknown long-term effects' (chosen by 44%), 'harms wildlife' (38%), 'leaves toxic residues in the soil, water or crop' (36%), 'harms beneficial insects' (28%), 'leads to a build-up of pesticides in the food chain' (26%) and 'makes farmers over-dependent on chemicals' (24%). Once again the items ranked most relevant corresponded closely to those with the most extreme attitude scores (positive or negative) in Table 8.6.

Although all the items were salient to at least one or two people in each group, the beliefs considered most salient by the farmers were generally those considered least salient by the conservationists and vice versa.

8.6 Straw disposal

8.6.1 Attitude clusters

In the cluster analysis of attitude scores about straw disposal, items about burning and those about incorporation were analysed together in order to detect any links between the two pools of items.

For farmers there were five main attitude clusters. One concerned the indirect disadvantages of straw incorporation, such as 'leads to slug problems'

Table 8.7 *Most relevant pesticide beliefs*

| <i>Using pesticides:</i> | Farmers | | Cons. | |
|--|---------|------|-------|------|
| | % | Rank | % | Rank |
| Is essential for high yields | 59 | 1 | 4 | 10 |
| Increases income | 33 | 2 | 6 | 9 |
| Allows us to keep on top of pests | 22 | 3 | 10 | 7 |
| Is now restricted to well tested chemicals | 20 | 4 | 6 | 9 |
| Is an essential part of high input systems | 20 | 4 | 8 | 8 |
| Is a waste of money used routinely | 18 | 5 | 2 | 11 |
| Ensures good quality crops | 18 | 5 | 4 | 10 |
| Affects our health | 10 | 6 | 38 | 2 |
| Recovers growing costs | 8 | 7 | 2 | 11 |
| Harms wildlife | 6 | 8 | 38 | 2 |
| Users have no specialist knowledge | 6 | 8 | 10 | 7 |
| Leads to worse pests | 4 | 9 | 8 | 8 |
| Harms beneficial insects | 4 | 9 | 28 | 4 |
| Leads to over-dependence | 4 | 9 | 24 | 6 |
| Builds up in the food chain | 4 | 9 | 26 | 5 |
| Has unknown long-term effects | 4 | 9 | 44 | 1 |
| Leaves toxic residues | 2 | 10 | 36 | 3 |

(Figure 8.7A). A second concerned the adverse effects of incorporation on the physical condition of the soil and their implications (Figure 8.7B). A third concerned disadvantages of burning, such as 'creates smuts' (Figure 8.7C) and a fourth the farming advantages (Figure 8.7D). The fifth concerned the disadvantages of burning which farmers considered more debateable (Figure 8.7E). There were two further pairs of items, one about the mechanics of incorporation (Figure 8.7F) and one about soil condition (Figure 8.7G). The item 'wastes a useful resource' was uncorrelated to any other, suggesting erratic scoring, possibly caused by the implied positive evaluation in the phrase which provoked some debate among farmer respondents.

For conservationists the most highly correlated pair of items concerned the effect of burning on wildlife (Figure 8.8A). Clusters B and C concerned the disadvantages of burning, the distinction between these two clusters not being readily apparent. The remaining three clusters concerned farming considerations, cluster D being mainly about the benefits to the farmer of burning, and E and F about the disadvantages to the farmer of incorporation.

8.6.2 Attitudes, beliefs and values

As with both the other practical issues, there was a sharp division between the attitudes of farmers and conservationists to straw disposal. Overall median attitude scores for straw burning were +10.5 for farmers (IQR -2 to +19) and -24.5 for conservationists (IQR -28 to -18) (Table 8.8). Overall median attitude scores for straw incorporation were -14 for farmers (IQR -24 to -8) and +2 for conservationists (IQR 0 to +4) (Table 8.9).

There were significant differences between the attitude scores of farmers and conservationists for all items except one; both farmers and conservationists generally agreed that incorporating straw 'adds humus to the soil' and that this was quite good. While most farmers had an unfavourable attitude to straw incorporation on every other count, conservationists' attitudes to incorporation were generally neutral, because for many the beliefs were non-salient (Table 8.9).

Among the items about straw burning, the difference in attitude scores for the item 'upsets the general public' was the least significant, and both farmers and conservationists evaluated this as very bad (Table 8.8).

Straw burning

The straw burning items viewed most favourably by farmers, relating to the farming advantages ('allows early drilling', 'keeps costs down', 'allows minimum cultivation, saving fuel' and 'cleans the fields of weeds, pests and

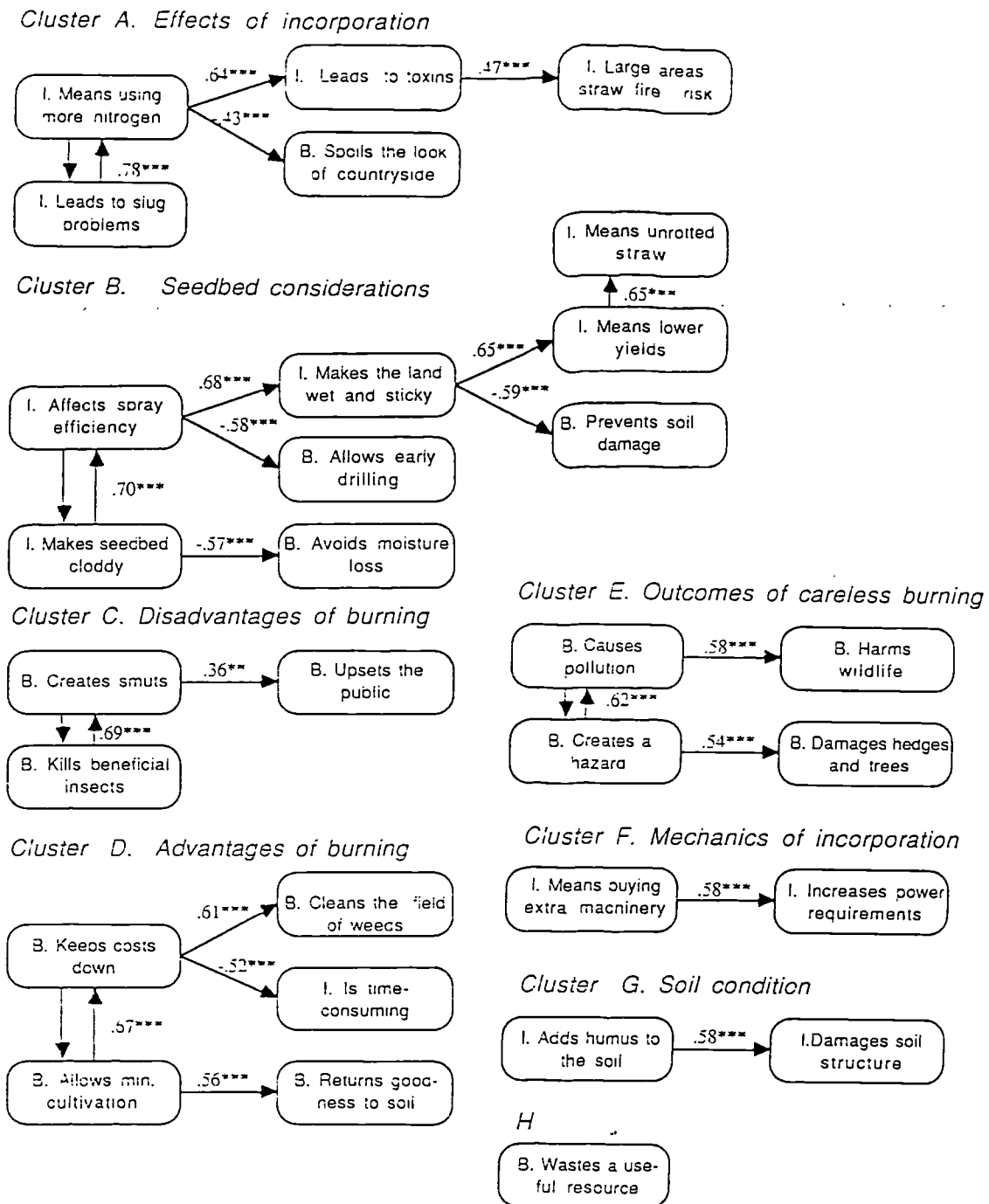
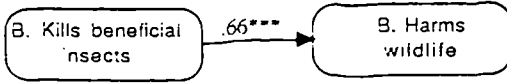
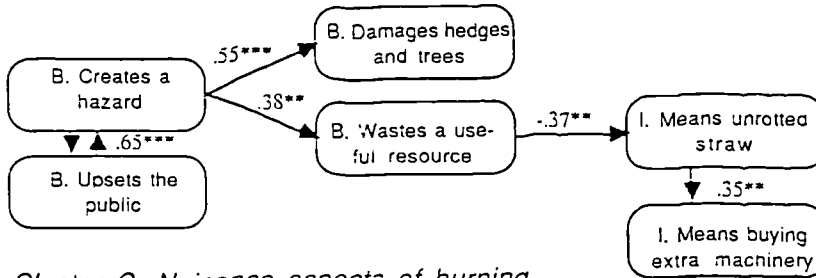


Figure 8.7 Farmer attitude clusters for straw disposal.
 (Diagramming conventions as in Figure 8.1. I denotes items about straw incorporation, B items about straw burning.)

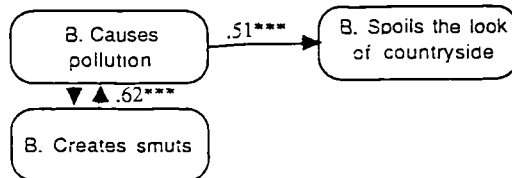
Cluster A. Burning and wildlife



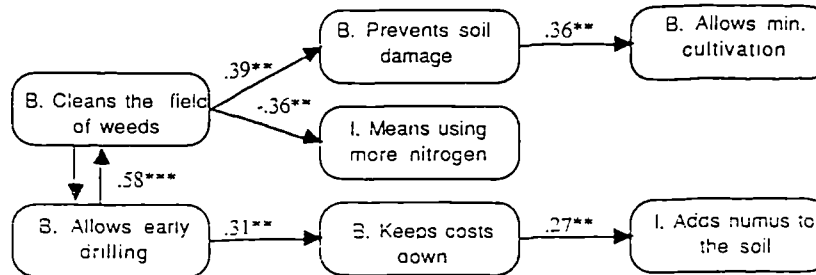
Cluster B



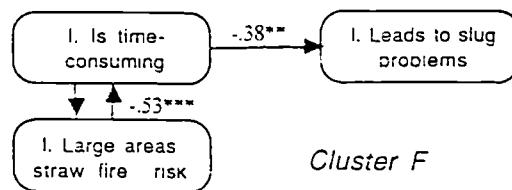
Cluster C. Nuisance aspects of burning



Cluster D. Farming considerations



Cluster E



Cluster F

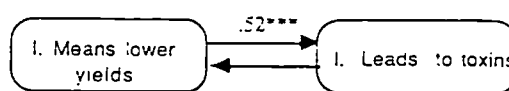


Figure 8.8 Conservationist attitude clusters for straw disposal. (Diagramming conventions as in Figure 8.1. I denotes items about straw incorporation, B items about straw burning.)

disease', farming clusters B and D) produced a neutral response from most conservationists, although some were inclined to view 'cleaning the fields of weeds, pests and disease' and 'allowing early drilling' more favourably.

The straw burning opinions about which conservationists felt most unfavourably produced two types of response from farmers. One group of items ('kills beneficial insects', 'creates smuts' and 'upsets the general public', farmer cluster C) were also viewed unfavourably by farmers, although to a lesser extent than conservationists. The second group ('creates a hazard', 'causes pollution', 'damages hedges and trees' and 'harms wildlife', farmer cluster E) produced a much greater variation in farmer response. This group of items referred more to the outcomes of careless burning, so that replies might be expected to vary according to whether the farmers were answering in personal or general terms, and if personally, whether they had themselves had unfortunate experiences. These items produced a bimodal distribution in the belief response for farmers, as can be seen from the frequency data in Appendix E, Table E.10.

There were significant differences between farmers and conservationists in their belief scores for all the items about straw burning. Generally farmers were less convinced about conservationist concerns such as that 'straw burning causes pollution' and conservationists were less convinced of the farming benefits of straw burning such as 'keeps weeds down'. But farmers tended to disagree altogether with conservationists about their beliefs that burning 'damages hedges and trees' and 'spoils the look of the countryside', many considering both outcomes to be transient, although opinions were divided as mentioned previously. Enough farmers were as convinced as conservationists that burning 'causes smuts' and 'upsets the public' to produce the same median score, but when the whole sample was considered farmers were significantly less convinced than conservationists.

Most evaluation scores showed significant differences between the two groups, but both farmers and conservationists agreed that upsetting the public was very bad. There was also agreement over the evaluation of the straw burning item 'returns goodness to the soil', both groups considering this to be quite good. The evaluative differences between the groups reflected the differences in their beliefs, the most strongly held sets of beliefs usually being evaluated more strongly (regardless of whether they were positive or negative).

Straw incorporation

Farmer attitudes to straw incorporation ranged from extremely negative to neutral, except for the one outcome 'adds humus to the soil' for which both farmers and conservationists had a neutral to moderately favourable

Table 8.8 Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about burning straw

| | Attitudes (bx _e) | | | Beliefs (b) | | | Values (e) | | | |
|--|------------------------------|-------|-----|--------------|---|---|--------------|----|----|-----|
| | Median score | F | C | Median score | F | C | Median score | F | C | |
| <i>Burning straw:</i> | | | | | | | | | | |
| A Spoils the look of the countryside | 0 | -4 | *** | -1 | 2 | 2 | -1 | -1 | -2 | *** |
| B Prevents damage to soil structure | 1 | 0 | *** | 1 | 0 | 0 | 1 | 1 | 1 | * |
| " Allows early drilling | 4 | 1 | *** | 2 | 1 | 1 | 2 | 2 | 1 | *** |
| " Avoids soil moisture loss ^a | 1 | | | 1 | | | 1 | | | |
| C Kills beneficial insects | -1 | -4 | *** | 1 | 2 | 2 | -1 | -1 | -2 | ** |
| " Creates smuts | -2 | -4 | *** | 2 | 2 | 2 | -1 | -1 | -2 | *** |
| " Upsets the public | -2 | -4 | * | 2 | 2 | 2 | -2 | -2 | -2 | ns |
| D Keeps costs down | 4 | 0 | *** | 2 | 1 | 1 | 2 | 2 | 1 | *** |
| " Allows minimum cultivation | 4 | 0 | *** | 2 | 1 | 1 | 2 | 2 | 1 | *** |
| " Cleans the soil of weeds | 4 | 1 | *** | 2 | 1 | 1 | 2 | 2 | 1 | *** |
| " Returns goodness to the soil | 1 | 0 | *** | 1 | 0 | 0 | 1 | 1 | 1 | ns |
| E Creates a hazard | 0 | -4 | *** | 1 | 2 | 2 | -1 | -1 | -2 | ** |
| " Causes pollution | -1 | -4 | *** | 1 | 2 | 2 | -1 | -1 | -2 | *** |
| " Damages hedges and trees | 0.5 | -4 | *** | -1 | 2 | 2 | -2 | -2 | -2 | *** |
| " Harms wildlife | -1 | -4 | *** | 1 | 2 | 2 | -1 | -1 | -2 | *** |
| H Wastes a useful resource | 0 | -1 | *** | 0 | 1 | 1 | -1 | -1 | -1 | *** |
| Overall attitude ($\sum bx_e$)† | 10.5 | -24.5 | *** | | | | | | | |

A-H refer to the farmer attitude clusters shown in Figure 8.7.

† Significance of the difference in the distribution of the scores of farmers and conservationists on the basis of the Mann-Whitney U test (M-W). ^a This item was not included on the conservationists' questionnaire. ‡ Overall attitude score is based only on items common to both questionnaires.

attitude. Farmers attitudes were most negative for the outcomes 'is time-consuming' (Cluster D), 'means large areas of standing straw which would be a fire hazard' (Cluster A), 'means buying extra machinery' and 'increases power requirements' (Cluster F). These opinions were both strongly believed by the majority of farmers and most negatively evaluated, with the exception that 10% of farmers didn't think 'having to buy extra machinery' was either particularly good or bad. There was some split in farmers' attitudes to the items 'leads to slug problems', 'means using more nitrogen', 'creates toxins which affect germination' (all in Cluster A), 'means lower yields' and 'means unrotted straw is there for a long time afterwards' (Cluster B); some farmers had very negative attitudes to these outcomes whereas others were neutral, as shown by the frequency data in Appendix E, Table E.11. There was a sizeable minority of farmers (10-33%, depending on the item) who either were not convinced these opinions were true, or didn't evaluate them as particularly good or bad, or both.

Conservationists generally had neutral attitudes to all the straw incorporation items, because for many the beliefs were not salient, as predicted in the section on the design of the questionnaire (Section 7.3). There was slightly more spread in their attitudes to the outcomes 'is time-consuming' and 'means large areas of standing straw which would be a fire hazard' (Appendix E, Table E.11). Evaluation of the outcomes of straw incorporation by conservationists were not so different from the farmers; most outcomes, except 'adding humus to the soil' tended to be considered moderately bad. However 52% of conservationists evaluated the item about straw incorporation 'being time-consuming' as quite good (Appendix E, Table E.12). Although median belief scores for conservationists were neutral for many items, a sizeable number of conservationists disbelieved the items about straw incorporation 'creating toxins which affect germination', 'being a fire hazard', 'lowering yields' and 'requiring extra machinery'; while many (28-48%) were inclined to believe somewhat the items about it 'being time-consuming', 'means unrotted straw is there for a long time afterwards' and 'means using more nitrogen'.

8.6.3 Belief salience

The most relevant beliefs for farmers about straw burning had to do with its farming advantages, that it 'cleans the fields of weeds, pests and disease', 'allows following crops to be drilled as early as possible', 'keeps costs down', 'allows minimum cultivation, saving fuel' and 'prevents soil damage caused by heavy machinery' (Table 8.10). However 'upsetting the general public' was also considered very relevant (ranked third). The items 'damages hedges and trees' and 'spoils the look of the countryside in summer'

Table 8.9 Comparison of the attitudes, beliefs and values of farmers (F) and conservationists (C) about incorporating straw

| | Attitudes (bx _e) | | | | Beliefs (b) | | | | Values (e) | | | |
|-----------------------------|--|-----|-------|-----|--------------|----|------|--|--------------|----|------|-----|
| | Median score | | Sig.† | | Median score | | Sig. | | Median score | | Sig. | |
| | F | C | M-W | | F | C | M-W | | F | C | M-W | |
| <i>Incorporating straw:</i> | | | | | | | | | | | | |
| A | Leads to slug problems | -2 | 0 | *** | 1 | 0 | *** | | -1 | -1 | | ns |
| " | Means using more nitrogen | -1 | 0 | *** | 1 | 0 | *** | | -1 | -1 | | ** |
| " | Leads to toxins | -1 | 0 | *** | 1 | 0 | *** | | -1 | -1 | | ns |
| " | Standing straw fire hazard | -4 | 0 | *** | 2 | -1 | *** | | -2 | -1 | | *** |
| B | Makes the seedbed cloddy ^a | -1 | | | 1 | | | | -1 | | | |
| " | Affects spray efficiency ^a | -1 | | | 1 | | | | -1 | | | |
| " | Turns the land wet and sticky ^a | -2 | | | 1 | | | | -2 | | | |
| " | Means lower yields | -1 | 0 | *** | 1 | -1 | *** | | -1 | -1 | | *** |
| " | Means unrotted straw | -2 | 0 | *** | 1 | 0 | *** | | -1 | 0 | | *** |
| D | Is time consuming | -4 | 0 | *** | 2 | 1 | *** | | -2 | 1 | | *** |
| F | Means buying extra machinery | -4 | 0 | *** | 2 | 0 | *** | | -2 | 0 | | *** |
| " | Increases power requirements ^a | -4 | | | 2 | | | | -2 | | | |
| G | Adds humus to the soil | 1 | 1 | ns | 1 | 1 | ns | | 1 | 1 | | ns |
| " | Damages soil structure ^a | 0 | | | 0 | | | | 1 | -2 | | |
| | Overall attitude ($\sum bx_e$)† | -14 | 2.5 | *** | | | | | | | | |

A-G refer to the farmer attitude clusters shown in Figure 8.7.

† Significance of the difference in the distribution of the scores of farmers and conservationists on the basis of the Mann-Whitney U test (M-W). ^a These items were not included on the conservationists' questionnaire. ‡ Overall attitude score is based only on items common to both questionnaires.

were not considered particularly relevant by any farmers.

For conservationists, beliefs about the disadvantages of burning were considered most relevant, and the farming benefits least relevant. The items 'allows minimum cultivation, saving fuel' and 'prevents soil damage caused by heavy machinery' were not considered particularly relevant by any of the conservationists.

The most relevant beliefs for farmers about straw incorporation were that it 'means buying extra machinery', 'means large areas of straw left standing after harvest which would be a fire hazard', 'is time-consuming', 'means lower yields', 'increases power requirements', 'leads to slug problems' and 'means unrotted straw is there for a long time afterwards'. Since it was anticipated that few conservationists would find the straw incorporation beliefs salient, they were asked to select only three items covering both lists. Only two items from the straw incorporation list were considered at all relevant by conservationists: 'means large areas of standing straw which would be a fire hazard' and 'adds humus to the soil'.

As with the other issues, beliefs selected as the most relevant corresponded with the items which produced the most extreme scores on the attitude scale, whether positive or negative (Tables 8.8 and 8.9).

8.7 General outlook

Differences between farmers and conservationists in their general outlook were most obvious for the group of items taken from Cotgrove's 'anti-industrialism' scale (Cotgrove, 1982), that is items 5-10 in Table 8.11. Farmers supported the idea of expansion and economic growth whereas conservationists were more dubious about its benefits. Conservationists were more likely than farmers to agree that resources were being wasted in order to supply artificially created needs.

The differences between farmers and conservationists on Cotgrove's 'anti-science' scale (items 1-4) were less significant. Both groups seemed to be moderately convinced of the benefits of science and technology, but with some reservations (item 2).

The group of items taken from Cotgrove's 'post-material values' scale (items 11-15) showed no significant difference between farmers and conservationists for the items about respect for law and order (item 13) and keeping the rate of inflation down (item 15). However, there were significant differences for the item about the importance of maintaining a high rate of economic growth (item 11), an item which seemed closely related to the anti-industrial scale. Conservationists were also more likely than farmers to agree with the closer involvement of people in decision making both at the

Table 8.10 *Most relevant straw disposal beliefs*

| | Farmers | | Cons. | |
|---|---------|------|-------|------|
| | % | Rank | % | Rank |
| <i>Burning straw:</i> | | | | |
| Cleans fields of weeds, pests and disease | 53 | 1 | 6 | 8 |
| Allows early drilling | 45 | 2 | 2 | 10 |
| Upsets the general public | 31 | 3 | 38 | 3 |
| Keeps costs down | 31 | 3 | 2 | 10 |
| Allows minimum cultivation, saving fuel | 16 | 4 | 0 | - |
| Prevents soil damage caused by machinery | 14 | 5 | 0 | - |
| Returns goodness to the soil | 8 | 6 | 4 | 9 |
| Kills some insects which do good | 4 | 7 | 12 | 7 |
| Creates a hazard | 4 | 7 | 38 | 3 |
| Creates smuts | 4 | 7 | 26 | 5 |
| Causes pollution | 4 | 7 | 28 | 4 |
| Avoids moisture loss caused by ploughing | 4 | 7 | | |
| Wastes a useful resource | 2 | 8 | 14 | 6 |
| Harms wildlife | 2 | 8 | 48 | 1 |
| Damages hedges and trees | 0 | - | 42 | 2 |
| Spoils the look of the countryside | 0 | - | 14 | 6 |
| <i>Incorporating straw:</i> | | | | |
| Means buying extra machinery | 41 | 1 | 0 | - |
| Means straw is a fire hazard | 33 | 2 | 2 | 10 |
| Is time consuming | 33 | 2 | 0 | - |
| Means lower yields | 25 | 3 | 0 | - |
| Increases power requirements | 18 | 4 | | |
| Leads to slug problems | 16 | 5 | 0 | - |
| Means unrotted straw | 16 | 5 | 0 | - |
| Turns the land wet and sticky | 12 | 6 | | |
| Leads to toxins inhibiting germination | 8 | 7 | 0 | - |
| Adds humus to the soil | 8 | 7 | 2 | 10 |
| Makes the seedbed cloddy | 8 | 7 | | |
| Damages soil structure | 6 | 8 | | |
| Means using more nitrogen | 4 | 9 | 0 | - |
| Affects spray efficiency | 2 | 10 | | |

Table 8.11 *Comparison of the general outlook of farmers (F) and conservationists (C)*

| | | Median score | | Sig.† |
|----|---|--------------|----|-------|
| | | F | C | M-W |
| 1 | Science and technology provide man with his best hope for the future | 1 | 1 | ** |
| 2 | We are in danger of letting technology run away with us | 1 | 1 | ns |
| 3 | The bad effects of technology outweigh its benefits | -1 | 0 | * |
| 4 | Science and technology can solve our problems by finding new ... | 1 | 1 | ns |
| 5 | Industrial societies are 'good' societies in that they provide a high ... | 1 | 0 | ** |
| 6 | There are forces at work in modern societies which stimulate a ... | 1 | 2 | *** |
| 7 | Vigorous industrial output is the mark of a healthy society | 1 | 0 | *** |
| 8 | We attach too much importance to economic measures of well ... | 1 | 2 | *** |
| 9 | The business community works for the good of the nation | 1 | -1 | *** |
| 10 | Our present way of life is much too wasteful of resources | 1 | 2 | *** |
| 11 | It is important that the country maintains a high rate of ... | 1 | 1 | ** |
| 12 | People should have more say in important government decisions | 0 | 1 | *** |
| 13 | People should have more respect for law and order | 2 | 2 | ns |
| 14 | People should have more say in how things get decided | 1 | 1 | ** |
| 15 | It is important to keep the rate of inflation down | 2 | 1 | ns |

†Significance of the difference in the distribution of the scores of farmers and conservationists on the basis of the Mann-Whitney U test (M-W). *, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

local (item 14) and national level (item 12).

8.8 Summary

Both farmers and conservationists had a similarly favourable attitude to conservation when it was discussed in general terms. Like the conservationists, farmers saw the main benefits of conservation as improving the farm environment, improving public relations and attracting wildlife or game. Disadvantages to the farmer mentioned in the first survey were either considered unlikely to be true (for example, that conservation puts farmers at a disadvantage with those less conservation-minded than themselves, and that it makes the farm look overgrown) or caused debate as to whether they were necessarily bad (such as cost, and reduced productivity).

However when conservation was discussed in terms of practical farming decisions, wildlife and other conservation considerations were outweighed by considerations of farming convenience, productivity and economics for most farmers. This was particularly true in the case of pesticide use and straw burning.

With hedge removal, farmers did appreciate the loss of wildlife, shelter and, to a lesser extent, a traditional landscape. They saw the economic advantages of hedge removal as relatively small. But they were still in favour of hedge removal for reasons of farming convenience, such as the ease of use of big machinery, the removal of a source of weeds and the saving of time in hedge maintenance.

With pesticides, attitudes to economic factors overwhelmingly favoured their use. The disadvantages of pesticide use to wildlife were a relatively minor consideration, and aspects such as the effects of pesticides on health, toxic residues and long-term hazards were ignored by the majority of farmers.

With straw burning, most farmers thought that permanent damage to hedges and trees was unlikely, and that pollution and damage to wildlife were minimal, so that these conservationist concerns played little part in their overall attitude to straw burning. However the creation of smuts and upsetting the public were seen as important disadvantages of burning. But these disadvantages were far outweighed by the farming benefits of burning in terms of cost savings, timeliness of drilling, reduced cultivations and weed suppression, and by the perceived disadvantages of straw incorporation such as the need for extra equipment, the extra time required and the risk of fire after harvest when large areas of dry straw remained in the fields.

In all instances, conservationists felt more strongly than farmers about the benefits of conservation for wildlife and the disadvantages to wildlife of

hedge removal, pesticide use and straw burning. They tended to be neutral or only moderately favourable about the farming benefits.

Problems encountered in the use of the model were relatively few. Respondents sometimes had difficulty scoring phrases containing evaluative words when they disagreed with the evaluation (for example, 'conservation makes everywhere look overgrown'). In a few instances there was doubt about the most appropriate level of context specificity to use. For example 'increasing income' was seen as very good in general terms but less so if it depended on hedge removal. To some extent the evaluative score was affected by the belief score, in that evaluation was moderated if the outcome was considered unlikely to be true; for example, farmers thought soil erosion was less bad if they did not believe that hedge removal resulted in erosion. Such problems are examples of an aspect of the model that requires further investigation, i.e. under some circumstances respondents find it difficult to separate belief and evaluation conceptually (Tait, 1979).

Because of the circumstances in which the model was used, with one group (the farmers) tending to relate the questions to their own situation and the other (the conservationists) considering farmers in general, differences in context specificity sometimes also affected belief scores. For example, farmers on heavy soil did not believe that hedge removal led to soil erosion, whereas most conservationists, thinking about soil erosion in general terms, did.

Otherwise respondents had little difficulty in scoring the items, and the correspondence of the items selected as most relevant with those which resulted in the most extreme attitude scores suggests that use of the model gave reliable results. The data support Ajzen and Fishbein's (1980) claim that the *salience* or importance of beliefs to individuals does not need to be measured separately.

Chapter 9

Results: social pressures

9.1 Introduction

As mentioned in Section 8.1, the theory of reasoned action suggests that behaviour is determined not only by attitudes but also by social pressures. The social pressures on farmers concerning conservation were examined using the subjective norm component of the Fishbein-Ajzen model, as discussed in Section 7.2.1. The subjective norm (SN) refers to respondents' perception of how other people, whose opinions they respect, expect them to behave. It therefore depends on their perceptions of other peoples' beliefs (b_j) and the extent of their motivation to comply with those beliefs (m_j), and can be represented by the following equation (see also Section 3.2.2, Equation 3.2):

$$SN = \sum_{j=1}^n b_j m_j. \quad (9.1)$$

Farmers were asked to select from a list of groups and individuals those on whose opinions they would be most likely to act in relation to tree planting, hedge removal, pesticide use and straw burning. The list (Appendix C, pages 20–21) was based on the findings from the first, descriptive survey and the resulting scores (from +2 very likely to 0 unlikely) formed the m_j component of the subjective norm part of the model.

The first survey had suggested that although conservationists had very different attitudes to farmers and felt unhappy about some farming activities, few were able to make their feelings known to farmers. Farmers seemed unaware of their views. Conservation groups were therefore added to the list of possible referent groups to check this apparent lack of influence.

For the groups whose opinions they did respect, farmers were then asked how likely they thought it was that those groups wanted them to behave in a conservation-minded way, i.e. to plant more trees, not to remove hedges, to reduce their pesticide use and not to burn straw. These scores (from +2 very likely to -2 very unlikely) formed the b_j component of the model.

The results are presented in a disaggregated form, since this provides much useful information on the sources and direction of social pressures. Although Ajzen and Fishbein (1980, p. 262) consider that a single overall measure of *SN*, in response to the statement 'most people who are important to me think I should/should not act this way', is sufficient to predict and explain behaviour at the general level, the disaggregated information is needed in order to fully understand and influence behaviour.

A similar set of questions was used for the conservationist sample (Appendix D, pages 13–14), but because they were not in a position to act, the questions referred to the sources of influence on their views about how farmers should behave. This was a somewhat unorthodox use of the model, but was only intended to provide comparative information, not for examining the correlations between subjective norm and behaviour.

Before prompting respondents with a list of possible influences, they were asked an open-ended question about who they thought farmers should turn to for conservation advice, to examine individual awareness of the sources available.

9.2 Farmers and social pressures

The initial open-ended question (not part of the measures required by the model) showed that many farmers were uncertain who they would turn to if they ever needed conservation advice, although ADAS, the County Council and FWAG were most often mentioned first (Table 9.1). If references to the Forestry Officer and the New Agricultural Landscapes Project Officer, both employees of the County Council, are included under the County Council heading, then this can be considered potentially the most important first source of advice on conservation matters by farmers in Bedfordshire (mentioned by 45%); however this may relate to conservation perceived in terms of tree planting rather than in a broader sense. A few farmers (four in each case) mentioned they would turn to the NFU, the Game Conservancy or neighbouring farmers for advice or else considered they had sufficient knowledge themselves. Others mentioned a variety of different sources, which suggests many had no clear idea who to turn to or had not considered seeking such advice.

The response to the list of possible referent groups drawn up for the *SN* measure was more positive, especially for less formal sources of conservation opinion within the farming community, such as the family, neighbouring farmers, the landlord and the farming media. For each behaviour, the opinions of ADAS were most highly regarded by farmers (Tables 9.2–9.5). Respect for their views ranged from 57% of farmers for hedges to 82% for

Table 9.1 *The potential sources of conservation advice perceived by farmers†*

| | % |
|-------------------------|----|
| ADAS | 37 |
| County Council | 27 |
| FWAG | 18 |
| CC, Forestry Officer | 10 |
| CC, NAL Project Officer | 8 |
| Game Conservancy | 8 |
| Other farmers | 8 |
| NFU | 8 |
| Self | 8 |
| NCC | 4 |
| Forestry Commission | 4 |

† In answer to the question 'Who would you turn to if you ever needed advice about conservation on the farm?'. The total is greater than 100% because some farmers gave more than one response. Additional responses, each mentioned once, were: CLA, the land agent, the landlord (London Brick Company), the estate forester, books, talks, the Countryside Commission, WAGBI, spray consultant, seed merchant and Countryside Ranger.

pesticides. The motivation score (Table 9.2–9.5, column 3) shows that many farmers were *very* likely to act on the opinions of ADAS and their own family, whereas they were only *quite* likely to act on the opinions of many other groups.

The relative value farmers placed on different sources of advice was similar for hedges and trees, with the opinions of ADAS, the family, neighbouring farmers, the landlord, the farming media, the NFU and the County Council being most well regarded (Tables 9.2 and 9.3). The County Council was particularly valued for its advice on trees (41% of farmers, Table 9.3). At the time of the survey Bedfordshire FWAG did not have a full-time adviser and FWAG was not well known among the farmers surveyed, which probably accounts for its being only eighth on the prompted list for hedge and tree advice. The County Council's NAL Project officer, who later took on the role of FWAG adviser, worked only in a restricted area of the county at that time.

Table 9.2 Sources and direction of influence on farmers (F) about not removing hedges

| | % | Motivn score‡ | % F with a belief score† of: | | | | |
|-------------------------|----|------------------|---------------------------------|----|----|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| ADAS | 57 | 86 | 0 | 6 | 10 | 31 | 8 |
| Family | 47 | 71 | 0 | 4 | 11 | 14 | 18 |
| Neighbouring farmers | 43 | 53 | 2 | 12 | 15 | 8 | 2 |
| Landlord | 33 | 53 | 0 | 2 | 2 | 10 | 20 |
| Farming media | 31 | 35 | 0 | 0 | 2 | 25 | 4 |
| NFU | 23 | 26 | 0 | 0 | 2 | 14 | 4 |
| County Council | 20 | 26 | 0 | 0 | 2 | 8 | 8 |
| FWAG | 18 | 24 | 0 | 0 | 2 | 8 | 8 |
| CLA | 12 | 12 | 0 | 0 | 0 | 6 | 2 |
| TV environl programmes | 12 | 12 | 0 | 0 | 0 | 6 | 6 |
| Non-farming neighbours | 12 | 12 | 0 | 2 | 0 | 2 | 8 |
| RSPB | 12 | 12 | 0 | 0 | 0 | 10 | 2 |
| Scientists | 8 | 12 | 0 | 0 | 2 | 4 | 2 |
| NAL project officer | 8 | 10 | 0 | 0 | 2 | 4 | 0 |
| Conservation Volunteers | 8 | 10 | 0 | 0 | 0 | 4 | 4 |
| Commercial reps | 6 | 10 | 0 | 0 | 4 | 0 | 2 |
| Local papers | 6 | 6 | 0 | 0 | 0 | 2 | 4 |
| Natural History Society | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| BHNT | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| Preservation Societies | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| RA | 2 | 2 | 0 | 0 | 0 | 2 | 0 |

† Belief score is the normative belief (b_j) about how likely it is that these groups of people think farmers should not remove hedges, scored from -2 very unlikely to +2 very likely.

‡ Motivation score is the percentage of respondents influenced by the group, weighted according to the likelihood of their being influenced (x1 for quite likely and x2 for very likely, the m_j measure).

A few respondents commented on, but did not score, the belief question for certain groups, as shown by the difference between the % column and the total % with belief scores.

Groups with no influence were FoE and bank managers.

Table 9.3 Sources and direction of influence on farmers (F) about planting more trees

| | % | Motivn score‡ | % F with a belief score‡ of | | | | |
|-------------------------|----|------------------|--------------------------------|----|----|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| ADAS | 59 | 88 | 0 | 0 | 10 | 39 | 10 |
| Family | 47 | 71 | 0 | 4 | 2 | 20 | 20 |
| Neighbouring farmers | 47 | 59 | 0 | 12 | 6 | 18 | 8 |
| County Council | 41 | 58 | 0 | 0 | 0 | 14 | 27 |
| Landlord | 33 | 52 | 0 | 4 | 0 | 12 | 16 |
| Farming media | 31 | 35 | 0 | 0 | 0 | 18 | 12 |
| NFU | 23 | 26 | 0 | 2 | 2 | 14 | 4 |
| FWAG | 18 | 24 | 0 | 0 | 0 | 4 | 12 |
| TV environl programmes | 18 | 20 | 0 | 0 | 0 | 6 | 12 |
| Non-farming neighbours | 14 | 16 | 0 | 2 | 0 | 2 | 10 |
| RSPB | 12 | 12 | 0 | 0 | 0 | 6 | 6 |
| NAL project officer | 10 | 12 | 0 | 0 | 0 | 6 | 4 |
| Scientists | 8 | 12 | 0 | 0 | 0 | 6 | 2 |
| CLA | 10 | 10 | 0 | 0 | 0 | 8 | 2 |
| Conservation Volunteers | 8 | 10 | 0 | 0 | 0 | 2 | 6 |
| Local papers | 8 | 10 | 0 | 0 | 2 | 0 | 6 |
| Commercial reps | 2 | 2 | 0 | 0 | 4 | 0 | 2 |
| Natural History Society | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| BHNT | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| Preservation Societies | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| RA | 2 | 2 | 0 | 0 | 0 | 2 | 0 |

† Likelihood that these groups think farmers should plant more trees, scored from -2 very unlikely to +2 very likely.

‡ See notes on Table 9.2.

Groups with no influence were FoE and bank managers.

Apart from the County Council, the opinions of groups outside the farming community were respected by relatively few farmers, confirming the impression given by the first survey. TV environmental programmes came nearest to bridging this divide, with 18% of farmers influenced by what was said on them about trees and 12% about hedges. Of the conservation groups the views of the RSPB were most respected (6–12% of farmers) but the farmer who said tongue-in-cheek ‘Bless them all!’ seemed to sum up most farmers’ view of the opinions of conservation groups. One said he would do the opposite of anything FoE recommended (suggesting that occasionally there may be the element of ‘bloody-mindedness’ in relation to subjective norms, as discussed in Section 7.2.1).

Of the most influential groups, those within the farming community were not always seen as being in favour of conservation-related activities, such as planting trees and keeping hedges. For example 14% of farmers who respected the opinions of neighbouring farmers believed they were unlikely to be against hedge removal. And 10% of farmers who were prepared to listen to ADAS on hedges and trees were uncertain of the ADAS view, possibly because while some sections of ADAS were now recommending hedge planting others were still advocating hedge removal. Opportunities for influencing farmers were therefore being missed. Similarly the farmer’s family and neighbouring farmers, whose views were widely respected, seem to have unused potential as a positive conservation influence within the farming community.

The relative order of importance of the various groups differed for advice on pesticides (Table 9.4). The views of ADAS were particularly highly regarded, but commercial representatives moved up to second place with 53% of farmers likely to act on their advice. However most farmers appreciated the bias in commercial sources of advice, in that they were thought very unlikely to favour reduced pesticide use. The views of scientists on pesticides were also considered important. The views of the County Council and the NAL officer, which were respected on the subject of hedges and trees, were considered irrelevant to pesticide use. Many farmers considered the most influential groups unlikely to want farmers to reduce their pesticide use. And as with hedges and trees, several groups who were influential had not made their opinions clear; for example 29% of farmers who respected ADAS’ views were uncertain whether ADAS favoured reduced pesticide use or not. As with hedges, this might be because different sections of ADAS were giving conflicting advice. Several farmers were not prepared to say whether they thought ADAS favoured reduced pesticide use but made comments such as ‘They encourage careful use’, ‘They’re not in favour of blanket spraying’ and ‘They recommend the simplest and cheapest spray to resolve the problem’. The views of non-farming neighbours about pesticide use were irrelevant

Table 9.4 Sources and direction of influence on farmers (F) about reducing pesticide use

| | % | Motivn score† | % F with a belief score‡ of | | | | |
|-------------------------|----|------------------|--------------------------------|----|----|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| ADAS | 82 | 131 | 2 | 12 | 29 | 25 | 2 |
| Commercial reps | 53 | 70 | 33 | 12 | 0 | 4 | 0 |
| Scientists | 45 | 66 | 2 | 10 | 5 | 18 | 2 |
| Neighbouring farmers | 45 | 55 | 2 | 20 | 11 | 6 | 0 |
| Family | 26 | 36 | 0 | 10 | 4 | 8 | 2 |
| Farming media | 27 | 31 | 0 | 2 | 13 | 8 | 4 |
| NFU | 20 | 26 | 2 | 2 | 6 | 4 | 2 |
| TV environl programmes | 18 | 20 | 0 | 4 | 0 | 6 | 8 |
| Landlord | 6 | 10 | 0 | 2 | 0 | 2 | 0 |
| CLA | 6 | 8 | 0 | 0 | 4 | 0 | 0 |
| FWAG | 6 | 6 | 0 | 0 | 0 | 2 | 4 |
| Non-farming neighbours | 6 | 6 | 0 | 2 | 0 | 4 | 0 |
| RSPB | 6 | 6 | 0 | 0 | 0 | 4 | 2 |
| Local papers | 4 | 6 | 0 | 0 | 2 | 0 | 2 |
| Natural History Society | 4 | 6 | 0 | 0 | 0 | 2 | 2 |
| BHNT | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| Bank manager | 2 | 2 | 0 | 0 | 2 | 0 | 0 |

† Likelihood that these groups think farmers should reduce their pesticide use, scored from -2 very unlikely to +2 very likely.

‡ See notes on Table 9.2.

Groups with no influence were: County Council, NAL project officer, Conservation Volunteers, Preservation Societies, FoE and RA.

Table 9.5 Sources and direction of influence on farmers (F) about straw burning

| | % | Motivn score‡ | % F with a belief score‡ of | | | | |
|-------------------------|----|------------------|--------------------------------|----|----|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| ADAS | 72 | 106 | 6 | 16 | 19 | 20 | 2 |
| Neighbouring farmers | 47 | 61 | 18 | 14 | 9 | 2 | 0 |
| NFU | 41 | 57 | 2 | 10 | 11 | 6 | 2 |
| Family | 33 | 45 | 0 | 8 | 7 | 10 | 6 |
| Scientists | 27 | 37 | 2 | 2 | 11 | 8 | 0 |
| Farming media | 25 | 29 | 0 | 0 | 13 | 8 | 4 |
| Non-farming neighbours | 20 | 26 | 0 | 0 | 2 | 6 | 12 |
| County Council | 18 | 26 | 0 | 0 | 0 | 12 | 6 |
| Commercial reps | 16 | 22 | 2 | 2 | 8 | 4 | 0 |
| TV environl programmes | 18 | 20 | 0 | 0 | 0 | 10 | 8 |
| Landlord | 12 | 18 | 2 | 0 | 4 | 4 | 0 |
| Local papers | 8 | 12 | 0 | 0 | 2 | 2 | 4 |
| FWAG | 8 | 8 | 0 | 0 | 2 | 4 | 2 |
| RSPB | 6 | 6 | 0 | 0 | 0 | 4 | 2 |
| CLA | 4 | 6 | 0 | 0 | 0 | 0 | 0 |
| NAL project officer | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| Conservation Volunteers | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| BHNT | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| Natural History Society | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| Preservation Societies | 2 | 2 | 0 | 0 | 0 | 2 | 0 |
| Bank manager | 2 | 2 | 0 | 0 | 2 | 0 | 0 |
| RA | 2 | 2 | 0 | 0 | 0 | 2 | 0 |

† Likelihood that these groups think farmers should not burn straw, scored from -2 very unlikely to +2 very likely.

‡ See notes on Table 9.2.

Group with no influence was FoE.

for most farmers, although their views on straw burning, tree planting and hedges were taken into consideration by some (20, 14 and 12%, respectively).

For straw burning the views of the NFU became relatively more important, being third after ADAS and neighbouring farmers (Table 9.5). As with the other issues, particularly pesticide use, the principal sources of influence were not necessarily seen to be against straw burning, especially in the case of neighbouring farmers. Several farmers commented that groups such as ADAS and the NFU, within the farming community, understood the farmers' dilemma and shared their view that there was no practical alternative to straw burning especially on heavy land. Other comments were that several of the farming groups had divided opinions on the matter. Non-farming neighbours, the County Council and TV environmental programmes were the most important of the influences seen as wholeheartedly in favour of a ban on burning.

9.3 Conservationists and social pressures

When conservationists were asked whom they thought farmers should turn to for conservation advice in an open-ended question, the response was even more vague and varied than that of the farmers (Table 9.6). Almost one third said they didn't know. Slightly more (42% compared with 36%) thought farmers should seek advice from within the farming community (MAFF, NFU, CLA, other farmers or agricultural colleges) than from conservation organisations (FoE, National Trust, RSPB, Naturalists Trust, Soil Association, DoE or NCC). Six per cent specifically stated that the advice should not come from conservation groups, as farmers would take little notice, and only 2% that it should not come from a farming organisation, because it would not be sound. Eighteen per cent thought the advice should come from an unbiased source or one representing a consensus view such as FWAG.

The response to the *SN* measures showed that conservationists' views on farming and conservation were strongly influenced by environmental programmes on television and to a lesser extent by the national and local press, bearing out the farmers' views in the earlier survey about the significance of 'the media' in the conflict. But farmers might be surprised at the significant influence of farming friends on many conservationists' opinions (mentioned by 38–40%).

The relative influence of different groups was similar for all four issues (Tables 9.7, 9.8, 9.9 and 9.10) although the views of FoE were relatively more influential for pesticide use (Table 9.9), and the local press (who ran an anti-straw burning campaign) more so for straw burning (Table 9.10). RSPB, the second most important influence concerning hedge removal (Table 9.7),

Table 9.6 Sources of conservation advice for farmers, as perceived by conservationists†

| | % |
|-------------------------------------|----|
| Don't know | 30 |
| Conservation groups‡ | 24 |
| MAFF | 18 |
| Independent/joint group (e.g. FWAG) | 18 |
| Farming organisation (e.g. NFU/CLA) | 14 |
| Not a conservation group | 6 |
| County Council | 4 |

† In answer to the question 'Who do you think farmers should turn to for advice about conservation on the farm?'. The total is greater than 100% because some gave more than one response. Additional responses, each mentioned once, were: government, agricultural college, local people, bible and *not* a farming organisation.

‡ Groups mentioned included FoE, National Trust, RSPB, Naturalists Trust and the Soil Organisation.

tree planting (Table 9.8) and pesticide use, was less influential about straw burning, and straw burning influences in general were weaker than for the other issues.

The influences on conservationists were almost all seen as being in favour of conservation, or at least neutral. The important exception was friends from the farming community, of whom more were likely to be seen as unfavourable to conservation-related activities apart from tree planting. All the comments, where respondents declined to score beliefs, referred to the diversity of beliefs among respected sources of information, such as scientists and farming friends.

9.4 Summary

The results confirmed the impressions from the first survey, that the views of conservation groups had little impact on the farming community.

The most important sources of influence on farmers were those within the farming community itself, or closely associated with it like ADAS. Informal sources of advice such as the family, neighbouring farmers and the landlord were particularly influential. Such sources were not always seen as being in favour of conservation, especially in the case of neighbouring farmers. With other respected groups, such as ADAS, there was sometimes uncertainty

Table 9.7 Sources and direction of influence on conservationists (C) about farmers not removing hedges

| | % | Motivn score‡ | %C with a belief score† of | | | | |
|-------------------------|----|------------------|-------------------------------|----|----|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| TV environl programmes | 72 | 102 | 0 | 0 | 0 | 30 | 38 |
| RSPB | 56 | 90 | 0 | 0 | 0 | 2 | 54 |
| Scientists | 40 | 60 | 0 | 0 | 12 | 10 | 10 |
| Farming friends | 40 | 56 | 6 | 10 | 4 | 12 | 0 |
| BHNT | 34 | 52 | 0 | 0 | 0 | 2 | 32 |
| National press | 26 | 30 | 0 | 0 | 2 | 8 | 14 |
| FoE | 18 | 28 | 0 | 0 | 0 | 2 | 16 |
| Local press | 24 | 26 | 0 | 0 | 4 | 12 | 4 |
| Natural History Society | 14 | 22 | 0 | 0 | 0 | 0 | 14 |
| Non-farming friends | 18 | 20 | 0 | 0 | 0 | 8 | 8 |
| County Council | 10 | 14 | 0 | 0 | 2 | 8 | 0 |
| Family | 10 | 14 | 0 | 0 | 0 | 2 | 8 |
| Conservation Volunteers | 8 | 14 | 0 | 0 | 0 | 2 | 6 |
| RA | 8 | 12 | 0 | 0 | 0 | 0 | 8 |
| FWAG | 4 | 6 | 0 | 2 | 0 | 0 | 2 |
| Preservation Societies | 2 | 4 | 0 | 0 | 0 | 2 | 0 |

† Belief score is the normative belief (b_j) about how likely it is that these groups of people think farmers should not remove hedges, scored from -2 very unlikely to +2 very likely.

‡ Motivation score is the percentage of respondents influenced by the group, weighted according to the likelihood of their being influenced (x_1 for quite likely and x_2 for very likely, the m_j measure).

A few respondents commented on, but did not score, the belief question for certain groups, as shown by the difference between the % column and the total % with belief scores.

Table 9.8 Sources and direction of influence on conservationists (C) about farmers planting more trees

| | % | Motivn score† | %C with a belief score‡ of | | | | |
|-------------------------|----|------------------|-------------------------------|----|---|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| TV environl programmes | 74 | 104 | 0 | 0 | 0 | 30 | 40 |
| RSPB | 58 | 94 | 0 | 0 | 0 | 2 | 56 |
| Scientist | 38 | 60 | 0 | 0 | 0 | 10 | 14 |
| Farming friends | 40 | 56 | 2 | 6 | 4 | 14 | 6 |
| BHNT | 34 | 52 | 0 | 0 | 0 | 2 | 32 |
| National press | 28 | 34 | 0 | 0 | 0 | 10 | 14 |
| FoE | 20 | 32 | 0 | 0 | 0 | 4 | 16 |
| Local press | 26 | 30 | 0 | 0 | 6 | 12 | 6 |
| Non-farming friends | 20 | 22 | 0 | 0 | 0 | 6 | 12 |
| Natural History Society | 12 | 20 | 0 | 0 | 0 | 0 | 12 |
| Family | 12 | 18 | 0 | 0 | 0 | 4 | 8 |
| Conservation Volunteers | 10 | 18 | 0 | 0 | 0 | 2 | 8 |
| County Council | 10 | 14 | 0 | 0 | 2 | 4 | 4 |
| RA | 8 | 12 | 0 | 0 | 0 | 0 | 8 |
| FWAG | 4 | 6 | 0 | 0 | 0 | 0 | 4 |
| Preservation Societies | 2 | 4 | 0 | 0 | 0 | 0 | 2 |

† Belief score is the normative belief (b_j) about how likely it is that these groups of people think farmers should plant more trees, scored from -2 very unlikely to +2 very likely.

‡ See notes on Table 9.7.

Table 9.9 Sources and direction of influence on conservationists (C) about farmers reducing pesticide use

| | % | Motivn score‡ | %C with a belief score† of | | | | |
|-------------------------|----|------------------|-------------------------------|----|----|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| TV environl programmes | 74 | 104 | 0 | 0 | 6 | 22 | 40 |
| RSPB | 60 | 98 | 0 | 0 | 0 | 6 | 54 |
| Scientists | 44 | 70 | 4 | 0 | 12 | 10 | 10 |
| Farming friends | 38 | 52 | 6 | 6 | 10 | 10 | 0 |
| FoE | 28 | 48 | 0 | 0 | 0 | 2 | 26 |
| National press | 34 | 40 | 0 | 0 | 2 | 14 | 16 |
| BHNT | 24 | 38 | 0 | 0 | 0 | 0 | 24 |
| Local press | 24 | 26 | 0 | 0 | 6 | 12 | 4 |
| Non-farming friends | 20 | 22 | 0 | 0 | 4 | 6 | 10 |
| Family | 14 | 22 | 0 | 0 | 0 | 4 | 10 |
| Natural History Society | 10 | 16 | 0 | 0 | 0 | 2 | 8 |
| County Council | 8 | 10 | 0 | 0 | 4 | 4 | 0 |
| RA | 6 | 8 | 0 | 0 | 0 | 0 | 6 |
| FWAG | 4 | 6 | 0 | 0 | 0 | 2 | 2 |
| Preservation Societies | 2 | 4 | 0 | 0 | 0 | 0 | 2 |
| Conservation Volunteers | 2 | 4 | 0 | 0 | 0 | 0 | 2 |

† Belief score is the normative belief (b_j) about how likely it is that these groups of people think farmers should reduce their pesticide use, scored from -2 very unlikely to +2 very likely.

‡ See notes on Table 9.7.

Table 9.10 Sources and direction of influence on conservationists (C) about farmers not burning straw

| | % | Motivn score‡ | %C with a belief score‡ of | | | | |
|-------------------------|----|------------------|-------------------------------|----|----|----|----|
| | | | -2 | -1 | 0 | +1 | +2 |
| TV environl programmes | 54 | 76 | 0 | 0 | 8 | 20 | 24 |
| Scientists | 36 | 56 | 0 | 0 | 16 | 8 | 6 |
| Farming friends | 38 | 54 | 12 | 8 | 4 | 4 | 2 |
| RSPB | 30 | 44 | 0 | 0 | 4 | 8 | 18 |
| Local press | 38 | 42 | 0 | 0 | 2 | 14 | 18 |
| BHNT | 18 | 26 | 0 | 0 | 4 | 2 | 12 |
| National press | 22 | 24 | 0 | 0 | 2 | 14 | 6 |
| FoE | 14 | 24 | 0 | 0 | 0 | 4 | 10 |
| Non-farming friends | 18 | 22 | 0 | 0 | 2 | 2 | 14 |
| Family | 12 | 14 | 0 | 0 | 0 | 6 | 6 |
| County Council | 8 | 10 | 0 | 0 | 0 | 6 | 2 |
| Natural History Society | 8 | 10 | 0 | 0 | 0 | 4 | 4 |
| RA | 6 | 8 | 0 | 0 | 0 | 0 | 6 |
| FWAG | 4 | 6 | 0 | 0 | 2 | 0 | 2 |

† Belief score is the normative belief (b_j) about how likely it is that these groups of people think farmers should not burn straw, scored from -2 very unlikely to +2 very likely.

‡ See notes on Table 9.7.

Groups with no influence were the Conservation Volunteers and Preservation Societies.

about their point of view so that opportunities to influence farmers were being missed.

The County Council came nearest to bridging the divide between the farming and non-farming community, particularly in as far as advice about tree planting was concerned.

No single group was clearly identified as the principal source of conservation advice, either by farmers or conservationists. Only 18% of farmers, and very few conservationists, mentioned FWAG. It seems that more effort needs to be devoted to publicising FWAG's services. Since the survey, the formation of the Farming and Wildlife Trust to raise money and promote FWAG's image, and the appointment of a full-time adviser in the county, may have increased awareness in the local farming community. Even so, the FWAG policy of being re-active rather than pro-active (Cox *et al.*, 1985a) and the relatively small number of payed advisers and support staff may reduce its impact.

In the case of the conservationists, the findings confirmed the farmer's comments about the powerful influence of television on conservationists' views. But the results also confirmed the influence which farmers themselves had; 40% of conservationists said they were influenced by their farming friends, many of whom they knew were not in favour of conservation except as far as tree planting was concerned.

Few problems were encountered with the methodological approach used. The only exception was where the referent group embraced a range of opinion, or conflicting views, to which respondents were understandably reluctant to assign a single score. For example 'neighbouring farmers' could include some both sympathetic and unsympathetic to conservation.

The disaggregated approach, scoring each group's influence separately, provided valuable information which would have been lost if a single overall measure of *SN* had been use.

The open-ended question about sources of conservation advice (Table 9.1) produced a slightly different response from that provided by the *m_i* measure (Tables 9.2-9.5), since respondents omitted to mention important informal sources of advice such as their family in answering the open-ended question.

Chapter 10

Results: behaviour

10.1 Introduction

As discussed in Section 7.2.1, the theory of reasoned action was used as the framework for examining the part played by attitudes (Chapter 8) and social pressures (Chapter 9) in determining farmers' conservation-related behaviour.

In simple situations, a single verifiable statement of intent (for example, intention to vote for a particular party in an election) can be scored and correlated by multiple regression with overall attitude and subjective norm scores to provide weightings for the relative contribution of each to behaviour, as described by Equation 3.3 in Section 3.2.2.

In this more complex situation, where the concept of conservation-related behaviour encompassed a wide variety of possible actions, a set of behaviours was examined for each issue (hedge removal, pesticide use and straw burning) as described in Section 7.2.1. The intention was to sum the scores over each set to provide a behavioural index for each issue, as suggested by Ajzen and Fishbein (1980) in such circumstances.

The construction of the behavioural index for pesticide use was relatively straightforward. The application of herbicides, fungicides and insecticides was summed to provide an index of total pesticide use for each crop. Since the measure used for each type of pesticide was equivalent, there was no distortion introduced by summing component items of the index.

Constructing a behavioural index for hedge management behaviour was very much more complicated. It involved ranking behaviours according to whether they were judged to indicate more, or less, conservation-minded behaviour. For example, farmers were asked whether they had any hedges (scored yes=1, no=0), what proportion they had removed (none=4, $\frac{1}{4}$ =3, $\frac{1}{2}$ =2, $\frac{3}{4}$ =1, all=0), whether they had removed boundary hedges (no=1, yes=0), whether they had planted hedges (yes=2, attempted but died=1, no=0) etc.

In some cases a ratio measure could be used (e.g. the proportion of hedge removed). Some items overlapped with others (e.g. proportion of hedge removed, extent of boundary hedge removal). Tree planting was considered by some to compensate for hedge removal and so might also have justifiably been included in the index. A further complication is that conservation behaviour can be active or passive; a farmer who continues to manage what already exists in a traditional way might be considered equally if not more conservation-minded than one actively creating new habitat to replace what has been lost. Taking all these factors into account, it was considered that for hedge behaviour, summing across individual actions to provide a behavioural index would have resulted in considerable distortion. It was therefore decided to study the correlation of attitudes with individual behavioural items rather than using an index.

Straw disposal behaviours were also treated as separate items, and not grouped to provide a behavioural index, since they involved three alternative actions (burning, baling and/or incorporation).

Individual behavioural scores for hedge management and straw disposal behaviour, and the behavioural index for pesticide use, were correlated with the attitude and subjective norm scores using Spearman's rank correlation coefficient, as in Tait (1983) and Tait and Fraser (1983). All correlations significant at $P \leq 0.05$ are shown in the tables which follow, but Ajzen and Fishbein (1980, p.99) suggest that only correlations of 0.30 or more are likely to be of practical significance. Values between 0.30 and 0.50 imply a moderate correlation and those greater than 0.50 a strong correlation.

For tables showing the correlations of social norms, all behaviours have been scored so that a higher score is awarded for the more desirable behaviour from a conservation point of view. For example, for hedge removal, the highest score denotes those who have removed least hedge. For pesticides, the highest score is for those who use least pesticide. For straw burning, the highest score is for those who burn least straw, whereas for baling and incorporation it is for those who bale or incorporate most.

For tables showing the correlations of attitudes with behaviour, the direction of scoring for behaviours is given in the footnote. For hedge behaviour, a higher score denotes a more conservation-minded behaviour. However, for pesticide use and straw disposal behaviours it was more straightforward to use a higher score to denote higher pesticide use, or a greater proportion of straw burnt, baled or incorporated.

The actions taken by conservationists to promote conservation are discussed at the end of the chapter. Correlations between these actions and the conservationists' attitudes and social norms are not followed up here since they are not directly comparable with the farmer correlations.

Table 10.1 *Reasons given by farmers (F) for hedge removal*

| | %F |
|-----------------------------|----|
| Larger fields | 43 |
| More efficient/economic | 16 |
| Dead elm | 10 |
| Machinery | 10 |
| Awkward corners | 8 |
| Cost of maintenance | 8 |
| Wet ground/improve drainage | 8 |
| Scruffy | 6 |
| Improve view | 2 |
| Time spent at gates | 2 |

10.2 Hedge and tree management

10.2.1 Behaviour

Only 4% of the farms had no hedges; this 4% was the result of hedge removal rather than because the farms had never been hedged. Two thirds of the farmers had done some hedge removal: 41% had removed up to a quarter, 12% up to a half and 6% up to three-quarters of their hedges. Boundary hedges had been removed on 12% of the farms. As a check on the results of the first survey, farmers were asked why they had removed hedges. The reasons given are shown in Table 10.1 and were mainly to do with field size and machinery. They were very similar to the most relevant hedge beliefs listed in Table 8.5. However the relative importance of dead elm in the list of reasons for hedge removal in Table 10.1 compared with the relevance of the belief that hedge removal ‘tidies up the countryside’ in Table 8.5 suggests that these two reasons are distinct, and that ‘removes dead elms’ should have been included as an additional salient hedge belief on the questionnaire.

Most farmers were not intending to remove any more hedges, some saying that they had done all they needed to do. But 6% who had removed a relatively small proportion in the past (less than one third) still intended to remove more. One third of farmers had planted hedges or renovated them by infilling gaps, and 27% were intending to plant them. Reasons given were mainly agricultural (shelter, shade, filling gaps—presumably to make them stock-proof) but wildlife conservation, amenity and moral reasons were also mentioned (Table 10.2).

Table 10.2 *Reasons given by farmers (F) for hedge planting*†

| | %F |
|---------------------------|----|
| Infill gaps | 16 |
| Shelter/windbreak | 14 |
| Renovate | 6 |
| Shade horticultural crops | 6 |
| Conservation | 4 |

† Enclose conservation area, wildlife, amenity and moral obligation all mentioned once.

Questions about the maintenance of existing hedges showed that more than half the farmers (55%) aimed to cut their hedges annually, although 27% left at least some for two years before trimming them (sometimes because of lack of time to complete annual cutting) and 16% allowed some hedges to grow up. Most farmers said they cut their hedges between early autumn and late winter but a few (12%) cut them as early as July, which may weaken and eventually kill the hedge (Westmacott and Worthington, 1984, pp. 63-64) or after March, which affects nesting birds.

While one quarter of the farmers kept their hedges well trimmed, below 4' 6", more than half (59%) said they kept all their hedges above 4' 6" and a further 14% kept at least some hedges above this height. Two thirds (65%) trimmed the hedges square and one third (33%) aimed for a tapered shape, considered more desirable from a conservation point of view at the time. A few (14%) layed hedges on the farm and a further 14% said they had done so in the past.

When asked their ideal field size all but one farmer gave values of 50 acres and below and 20% said 10 acres or less. Actual maximum field sizes reported were up to 210 acres, with 53% being 50 acres and more (4% less than 20 acres, 20% 20-29 acres, 16% 30-39 acres and 6% 40-49 acres). Reported minimum field sizes (the majority between 1 and 8 acres) were considered meaningless as an indicator of conservation behaviour since in many cases these referred to small paddocks close to the house, untypical of the rest of the farm.

Nearly three quarters of the farmers (73%) had planted at least some trees on the farm, and a further 8% said they intended to plant trees. Two thirds said they left some saplings on field boundaries.

The most common reasons given for tree planting were for their appearance and to replace elms killed by Dutch elm disease (Table 10.3). Only 4% mentioned commercial reasons. Conservation and a sense of moral obliga-

Table 10.3 *Reasons given by farmers (F) for tree planting†*

| | %F |
|-------------------------------|----|
| Appearance | 29 |
| Replace dead elms | 27 |
| Windbreak | 14 |
| Conservation/moral obligation | 14 |
| Unproductive areas | 12 |
| Soften buildings | 10 |
| Shelter houses | 6 |
| Game cover | 4 |
| Commercial | 4 |
| Round pond | 4 |

† NAL project officer influence, family influence, planted by estate, transplanted seedling, rehabilitate quarry, and for the grandchildren, all mentioned once.

tion were mentioned by 14%.

Numbers of trees planted ranged from 12 to 6000, with numbers in relation to farm size equivalent to between 0.2 and 11.5 per hectare, and one outlier equivalent to 107 per hectare (a farm with a commercial Christmas tree enterprise).

A great variety of tree species had been planted, with oak, ash and unspecified conifers being the most popular (Table 10.4). Species of maple were also often used.

One fifth of farmers had cleared woodland since they had been running the farm, amounts ranging from 1 to 15 acres. In most cases the main reason given was either to remove dead elm or in woodland management.

The overall impression was that wildlife conservation only affected decisions about hedge management for one sixth of the farmers at the most. Except for allowing their hedges to grow up, few measures were taken to promote conservation. Although a surprising number of farmers were planting, intending to plant or renovating hedges, it was mainly for agricultural rather than conservation reasons. The majority of farmers had planted at least some trees, mainly for amenity reasons and to replace dead elm rather than to encourage wildlife.

Table 10.4 *Tree species planted by farmers (F)†*

| | %F | | %F |
|--------------------|----|-----------------------|----|
| Oak | 43 | Hornbeam | 6 |
| Ash | 31 | Larch | 6 |
| Unspec. conifers | 25 | Lawson's cypress | 6 |
| Beech | 16 | Maple, field | 6 |
| Christmas trees | 16 | Maple, Norwegian | 6 |
| Chestnut | 14 | Silver birch | 6 |
| Alder | 12 | Unspec. Br. deciduous | 6 |
| Cherry | 12 | Unspec. Br. hardwoods | 6 |
| Lime | 12 | Ash, mountain | 4 |
| Maple, unspecified | 12 | Hawthorn | 4 |
| Poplar | 12 | Walnut | 4 |
| Sycamore | 10 | Whitebeam | 4 |
| Willow | 8 | Unspec. evergreens | 4 |

† Buckthorn, Corsican pine, disease-resistant elm, Laurel, London plane, Nothofagus, Plane, Red oak, Scots pine, Western red cedar, unspecified softwoods and 'as recommended by the County Council' were each mentioned once.

10.2.2 Correlation of behaviour with attitudes

There were strong and significant correlations of overall attitude to hedge removal with the extent of actual hedge removal (H2 and H3) or intended removal (H4) of hedges on the farm (Table 10.5). Correlations between attitudes to keeping hedges and hedge removal behaviour were less strong; this would be expected on the basis of Ajzen and Fishbein's suggestion that the closest correlation between attitude and behaviour is found when the behavioural measure corresponds closely with the attitude under investigation.

All the items in the attitude cluster to do with improving productivity (see Figure 8.3A and items marked A in Table 10.5) were strongly correlated with the extent of hedge removal (H2 and H3), particularly so where boundary as well as internal hedges had been removed (H3). Items from the attitude cluster to do with tidyness and maintenance (see Figure 8.3D and items marked D in Table 10.5) were also correlated with hedge removal but to a lesser extent. The reduction of wildlife did not appear to be a significant consideration in hedge removal, except that those who had removed boundary as well as internal hedges tended to be those least concerned about the impact of this on 'removing wildlife corridors'.

The intention still to remove hedges (H4) was again linked to the cluster of attitudes about farm productivity, although not so strongly as past hedge removal behaviour. Presumably this correlation was weakened by the fact that many people with the most strongly held views on this cluster of items had already removed all the hedges they wanted to (as mentioned in the previous section, 10.2.1). An intention to remove further hedges was also correlated with a favourable attitude to the item 'opens up the view'; again this could be explained by the fact that those still intending to remove hedges were amongst those who had removed least in the past.

There were also weak to moderate correlations between hedge removal behaviour and attitudes to keeping hedges. Those without hedges (H1) had the most unfavourable attitudes to hedges for 'shading the crop' and 'means part of the field is always wet'. However they were unlikely to think that keeping hedges 'encourages people to dump rubbish', one saying 'They'll dump it anyway'. Those still intending to remove hedges (H4) had the least favourable attitudes to hedges for the items 'means part of the field is always wet', 'creates disease pockets' and 'encourages people to dump rubbish'.

Fewer of the behaviours concerned with maintaining hedges were correlated with hedge removal attitudes (Table 10.6), as to be expected according to Ajzen and Fishbein's theory. Hedge planting (H5) was correlated with a negative attitude to 'removing a windbreak' and a corresponding positive attitude to 'providing shelter', implying that hedges were primarily being

Table 10.5 Correlation of hedge removal behaviour with attitudes†

| | | Removal behaviour | | | |
|-------------------------|-----------------------------------|-------------------|---------|---------|--------|
| | | H1 | H2 | H3 | H4 |
| <i>Removing hedges:</i> | | | | | |
| A | Is a way of increasing income | | -.56*** | -.54*** | -.39** |
| " | Makes the land more productive | -.24* | -.47*** | -.49*** | -.30* |
| " | Removes awkward corners | | -.41** | -.46*** | |
| " | Allows the use of big machines | | -.37** | -.39** | |
| " | Removes a marker for boundaries | | -.41** | -.49*** | -.28* |
| " | Removes a source of weeds | | -.32* | -.32* | -.28* |
| " | Destroys an ancient pattern | | -.28* | -.27* | -.26* |
| B | Reduces wildlife corridors | | | -.30* | |
| " | Removes a windbreak | | | -.30* | |
| " | Opens up the view | | | | -.27* |
| D | Saves time hedgecutting | | -.27* | -.33* | |
| " | Tidies up the countryside | | -.25* | -.24* | |
| " | Makes ditches easier to clean | | | -.30* | |
| " | Encourages soil erosion | | -.37** | -.38** | |
| $\sum bxe$ | | | -.40** | -.50*** | -.30* |
| <i>Keeping hedges:</i> | | | | | |
| C | Shades the crop | .28* | .25* | | |
| " | Means part of the field is wet | .32* | | | .34** |
| " | Creates disease pockets | | | .27* | .25* |
| " | Encourages people to dump rubbish | -.31* | | | .25* |

† Behaviour scored so that high score denotes more conservation-minded behaviour.

H1 any hedges on the farm, H2 proportion removed, H3 boundary hedges removed, H4 intention to remove hedges.

A–D refer to the attitude clusters shown in Figure 8.3.

No correlations of hedge removal behaviour with the attitudes 'reduces local wildlife', 'is the only way to deal with them economically if they are overgrown', 'provides shelter', 'harbours vermin' and 'is a hazard to motorists'.

No correlation of overall attitude to keeping hedges with hedge removal behaviour.

*, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

planted for sound agricultural reasons rather than for conservation.

Less frequent hedge cutting (H6) was associated with the most favourable (or least unfavourable) attitudes to hedges 'creating wet patches' and 'disease pockets' and 'providing shelter'.

Those having the most favourable attitude to removing hedges from the point of view of 'removing awkward corners' were those most likely to cut their hedges very early in the autumn or very late in the spring (H7), as were those who felt most concerned about 'destroying an ancient pattern'. The reasons for these correlations are unclear.

Those most favourably disposed to 'opening up the view' were most likely to keep their hedges trimmed low (H8), as might be expected. Those with the least favourable attitude to hedges for 'harbouring vermin', 'providing shelter' and 'being a hazard to motorists' were also likely to keep their hedges well trimmed.

There was a weak association between those who trimmed their hedges to a broad-based A shape, as opposed to a square shape, (H9) and an unfavourable attitude to the outcome 'encourages people to dump rubbish'. Those who layed some hedges (H10), or had done so in the past, were less inclined to consider 'saving time hedge cutting' a significant benefit of hedge removal, had an unfavourable attitude to removal for 'causing soil erosion' and had a less unfavourable attitude than others to hedges 'harbouring vermin'. They also felt less favourably about the hedge removal item 'removing awkward corners'.

None of the behavioural items about hedge maintenance were significantly correlated with attitudes to wildlife or wildlife corridors, implying either that many farmers are unaware of the type of hedge management that encourages wildlife or that wildlife is an insignificant factor in hedge management decisions. A further possible explanation is that the attitudinal items were not well enough matched to the hedge maintenance behaviours to provide reliable correlations.

Tree planting behaviour was only correlated with two of the attitude items about removing and keeping hedges. Farmers most in favour of removing hedges for 'saving time hedge cutting' had planted fewest trees ($r=-0.26$, $P\leq 0.05$) as had those with the most unfavourable attitude to keeping hedges (and so presumably trees too) for 'shading the crop' ($r=0.31$, $P\leq 0.05$). The practice of allowing saplings to grow up was not correlated with any of the hedge attitudes.

10.2.3 Correlation of behaviour with social pressures

There were few correlations between farmers' hedge removal behaviour and social pressures (Table 10.7). There was a weak positive association between

Table 10.6 Correlation of hedge maintenance behaviour with attitudes†

| | | Maintenance behaviour | | | | | |
|-------------------------|--------------------------------|-----------------------|------|--------|-------|-------|--------|
| | | H5 | H6 | H7 | H8 | H9 | H10 |
| <i>Removing hedges:</i> | | | | | | | |
| A | Removes awkward corners | | | -.39** | | | -.26* |
| " | Destroys an ancient pattern | | | .30* | | | |
| " | Economic if overgrown | | | | | | -.31* |
| B | Removes a windbreak | -.28* | | | | | |
| " | Opens up the view | | | | -.27* | | |
| D | Saves time hedgecutting | | | | | | -.26* |
| " | Makes ditches easier to clean | | | | | | -.28* |
| " | Encourages soil erosion | | | | | | -.40** |
| | $\sum bxe$ | | | | | | -.31* |
| <i>Keeping hedges:</i> | | | | | | | |
| B | Provides shelter | .42** | .29* | | .31* | | |
| C | Means part of the field is wet | | .29* | | | | |
| " | Creates disease pockets | | .26* | | | | |
| " | Encourages people to dump | | | | | -.25* | |
| D | Harbours vermin | | | | .25* | | .38** |
| | Is a hazard to motorists | | | | .27* | | |
| | $\sum bxe$ | | .35* | | .40** | | |

†Behaviour scored so that high score denotes more conservation-minded behaviour.

H5 planted hedges, H6 how often cut, H7 time of year cut, H8 hedge height, H9 hedge shape, H10 hedges layed.

A-D refer to the attitude clusters shown in Figure 8.3

No correlations of hedge maintenance behaviour with the attitudes: 'is a way of increasing income', 'makes the land more productive', 'allows the use of big machines', 'removes a marker for boundaries', 'removes a source of weeds', 'reduces local wildlife', 'reduces wildlife corridors', 'tidies up the countryside' and 'shades the crop'.

*, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

respect for ADAS as a source of advice and restraint in removing hedges (H1). The other correlations for hedge removal behaviour (with the farming media, BHNT, RA and the Preservation Societies) were negative. Since the influences had been selected by respondents as those whose views they respected, and most had *pro*-conservation views, the negative correlations imply that farmers who have been least conservation-minded in the past are most aware of criticism now. Thus those who have removed boundary hedges (H3) are aware that the BHNT, RA and Preservation Societies disapprove of hedge removal, those who cut their hedges at the wrong time of year from the conservation point of view (H7) are most aware of the disapproval of ADAS, their family and the NFU, and so on. A similar finding, where behaviour increased awareness of social norms, rather than social norms affecting behaviour, was noted by Tait and Fraser (1983) in their study of farmers' pesticide use.

The most positive influences on farmers over their hedge management behaviour concerned hedge height (H8). The influences of the farmer's family, FWAG and the CLA all seemed to result in higher hedges. The influence of the CLA also had a positive association with the planting of hedges (H5), as did the influence of the Conservation Volunteers. However those most influenced by the views of the Conservation Volunteers were also likely to have fewest hedges and to cut those which they did have hard back; this implies that it is farmers who have done least for conservation in the past who are taking advantage of the services provided by the Conservation Volunteers now, and so are aware that what they have done is not what the Volunteers would like. This ties in with Potter's thesis (1985), that among the groups of farmers most interested in active conservation are those who have completed planned agricultural improvements to their farms and are now prepared to devote some effort to enhancing the aesthetic or conservation value.

Taking into consideration both Table 10.7 and Table 9.2 it can be seen that ADAS, the family and the landlord, and to a lesser extent the farming media, the NFU, the County Council and FWAG, are the most important social influences on farmers' hedge management behaviour.

The extent of tree planting (T1) was associated with the positive encouragement of the family, the landlord and the RSPB. The practice of leaving saplings to grow along field boundaries (T2) was associated with the influence of ADAS and the NFU; possibly the practice was promoted by these farming organisations as a low-cost conservation exercise which would have their clients' support. Those farmers most prepared to listen to the Conservation Volunteers on the subject of trees were also those least likely to have left saplings; there was no corresponding positive association between respect for Conservation Volunteers' views and tree planting, so it was not because trees were being actively planted instead of saplings left. Rather the

Table 10.7 Correlation of hedge and tree management behaviour with social norms†

| | Hedge removal | | | Hedge maintenance | | | | | | | Trees | |
|-------------------------|---------------|----|----|-------------------|----|----|----|----|-----|------|-------|-------|
| | H1 | H2 | H3 | H5 | H6 | H7 | H8 | H9 | H11 | T1 | T2 | |
| ADAS | .26* | | | | | | | | | | | .34** |
| Family | | | | | | | | | | .25* | | |
| Neighbouring farmers | | | | | | | | | | | | |
| Landlord | | | | | | | | | | | | |
| Farming media | | | | | | | | | | | | |
| NFU | | | | | | | | | | | | |
| County Council | | | | | | | | | | | | |
| FWAG | | | | | | | | | | | | |
| CLA | | | | | | | | | | | | |
| TV environl programmes | | | | | | | | | | | | |
| Non-farming neighbours | | | | | | | | | | | | |
| RSPB | | | | | | | | | | | | |
| Scientists | | | | | | | | | | | | |
| NAL project officer | | | | | | | | | | | | |
| Conservation Volunteers | | | | | | | | | | | | |
| Commercial reps | | | | | | | | | | | | |
| Local papers | | | | | | | | | | | | |
| Natural History Society | | | | | | | | | | | | |
| BHNT | | | | | | | | | | | | |
| Preservation Societies | | | | | | | | | | | | |
| RA | | | | | | | | | | | | |
| $\sum SN$ | | | | | | | | | | | | |

† Behaviour scored so that high score denotes more conservation-minded behaviour. H1-H10 as in previous tables, T1 trees ha⁻¹, T2 saplings encouraged; H11 intention to plant hedges. *, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

negative correlation provides further evidence that those who had conserved least in the past were most likely to resort to the Conservation Volunteers for help and so were more aware that they had not done what the Volunteers desired.

The results for both hedges and trees show the importance of the family and the landlord as sources of conservation influence on farmers. Other groups, while having a positive influence on behaviour, do not affect nearly so many farmers.

10.3 Pesticide use

10.3.1 Behaviour

Farmers were first asked how they felt their own pesticide use compared with that of other farmers. More than a third felt they used less (29%) or a lot less (8%) than other farmers, while a few felt they used more (12%) or a lot more (4%). Reasons given for low use included conservation, cost, type of crop, late planting, low nitrogen input therefore less disease, beneficial insects, partridge, wildlife in general, 'know of deaths due to pesticides', 'don't go for maximum output', controlled droplet application, frightening therefore only used if absolutely necessary, no blanket spraying and perfection unnecessary. Reasons given for higher than average use included type of crop, high input/high output system and quality produce.

Asked if there were any pesticides they avoided using, six farmers mentioned Metasystox (demeton-S-methyl) and five DDT. Metasystox was disliked as an organophosphorus compound, bad for health and for the environment, because it affected ladybirds and horses and because of its smell. DDT was said to be dangerous and unavailable. Two farmers mentioned phorate and three Hostathion (triazophos), again because as organophosphorus compounds they were bad for health and for insects, especially bees, and birds. A blight spray (Polyram?) was mentioned by one as causing his face to swell, one farmer said Tilt (propiconazole) made him feel dizzy, and 2,4-D was described by another simply as dangerous. Other chemicals avoided, each mentioned by one person, were Gramoxone (paraquat), Roundup (glyphosate) and Temik (aldicarb).

All but 16% of farmers listed at least one precaution they took for environmental or wildlife reasons when using pesticides and 10% listed four. A great range of precautions were mentioned, all concerning conventional recommendations such as careful disposal of empty containers, not spraying in a stiff breeze, using selective pesticides if available, and not spraying hedge bottoms or trees. Relatively few (10%) mentioned precautions specifically concerning personal protection, such as wearing a mask, although this may

have been because they were not specifically referred to in the prompt.

Asked about non-chemical measures taken to minimise weeds, pests or disease, one fifth of the farmers were unable to mention any, but four fifths mentioned various forms of cultivation to reduce weeds (one after prompting). Five farmers (10%) mentioned mowing or topping, for example to keep down nettles in pasture or prevent the spread of weeds from verges. Twenty three (46%) said they used disease-resistant varieties but only four thought of this without prompting; three said other factors such as yield would be more important in the choice of variety. Four said they used several different varieties to minimise the risk of disease outbreaks. Three mentioned straw burning as a hygiene measure, three mentioned rotations (one after prompting) and two mentioned leaving ground fallow (in one case headlands only). Except for cultivations to reduce weeds, non-chemical measures were thus scarcely considered. Labour was twice mentioned as a constraint to the use of such measures.

Figures for pesticide use were collected only for the farmers' three main crops. Some crops such as peas, beans and oats were grown only by a few farmers and in other cases the crop description was general, such as Brassicas, so the analysis of pesticide use was restricted to the more widely grown and specifically named crops: winter wheat (grown by 86%), winter barley (37%), oilseed rape (31%), Brussels sprouts (18%) and maincrop potatoes (12%). Pesticide use on these crops is shown in Table 10.8.

By far the greatest total pesticide use occurred on Brussels sprouts, and this was mainly insecticide use. Otherwise insecticide use was usually minimal, especially on winter cereals. However in comparative terms, insecticide use on winter cereals showed the greatest variation in pesticide use among farmers. Greatest fungicide use occurred on potatoes, although some winter cereal crops were also heavily sprayed. Mean herbicide use was between one and two spray rounds on all crops and variation in herbicide use was generally low, except on Brussels sprouts where some mechanical hoeing is done. The values shown are similar to those found in previous surveys in Bedfordshire and Lincolnshire (Tait, 1983; Tait *et al.*, in preparation).

10.3.2 Correlation of behaviour with attitudes

Overall attitude to using pesticides was only significantly correlated to one measure of actual use, that for total pesticide use on oilseed rape (Table 10.9). However overall attitude was correlated to farmers' subjective assessment of their own pesticide use compared to other farmers, that is to say, attitudes were consistent with the farmers' own perception of their actual use. This suggests that farmers might be encouraged to reduce their pesticide use if they were presented with accurate comparisons of their use

Table 10.8 *Farmers' pesticide use (spray rounds): minimum, maximum and mean use and adjusted variation†*

| | | Min. | Max. | Mean | SD | CV |
|---------------------------|---|------|------|------|-----|-----|
| Winter wheat (N=41) | H | 0.5 | 3.0 | 1.6 | 0.6 | 0.4 |
| | F | 0.0 | 5.0 | 1.7 | 1.1 | 0.6 |
| | I | 0.0 | 2.0 | 0.3 | 0.5 | 1.9 |
| | T | 1.0 | 8.0 | 3.6 | 1.7 | 0.5 |
| Winter barley (N=18) | H | 0.0 | 2.9 | 1.3 | 0.7 | 0.5 |
| | F | 0.0 | 5.4 | 1.3 | 1.3 | 1.0 |
| | I | 0.0 | 1.0 | 0.1 | 0.3 | 2.9 |
| | T | 0.9 | 8.1 | 2.7 | 1.9 | 0.7 |
| Rape (N=15) | H | 0.9 | 4.0 | 2.0 | 1.0 | 0.5 |
| | F | 0.0 | 2.0 | 0.9 | 0.8 | 0.9 |
| | I | 0.0 | 2.0 | 0.8 | 0.5 | 0.6 |
| | T | 1.5 | 6.0 | 3.7 | 1.4 | 0.4 |
| Brussels sprouts (N=9) | H | 0.0 | 2.0 | 0.9 | 0.8 | 0.9 |
| | F | 0.0 | 3.0 | 1.3 | 1.0 | 0.8 |
| | I | 2.0 | 11.0 | 6.1 | 2.9 | 0.5 |
| | T | 4.0 | 13.0 | 8.3 | 3.5 | 0.4 |
| Potatoes (N=6) | H | 0.0 | 2.0 | 1.2 | 1.2 | 0.6 |
| | F | 2.0 | 4.0 | 3.0 | 3.0 | 0.2 |
| | I | 0.0 | 1.0 | 0.5 | 0.5 | 1.1 |
| | T | 3.0 | 6.0 | 4.7 | 1.2 | 0.3 |

† CV Coefficient of variation (SD/mean), a measure of deviation relative to the size of the mean, giving comparable deviations. N=No. of farmers describing this as one of their three main crops. H=herbicide, F=fungicide, I=insecticide and T=total pesticide use.

compared with others, as suggested by Tait (1983).

There were no significant correlations between total pesticide use on each of the five crops and the attitudinal items 'increases our income', 'ensures high yields', 'recovers growing costs', 'ensures quality crops', 'is restricted to carefully tested chemicals' and 'is being carried out by those with no specialised knowledge of chemicals'. Since this group of items (Cluster A in Figure 8.5) are amongst farmers' most relevant beliefs about pesticides (Table 8.7) it seems likely that the lack of correlation is due to a lack of variation in attitude among farmers about these items; most farmers view them favourably. This explanation is supported by the limited range of attitude scores for most of these items (Appendix E, Table E.7), if the extent of variation in behaviour is also taken into consideration.

The extent of total pesticide use on rape was associated with the individual attitude items 'wastes money if used on a routine basis', 'leaves toxic residues', 'harms beneficial insects' and 'harms wildlife'; low use was associated with an unfavourable attitude towards these items and vice versa.

High use of pesticides on winter barley was associated with a favourable attitude to 'keeping on top of pests, weeds and disease'. However it was also associated with unfavourable attitudes to 'leaving toxic residues', 'building up in the food chain' and 'leading to over-dependence'. These last three correlations are counter-intuitive (Tait and Fraser, 1983, p.15-16) and suggest that those farmers who use most pesticides on winter barley have misgivings about their level of use and might be open to suggestions about ways of reducing use on this crop.

The number of farmers giving pesticide data for Brussels sprouts (9) and potatoes (6) was small, so that correlations for these two crops may be unreliable. Since there were relatively few correlations they have not been included in the table, but for the sake of completeness they are mentioned here. As with winter barley, negative correlations were evident among those growing potatoes; those using most pesticides were also those with the most unfavourable attitudes to the outcomes 'leaving toxic residues' ($r=-0.84$, $P\leq 0.05$) and 'having unknown long-term effects' ($r=-0.84$, $P\leq 0.05$). However they were relatively unconcerned about the item 'affects our health' ($r=0.77$, $P\leq 0.05$).

No attitudinal items were significantly correlated with pesticide use on Brussels sprouts, although several underlying values were. High pesticide use was associated with negative evaluations of 'leaving toxic residues', 'having unknown long-term effects', 'affecting our health', 'harming beneficial insects' and 'leading to over-dependence'. As with pesticide use on barley, this suggests that the level of pesticide use on Brussels sprouts would be susceptible to change if farmers were ever to be presented with convincing evidence that these items were true.

10.3.3 Correlation of behaviour with social norms

The overall effect of social influences on pesticide use was most apparent for winter barley (Tables 10.10 and 10.11). However, the correlations were negative, implying that those using most pesticide were most aware of the criticism of people they respected. For barley this applied to both herbicide and fungicide use, but not to insecticide use—probably because insecticide use (and therefore the variation in use) on winter barley was limited. There was also a negative correlation between herbicide use on wheat and overall social pressure. Interestingly, there was a positive correlation between farmers' perception of themselves as high or low users of pesticides and overall awareness of how people they respected wanted them to behave ($\sum SN$). A similar match between farmers' own perception of their pesticide use and their attitudes to using pesticides has already been noted in Section 10.3.2. Self-assessed pesticide use was consistent with the perceived views of ADAS, the farming media and TV environmental programmes.

Another interesting point to note is that there were no correlations of pesticide use with the influence of commercial representatives, except for fungicide use on Brussels sprouts and insecticide and total pesticide use on rape. Moreover, the correlations for rape were negative, which implies that farmers were using less pesticide than the commercial representatives felt they should, since the majority of farmers perceived them to favour increased use.

Other instances of negative correlations between behaviour and sources of influence concerned the family (for total pesticide use, and particularly herbicides, on wheat and barley) and local papers (for insecticide use on wheat and fungicide use on potatoes), although the views of local papers only concerned two farmers.

There was a positive association of the perceived wishes of neighbouring farmers, TV environmental programmes and non-farming neighbours with herbicide and total pesticide use on potatoes. The sensitivity of herbicide use on potatoes to social pressures may have involved the decision whether or not to use a desiccant such as paraquat on the potato haulms, since this is a highly visible activity and some farmers believed that paraquat affected hares (see Section 5.3.1). However it would be unwise to attach too much importance to this correlation since, as mentioned before, only six farmers included potatoes among their three main crops.

Table 10.10 Correlation of pesticide use behaviour with social norms

| | SAU | Wheat N=41 | | | W. Barley N=18 | | | Rape N=15 | | | |
|-------------------------|-------|------------|---|---|----------------|---|---|-----------|---|---|--|
| | | H | F | T | H | F | T | H | F | T | |
| ADAS | .31* | | | | | | | | | | |
| Commercial reps | | | | | | | | | | | |
| Scientists | | | | | | | | | | | |
| Neighbouring farmers | | | | | | | | | | | |
| Family | | | | | | | | | | | |
| Farming media | .24* | | | | | | | | | | |
| NFU | | | | | | | | | | | |
| TV environl programmes | .26* | | | | | | | | | | |
| Landlord | | | | | | | | | | | |
| CLA | | | | | | | | | | | |
| FWAG | | | | | | | | | | | |
| Non-farming neighbours | | | | | | | | | | | |
| RSPB | | | | | | | | | | | |
| Local papers | | | | | | | | | | | |
| Natural History Society | | | | | | | | | | | |
| BHNT | | | | | | | | | | | |
| Bank manager | | | | | | | | | | | |
| $\sum SN$ | .41** | | | | | | | | | | |

N=No. of farmers describing this as one of their three main crops. SAU=self-assessed use. H=herbicide, F=fungicide, I=insecticide and T=total pesticide use (spray rounds). Behaviour scored so that a high score denotes more conservation-minded behaviour (low pesticide use). * and ** denote significance at the 0.05 and 0.01 levels, respectively.

Table 10.11 *Correlation of pesticide use behaviour with social norms (cont.)*

| | Sprouts N=9 | | | | Potatoes N=6 | | | |
|------------------------|-------------|---|---|---|--------------|---|---|------|
| | H | F | I | T | H | F | I | T |
| ADAS | .89** | | | | | | | |
| Commercial reps | .71* | | | | -.90** | | | |
| Neighbouring farmers | | | | | .87** | | | .77* |
| Farming media | | | | | -.77* | | | |
| TV environl programmes | | | | | .82* | | | .78* |
| Non-farming neighbours | | | | | .82* | | | .78* |
| Local papers | | | | | -.77* | | | |

Notation as in Table 10.10.

10.4 Straw disposal

10.4.1 Behaviour

Of the 44 farmers growing wheat, one third burnt all their wheat straw and two thirds burnt more than half. The rest of the wheat straw was mostly baled, only one farmer incorporating it all.

A greater proportion (48%) of the 42 farmers growing barley baled all their barley straw. As with wheat only one farmer (the same one) incorporated all his barley straw, although one other incorporated 70%.

On an area basis, 81% of the wheat area was burnt, 13% baled and 6% incorporated (Table 10.12). In the case of barley, the proportions of straw burnt and baled were almost equal (47:46%, respectively) and 7% was incorporated. Compared with straw disposal figures for England and Wales as a whole, the figures for burning in Bedfordshire are much higher than average and those for baling much lower (MAFF, 1986). This is almost certainly a reflection of the relative absence of livestock in the area, since in most cases where straw was baled the main reason given was for stock. Figures for incorporation were little different from average, being small both locally and nationally.

Most farmers were not intending to change their straw disposal methods but two who had previously burnt all or most of their straw were planning to incorporate more.

Almost one third of the farmers (31%) had had an accident at one time or another while straw burning, and a further 27% had been affected by accidents caused by other people.

Table 10.12 *Proportion of straw burnt, baled and incorporated on the surveyed farms compared with England and Wales as a whole (on an area basis)*

| | % Wheat straw | | | % Barley straw | | |
|-------------------------------------|---------------|-------|--------|----------------|-------|--------|
| | Burnt | Baled | Incord | Burnt | Baled | Incord |
| Bedfordshire 1984 (Farm survey) | 81 | 13 | 6 | 47 | 46 | 7 |
| Eng. and Wales 1984 (MAFF, 1986) | 56 | 34 | 10 | 14 | 82 | 4 |

10.4.2 Correlation of behaviour with attitudes

Overall attitudes to burning or incorporating straw were most closely linked to the extent of wheat straw burnt; farmers burning the most wheat straw had the most positive attitude to burning and the most negative attitude to incorporation (Table 10.13). The strong association of attitudes to straw incorporation with the extent of wheat straw burnt shows the significant role which attitudes to behavioural alternatives can play in decision making (previously discussed in Section 7.2.1) especially since some of the individual attitude items about straw incorporation were more strongly correlated to burning than were the ones about the outcomes of burning itself.

The theory of reasoned action implies that those who have the most favourable overall attitude to burning will be those most likely to burn. However the strong correlations of burning behaviour with negative attitudes to straw incorporation suggest that an overall attitude measure which takes account of attitudes to behavioural alternatives would be a better predictor of behaviour, as suggested by Jaccard (1981). This approach was tested by summing the attitudes to burning and incorporation (in practice, subtracting in this case because a negative attitude to incorporation would increase the likelihood of burning). Although this composite measure gave a weaker correlation with wheat straw burning than the two separate measures, it improved the correlation with barley straw incorporation. These findings suggest the approach is worth further investigation.

Those who baled most wheat straw were those with the most negative overall attitude to burning, and those who incorporated at least some wheat straw (only four farmers) had a more positive overall attitude to incorporation than those who did not.

There were no such associations between overall attitudes and the proportion of barley straw burnt, baled or incorporated; the decision to burn

Table 10.13 Correlation of straw disposal behaviour with attitudes

| | % Wheat straw | | | % Barley straw | | |
|--------------------------------------|---------------|--------|--------|----------------|--------|--------|
| | Burnt | Baled | Incord | Burnt | Baled | Incord |
| <i>Burning straw:</i> | | | | | | |
| A Spoils the look of the countryside | | | | | | |
| B Prevents damage to soil structure | .41** | | | .36** | -.36** | -.24* |
| " Allows early drilling | .27* | | | | | |
| " Avoids soil moisture loss | | | | | | |
| C Kills beneficial insects | | | -.29* | | | -.31* |
| " Creates smuts | | | -.30* | | | -.26* |
| " Upsets the public | .30* | | | | | |
| D Keeps costs down | | | | | -.30* | |
| " Allows minimum cultivation | .25* | | | | -.28* | .23* |
| " Cleans the soil of weeds | .33** | | | | -.37** | |
| " Returns goodness to the soil | .26* | | | | -.25* | |
| E Creates a hazard | | | | | | -.31* |
| " Causes pollution | .34** | -.32** | | | | -.32* |
| " Damages hedges and trees | | | -.31* | | | -.32** |
| " Harms wildlife | .30* | | | | | -.32** |
| H Wastes a useful resource | | | .24* | | | |
| $\sum b_{xe}$ for burning | .40** | -.28* | | | | |
| <i>Incorporating straw:</i> | | | | | | |
| A Leads to slug problems | -.33** | | | | | -.24* |
| " Means using more nitrogen | -.33** | | | | | |
| " Leads to toxins | -.42** | | | | | |
| " Standing straw fire hazard | -.29* | | | | | |
| B Makes the seedbed cloddy | -.24* | | | | | .26* |
| " Affects spray efficiency | -.28* | | | | | |
| " Turns the land wet and sticky | -.46*** | | .32** | -.32** | | .27* |
| " Means lower yields | | | | | | |
| " Means unrotted straw | | | .27* | | | |
| D Is time consuming | -.24* | | | | | |
| F Means buying extra machinery | | | | | .27* | |
| " Increases power requirements | | | | | | |
| G Adds humus to the soil | | | .37** | | | .26* |
| " Damages soil structure | -.29* | | .28* | | | .31* |
| $\sum b_{xe}$ for incorporation | -.38** | | .30* | | | |
| $\sum b_{xe}$ (burning-incorpn) | .25* | | | | | .27* |

Behaviour scored so that higher score denotes higher proportion of straw is burnt,baled or incorporated. *, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

or bale barley straw is more likely to be based mainly on the presence or absence of a demand for barley straw for stock, i.e. on the outcomes of baling rather than on those of burning or incorporation.

Turning to the correlations of individual attitude items with behaviour, those who burnt most wheat straw had the most favourable (or least unfavourable) attitudes to straw burning for 'preventing soil damage', 'allowing early drilling', 'upsetting the public', 'allowing minimum cultivation', 'cleaning the fields of weeds, pests and disease', 'returning goodness to the soil', 'causing pollution' and 'harming wildlife'. There were also significant correlations between the burning of wheat straw and attitudes to many of the items about straw incorporation. Those burning most wheat straw had the most unfavourable attitudes to straw incorporation on most counts, although not, surprisingly enough, for some of the items listed as most relevant (Table 8.10) such as 'means buying extra machinery', 'means lower yields', 'increases power requirements' and 'means unrotted straw is there for a long time afterwards'.

The baling of wheat straw was associated with a *negative attitude to 'causing pollution'*, implying that the main reason for baling rather than burning in the case of wheat straw was to avoid smoke near houses and roads. Since the baling of wheat straw was also associated with a negative evaluation (*e*) of burning for 'creating a hazard' and since non-farming neighbours did not significantly affect farmers' wheat burning behaviour (see subsequent section) it seems that attitude to the effect of smoke on nearby roads is the most likely deciding factor for those who bale wheat straw.

The closest association between attitudes and behaviour for the *incorporation* of wheat straw was that between the extent of incorporation and a favourable attitude to 'adding humus to the soil'. Farmers who incorporated straw also had the least unfavourable attitudes to 'turning the land into a wet sticky mess', 'unrotted straw being there for a long time afterwards' and 'damaging soil structure', being the least likely to believe these opinions were true. This is particularly noteworthy in that the one farmer incorporating all his straw was growing cereals mainly on heavy land, just the circumstances to which these beliefs are thought by most farmers to apply (see descriptive survey, Section 5.4.1).

Those who burnt barley straw were most likely to believe that burning 'prevents soil damage caused by heavy machinery' and that incorporation would 'turn the land into a wet sticky mess'. However such attitudes seemed to be held independently of soil type, since there was no significant correlation between farmers' attitudes to these two items and the heaviness of the soil on which they grew barley (or wheat for that matter).

Those who baled barley straw were less likely to be convinced of the benefits of burning; thus they were less convinced than others that burning

'prevents soil damage', 'keeps costs down' and 'allows minimum cultivation'; they did not evaluate 'cleaning the fields of weeds, pests and disease' as highly as those who burnt straw. They were also less likely to believe that incorporation 'means buying extra machinery' and 'increases power requirements', presumably because they were comparing incorporation with baling rather than burning.

Baling barley straw was not associated with convictions about the disadvantages of burning, such as 'creating a hazard', 'causing pollution', 'harming wildlife' and 'damaging hedges' (cluster E), again suggesting that the decision to bale barley is a pragmatic one based on a need for straw for stock rather than a desire to be socially responsible. However the incorporation of barley straw was associated with negative attitudes to these items. Incorporation was also associated with a positive attitude to 'adding humus', evaluated as good, and with a disbelief in the three items about the bad effects of incorporation on soil structure: 'turns the land into a wet sticky mess', 'makes the seedbed cloddy' and 'damages soil structure'. As mentioned previously these attitudes were not simply associated with farming on light land; the few farmers incorporating barley straw were doing so on heavy to medium soils. This suggests that if burning were banned it would not be the disaster that most farmers imagine. However those incorporating straw did have the most negative attitude to it from the aspect of 'encouraging slug problems', suggesting this was the main disadvantage they had encountered with straw incorporation.

Although it was assumed that those who had themselves had accidents while burning straw would be more convinced that burning was hazardous and damaged hedges and trees, this did not turn out to be the case. Such farmers generally felt the accidents were not of their own making, being caused for example by sudden changes in wind direction, and that they occurred rarely. Perhaps those who had had accidents took extra care to ensure they did not happen again.

10.4.3 Correlation of behaviour with social pressures

The few farmers incorporating some or all of their wheat straw were those most influenced by the views of others, especially non-farming neighbours, their own family, the farming media and their landlord (Table 10.14). The negative correlation between incorporation and the views of neighbouring farmers suggests that those incorporating straw were made more aware of their neighbours' pro-burning, anti-incorporation views.

Those burning barley straw were also affected by the views of others. The negative correlations of burning barley straw with the influence of the farming media, the County Council and the local papers suggests that those

who burnt most barley straw were most aware of criticism from these sources (since these sources were perceived to want farmers not to burn straw, Table 9.5). The positive correlation of burning barley straw with the influence of neighbouring farmers and the NFU occurs because these neighbouring farmers were generally seen as unlikely to believe that farmers should burn less straw and the NFU was generally seen as understanding the need for farmers to burn (Table 9.5).

The negative correlation between the baling of barley straw and respect for FWAG's views is hard to understand unless it is taken in conjunction with the positive correlation between FWAG's influence and the incorporation of straw, both barley and wheat. A farmer who particularly respected the views of FWAG and perceived FWAG to be against straw burning might well incorporate straw, so ruling out baling as well as burning as options.

The conservation groups were absent from the list of influences affecting straw disposal behaviour, which is not surprising given their relative indifference to the straw burning issue. However the absence of a correlation with the major potential source of influence, ADAS (Table 9.5), is more noteworthy.

10.5 Relative contribution of beliefs and values

In order to simplify the presentation of results, behavioural correlations have been shown for attitude scores only (*bxe*), and not for the underlying belief (*b*) and evaluation (*e*) scores.

For pesticide use, significant correlations of attitudes with behaviour usually depended mainly on beliefs. There was only one exception where the evaluative component dominated the *bxe* correlation (for the item 'keeps on top of pests' and the behaviour total pesticide use on barley). A similar finding of the dominance of beliefs in correlations with farmers' insecticide use behaviour led Tait and Fraser (1983) to conclude that one or other component of the attitude measure might always be redundant.

However, this did not prove to be the case for the correlations of attitudes with hedge management and straw disposal behaviour, since there were several instances where the correlation of *bxe* was greater than either that with *b* or *e* alone. There were also instances where *bxe* was correlated when *b* was not, indicating that values were playing a dominant role in the correlation.

These points are illustrated by Tables 10.15 and 10.16, which give examples for one hedge behaviour (the proportion of hedge removed, Table 10.15) and one straw disposal behaviour (the proportion of wheat straw burnt, Table 10.16).

Table 10.14 *Correlation of straw disposal behaviour with social norms*

| | % Wheat straw | | | % Barley straw | | |
|-------------------------|---------------|-------|--------|----------------|-------|--------|
| | Burnt | Baled | Incord | Burnt | Baled | Incord |
| ADAS | | | | | | |
| Neighbouring farmers | | | -.26* | .31* | .35** | |
| NFU | | | | .27* | | |
| Family | | | .36** | | | |
| Scientists | | | | | | |
| Farming media | | | .36** | -.25* | | |
| Non-farming neighbours | | | .44*** | | | |
| County Council | | | | -.32** | | |
| Commercial reps | | | | | | |
| TV environl programmes | | | .29* | | | |
| Landlord | .31* | | .34** | | | .41** |
| Local papers | | | | -.34** | | |
| FWAG | | | .27* | | -.30* | .40** |
| RSPB | | | | | | |
| CLA | | | | | | |
| NAL project officer | | | | | | |
| Conservation Volunteers | | | | | | |
| BHNT | | | | | | |
| Natural History Society | | | | | | |
| Preservation Societies | | | | | | |
| Bank manager | | | | | | |
| RA | | | | | | |

Behaviour scored so that a high score denotes the more conservation-minded behaviour.

*, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

The results suggest that values may be more heavily involved than beliefs in decisions about hedges and, to a lesser extent, straw disposal, but that beliefs rather than values may dominate decisions about pesticide use.

10.6 Behaviour of conservationists

The majority of the conservationists interviewed took at least one action in support of conservation beyond simply paying their membership fee (Table 10.17). Most popular was supporting their organisation with additional funds (76% of conservationists) even if for some this only meant buying raffle tickets and gifts from their group at Christmas.

About one third (32%) had helped occasionally with conservation projects such as coppicing, tree planting or village appraisals. Some (24%) had helped increase public awareness of conservation issues by including conservation issues in lessons, writing articles or (two people only) giving talks.

Only 10% had contacted farmers directly about a particular conservation issue, although 26% had discussed conservation with farming acquaintances.

About one third (30%) had complained to the local or county council, contacted their MP or written to the press about conservation issues.

There were no obvious differences between the groups in the actions they took, except that RSPB members seemed most likely to have social contacts among farmers (although not necessarily locally, as mentioned before) and FoE members seemed most likely to be involved in teaching about conservation and in taking indirect action by contacting an intermediary or writing to the press. (The data were not analysed statistically.)

The results show that about a third of the conservationists had openly complained about farming activities, although not usually directly to the farmer.

10.7 Other correlations

Correlations of behaviour with farm and farmer variables (such as age, farm size, farm type) were not possible because of the small number of people falling into each category.

Correlations of behaviour with general outlook were tested but few were significant. For the behavioural items about hedge removal and hedge maintenance, only four general outlook items gave correlations greater than 0.30 (Items 2, 6, 9 and 11 in Table 8.11). For the behavioural items about pesticide use, five general outlook items gave correlations greater than 0.3 (Items 4, 5, 9, 14 and 15); for all except the first, the correlations were with pesticide use on rape. For straw disposal, five general outlook items gave correlations

Table 10.15 Example of the contribution of underlying beliefs (*b*) and values (*e*) to the correlation of attitudes (*bxe*) with hedge removal behaviour

| | Proportion hedge removed (H2) | | |
|-----------------------------------|-------------------------------|----------|------------|
| | <i>b</i> | <i>e</i> | <i>bxe</i> |
| <i>Removing hedges:</i> | | | |
| Is a way of increasing income | -.42*** | -.48*** | -.56*** |
| Makes the land more productive | -.45*** | -.34** | -.47*** |
| Removes awkward corners | -.48*** | -.33* | -.41** |
| Allows the use of big machines | -.30* | -.37** | -.37** |
| Removes a marker for boundaries | | -.42** | -.41** |
| Removes a source of weeds | | -.34** | -.32* |
| Destroys an ancient pattern | .30* | | -.28* |
| Reduces wildlife corridors | | | |
| Removes a windbreak | .46*** | -.26* | |
| Opens up the view | | | |
| Saves time hedgecutting | | -.25* | -.27* |
| Tidies up the countryside | | -.31* | -.25* |
| Makes ditches easier to clean | | -.26* | |
| Encourages soil erosion | | | -.37** |
| $\sum bxe$ | | | -.40** |
| <i>Keeping hedges:</i> | | | |
| Shades the crop | | .26* | .25* |
| Means part of the field is wet | | | |
| Creates disease pockets | | | |
| Provides a harbour for vermin | | .33* | |
| Provides shelter | .29* | | |
| Encourages people to dump rubbish | | | |

Behaviour scored so that high score denotes more conservation-minded behaviour.

*, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 10.16 Example of the contribution of underlying beliefs (b) and values (e) to the correlation of attitudes (bx_e) with straw disposal behaviour

| | Proportion wheat straw burnt | | |
|------------------------------------|------------------------------|--------|-----------------|
| | b | e | bx _e |
| <i>Burning straw:</i> | | | |
| Spoils the look of the countryside | | .25* | |
| Prevents damage to soil structure | .28* | .32** | .41** |
| Allows early drilling | | .25* | .27* |
| Avoids soil moisture loss | | | |
| Kills beneficial insects | | | |
| Creates smuts | | | |
| Upsets the public | -.29* | | .30* |
| Keeps costs down | | | |
| Allows minimum cultivation | | .25* | .25* |
| Cleans the soil of weeds | .29* | .26* | .33** |
| Returns goodness to the soil | | | .26* |
| Creates a hazard | | | |
| Causes pollution | -.31* | | .34** |
| Damages hedges and trees | -.30* | | |
| Harms wildlife | -.29* | | .30* |
| Wastes a useful resource | | | |
| ∑ bx _e | | | .40** |
| <i>Incorporating straw:</i> | | | |
| Leads to slug problems | .29* | -.33** | -.33** |
| Means using more nitrogen | .29* | -.38** | -.33** |
| Leads to toxins | .42*** | -.30* | -.42** |
| Standing straw fire hazard | | | -.29* |
| Makes the seedbed cloddy | .27* | -.31* | -.24* |
| Affects spray efficiency | .33** | | -.28* |
| Turns the land wet and sticky | .39** | -.40** | -.46*** |
| Means lower yields | | | |
| Means unrotted straw | | -.27* | |
| Is time consuming | .31* | | -.24* |
| Means buying extra machinery | .37** | | |
| Increases power requirements | | | |
| Adds humus to the soil | | | |
| Damages soil structure | .27* | | -.29* |
| ∑ bx _e | | | -.38** |

Behaviour scored so that high score denotes more straw burnt.

*, ** and *** denote significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 10.17 *Action taken by conservationists to promote conservation*

| | BHWT N=20 | RSPB N=20 | FoE N=10 | Total (%) |
|-------------------------------------|--------------|--------------|-------------|--------------|
| Fund-raising | 9 | 6 | 4 | 38 |
| Selling raffle tickets | 6 | 7 | 4 | 34 |
| Donating money | 3 | 4 | 1 | 16 |
| Total raising money | 15 | 15 | 8 | 76 |
| Social contact with farmers | 3 | 6 | 2 | 22 |
| Contacted farmer direct | 3 | 1 | 1 | 10 |
| Work contact with farmers | 0 | 2 | 0 | 4 |
| Total with farmer contact | 6 | 9 | 3 | 36 |
| Active conservation work | 6 | 5 | 4 | 30 |
| Parish appraisal | 2 | 2 | 0 | 8 |
| Total involved in conservn projects | 6 | 6 | 4 | 32 |
| Contacted council or NFU | 2 | 5 | 4 | 22 |
| Contacted MP | 1 | 0 | 2 | 6 |
| Written to press | 1 | 1 | 0 | 4 |
| Total taking indirect action | 4 | 6 | 5 | 30 |
| Teaching conservation projects | 1 | 1 | 4 | 12 |
| Writing articles | 3 | 1 | 1 | 10 |
| Giving talks | 0 | 2 | 0 | 4 |
| Total increasing public awareness | 4 | 4 | 4 | 24 |
| Total taking no action | 4 | 3 | 0 | 14 |

Many conservationists took more than one action (for example, fund-raising and selling raffle tickets) so that the sum of the numbers in the columns may be greater than the total for each group of actions.

greater than 0.3 (Items 2, 5, 8, 9 and 10); the correlations were mainly with straw incorporation. Since there was no clear pattern and the correlations did not obviously add to an understanding of farmers' behaviour and the conflict, they are not pursued further here.

Part IV

Summary and Conclusions

Chapter 11

Summary and conclusions

This chapter summarises the results of the two surveys described in Parts II and III by considering the extent to which they lead to an improved understanding of the points raised in the three introductory chapters (Part I). These points concerned first, the underlying reasons for the conflict about agriculture and conservation (Chapter 1), secondly, the gaps in the existing literature on the attitudes of farmers and conservationists (Chapter 2), and thirdly, the adequacy of the Fishbein and Ajzen model as a methodological tool for this type of research (Chapter 3). The extent to which the research has satisfied the objectives listed at the end of Chapter 1, Section 1.6, is examined and areas which merit further investigation noted.

In conclusion, the practical implications of the research findings for promoting conservation among farmers are discussed.

11.1 Contribution to an understanding of the conflict

The bitter conflicts at the national level which triggered this research (Section 1.1) were not apparent at the local level. Although there were considerable differences of opinion between many farmers and conservationists over a range of conservation-related farming activities (Tables 8.3, 8.4, 8.6, 8.8 and 8.9), the limited opportunity for contact between the two communities seems to have been one of the the main reasons why open conflict did not develop.

The idea that the more serious underlying conflicts about farming and conservation might be caused by differences in values (Section 1.5) was supported by the results of the first survey (Section 5.6). In particular there were examples of extreme differences between some farmers and conservationists concerning individual freedom of action versus regulation, land ownership versus stewardship, increasing productivity versus resource con-

servation, and an orderly controlled landscape versus a less managed one. The Ajzen and Fishbein (1980) framework for studying attitudes did not prove as useful as initially hoped in distinguishing between conflicts due to differences in attitude resulting from self-centred interests and those arising from differences in deeply held moral values, so that the significance of value differences in the conflict could not be quantified. However, it did show that values played a more important role than beliefs in determining many of the attitudes which correlated with farmers' hedge removal and straw burning behaviour. This was not the case for pesticide use, where attitudes were mainly belief-driven, as shown previously by Tait and Fraser (1983).

Use of Cotgrove's scales (Cotgrove, 1982) to examine respondents' world-view confirmed the difference between farmers and conservationists over values concerning productivity versus resource conservation, but these world-view measures were poorly correlated with behaviour compared with the more context-specific attitude measures of the Ajzen and Fishbein model.

The role which differences in values play in the conflict deserves further research. There are also questions to be investigated concerning the relative importance of particular values in the conflict, since lower order values over which there is conflict may be transcended by higher order values over which there is agreement (Stern, 1980). An example in this study was that many conservationists were prepared to tolerate country sports, such as shooting, among the farming community if it meant that habitat would be preserved (Section 7.5).

The importance attached in this research to the study of conservation attitudes in relation to behaviour, rather than in isolation, was supported by the fact that when conservation was discussed in general terms there was very little disagreement between farmers and conservationists (Table 8.1); both groups agreed in principle that conservation was 'a good thing'. However, once conservation was discussed in relation to specific activities, such as hedge removal, pesticide use and straw burning, very sharp differences of opinion between the two groups emerged. While many respondents were prepared to sympathise with the other group's beliefs to a limited extent, their overall attitudes were usually dominated by their own over-riding concerns (farm business considerations for the farmer, wildlife for the conservationist).

These distinct concerns were emphasised by ordering the attitude items into groups which had been scored in a similar way, as revealed by cluster analysis. This showed, for example, that the overall positive attitude to hedge removal among farmers (Table 8.3) arose mainly from a favourable attitude to the group of items relating to farm productivity, and to a lesser extent to those relating to ease of maintenance. These advantages far outweighed the conservation disadvantages. For conservationists, on the other

hand, attitudes to farm productivity and ease of maintenance played no part in their overall attitude to hedge removal. Their strong concern about wildlife loss and soil erosion dominated all other considerations and meant that they were very much against hedge removal.

When behaviour itself was considered, the importance of farmers' attitudes to productivity compared with their attitudes to wildlife was even more apparent. For example, with hedges there was a strong association between the extent of hedge removal and a favourable attitude to the group of items concerning farm productivity, a moderate association with those concerning ease of maintenance, and scarcely any link with extent of concern about wildlife. Only in the case of hedge laying was there an association between behaviour and conservation concerns. Even the planting of hedges was associated with sound farming considerations rather than a concern for wildlife.

Associations between farmers' pesticide use behaviour and attitudes were somewhat different, in that there was general agreement among farmers about the benefits of pesticides from the farming point of view so that *these* attitudes did not explain differences in use. In the case of rape, low pesticide use was associated with conservationist-type concerns such as harming beneficial insects, wildlife and leaving toxic residues. In the case of winter barley and potatoes, on the other hand, there were negative associations between the amount of pesticide used and concern about such things as toxic residues, suggesting that high use was the cause of the concern, rather than concern leading to reduced use, as also suggested by Tait and Fraser (1983).

The results for pesticides indicate that although economic and farming considerations overwhelmingly dominated farmers' pesticide use decisions at the time of the survey, there was evidence of concern about certain aspects of use, particularly toxic residues, which might play a bigger role in behavioural decisions if economic circumstances changed.

For straw burning, negative attitudes to straw incorporation, particularly those concerning its effect on seedbed preparation, were as important in determining behaviour as positive attitudes to burning. However attitudes to upsetting the public and harming wildlife also played a part in the decision whether or not to burn. The few who incorporated straw seemed to share conservationist views about the harmful effects of burning, especially pollution and damage to hedges and wildlife, but also had negative attitudes to the slug problems created by incorporation.

The examination of the links between farmers' attitudes and behaviour showed that even though farmers may have a sympathetic attitude to wildlife, for most farmers this plays a relatively insignificant part in their everyday farming decisions. It helps account for the concern which conservationists feel despite assurances from the farming community that they care

as much as anyone about the countryside.

To turn to the reasons why this concern has so far rarely surfaced as open conflict at the local level, three possible reasons were suggested by the results of the first survey (Section 6.4). These were (1) that differences between the attitudes of the two communities were more apparent than real, being exaggerated by unintentional bias in the selection of remarks to quote, (2) that conservationists attempt to change the way the countryside is managed only indirectly via local and national government rather than by confronting local farmers, and (3) that they take no action because they have no access to the farming community and feel powerless to change farmers' behaviour.

The results of the second survey showed that the differences in attitudes between the two communities were real and not due to reporting bias. They also showed that the majority of conservationists were taking steps, other than simply supporting their group, in order to promote conservation. Mostly this involved some form of fund-raising for their group and in some cases helping with conservation projects. Only 10% had approached a farmer directly to complain about a conservation issue. Most who felt strongly about a particular incident or issue had instead taken indirect action by contacting the county council, the NFU, their MP or the press. It was not clear from the results of the second survey whether any felt very strongly and yet took no action because of a pessimistic view that nothing could be done, as suggested by Francis (1983) for other environmental issues.

Although a surprising number of conservationists had some links with farming, either socially or through work, the minimal impact of the views of the conservation community on farmers (Tables 9.2, 9.3, 9.4 and 9.5) suggests that genuine communication between the two groups is limited. The results therefore suggest that conflict is suppressed partly because most conservationists take indirect rather than direct action and partly because the opportunities for contact with local farmers are few.

Farmers' views were most strongly influenced by those within the farming community or closely associated with it. In many cases these influences served to reinforce traditional farming attitudes and so were counter to conservation.

Examination of the correlation between social pressures and behaviour showed that in practice social pressures had relatively little impact on behaviour. Many correlations were negative, suggesting that it was only after taking a particular course of action that farmers became aware of the disapproval of some groups of people. Where they were positive it was usually with groups such as neighbouring farmers who shared the dominant 'pro-productivity' view. There was, however, a positive correlation between the height of hedges and the influence of family, FWAG and CLA; between

planting hedges and the influence of the CLA and conservation volunteers; between planting trees and the influence of the family, the landlord and the RSPB; between leaving saplings to grow and the influence of ADAS, the NFU and RSPB; between some pesticides used and the influence of non-farming neighbours; and between straw incorporation and the influence of non-farming neighbours, TV environmental programmes and FWAG. It should be remembered however that the numbers of farmers influenced by conservationists in this way was very small.

11.2 Contribution to environmental attitudes' research

The use of a formal attitude research methodology relating attitudes to behaviour provided a clearer picture of the relative practical significance of particular attitudes than previous farmer studies. Thus, although these results cannot be directly compared with those of Gasson (1973), Le Vay (1979) and Casebow (1980) discussed in Section 2.1.1, it seems likely that economic considerations play a much more important role in practice than their work on farmers' motivation and values suggest. On the other hand, it is also possible that economic concerns have increased in importance since these earlier studies were done, and that for retired and part-time farmers (as included in Le Vay's survey) economics would play a less important role than shown for farmers in the present survey. It is also likely that there are regional variations and that farmers in Somerset (Casebow) and Wales (Le Vay) have different priorities from those in the eastern counties, as suggested by the results of the ADAS survey (1976) and those of Newby *et al.* (1977), discussed in Sections 2.1.3 and 2.1.5. It would be valuable to repeat these surveys using a common methodology to find out if this is the case.

The surveys of Westmacott and Worthington (1974, 1984) and MAFF (1985b) provided very good behavioural information, but unfortunately they did not use formal attitude measures to assess the link between attitudes and behaviour objectively. As this survey has shown, attitudes to conservation expressed in general terms are not a good indicator of actual conservation-related behaviour. It seems likely that previous farmer surveys, especially that of ADAS (1976), have overestimated the practical significance of farmers' expressed general interest in conservation.

Previous farmer surveys have paid considerable attention to the role of farm and farmer variables, such as farmers' age and farm type, in relation to conservation attitudes, although the results have often been inconclusive. In this survey the main interest was in comparing farmers with conservationists. The numbers in sub-categories within these two groups (such as farm

types or conservation organisation) were therefore too small to draw meaningful conclusions about the relation of such variables to attitudes. However, it would be an easy matter, and valuable, to explore this further by using a stratified sample in future surveys. It would also be interesting methodologically to investigate further Ajzen and Fishbein's (1980) claim that other variables do not improve the predictive power of their model because they are mediated through attitudes and social norms and so are already taken into account.

The use of formal measures of social norms in this research has demonstrated the almost closed circle of information in the farming community, with very little influence from outside. The fact that most of the farmers finished their formal education very young, and returned directly to work on the farm, must have minimised their exposure to alternative points of view. This is especially significant if, as Inglehart (1981) suggests, the late teens and early twenties are the most impressionable years. The farmers interviewed were predominantly in their forties and fifties. The next generation of farmers are likely to be more highly educated and so exposed to other perspectives, so that the situation may change. From this point of view it is interesting that the Ministry of Agriculture are proposing higher grants for the under forties in their new farm diversification scheme.

Measures of worldview or general outlook based on the scales used by Cotgrove (1982) showed significant differences between farmers and conservationists, especially on the 'anti-industrialist' scale. Farmers were more likely than conservationists to agree that it was important to have an expanding economy and a thriving business community, whereas conservationists were more likely to agree that the conservation of resources was important. However differences in worldview among farmers themselves were poorly correlated with their behaviour. This suggests that identifying the broad attitude framework or general outlook of respondents is a poor guide to predicting how they will act on a particular issue. It may also be that such standard scales, even though well-tested, are only valid for the population on which they were originally tested, and at that particular time.

The survey of conservationists confirmed previous findings (e.g. van Liere and Dunlap, 1980; Cotgrove, 1982) that environmentalists tend to be well-educated. From information volunteered, it was apparent that many of the conservationists worked in the non-market sector, again a finding of previous surveys (Cotgrove, 1982).

A point which does not seem to have been picked up in previous surveys of conservationists concerns the remarkably high proportion with close family farming connections (40%). A possible explanation is that their interest in conservation develops from a strong interest in the countryside, but being dispossessed of land and divorced from economic ties with farming,

they become more critical of farming practices which damage the interest of the countryside for them. Their interest in farming could be used constructively in attempts to bring the communities closer together, for example by opening up more farming meetings and demonstrations to the interested public.

The comparison of farmers and conservationists threw farmers' attitudes into greater relief than has been possible in previous surveys of farmers' views alone. It was thus more valuable in explaining the reasons for conflict, since comparisons among farmers tend to over-estimate the extent of farmers' sympathy for conservation measures.

11.3 Contribution to methodology

The theory of reasoned action has been used mainly to study relatively straightforward behavioural decisions, such as whether people will buy a particular make of car or not, how they will vote in an election, the attitudes which distinguish non-smokers from smokers. In this case the model was tested in much more complex circumstances, since what constitutes conservation behaviour cannot be precisely defined and involves value judgements. The fact that only one of the groups of people studied was in a position to convert attitudes directly into action was a further complication.

Despite these difficulties, use of the model provided valuable information, elaborating on and extending the findings of the initial qualitative survey. This suggests that the model is very robust.

Comments about the model are most conveniently divided into those concerning behaviour, attitudes and subjective norms.

11.3.1 Behaviour

The study raised two questions about the behavioural measure, the first concerning the construction and use of a behavioural index and the second concerning behavioural alternatives.

As discussed in Chapter 10, the construction of a behavioural index for pesticide use was straightforward, since the component measures of the index (herbicide, fungicide and insecticide use on individual crops) were all equivalent (although in conservation terms, herbicides and insecticides might be considered more damaging to wildlife than fungicides). However, the construction of a behavioural index for hedge removal behaviour proved extremely complex. Value judgements about what was 'good' and 'bad' in conservation terms were involved. 'Active' and 'passive' conservation further complicated the measures; is planting trees to compensate for hedge removal better or worse than never having removed any hedges in the first

place and so not needing to plant trees? In some cases there was an overlap between measures, for example the extent of hedge removal and the extent of boundary hedge removal.

The construction of indices for such complex behaviours obviously deserves more detailed further study. It may involve considerable pre-testing in order to weight the contribution of component items and, in the case of such subjective measures, validation by a team of judges.

In the case of straw disposal, farmers had three main behavioural options: they could burn, bale and/or incorporate the straw. According to Ajzen and Fishbein (1980), the correlation between attitude and behaviour will be greatest when the context of the attitude measure corresponds closely with that of the behavioural measure. However in this case some of the negative attitudes to straw incorporation correlated more closely with the proportion of straw burnt than did attitudes to straw burning itself; farmers burnt straw not only because they favoured burning but also because they were strongly opposed to incorporation.

The theory of reasoned action may need to be modified to take account of the contribution of attitudes to alternative behaviours in such circumstances. The theory implies that this should be handled by measuring attitudes to each alternative behaviour; those individuals with the most favourable attitude to each option are those most likely to act in that way. However Jaccard (1981) suggests this can give misleading results; the individual with the most favourable attitude to one option may have an even more favourable attitude to another option. A better correlation with behaviour ought to be achieved by summing the individual's attitude to all the options.

The data from this survey support Ajzen and Fishbein's approach, in that straw burning behaviour was most closely correlated to the overall positive attitude to burning, slightly less well correlated to the overall attitude to incorporation and least well correlated to the combined attitude to burning and incorporation. However the correlation with the combined attitude measure was significant, and as attitudes to the third option (baling) were not measured and so could not be included in the combined measure, the moderate correlation suggests that Jaccard's approach deserves further consideration in a more rigorous test.

11.3.2 Attitudes, beliefs and values

Several points concerning the attitudinal measures arose from the survey.

First, the correspondence between the attitude items selected as most salient and those with the largest *bxe* score (whether positive or negative) provided support for Ajzen and Fishbein's claim that belief salience, or relevance, does not need to be measured separately but is already accounted

for by the model.

Secondly, there seems to be a grey area where beliefs shade into values. Some opinion statements are almost entirely evaluative: for example, 'straw burning is selfish', 'hedges look nice'. Such statements cannot be expressed as outcomes and so are not covered by the model. Other statements which have a strong evaluative component, for example 'conservation makes everywhere look overgrown' or 'straw burning wastes a useful resource' caused respondents difficulty in separating their beliefs from their values and so were scored erratically.

Respondents also had problems evaluating negative beliefs. Some refused to evaluate them, scoring 0; some said since they didn't believe them they would only give them a moderate evaluation score; and others scored them in isolation from the belief, as intended by the model. It may be that most negative beliefs are non-salient and can be omitted from the model, or that they do not affect attitudes to the extent that positive beliefs do.

Some outcomes seemed to be used as counter-arguments and mentioned 'tongue in cheek' rather than as sincerely held beliefs which affected behaviour, for example 'keeping hedges is a hazard to motorists'. Such items again caused erratic scoring and perhaps should have been excluded from the questionnaire.

In the circumstances in which the model was used here, where only one group, the farmers, was in a position to act, there was a problem in the appropriate level of specificity for belief and evaluation. Farmers tended to relate some items, particularly 'removing hedges causes soil erosion', to their own situation whereas conservationists were thinking in more general terms.

Although the model showed that values played a more significant part in attitudes for some issues (hedge removal, straw burning) than others (pesticide use), and that there were differences in values between farmers and conservationists, it did not allow a distinction to be made between deeply held values and more pragmatic ones. Further research is needed into the significance of deeply held values in the conflict. One approach might be to explore differences in values more thoroughly in the initial survey using methods such as those developed by Eden (1979), and then to follow these up using the Ajzen and Fishbein framework but selecting items judged to show these differences most clearly. Alternatively, individual respondents with the most polarised value scores might be invited to explore their value systems with the help of in-depth approaches, such as COPE, discussed in Chapter 3. Although more deeply held values may be poor predictors of specific behaviours, it seems there is an important area of research in determining the limits to the range of behaviours which a particular deeply-held value will allow. It may also help conflict resolution to establish the ordering of such values by individuals, that is to say, which they will be

prepared to sacrifice in order to satisfy more deeply-held values.

11.3.3 Subjective norm

The only query over the subjective norm part of the model concerned the use of a unimodal as opposed to a bimodal scale in measuring motivation to comply. Where conflicting attitudes are involved, it may be best to use the bimodal scale since it is possible to imagine circumstances where an action might be taken to spite an important referent. For example in the conflict over agriculture and conservation there have been instances where farmers have ploughed up land designated as an SSSI in defiance of an NCC officer. Some of the remarks by local farmers about conservation groups such as FoE suggested they might also be tempted to act out of defiance.

11.4 Review of research objectives

A review of the research objectives listed at the end of Chapter 1 shows they have in large part been met but also indicates the need for further research.

The theory of reasoned action proved a very useful tool for studying the complex interactions between farmers and conservationists. The results provided support for two aspects of the model about which there has been some doubt. Belief salience determined by the extent of polarisation of the attitude score was almost identical to that determined by asking respondents to mark their most relevant beliefs, so there would seem to be no need for an independent measure of salience. Both belief and evaluation scores contributed to attitude, although to differing extents depending on the issue involved, so that it is not true to say that either the belief or the evaluation measure may be redundant as some researchers have suggested.

The results indicate three particular aspects of the model which should be developed further. Behavioural indices, particularly those involving value judgements, need further attention to the way in which items should be scored and the weighting they should be given in the index. The part which attitudes to alternative behaviours play in determining behaviour needs further investigation. Also, a means of distinguishing deeply held values from more pragmatic ones needs to be developed in order to explore conflicting attitudes more thoroughly.

Nevertheless, the framework of the theory of reasoned action provided valuable insights into the attitudes of farmers and conservationists in Bedfordshire. It showed that although farmers had sympathetic attitudes to conservation discussed in general terms, there were sharp differences in attitude between farmers and conservationists when it came to specific issues. However open confrontation was rare and few farmers seemed aware of the

strength of local feeling about certain farming practices such as hedge removal and frequent pesticide use. The exception was straw burning, but most conservationists considered this relatively unimportant as a conservation issue.

The examination of behaviour in relation to attitudes showed that while many farmers expressed a concern about wildlife, in practice their behaviour was dominated by economic and farming considerations.

The subjective norm part of the model confirmed the minimal influence of conservation groups on farmers' behaviour and showed their main sources of influence lay within the farming community itself, so insulating farmers from alternative points of view and increasing the potential for conflict with those outside the community. At the same time it showed that some valued sources of influence, such as ADAS, were not playing as full a role in influencing behaviour as they might, because their views on some issues were unclear to the farmers.

The study of conservationists' behaviour showed that few were prepared to take direct action and confront farmers with their views, even if they had the opportunity to do so. If they felt strongly about a particular issue they usually took indirect action, such as contacting the local authority or their MP.

The results of the first survey strongly suggested that differences in deeply held values are involved in the conflict about farming and conservation, as suggested in Chapter 1 (Section 1.5). There were indications that many farmers felt deeply about land ownership, the individual's freedom of action, an orderly landscape, and efficient, productive farming. Many conservationists, on the other hand, valued the idea of stewardship as opposed to ownership, a wilder less-managed landscape and a more careful husbanding of resources.

The first survey indicated that there was a small number of conservationists who identified closely with the dominant farming values, and a few farmers who felt as deeply as conservationists about conservation values. The number of farmers and conservationists with totally opposed beliefs and values also appeared to be relatively small. The attitudes of the majority were intermediate, with beliefs and values shared and conflicting to varying degrees. Although the theory of reasoned action proved unsatisfactory as a means of quantifying the contribution of deeply-held, as opposed to self-interested, values to conflict, it did show clearly differences in the pattern of beliefs and values between farmers and conservationists and the extent to which these influenced farmers' behaviour.

11.5 Practical implications of the research

Used in conjunction with previous research on attitude change and conflict management in other contexts, these survey results provide useful guidance for those wishing to promote conservation among farmers. The results are particularly relevant to those directly involved in advising farmers, but have implications for policy makers too.

It is clear from the second survey that for the majority of the farmers surveyed, conservation issues do not play a significant part in farming decisions even though the farmers may consider themselves sympathetic to conservation aims. In addition, the surveys suggest there is a lack of knowledge among farmers about what constitutes good conservation practice, for example in hedge management. There is uncertainty about whom to approach for conservation advice and little notice is taken of the opinions of conservation groups on farming matters related to conservation.

These findings suggest that conservation-minded behaviour is unlikely to be undertaken spontaneously, for example on land that is set-aside, without considerable persuasion or attitude change. If a more conservation-minded approach is to be encouraged it will need more active, intensive promotion of advice by respected sources, reinforced by financial inducement (in the case of conflicts of interest) and regulation (in the case of the more deeply held conflicts of value).

11.5.1 Improving effectiveness of social pressures

At present, social pressures on farmers to conserve appear to be minimal, except in so far as straw burning is concerned.

The surveys suggest that conservation advice is most likely to be heeded if it is channelled through well respected sources within the farming community. The literature on persuasion research (Cooper and Croyle, 1984) suggests that respected sources of advice who have changed their position on an issue, 'poachers turned gamekeepers', are particularly likely to be listened to, because they will be considered to have thought the issue through and to give unbiased advice. This suggests, for example, that conservation advice given by ADAS would be particularly influential (provided, that is, that is unequivocal).

Because conservation is not of central concern to farmers such as those surveyed, few actively seek out conservation advice. This may explain the limited success of the FWAG approach, which relies on the farmer to request advice, once the minority of highly motivated farmers has been covered. The uptake and diffusion of conservation ideas is unlikely to be as enthusiastic or straightforward as that of agricultural technology, such as the introduction

of improved crop varieties where there is an obvious economic pay-off. In the case of conservation methods which challenge existing farming values, diffusion is likely to be actively resisted. More widespread uptake of conservation advice will probably depend on a much more aggressive salesman-like approach, with skillful marketing, grants and other incentives to encourage the initial steps.

Greater publicity is needed for the services being offered, for example prominent and regular advertisements in the farming media. The surveys showed little awareness of FWAG and a confused picture of sources of conservation advice.

If it is to be effective in changing attitudes and behaviour, the advice offered to the farming community will need to be carefully coordinated and clearly presented, which is far from being the case at the moment. The surveys show that farmers are confused about what is expected of them; the signals from government, scientists, conservationists and the public are ambiguous.

More effort could be made to target advice at the groups most likely to respond. For example, many livestock farmers are sympathetic to conservation ideas although they may not actively seek out advice or know what they could do. Many farmers' wives, and young and old members of farming families, are interested in the less commercial aspects of the farm, such as its appearance and wildlife. Efforts should be made to involve them in discussions about conservation on farms, since the surveys show their importance as informal sources of influence.

Although the surveys show that conservation groups have a minimal direct influence on farmers' behaviour, the straw burning issue shows that public pressure can have an indirect effect by provoking a government response. Conservation groups therefore need to channel any concerns their members have about farming to maximum effect, as in the case of Friends of the Earth, by suggesting they take a unified course of action, for example by writing in to their local councillor, MP, NFU branch and press.

Conservation groups can also achieve a degree of influence over the farming community through the provision of grants. This is most likely to succeed where the farmer shares conservation values but economic interests act as a barrier to conservation behaviour. Where values are in conflict with conservationists, the transaction requires extremely sensitive handling, since the slight shift in the balance of power between farmer and conservationist may be a source of friction if those receiving money feel they are being 'controlled' and those providing it feel they are not getting value for money.

11.5.2 Changing attitudes and behaviour

In some cases (a minority in this survey), where farmers share conservationists' beliefs and values, conservation behaviour can be encouraged, as just mentioned, by removing any practical barriers to the expression of these attitudes. For example, training in conservation skills can help where the barrier is lack of knowledge, voluntary labour where the barrier is lack of time or people, and grants where the barrier is financial. In cases where attitudes are mainly belief-driven, and deeply held values not an issue, the provision of more and better information can be used to change beliefs and their salience, to give a more positive attitude to conservation behaviour.

Conservation advisers and promotional literature should emphasise the beliefs which are salient to both farmers and conservationists (and valued in the same way), for example that conservation makes the farm more attractive (from Table 8.1), that removing hedges removes a windbreak (Table 8.3) and that straw incorporation adds humus to the soil (Table 8.9).

Attention should be given to correcting misperceptions, or clarifying research findings, for example that the acceptance of grants for tree planting necessarily commits the landowner to allowing public access (as believed by a farmer in the qualitative survey), or that straw incorporation always increases the requirement for nitrogen (Table 8.9).

Salient beliefs which act as a barrier to conservation can be changed. Since economic beliefs play the dominant role in most farming decisions, economic measures are likely to be one of the most effective ways of achieving this change. These measures might be in the form of improved market opportunities. For example, in the case of pesticide use, increases in the profitability of some organic produce is already tipping the balance in favour of reduced pesticide use (although practices associated with organic farming are not invariably beneficial for conservation). The creation of economic outlets for straw products would reduce the amount of straw burnt. Other measures include grants to make a conservation-minded form of agriculture more economically attractive, or penalties and taxes to make intensive agricultural practices less profitable.

Negative salient beliefs could also be affected, in the long term, by directing research at the real disadvantages of some conservation behaviour, to find acceptable solutions, for example, to problems of slug damage when straw is incorporated.

Different beliefs could be made more salient, for example by giving wider publicity to the health hazards associated with certain pesticides. New beliefs could be introduced, again by ensuring publicity for any research or experience which shows farming benefits from conservation (as in the case of the Game Conservancy's work on conservation headlands).

By avoiding the more contentious aspects of conservation, where values conflict, and in each case focussing on those aspects where the interests of the farmer and conservationist can be aligned, much can be achieved in the way of piecemeal conservation on farms. However to achieve a situation where conservation is fully integrated into farming activities will require a change in some of the dominant farming values. These deeply held values, including those about the property rights of landowners, the merits of a tidy controlled landscape and maximum yields, and the importance of the individual's freedom of action, are likely to prove very resistant to change, since change threatens all the beliefs which follow from those values.

Attempts to change values by education, for example by exposing people to other points of view, are best directed at those in their early teens and twenties before values become entrenched.

For others, it may take shock tactics or enforcement to bring about change. A major incident or revelation, for example a dramatic increase in the known dangers of environmental pollution such as that caused by the delayed contamination of water supplies as industrial waste, fertilisers and pesticide residues percolate through to deep aquifers, could force acceptance of a changed situation, precipitating a change in behaviour despite contrary values. A period of uncertainty, as at present in agriculture, with restrictions on production and repeated warnings of worse to come, can also force people to face up to a situation and prepare them for change (Pettigrew, 1986). However the direction of change in these circumstances is likely to be unpredictable unless it is backed up by effective regulation.

In the short term, enforced change in behaviour which challenges existing values is likely to cause a considerable increase in the level of conflict. The internal inconsistency between values and behaviour is stressful for those being forced to change. A thorough understanding of the reasons underlying this period of conflict, and sympathetic handling at the local level, can have a very important influence on eventual outcomes.

References

- Adams, W. & Lowe, P.D. (1981). Continuity and change: science and values in nature conservation strategies. In *Values and Evaluation. Discussion Papers in Conservation 36* (Ed. C. Rose). London: University College.
- ADAS (1976). *Wildlife Conservation in Semi-Natural Habitats on Farms. A Survey of Farmer Attitudes and Intentions in England and Wales*. London: HMSO.
- ADAS (1986). *Hedgerows. P3027*. London: HMSO.
- Ajzen, I. & Fishbein, M. (1977). Attitude-behavior relations: a theoretical analysis and review of empirical research. *Psychological Bulletin 84*: 888-918.
- Ajzen, I. & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Allport, G.W. (1935). Attitudes. In *A Handbook of Social Psychology*, 798-844 (Ed. C. Murchinson). Worcester, Massachusetts: Clark University Press.
- Arnold, G.W. (1983). The influence of ditch and hedgerow structure, length of hedgerows, and area of woodland and garden on bird numbers on farmland. *Journal of Applied Ecology 20*: 731-750.
- Barber, D. (Ed.) (1970). *Farming and Wildlife: a Study in Compromise*. Sandy: Royal Society for the Protection of Birds.
- BCC (1980a). *Bedfordshire: Landscape and Wildlife. Landscape Technical Volume*. Bedford: Bedfordshire County Council.
- BCC (1980b). *Bedfordshire: Landscape and Wildlife. Wildlife Technical Volume*. Bedford: Bedfordshire County Council.
- Bigmore, P. (1979). *The Bedfordshire and Huntingdonshire Landscape*. London: Hodder and Stoughton.

- Body, R. (1983). *Agriculture: The Triumph and the Shame*. London: Temple Smith.
- Bogardus, E.S. (1925). Measuring social distance. *Journal of Applied Sociology* 33: 299–308.
- Bowers, J.K. & Cheshire, P. (1983). *Agriculture, the Countryside and Land Use*. London: Methuen.
- Breckler, S.J. (1984). Empirical validation of affect, behaviour and cognitions as distinct components of attitude. *Journal of Personality and Social Psychology* 47: 1191–1205.
- Brown, M.A. & Macey, S.M. (1983). Understanding residential energy conservation through attitudes and beliefs. *Environment and Planning A* 15: 404–416.
- Bull, C.J. (1986). Popular Support for Wildlife Conservation: an Analysis of the Membership and Organisation of County Nature Conservation Trusts. PhD thesis, University of London.
- Buss, D.M. & Craik, K.H. (1983). Contemporary worldviews: personal and policy implications. *Journal of Applied Social Psychology* 13: 259–280.
- Carruthers, S.P. (1986). *Alternative Enterprises for Agriculture in the UK*. Reading: Centre for Agricultural Strategy.
- Carson, R. (1963). *Silent Spring*. London: Hamilton.
- Casebow, A. (1980). Human motives in farming. *Agricultural Progress* 55: 119–123.
- Catton, W.R.Jr & Dunlap, R.E. (1980). A new ecological paradigm for post-exuberant society. *American Behavioural Scientist* 24: 15–47.
- Caufield, C. (1981). Wildlife Bill: bad law good lobbying. *New Scientist* 30 July 1981.
- CC (1980). *Hedge Management. Countryside Conservation Handbook Leaflet 7*. Cheltenham: Countryside Commission.
- CC (1985). *National Countryside Recreation Survey 1984. CCP201*. Cheltenham: Countryside Commission.

- CC (1986). What really is happening to the landscape. In *Countryside Commission News* 23 September/October 1986. Cheltenham: Countryside Commission.
- CLA (1984). *Report of the Advisory Group on the Integration of Agricultural and Environmental Policies*. London: Country Landowners Association.
- CLA & NFU (1977). *Caring for the Countryside*. London: CLA and NFU.
- Collins, E.J.T. (1985). Agriculture and conservation in England: an historical overview, 1880–1939. *Journal of the Royal Agricultural Society* 146: 38–46.
- Cooper, J. & Croyle, R.T. (1984). Attitudes and attitude change. *Annual Review of Psychology* 35: 395–426.
- Converse, J.M. (1984). Attitude measurement in psychology and sociology: the early years. In *Surveying Subjective Phenomena Vol. 2*, 3–39 (Eds C.F. Turner and E. Martin). New York: Russell Sage Foundation.
- Cotgrove, S. (1982). *Catastrophe or Cornucopia*. Chichester: Wiley.
- Cotgrove, S. & Duff, A. (1981). Environmentalism, values, and social change. *British Journal of Sociology* 32: 92–110.
- Cox, G. & Lowe, P. (1983a). A battle not the war: the politics of the Wildlife and Countryside Act. In *Countryside Planning Yearbook* (Ed. A.W. Gilg). Norwich: Geo Books.
- Cox, G. & Lowe, P. (1983b). Countryside politics: goodbye to goodwill? *The Political Quarterly* 54: 268–282.
- Cox, G., Lowe, P. & Winter, M. (1985a). Land use conflict after the Wildlife and Countryside Act 1981: the role of the Farming and Wildlife Advisory Group. *Journal of Rural Studies* 1: 173–183.
- Cox, G., Lowe, P. & Winter, M. (1985b). Changing directions in agricultural policy: corporatist arrangements in production and conservation policies. *Sociologia Ruralis* 25: 130–154.
- Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika* 16: 297–334.

- Davies, G.H. (1984). Farmers scent £40 m by ploughing up the wilds. *The Sunday Times* 11 March 1984.
- Department of the Environment (1983). *Agriculture and Pollution. Pollution Paper No. 21*. London: HMSO.
- Donaldson, J.G.S. & Donaldson, F. (1969). *Farming in Britain Today*. London: Allen Lane The Penguin Press.
- Easterby-Smith, M. (1981). The design, analysis and interpretation of repertory grids. In *Recent Advances in Personal Construct Technology*, 9–30 (Ed. M.L.G. Shaw). London: Academic Press.
- Eden, C. (1979). *Thinking in Organizations*. London: MacMillan.
- Eden, C., Smithin, T. & Wiltshire, J. (1980). Cognition simulation and learning. *Journal of Experiential Learning and Simulation* 2: 131–143.
- Eiser, J.R. & van der Pligt, J. (1979). Beliefs and values in the nuclear debate. *Journal of Applied Social Psychology* 9: 524–536.
- Fishbein, M. & Ajzen, I. (1975). *Belief, Attitude, Intention and Behaviour. An Introduction to Theory and Research*. Reading, Massachusetts: Addison-Wesley.
- Fitton, M. (1981). The farmer and the landscape: park keeper, custodian or thief? *Ecos* 2 (1): 3–9.
- Francis, R.S. (1983). Attitudes towards industrial pollution, strategies for protecting the environment, and environmental-economic trade-offs. *Journal of Applied Social Psychology* 13: 310–327.
- Friend, J. & Norris, M. (1985). Planners, agriculture and countryside conservation. Unpublished paper derived from an end of award report to the ESRC.
- FWAG (1983). *A Hedgerow Code of Practice*. Sandy: Farming and Wildlife Advisory Group.
- Gasson, R. (1973). Goals and values of farmers. *Journal of Agricultural Economics* 24: 521–542.
- Goldsmith, F.B. (1983). Evaluating nature. In *Conservation in Perspective*, 233–246 (Eds A. Warren and F.B. Goldsmith) . Chichester: Wiley.

- Goode, D.A. (1984). Conservation and value judgements. In *Planning and Ecology*, 188–205 (Eds R.D. Roberts and T.M. Roberts) . London: Chapman and Hall.
- Gray, D.B. (1985). *Ecological Beliefs and Behaviors*. London: Greenwood Press.
- Gregory, S. (1978). *Statistical Methods and the Geographer. Fourth Edition*. London: Longman.
- Guttman, L. (1944). A basis for scaling qualitative data. *American Sociological Review* 9: 139–150.
- Hardy, A.R. (1986). The Boxworth project—a progress report. In *1986 British Crop Protection Conference—Pests and Diseases, 1215–1224*. Croydon: British Crop Protection Council.
- Hirsch, F. (1977). *Social Limits to Growth*. London: Routledge and Kegan Paul.
- HMSO (1975). *Food From Our Own Resources. Cmnd. 6020*. London: HMSO.
- HMSO (1979a). *Farming and the Nation. Cmnd. 7458*. London: HMSO.
- HMSO (1979b). *Report of the Committee of Inquiry into the Acquisition and Occupancy of Agricultural Land. Cmnd. 7599*. London: HMSO.
- HMSO (1981). *Wildlife and Countryside Act 1981. Chapter 69*. London: HMSO.
- Hofstede, G. (1980). *Culture's Consequences*. London: Sage.
- Holsti, O.R. (1969). *Content Analysis for the Social Sciences and Humanities*. Reading, Massachusetts: Addison-Wesley.
- House of Commons Environment Committee (1985). *First Report. Session 1984–85. Operation and Effectiveness of Part II of the Wildlife and Countryside Act*. London: HMSO.
- Inglehart, R. (1977). *The Silent Revolution; Changing Values and Political Styles among Western Publics*. Princeton: Princeton University Press.
- Inglehart, R. (1981). Post-materialism in an environment of insecurity. *The American Political Science Review* 75: 880–900.

- Jaccard, J. (1981). Attitudes and behavior. Implications of attitudes towards behavioral alternatives. *Journal of Experimental Social Psychology* 17: 286-307.
- Jaccard, J. & Becker, M.A. (1985). Attitudes and behavior: an information integration perspective. *Journal of Experimental Social Psychology* 21: 440-465.
- Jackman, B. (1984). £3/4 m not to plant: new tree outcry. *The Sunday Times* 13 May 1984.
- Kahalas, H. & Groves, D.L. (1978). Ecology, pollution and business: a proposed planning solution. *Long Range Planning* 11: 62-66.
- Kantola, S.J., Syme, G.J. & Campbell, N.A. (1982). The role of individual differences and external variables in a test of the sufficiency of Fishbein's model to explain behavioural intentions to conserve water. *Journal of Applied Social Psychology* 12: 70-83.
- Katz, D. & Kahn, R.L. (1978). *The Social Psychology of Organizations. Second Edition*. New York: John Wiley & Sons.
- Kay, S. (1983). Melchett warns of head-on clashes. *Farmers Weekly* 14 January 1983.
- Kelly, G. (1955). *The Psychology of Personal Constructs*. New York: Norton.
- Larkin, S.B.C., Lee, M., McInnes, G., Sharp, M. & Simmonds, A. C. (1985). *The Measurement of Air Pollution and Other Factors Relating to the Practice of Straw and Stubble Burning*. Stevenage, Herts.: Warren Spring Laboratory, Department of Trade and Industry.
- Laurence Gould Consultants (1985). *Wildlife and Countryside Act 1981. Financial Guidelines for Management Agreements*. Warwick: Laurence Gould Consultants.
- Leach, G. (1975). *Energy and Agriculture*. London: International Institute for Environment and Development.
- LeVay, C. (1979). Farm viability in Mid Wales. *Town and Country Planning* 48: 197-198.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology* No. 140.

- Lowe, P. (1975). The environmental lobby (3). Participation in planning. *Built Environment Quarterly* 1: 235–238.
- Lowe, P.D. (1983). Values and institutions in the history of British nature conservation. In *Conservation in Perspective*, 329–352 (Eds A. Warren and F.B. Goldsmith) . Chichester: Wiley.
- Lowe, P.D. & Rudig, W. (1986). Political ecology and the social sciences: the state of the art. *British Journal of Political Science* 16: 223–260.
- Mabey, R. (1980). *The Common Ground: A Place for Nature in Britain's Future?* London: Hutchinson.
- Macdonald, D.W. (1984). A questionnaire survey of farmers' opinions and actions towards wildlife on farmlands. In *Agriculture and the Environment*, 171–177 (Ed. D. Jenkins) . Cambridge: NERC.
- MacEwen, A. & MacEwen, M. (1982). An unprincipled Act? *The Planner* May/June.
- Macey, S.M. & Brown, M.A. (1983). Residential energy conservation. The role of past experience in repetitive household behavior. *Environment and Behavior* 15: 123–141.
- MAFF (1979). *Farming and the Nation. Cmnd. 7458*. London: HMSO.
- MAFF (1981). *Agriculture in Eastern Region 1980–81*. Cambridge: Ministry of Agriculture, Fisheries and Food.
- MAFF (1985a). Environmental Topics on Farms. Report of Pilot Survey (unpublished). Guildford: Government Statistical Service.
- MAFF (1985b). Survey of Environmental Topics on Farms in England and Wales: 1985. MAFF Statistical Notice No. 244/85. Guildford: Government Statistical Service.
- MAFF (1986). Straw Survey 1985—England and Wales. Statistics Note 112/86. Guildford: Government Statistical Service.
- MAFF, DAFS, DA for Northern Ireland and The Welsh Office (1984). *Agricultural Statistics UK 1983*. London: HMSO.
- MAFF, DAFS, DA for Northern Ireland and The Welsh Office (1986). *Agricultural Statistics UK 1985*. London: HMSO.

- McKennell, A.C. (1970). Attitude measurement: use of coefficient alpha with cluster or factor analysis. *Sociology* 4: 227-245.
- Meadows, D.H., Meadows, D.L., Randers, J. & Behrens, W.W. (1972). *The Limits to Growth: a Report for the Club of Rome's Project on the Predicament of Mankind*. London: Earth Island.
- Melchett, P. (1982). Following a hard Act. *The Countryman* 87 (1):27-38.
- Melchett, Lord (1983). Public rights and taxpayer's money. In *Excess and Access: Farming's Response. 37th Oxford Farming Conference*. Oxford: Oxford Farming Conference.
- Mellanby, K. (1967). *Pesticides and Pollution*. London: Collins.
- Miniard, P.W. & Cohen, J.B. (1979). An examination of the Fishbein-Ajzen behavioral intention's model's concepts and measures. *Journal of Experimental Social Psychology* 17: 309-339.
- Moore, N.W. (1962). Toxic chemicals and birds. *British Birds* 55: 428-455.
- MORI (1983). *Public Attitudes towards Farmers*. London: Market and Opinion Research International.
- National Plan (1965) Cmnd. 2764*. London: HMSO.
- Newby, H., Bell, C., Rose, D. & Saunders, P. (1978). *Property, Paternalism and Power*. London: Hutchinson.
- Newby, H., Bell, C., Saunders, P. & Rose, D. (1977). Farmers' attitudes to conservation. *Countryside Recreation Review* 2: 23-30.
- NCC (1977). *Nature Conservation and Agriculture*. London: Nature Conservancy Council.
- NCC (1979). *Hedges and Shelterbelts. E1.2*. Peterborough, Cambridgeshire: Nature Conservancy Council.
- NCC (1984). *Nature Conservation in Great Britain*. Peterborough, Cambridgeshire.
- NCC (1985). *Report 1984/85*. Peterborough, Cambridgeshire: Nature Conservancy Council.
- NFU (1984). *New Directions for Agricultural Policy*. London: National Farmers Union.

- Northfield, Lord (1979). *Report of the Committee of Inquiry into the Aquisition and Occupancy of Agricultural Land. Cmnd. 7599*. London: HMSO.
- O'Connor, R.J. (1984). The importance of hedges to songbirds. In *Agriculture and the Environment*, 117–122 (Ed. D. Jenkins) . Cambridge: NERC.
- Office of Population Censuses and Surveys (1983). *Census 1981. County Report. Bedfordshire Part 2*. London: HMSO.
- Official Journal of the European Communities (1984). Commission Decision of 29 February 1984 amending Decision 78/463/EEC establishing a Community typology for agricultural holdings. *Official Journal of the European Communities L128 Vol 27*.
- Oliver-Bellasis, H.R. & Sotherton, N.W. (1986). The cereals and gamebirds research project: an independent viewpoint. In *1986 British Crop Protection Conference—Pests and Diseases*, 1225–1233. Croydon: British Crop Protection Council.
- O'Riordan, T. (1976). *Environmentalism*. London: Pion.
- O'Riordan, T. (1982). *Earth's Survival. A Conservation and Development Programme for the UK. Report No. 7. Putting Trust in the Countryside*. London: World Conservation Strategy Programme Organising Committee.
- O'Riordan, T. (1985). Environmental issues. *Progress in Human Geography 9*: 402–414.
- Osgood, C.E., Suci, G.J. & Tannenbaum, P.H. (1957). *The Measurement of Meaning*. Urbana: University of Illinois Press.
- Oskamp, S. (1977). *Attitudes and Opinions*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Otway, H.J., Maurer, D. & Thomas, K. (1978). Nuclear power. The question of public acceptance. *Futures* April 1978: 109–118.
- Parry, G. (1983). Farmer faces gaol over tree-felling. In *The Guardian* 5 March 1983.
- Pettigrew, A. M. (1986). Some limits of executive power in creating strategic change. In *The Functioning of Executive Power* (ed. by S. Srivastva). San Francisco: Jossey Bass.

- Piddington, H.R. (1981). *Land Management for Shooting and Fishing*. Cambridge: University of Cambridge, Department of Land Economy.
- Potter, C. (1983). *Investing in Rural Harmony. An Alternative Package of Agricultural Subsidies and Incentives for England and Wales*. London: World Wildlife Fund.
- Potter, C. (1985). Countryside Change in Lowland England: A Survey of Farmer Investment Behaviour. PhD Thesis, University of East Anglia.
- Powelson, D.S., Jenkinson, D.S., Pruden, G. & Johnstone, A.E. (1985). The effect of straw incorporation on the uptake of nitrogen by winter wheat. *Journal of the Science of Food and Agriculture* 36: 26–30.
- Rands, M.R.W. (1986). Effect of hedgerow characteristics on partridge breeding densities. *Journal of Applied Ecology* 23: 479–487.
- Raymond, W.F. (1984). Trends in agricultural land use: the lowlands. In *Agriculture and the Environment*, 7–13 (Ed. by D. Jenkins) . Cambridge: NERC.
- Royal Commission on Environmental Pollution (1979). *Seventh Report: Agriculture and Pollution. Cmnd. 7644*. London: HMSO.
- RSPB (1986). *Hedges and Hedgerow Birds. Birds and Agriculture Paper No. 1*. Sandy, Bedfordshire: Royal Society for the Protection of Birds.
- Schuman, H. & Johnson, M.P. (1976). Attitudes and behaviour. *Annual Review of Sociology* 2: 161–207.
- Self, P. & Storing, H. (1962). *The State and the Farmer*. London: Allen & Unwin.
- Sheail, J. (1976). *Nature in Trust*. Glasgow: Blackie.
- Shoard, M. (1980). *The Theft of the Countryside*. London: Temple Smith.
- Siegel, S. (1956). *Nonparametric Statistics for the Behavioral Sciences*. New York: McGraw-Hill.
- Sinclair, G. (ed.) (1983). *Uplands Landscape Study*. Martletwy: Environment Information Services.
- Slater, P. (1981). Construct systems in conflict. In *Recent Advances in Personal Construct Technology*, 115–123 (Ed. M.L.G. Shaw) . London: Academic Press.

- Social and Community Planning Research** (1972). *Depth Interviews and Group Discussions*. Technical Manual No. 4. London: Social and Community Planning Research.
- Social Research Consultancy** (1982). *Demonstration Farms Project. Monitoring and Evaluation Programme. Conclusions Document*. Oxford: Social Research Consultancy.
- Sturrock, F.G. & Cathie, J.** (1980). *Farm Modernisation and the Countryside. Occasional Paper No. 12*. Cambridge: University of Cambridge Department of Land Economy
- Tait, E.J.** (1977). A method for comparing pesticide usage between farmers. *Annals of Applied Biology* 86: 229–240.
- Tait, E.J.** (1979). *Measuring Attitudes to Risk: Farmers' Attitudes to the Financial, Personal and Environmental Risks Associated with Pesticide Usage. Publication No. EPR-6*. Toronto, Canada: Institute for Environmental Studies, University of Toronto.
- Tait, E.J.** (1983). Pest control decision making on brassica crops. *Advances in Applied Biology* 8: 121–188.
- Tait, E.J., Carr, S. & Russell, F.** (In preparation). Pesticides in the rural environment: political aspects of control.
- Tait, E.J. & Fraser, C.** (1983). The theory of reasoned action as a framework for the study of complex decision making: the use of insecticides by farmers. Paper presented at the British Psychological Society Conference on Applied Attitude Research: Recent Advances in Theory and Methodology, held at Surrey University on 23 March 1983.
- Tapper, S.C. & Barnes, R.F.W.** (1986). Influence of farming practice on the ecology of the brown hare (*Lepus europus*). *Journal of Applied Ecology* 23: 39–52.
- The Open University** (1975). *Attitudes and Beliefs. D101 Block 7*. Milton Keynes: The Open University Press.
- The Open University** (1982). *Government Systems—Planning and Regulation of the British Environment. T241 Module 4*. Milton Keynes: The Open University Press.
- The Open University** (1985a). *The Countryside Handbook*. Beckenham, Kent: Croom Helm.

- The Open University (1985b). *Interorganizational Relations. T244 Block IV*. Milton Keynes: The Open University Press.
- Thomas, K., Maurer, D., Fishbein, M., Otway, H.J., Hinkle, R. & Simpson, D. (1980). *A Comparative Study of Public Beliefs about Five Energy Systems*. Laxenburg, Austria: International Institute for Applied Systems Analysis.
- Thurstone, L.L. (1928). Attitudes can be measured. *American Journal of Sociology* 33: 529–554.
- Towriss, J.G. (1984). A new approach to the use of expectancy value models. *Journal of the Market Research Society* 26: 63–75.
- Triandis, H.L. (1977). *Interpersonal Behavior*. Monterey, California: Brooks/Cole.
- Van der Pligt, J., van der Linden, J. & Ester, P. (1982). Attitudes to nuclear energy: beliefs, values and false consensus. *Journal of Environmental Psychology* 2: 221–231.
- Van Liere, K.D. & Dunlap, R.E. (1980). The social bases of environmental concern: a review of hypotheses, explanations and empirical evidence. *Public Opinion Quarterly* 44: 181–197.
- Westmacott, R. & Worthington, T.R. (1974). *New Agricultural Landscapes*. Cheltenham: Countryside Commission.
- Westmacott, R. & Worthington, T.R. (1984). *Agricultural Landscapes. A Second Look*. Cheltenham: Countryside Commission.
- White, M. (1981). *The Hidden Meaning of Pay Conflict*. London: MacMillan.
- Whyte, A.V.T. (1977). *Guidelines for Field Studies in Environmental Perception*. Paris: UNESCO.
- Winegarten, A. (1978). British agriculture and the 1947 Agriculture Act. *Journal of the Royal Agricultural Society of England* 139: 74–82.
- Winnifrith, J. (1962). *The Ministry of Agriculture, Fisheries and Food*. London: George Allen and Unwin.
- Wittenbraker, J. & Gibbs, B.L. (1983). Seat belt attitudes, habits and behaviors: an adaptive amendment to the Fishbein model. *Journal of Applied Social Psychology* 5: 406–421.

- Wootton, G. (1978). *Pressure Politics in Contemporary Britain*. Lexington, Massachusetts: Lexington Books.
- Worth, J. (1984). What we think of the countryside. *Ecos* 5: 35–37.
- Worthington, T.R. (1979). *The Landscapes of Institutional Landowners. A Study for the Countryside Commission*. Cheltenham: Countryside Commission.
- Young, K. & Mills, L. (1980). *Public Policy Research: a Review of Qualitative Methods*. London: Social Science Research Council.

Appendix A

Content analysis categories

A.1 Farmers

Farm and farmer variables (including extent of contact with non-farmers).

Hedges, trees, field size.

Ponds, wetland.

Wildlife, nature, flora, game, archaeological features.

Public access, footpaths.

Pollution, nitrates.

Straw burning.

Surpluses, subsidies.

Animal welfare.

Meadows.

Pesticide use, high inputs.

Farming as a business, or as a way of life.

Land ownership, trustees, guardians, rights.

Perception of self or other farmers.

Perception of 'the others'.

Perception of rough areas, farmland, countryside.

Influences on farmer or public.

Association of ideas, e.g. pressure groups and CND.

Payment for conservation.

Field sports and conservation.

Reasons for or against conservation, e.g. appearance, shooting.

Others activities are much worse, or as bad, e.g. house building, roads.

Not our responsibility, e.g. it's up to scientists, engineers.

Meaning of conservation.

General references to conservation.

Conservation behaviours.

Changes in enterprise, e.g. from livestock to arable.

Institutional landowners.

A.2 Conservationists

Personal variables.

Hedges, trees, field size.

Ponds, wetland.

Wildlife, loss of habitat.

Footpaths, access.

Pollution, nitrates.

Straw.

Surpluses, subsidies, 'the system'.

Animal welfare.

Pesticides, chemical inputs.

Old pastures, meadows, downland.

Perception of self and conservation groups.

Perception of 'the others'.

Perception of how countryside should be.

Conservation behaviours, e.g. membership of other groups, maintenance work on reserves.

Details of organisation.

Links, or conflicts, between organisations.

Contact with farmers.

Influences on farmer or public.

Solutions, changing the system.

Institutional farms.

Others are as bad or worse, e.g. water authority.

Appendix B

Examples of farmer tape transcripts

11/8/83 3pm

Through village, past
the farm is on the RHS with a sign. (Still smarting from Harvest Gold).

I'll just put you in the picture. We're a farming company,
a subsidiary of of which I'm one of the directors.
I run the farms in what we call the Bedford area which includes all land we
farm in Bedfordshire and Buckinghamshire and that amounts to some 2000 acre
plus.

You want to talk about conservation and conservation pressures. Farmers
point of view receives relatively little... Well I agree with that.

I think from what I already know about that they have their own
nursery?

That's correct. Their own environment officer.

So perhaps you can explain to me a bit more about that. From the farming
angle? Yes.

22 Firstly we farm large scale cereals in this area so we're burning straw.
We've got large machines so we need large fields so firstly we have been
removing hedges. My own and the companies view is, what we try to do
we work in conjunction with our environmental officer and I always have to
get his agreement before we can remove hedges, that we replace it with
coppices, spinneys which we've got examples of, and I think that's fair, it
suitsus both.

So what advantages are there in removing your hedges?

For better size fields, for using the big machinery. A good sized field
is anything from 30 acres upwards. We wouldn't unless it was an awkward
shape, that's the other thing see an awkward shape, the ideal field would
be 50 acres square but they don't just come like that.

And is there an upper limit?

There is. A 100 acre field, that's OK. I've got 2. Once you get much
more than that you start to want roads through so there's no point in
removing hedges from that point of view. I mean it is done.

Are there any other reasons for removing the hedges then?

34 yes, they do carry disease from one crop to another. They're also a
harbour for the harder to kill weeds i.e twitch and we're now getting
into trouble with a weed called sterile brome there's nothing to kill it
and that starts from hedge bottoms. But they're not my reasons, my reasons
would be , because there must be another way round that, my reasons would be
for the right sized fields - workable sized fields - rationilizing.
But I strongly believe that we should put back more than we take out. I'M

prepared to pay for what were doing in putting it back, in the form of coppices, spinneys, woods.

And is that because you've got an environmental officer that influences you?

I must admit yeah he does have some influence over me because it's only human nature to do what you can get away with. You can have good intentions to do these things and you want a little bit of a push to keep up to it. You don't get away easily - he's obviously not only over me but over all the other farms.

And as well?
Yes.

And does anyone else put pressure on you?

1/6 I suppose the public in some ways. Directly? Well, yes I suppose so. Criticism for hedge removal. I mean I do get a bit involved in village life, I was chairman of the local parish council where we farm and there was a village appraisal - that's been going on for 2 years and we had 2 open meetings. It wasn't particularly criticism over my farm but one farmer got highly criticised for using these flail type hedge - he had made a terrible mess, it'll be alright once it greens up - it is the look of the thing. I think from the farming point of view we've got to watch some of these things. Because public opinion carries more and more weight. I mean straw burning is our worst thing but there are so many plusses to it on this type of farm - were on very heavy clay. and I'M drilling 2000 plus acres into winter cereals there's a limited time - we'll finish harvesting the end of August, early September - and by mid-October or at the latest the end of October we want to be drilled up again. That's such a short time that to burn the straw is the only economic way to do it and the plusses we get after that are disease control, weed control and the ground does work minimum-cultivation wise, through the bit of heat put over it.

And does that go straight back into winter cereals?

We grow oil seed rape, a bit of winter barley and a lot of winter wheat.

So if you wer'nt allowed to burn what would you do?

If were' not allowed to burn we're in a mess. I'm looking at these burner type things for burning off stubble. There's nothing very successful there and I can't see how they're going to work. I think, my personal opinion is, when a ban does come we'll have some sort of chemical we can spray on to rot it all down because there's no - I mean we keep hearing about this briquette job and this that and the other but the economics of that are not good enough yet - but it's not only that - it's the time involved in getting all that stuff off the ground and the weather comes into it - you can have as much machinery as you like to do it - you get a night's rain you'd mess the ground up too much to get drilled up - that is the big problem. -you'd rut it - I mean this ground can be like concrete one minute and a nights rain and its just like a lot of grease. To say incorporate it, it's not on on heavy land -there's a case for it on lighter lands, where they're easier working and getting some humus back in is a good thing but this land - we don't plough an acre now. In the days we did, 2 years later, 5 years, 10, you could still plough straw up that had been turned in so you see it just doesn't break down.

157 And are you direct drilling?

We went into direct drilling and we settled for a mid-way between minimum cultivation and direct drilling. We do just move the ground. One of the reasons is to try and incorporate this ash as quick as we can. When we get a burn, the ash is more trouble than anything, if you get a wind anything up to a week or more then that's the big environmental trouble.

And do you have individuals complain about that?

9: 115 Yes I get a lot of complaint about that. I make great efforts to do our firebreaks. One thing I mustn't do is scorch hedges and that's very very difficult at times there's so much heat comes from this straw that you can scorch a hedge in some conditions 100 yards away if it goes wrong for you. What we do we bale 40 metres round. We either remove that, the bit we want - I do keep a few cattle through the winter - but the other we push into the middle of the field and burn it. Then we do our firebreaks - but you can still get scorch. The biggest trouble is the bit you remove that's where you get your weeds and disease from - that's why I'm looking at this calor gas burner.

And are they people in the village complaining or are they any pressure groups?

People in the village complaining. Here's the burner. (I've seen choppers but not these).

We use spreaders, but choppers - straight away you need alot more power. If we chopped it there'd be so much - you see the trouble is it's a vicious circle really - there's no manufacturer going to devize anything to break this straw down until he can sell it. So until there's a ban nobody's going to start really working on it. But I accept that the day will come when we are banned from burning straw, but until that time I don't know what the answer's going to be.

Is it banned in parts of Cambridgeshire?

153 Cambridgeshire they're trying hard, Bedfordshire they're trying hard. I know they had a lot of trouble in Cambridgeshire last year because there're some very large farms up there - they're like prairies aren't they. I think we do suffer a bit from being a large company - you always stand to get a bit more flack than an individual. I always have to watch what I say because if I was an individual I needn't choose my words so carefully. We don't set out to upset people, I don't think anybody does the majority don't, but it's very difficult with this straw burning. You've got roads houses and what have you, well the first thing must be to keep it away from the road to cause accidents, main roads. There's a limited time to do it, if it gets wet the stuff all gets through - these are all the problems.

It seems to me that farmers that are more involved in the village are more aware.

Today in the villages I term as townies. We get a lot of townies coming into the village as don't understand it and they're always the ones who complain. I think the farming community having these open days is a good thing when youre talking to people and they can start understanding some of our problems. There's always the person who doesn't want to understand your problem because he thinks you're an overpaid underworked... but this is all part of life.

Yes it seems when you can talk to a person face to face you can solve some of the problems.

9: 164 Yeah. When people ring me up to complain, some people you can talk to, reason with - others you do'nt get a word in - they say what they

9:
say what they've got to say and they don't want to listen - but more people who ring up to complain I usually apologise and try and point out why it happened and they go off quite happy - well not so happy if the smuts have all got in the house, but they accept it - but there are some people they're not going to accept it, they get stirred up by the media. The other thing is - I know we're supposed to be talking conservation and I'm going on and on about this straw burning - from the conservation point of view there's a fair bit of shooting and that does one to put game cover in etc.

Are you interested in shooting?

I'm very interested in shooting. I'm lucky enough to have several 100 odd acres down that way that I have the shoot of. So that gives me an interest and we done quite a bit of planting of trees of one sort and another and also it makes you extra careful not to burn your hedges or trim them back too much.

So the hedges you've got left how do you manage them?

Well, I have to keep them in check obviously. We try to trim round them every year if we can. Again that's always difficult on this land because there's so much work at harvest - that's the best time to do it - we usually end up doing it in early spring, before the birds get nesting and that sort of thing, when the ground will carry. You can't do much in this sort of land through the winter.

And if you're interested in shooting does that make you more wary of using pesticides - do you have any feelings about it?

No, I don't really, because your work must always come first. I think today you've got to earn a living and if you like make a profit - that's what we're all in business for. Not at cost but we must be up with modern methods and techniques. I do try - well one instance I'll give, we grow a lot of rape and I'm very aware of bees. I always do give warning to bee keepers and we make sure the flower's gone. But I would still use the best chemical to do the job. I've used some of the others that they say don't kill the ladybirds etc. but quite frankly they don't do the job. So we must use the more persistent ones. I think now we've got these pyrethrum's coming along which are a lot better in that respect, they're not going to do so much harm. I try all these things. Again from the game point of view I know we've had a decline in hares and everybody blames it onto gramoxone - well, it may or may not be but when you - if you look at the hare he needs rough grass and so on to live on but alright a few years back a few years back we had quite a bit of rough grass about but now it's all farmed. I mean out the back of my house there they're now digging for clay but there was a hill at the back and on a wet afternoon you could sit and look out there and count 40 or 50 hares come off the plough and onto the grass but now that's gone there's nowhere for them to go and I think it's the change in that environment through going into cereals - I mean we used to keep a lot of cattle at one time and a lot of grass of course and people are apt to say that is this herbicide or insecticide - I agree the ones we use on cereals must have some effect because a lot of partridge and so on live on insects so in that respect yes. I keep up with modern techniques but we don't what I call blanket spray. I try to spray only when necessary, take the middle line if you like but there are some people they live on the sprayer.

And do you worry about resistance to fungicides or do you think there will always be another one?

Well, all these things are concerning. We are now swapping fungicides about a bit so we try not to build up resistance - I'm not a chemist, I'm not ←

sure whether it's the right thing. Today we're using half rates a lot and going twice - so you can look at sprays and fungicides as an insurance. I mean a lot of the time it's no good actually waiting until the disease is there, it's too late. You've got to be on the ball, so using a half rate can help but it could be building up immunity.

You use the half rate as a precaution?

It's a recommended procedure now. So if you look at it from an insurance point of view, you're going to spend x pounds and it's how you spend it, you can say I'll use it half rate and it'll only give me six weeks cover or I'll wait until the disease is there and put it all on, but you're extending your cover by using two half rates.

These mixed cereals, are they widely used?

The blends? They're not. I must admit I've mixed feelings about them. We did some 8/9 years ago work with ADAS on mixed spring barley blends, but you always get the feeling are you getting the best - I know you can think about it variety A suffers from brown rust and variety B from yellow rust and C from some other disease so you're hedging your bets, but all the blends - I was round at some trial plots last week and the winter wheat blend looked pretty good but they'd all got one low yielder in them and it's like a pure strain and a bit of a mongrel. That's how I feel about it.

And the low yielder isn't made up for by reduced inputs?

Well this is questionable. You'd need a lot of trials. This is where farmers - we're not in a position - a lot of our things are judged by eye - you've got to get into the business where you weigh everything up and do trials and there's not the time .

Do you take advice, or do you just read what you can?

Well I read a lot. I take a lot of advice from ADAS because they're the impartial ones. I listen to all these people and at the end of the day I try and make my own mind up. I mean at this time of the year I'm looking for the varieties I shall be growing next year and nowadays we've got new varieties all the while, they're not like the old varieties they don't last for years - you can have a couple of good years with them and the third year they go bang - they break down with something or other. So it's essential to be up - and knowing - at the same time you can go and look at them/^{on} trial plots but what they'll do for you is another thing. So I'm trying to be a year or so in front and I look around the trials this year to see what I fancy and then probably buy a small quantity and grow it on a trial scale and develop from that.

And the fertilizer problems, high nitrates, do you worry about that yet?

I'm not - I always thought I put a lot on but I think it's a bit of a rat race nowadays because I'm not putting the highest nitrates on. I don't well, I like to think on this heavy land we're not getting a lot of leaching. I think you need an inch of rain to send it down half an inch or something of that order. The heaviest dressings we're putting is on on oilseed rape where we're putting something like 6cwt, that's 200 units, we put that in two dressings. The most I put down at one time is 100 units at the very most, mainly we put 50/60 units down at a time.

You're saying that's lower than some?

Yes my cereals I'll be putting on something of the order of 150 units,

probably a bit more but you see people are now putting on 200 plus
Whether they're getting that return I don't know.

How do you weigh it up?

Again - what I'm trying to get here is a weighbridge, but they're a lot of money - we can only go on averages - what corn we sell at the end of the year on the acreage we've grown it. We're looking for 3 ton an acre which when you talk to farmers that's low, but when I look at some of my neighbours crops, and other farmers crops, they say we had 4 ton I know from my crops they didn't. It's very easy to say that. I do weigh my trailers so that I've got some idea of how it's going bushel wise and we're never far out of what we calculate after harvest to what we sell. So I'm not just whopping nitrogen on and saying the yields will come anyway because I don't think they do.

But others would?

Well yes - there are - there's all sorts of sums about so many units of this and so many units of that. I think this nitrate's a worry but the other factor is we're now better drained and the stuff is getting through that much easier - I suppose that's how it's getting into the rivers. I like to think a lot of these things we're scared into. When you think back to the water we drank and some of the things we used in my younger days were a lot more dangerous than the things we use today I'm sure. We grew a lot of potatoes and we were using arsenic based stuff. I remember my brother going to spray some potatoes with this arsenic spray, he'd got a brand new tractor, and when he came back it had stripped the paint off the tractor and he was a bit of a mess and all. His face had gone all red. We used arsenic based sprays for dipping sheep, for pig foot rot and that sort of thing so you've got to get things in perspective. I'm not saying all we do today is right and it couldn't be better, and we should be looking at these things, but it's very good to have ideals but we've got to stay in business. You can have the best ideals and be out of business. These are the sort of lines I look along.

Have you brought a lot of your rough land into production?

We are doing. We're large farmers. We're farmers in Bedfordshire.

Oakley. My idea, rightly or wrongly, is we clean up all the areas we've already got before we take on more land and in that respect, we had a big area over that way wh-

so that's now a nature reserve but there was 60 acres of land all round it which was derelict really hadn't been farmed since the turn of the century, we've brought that into production. WE've had three cereal crops off it all yielding two ton and more and we've now got oil seed rape on it which looks pretty fair. It was a real battle to get it because 20 acres of it was used by the War Department to try out Vickers tanks and blowing buildings to bits to see if they were shatter proof so we did 5/6 years ago square that up because we were ate out with rabbits on it and they used to clear the surrounding crops. So that's been a good exercise . We've tidied up from the farming point of view. I think probably some wildlife has gone but I don't think to that extent because round these pits there's still a fair bit of rough area. I've been here 17 years now - I came from N. Bedfordshire where we were into sprouts and market gardening and the first thing I noticed was the wildlife about here. I mean I'd never seen herons and that sort of thing stand about the fields - we get a lot of those and magpies and those sort of birds. We really were using the sprays in market gardening because we were using metasystox and that type of thing for fly and aphids and I think that was doing the little

birds.

Does do anything in the conservation line for its tenants?
Does it provide them with trees for example?

Yes, they're the same as I am - if they want a hedge out or they want to do anything or plant up they will be helped - yes the trees are given. Usually we (the farmers) do the work and they provide the materials.

And are they encouraged to do that?

Well, they're encouraged to do it. Then again, that depends how persuasive the environment officer is. I mean I've promised to do different things, I've done some of them and not others - Isay there's some times when you've got to come and kick us up the backside and say get on with it - it depends on him really.

Does he make regular visits round or only when you ask him to come?

Only when you ask him to come really, else he'd be so weighed down. You can imagine all the environmental trouble he's got to do and what not-probably we're a smaller part of his work.

And if people plant any of their land to trees would they still have to pay rent on that land?

I think that would be negotiable with the land agent . I mean I've got areas planted up. Round the back of my house

They've now planted strips right the way through that's all come out of my tenancy . We are tenants of The other tenants would be the same. That acreage is taken out.

I'm interested in what makes some farmers take an interest in conservation while others don't want anything to do with it.

Well there's some people really go to town on it. I can think of some farmers but there's usually a reason behind it and it's usually hunting fishing shooting. And they like to see it. I can think of one farmer his place is smashing and I think that's what he gets out of life. There's that to it, I mean when I go about and look at farms there's some seem more desirable to work on than others. I won't say I never burn a hedge, I do my utmost, I hate to see a hedge burnt but what comes in to that is your men, some men are more careful than others, but it's not very nice to see hedges burnt. Since I took this lot over I've cleared up a lot of dead trees because I hate to see them. We get blamed for killing trees, but a lot of it was elm disease. When you see a lot of dead trees about its a bit depressing and I'm a bit proud of what I've done. After saying that I've got two dead ones in the orchard, they'll come down hopefully this winter but again you're torn between when you've got the time and when you won't disturb the pheasants but I think it's conservation, to tidy the place up.

I wondered whether people with more of an income would be more able to go round thinking of the appearance of their farm?

I'm sure you're right. All the people I can think of who I would call good conservationists are the better farmers, the ones who do the job properly and obviously make more money.

Whereas once it would have been the untidy farmer?

Then again you see it's what your ideas are of conservation. I did my National Service and I used to travel up and down from North Bedfordshire and think god I couldn't possibly live and work in that area but when you get in it and among it it's not so bad. Over the years I've been here I think it's been built up better.

I also wondered if the type of training, if they'd had an intensive agricultural training at college...?

Well that's one thing I never had so I cant really comment on that. I think you've possibly got a point there. I think the youngsters, they must have something instilled in them at college. I think we're all different as people, we're probably all different as farmers. Some farmers care more about how their farms look in every aspect. I mean I like to see the place looking tidy - we're reasonably tidy, I can always see it looking tidier. But some farms I go to I couldn't live - I think if you have a tidy mind then that must go through the farm in all respects and in conservation too. I can think of a good friend of mine who's a farmer and we nickname him Steptoe, his thing is machinery and his idea of conservation is to stick a few leylandii up to hide his old tackle but I notice he's run his crawler over - we're all different aren't we. When we get busy I like to run my tackle and when we're ready to go we're ready to go - there's nothing he likes more than when his breaks down because he loves pulling it to bits - the farming is secondary to the machinery... (While away on holiday men tidied up the yard and pulled down some greenery from the farm buildings - I like to see some greenery in the work environment.)

Another thing I don't like to see - on some farms they just go round with round-up or gramoxone and do the lot, weeds this high. Well I use it but I always trim them low then it doesn't look to bad. Again whether you'd term that conservation I don't know, it's all part of it I suppose. I know, coming back to when we did this appraisal of the village they showed films they showed us lovely countryside with great big hedges. Well they're all very nice but they're not very good for farming.

Why do you say that?

If you've got it into grass it's a job to make hay because the big high hedge shades so much of the field and the stuff never dries. Some hedges I've got the land agent says that hedge has got to grow up - it's a bit of a nuisance to us because again you get the shade and this is why some farmers just wipe the hedge right out at the bottom and just keep doing it.

Who's responsible for doing the appraisal ?

The parish council were. The County Council started it and we had a very good response.

Are you part of Well we farm right through. Before I moved down to here I used to live within the parish of and that's how I came to be on the parish council and I was chairman for the last five years - I've just this year given it up. We had a good response and all who took part in it did some good work. I was a farmer on it our vice-chairman was a farmer and a couple of other farmers came to it, but they were all a little bit edgy - you see footpaths always come into it and that's their big bugbear again. Well with footpaths, if people would use them properly fair enough but you always get the chap who takes Bonzo and lets him wander everywhere and leaves the gates open and that sort of thing, they can be a darn nuisance to us. I like to be amenable but I find that footpaths, they'll go along the boundary and then they'll suddenly cut across a field. Alright, there's a footpath there why not

take it round the edge, but some people get very dogmatic about that and then the fun starts. All the people that use footpaths today it's for pleasure, what they were first for was going to work and church. Mainly where footpaths run it's the church or a set of buildings where there were animals and the chap went to feed them. (And so they should be rationalised?) Yes I think so. What does it matter if they go round the edge and walk a bit farther.

Do you have any problems? Is that Nature Reserve within your farm?

Yes it's within my farm. It's been agreed by the Land Agents that it should be - we were involved in the agreeing of it. That's alright. Obviously you get some - but I don't see too many problems there. It's a lovely spot - it's some 30 or 40 acre (Is that at ? - no, if you'd never been across the field you'd never see it - it's behind it lays behind the back here - it's very quiet - it's 2 fields away from the road and I've spent quite a bit of time there when we've been working, it's nice and relaxing to go and sit on the edge of it. In the first case I saw a trout jumping. And is that open? - No that's purely - it comes under the Beds and Hunts Naturalist Trust for their members - a Mr Heckler is the one that's in charge. I'm a little bit averse to opening every thing willy nilly to the public because they just wander everywhere.

That's a great help. You've covered a great range of topics.

Well, they're my views and how I go on while performing my duties.

I wondered if different organisations that people belong to provide any clue to their views. I mean you being chairman of the Parish Council...

Oh it does, it gives you an insight. I've met a lot of people in that time the Beds Rural Community Council - I've made some good friends on that , purely talking about these things gives you an insight into what they do and think and what can be done. I think the great thing is keep talking and if you can talk to people then they start to appreciate what your problems are then we can get somewhere.

Do you belong to anything else. Do you belong to the Game Conservancy?

No I don't belong the Game Conservancy. I've been along to their place towards Wolverton. I suppose we ought to belong to it - it's one of those things how many things do you join. I was interested to see what they did because obviously the Companies quite involved in that sort of thing.

60+ , 98 acres. Beef, some barley ,

(Lived there since 1947 and before that at Oakley. Interested in shooting but not so much now it's a business. Did get advice from the Game Conservancy. Beef and some barley for feed, about 98 acres. Can sympathise over straw burning and is totally against payment for leaving wild areas undrained but thinks conservation can go too far and that planning controls would be too cumbersome to work, be in the wrong hands and cause impossible delays. Has formed a pond in the garden).

such!

Conservation's a loose term, different people understand different things by it and I'm interested to know what you think a conservation minded farmer might do that would distinguish him from another farmer and what you see as the advantages of that type of thing?

Well I think all farmers are conservation minded really each in a different form, the large farmer he has to rip out all the hedges, the large cereal man but on the other hand when you travel the countryside you'll see they do an awful lot in the form of tree planting. There's more tree planting been done in the last few years than in the last hundred really, everyone's tree planting and I've been doing quite a lot. I think on the whole all farmers are conservation minded to the extent that it affects them. Some of the Councils are quite abusive really. ←

What makes you say that?

I suppose they can't help it really it's all a question of the services that we need - roadside verges for instance they have to trim roadside verges for the benefit of the motorist but really they make a hash of it sometimes, a lot of it's unnecessary but maybe that doesn't come into conservation . The builders, people need houses. On the whole all farmers are conservation minded, but having said that the countryside appears to be getting into the wrong hands in some ways - the large farmers are now more sort of townspeople aren't they, these large companies with farms. We are now seeing in Bedfordshire company farming. (Especially round here?) That's right, until a few years ago you only heard of it in Norfolk, Lincolnshire and the better parts around the country but now it's crept into Bedfordshire, there are one or two large companies farming in this area alone and I feel that they're more city people than country people and it's money really that's causing it all. (They've moved in quite recently?) Yes, over the last 7 years, there's 3 in this area which are part of large

←
←
←
←
←

companies

companies which farm in other parts of the country and they control 20,000 acres or more, but whether they affect the environment at all it's difficult to say.

Have you noticed changes round here?

Yes, there've been a lot of changes round here. The small farms have gone and * they're now large units. This farm it's only a small farm, under 100 acres, right in the middle of - the estate next door, Farm, they're 13000 acres, there's the they farm nearly all their land now, there's very few of the farms tenanted, well that's not quite true but as farms become vacant they're taken over themselves, there's the company across here known as , they're part of a large unit 20/30000 acres all over the country, they farm from right through to the other side of the A5. Quite recently they've purchased another farm, a small dairy farm, which, I'm not saying that's wrong but there aren't the opportunities for young people to start on their own that there were in my day. But then again we're getting away from the environment.

Would you say they were conservation minded?

These company farms? Difficult to say. They pull out hedges and all this sort of thing to make their fields bigger to cope with the bigger machines and whether that affects the environment I don't know. When we talk about the environment there's stubble burning as well do you want my opinion on that? It's something that we have to live with.

Do you have any cereals here?

Yes I grow cereals but I use all my own straw, we never burn straw. We have a problem, my wife has problems like all other housewives with stubble burning. Probably you miss it all where you live, but when the season starts the air is thick with smoke and all the black bits all over the bedroom, depending on the weather conditions but I think it's something we have to live with now.

You don't think there's any alternative?

There are alternatives but at the moment they're uneconomic, maybe later on, I won't see it but there will be ways to collect the straw and use it as a form of power, not put it in bags and issue it to housewives but they can probably use it to generate electricity if they could find a machine to compress it into small blocks it could be transported and used instead of coal, because here we are in 1983 and we still have men going under to dig coal. (Still too expensive

straw briquettes aren't they?) Yes they are at the moment, but we're supposed to be a nation of fine engineers and brains, they ought to be able to find a way of doing something with it. It's unfortunate that we've got to the stage where we have these vast areas of cereals. The funny about is we export all these cereals but I want to buy cereals for my livestock now I can't get it, the stuff I buy now to feed my young cattle is 70% coffee grounds. The cereal grower is upsetting the balance and he's upsetting the environment. Somewhere someone's thinking they can't grow enough cereal to feed their cattle, so they plant more coffee/and destroy their own environment. The basis for our cattle feed normally would be barley and when you see the acres and acres of barley when you travel this country you'd think there would be barley coming out of our ears but it all goes abroad to places like Spain and they feed it to pigs or something and it comes back here in tins, with the EEC market.



Can you grow any of your own feed?

I grow not a very large acreage of barley, but sometimes I need more and if I'm stupid enough to leave it until this time of the year it's just not available. You have to buy it in February March time. (Are they dairy or beef?) All beef. (Do you ever think of going out of beef into cereals?)

Many times yes but I can't because the acreage is too small (What, you couldn't make enough money?). It wouldn't stand the expensive machinery, it would have to be done by contractors and that would be uneconomic. Producing beef, we don't make the money that the cereal man makes but there's a living from it if you do the job properly. Like everything you have to work the market. You have to try and buy when things are low and sell when things are high. But we're getting away from the environment.

This business of pinching the odd wet corner from a field. Years ago it would always be there because the farmers hadn't got the machines to do it, it was all done with hand labour, they probably hadn't got the time anyway they were too busy trying to scratch a living from what they had got that little piece was hardly worth bothering about. But it seems to me now, I probably shouldn't say this, that the countryside is so wealthy now that farmers have got time that they can go and clear that area really for something to do something for the men to do. They can clear half an acre or more in an afternoon or a day at the most whereas in the old days it would have taken two men all winter to clear it and drain it and bring it into production, so they'd rather leave it. Now it's all a question of tidying up operation. As you notice coming down the lane my neighbours just trimmed all that grass verge, well they've just bought a new machine and they need something to do to practice and find out how it works



7:4
how it works so this young fellow was there all day getting it all neat and tidy. (I didn't notice that, I noticed the verges along the lane?) Oh you mean the new trees, well they pulled all that hedge out and had this avenue of trees. Well he wants to see everything all neat and tidy and all that grass will be mown with a machine and it will look more like parkland I suppose. People like me would rather see it how it used to be with all the, well they call it rubbish, but to me there's a certain amount of attractiveness to nettles and hemlock it's a home for the insects and butterflies.

Have you always had an interest in that sort of thing or do you like it to look how it always has looked?

I'm a bit old fashioned and my neighbour says - perhaps you can tell me the meaning of it - he says I'm partisan. When I complain about the way agriculture's going he says I'm partisan. I'm old-fashioned, I like to see all the old things, I know we can't do that because the environments changing all the time really and we're all responsible for it. You need somewhere to live and food and all sorts of things. (I suppose it's changing so rapidly now isn't it?) Yes it's so easy now to change things, The ordinary householder with his garden, now there's all these weedkillers, pesticide things slug pellets all these sprays he can use, mechanical lawnmowers and he wants it all neat and tidy because his neighbours is all neat and tidy - what do you see in those gardens, do you see the insects and frogs and toads. (It depends on your interest and your own point of view doesn't it?) My garden, I've tried to make an area ^{for} with that sort of thing, we've got water and we leave it and let all the weeds grow in it and we now have the dragonfly which we hadn't seen for years and years.

What's made you like that when other people aren't like that?

I don't know, probably I prefer that to people and they prefer people. I really don't know.

Do you have any strong views about pesticides, you mentioned pesticides just now?

Not really because it's something that's just grown ^{upon} with us and we have to live with and now we couldn't do without it, I couldn't farm without - we get these diseases in the corn and we have to use these fungus type things to combat that, and we have to use weedkillers and we use pesticides in the garden - blackfly on the beans. I'm a little bit against this burning off of fields where they use this paraquat. (you mean before they harvest or after they've harvested?) They used to use a lot after they harvested

when they've got a dirty stubble to kill off but they now do it sometimes in a standing crop like rape and they will use it quite a lot this year because of the wet spring they couldn't spray so they'll be using that stuff to kill off all the greenery before harvest and I really wonder if that does have an effect on the cereals and if it does end up in our system. We do now know that gramoxone that they use on the stubbles is harmful to hares but the powers that be keep very quiet on that. (You mean it actually is a poison?)

Yes. I'm not to sure about that type of thing, it's alright, I use it here for the concrete and paths to keep the weeds down, but on a large scale it's a bit much, but it's there to be used , I don't see how it can be stopped. It's all a question of money, economics and the whole business of the environment revolves round money. It's sad in many ways, I don't know if I've got it right, but where someone has got land which they want to drain, they can get money from someone or other to leave it as it is. Well that's wrong isn't it.

this business of him wanting to drain it to farm it is all a load of eyewash. (Have you got similar land that you could say I'm going to drain my land?) That's right, you get everybody all over the country saying that - wellyou tell me the people that give the money is it the Wildlife and Countryside Trust Fund or something like that? (It's from the Wildlife and Countryside Act, and it's th Nature Conservancy Council that have to say the sites very valualbe, it's a site of special scientific interest which is what they're going to say about that bit of land.) Yes, well that bit of land, I've been here 40 years I came here as a young man and I used to play cricket in with young men who'd go down those moors and they'd get a collection of birds eggs that noone could ever get now and you couldn't get then. In the late 20s and 30s they could collect those birds eggs but in 1940 those birds had gone. I've known those fields we used to go shooting down there, a friend of mine now retired he had that farm and there was never any question - those moors were just there for the few people who were fortunate enough to go down there and enjoy rabbit shooting and all that sort of thing and noone ever thought of doing other than that, then for some reason or other, these people aquired them and suddenly they're going to put them on the map and say they're doing this and that with them and drawing all the attention to them.

Have you got any of that sort of land on your farm? No. Have you got any wet areas? Just that little piece out in the garden which we've turned into a pond. No I must admit that over the years I have drained and done away

7:6

with ponds in almost every field on this farm I've done away with a pond.
(Would you still do that now?) Yes I think I would. (Why?). If it was
in the way, if it was in the corner of a field I might have second thoughts,
but if it was in the middle of a field and I wanted to plough I would do
away with it. (What sort of soil is this, is it peaty?) No this is heavy
clay.

You mentioned hedges on your farm, have you got hedges?

Yes we keep all our hedges and we try and trim them - the roadside hedge I
trim every year and the field hedges we do every other year so we keep them
under control but we keep them fairly large a good 6'. They're good shelter
for the stock this is why I do it. (Somebody else said they get quite thin
at the bottom if you let them grow tall). Yes they do. (How do you over-
come that?) When I came here the hedges were like that, they were tall and
bushy at the top and scraggy at the bottom and we layer them, ^{used to} I do it all
myself in the wintertime and over a period of years you get all round the
fields and then when the hedging machine came in - in the olden days you
would see a hedge 4', 4'6 high and I used to think they had them like that
because they had to be done by hand and it was easier for a man to it at
that convenient height - well when the machines came why not have them a bit
higher so you got more protection for the stock and a bit more protection
for wildlife as well if you like, for the small birds. So now we trim them
as I said and they look better, small fields look better than one big field.
Three small fields look better than one big field, do you think so. (To me
and to you, but they wouldn't be any use to a cereal grower would they?)
No, I suppose when I want to leave this farm, when I'm too old, I suppose
these people next door will acquire it and it will be lost as a small farm, *
it's only just over 90 acres and it could easily, all of that land down in
that valley could be one big field, at the moment it's three, but they
could pull all those hedges up and it could all be done within 2 days. The
house and buildings and the grass field would be sold off to someone with a
town interest and probably a couple of horses, who'd live the good life,
and this is the pattern of the countryside now. I call them flat-cap townies,
you meet them at the shows and they become members of the CLA which is fair
enough but they've only got a few acres really.

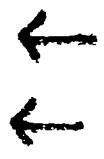
What would you think about planning controls then, before people could...?

I think that would be wrong, because it would go to far. I don't think that
would work, not in farming because you wouldn't have time, everything would
get held up and there would be people trying to operate that planning that
really, as now in my opinion they don't really understand. I don't know how
far

far you are involved with the environment but people are making too much of it now I think and the wrong people are becoming involved in it, leave the countryside to the country people. Unfortunately the real country people are getting fewer and fewer. The environment and how things are changing, everything adapts to change really. The motorways came, we go on about the motorways taking all this land , but then they are areas where one finds wildlife when one thinks of wildlife as part of the environment. I read they're now a haven for wildlife, whereas a few years ago people were saying that they wereruinng everything and if we go out and about - people go walking in areas such as this in the middle of the day and they see nothing and they think farmers have destroyed everything, but if they got up at 5 o'clock in the morning they would hear all sorts of birds and other things. It's just possible that all this fuss they're making about losing species is probably not losing so much as we think.

But on the other hand where you've got sweeping changes like you've got up the road and over quite wide areas where thay've taken out hedges and drained a lot of wetland then you probably are losing quite a bit?

I agree. I know that we've lost the barn owl and I like other people might be responsible for that because they cannot live in modern barns. When we first had these barns built, we had the small brown owl about but they would go into the barns at night to try and catch the roosting sparrows in the ledges under the asbestos roof but those asbestos sheets are hooked on concrete beams and the owl can't hang on those like he could on the wooden beamds so he'll hang onto the hooks and dies. We were always finding dead owls hanging from those beams but now we don't see them or hear them. Even in the towns the old buildings like you get in railway sidings must have been a haven for that type of thing but now they're obsolete. That tends to get rid of things, you can't really blame the farmer all the time can you, the poor old farmer he seems to get ti from everybody.



Would you ever go to anybody for advise on conservation or is it just your own interest?

Mainly my own interest. I'm a bit of a loner and I like to do things my way and discover if I'm right or wrong. I don't know how you feel about shooting, I don't go shooting so much now because I don't enjoy it like I used to. But I used to be a member of a shooting syndicate and we used tc have these people come and advise on shooting layout and I used to think they were just good talkers and earning an easy bob(?). Game Conservancy yes.

Im strongly against these landowners making known a wetland area or a consrvation
ar

7:8

area and saying if I farm that it will be worth so much a year for me so I ought to be getting so much a year to keep it there. I'm strongly against that because right through the ages farmers have kept those areas because it would be uneconomic to bring into production and just because we've got these machine they're frightening the likes of you or the conservation people into thinking that they're going to clear it and I think they have no thought of that whatsoever, all they're thinking of is those few pounds and where's that money coming from - the taxpayer - it's wrong. Whats to stop someone buying up some gravel pits and saying they want to turn it into a housing estate or something like that, it's surprising how these things can spiral. These people in County Hall they get on these committees and you know as well as I do that committee people can be manipulated.

Like I said a while ago
people are making toomuch of this environment business and probably a lot of
people get involved in it that really shouldn't be, but in some ways they are
helping to create what we've just been talking about, because it gives the
landowner the opportunity to say if it's mine why can't I do what I want
with it and if I can't do what I want with it I need compensation. You put
that into your property, probably you've got a nice garden and before you

7:
made it a garden it was probably just wild woodland - you didn't like it like that you wanted it all neat and tidy to walk round but if somebody said you can't do that you can't cut all those brambles down they've been there 100s of years and the rabbits live there, you'd say whats it got to do with you it's mine.

Do you think many farmers look on their farm as their farm or do they see it as part of Bedfordshire as well?

Basically first and foremost it's theirs. This is mine and if someone wants to walk across those fields they do it as my guest. I wouldn't want to open up my farm to every TOM, Dick and Harry as you wouldn't want to open up your garden if somebody came here and said can we have a church fete I'd say yes and you'd do exactly the same but you wouldn't want them coming in and out just because it was a lovely sunny evening and they wanted to go for a walk.

No. I was thinking more of the appearance. If you've got for example an area of trees and people appreciate that as they drive down the lane, and they appreciate that you've got hedges.

Yes I do in that respect because I rather pride myself that on this farm I've kept my hedges just sa they were when I came here. I've tidied them up and made them manageable and now people can look across the field where before they just looked at a big hedge and wondered what was beyond it. You must appreciate that what has been going on in the way of hedges , they've opened up the landscape and in some ways they've made Bedfordshire beautiful, don't you think so? I could take you along the lane here, with the big hedges you saw nothing and now you go along here on a lovely clear sunny evening and you can see Chicksands. (Do you want to see Chicksands?) No, not particularly, but people pay good money to go to Devon but look at the lovely view, you can see exactly the same thing here and many other places in Bedfordshire.

But Bedfordshire's so flat, in a lot of places, you've got quite a lot of eyesores, you've got the hangers and the brickworks, but I haven't lived here long enough to know how much it's changed but I imagine it's changed quite a lot?

Well there are some rather unattractive areas in Bedfordshire I must admit, but if you get on some of those roads in North Bedfordshire there are some fantastic views and you can go out this way, you can walk along the lane here and you can see right out to Sharpenhoe Clappers , that's better than Chicksands. I often go out there with my fieldglasses and scan round and

suddenly you come across a conglomeration of houses and think when did they go up. I think the planners when it comes to house building can very easily spoil an area some of it they do well but some look modern and hideous compared to the yellowy grey green brick of the older cottag^s. Bright red pantiles and red brick. etc. Unfortunately it brings in the moneyed people and they want things like street lights, and then they complain it's not like a village and move out.



Have you always lived in Bedfordshire?

Yes. I used to live in North Beds and lots of the villages in Bedfordshire, we can't help it because it's a commuter area we are a bit thick on the ground now. I think they've overdone it especially in your area, Flitwick, Maulden, Clophill and where do they work. When I first came here we used to employ 4 men but now we do it all ourselves. Next door they've got 1400 acres and they've only got 4 men.



I think that's part of the reason for the rift really isn't it because you've got so few people working in the country. They live in the country but they don't work in the country?

That's right. , it was a lovely little viallage and then they (extended it) and now there's a bit of life^{back} in the village but, they all go out to work. It's kept the cricket team going but they're closing the school

Is that your nearest vlllage, or ?

We're about in between but as a young man I always used my leisure time in , I used my local pub there and I played cricket down there. My wife's involved a lot with , and too. She does Mil meals on wheels and library and Womens Institute.



They got involved in conservation nationally didn't they. Does she ever get any comments locally?

There was a bit of a to-do locally about a grain dryer at and one of the Institutes wanted planning control on farm buildings. If we get too involved with planning in farming I think you're going to strangle agriculture because it's a long term thing. You've got to think ahead so much and the weather comes into it, it could be terribly expensive. This building here before we built that there was an old fashioned building with a loft , it was all broken and dilapidated, the tiles yoused to come off and it got to the stage where people wouldn't come and repair it, they were

712
above

too scared to get up there. One morning after a very strong wind, another couple of hours strong wind that thing would fall down. I thought it can't go on like this or one of these days a car will be parked by it so there and then I made plans to have it down. We were in a slack period and by the end of the week it was down and within 12 weeks it had gone through planning and we had a new barn but if that had got to go through County Hall it would take 12 months or more. Do you think there should be planning then?

I just wonder say where you've got woods and the farmer doesn't even realise that a lot of people appreciate that wood being there and it's been there for 100s of years.

When a farmer owns a wood and he goes in there with some men and starts coppicing someone comes along and they don't really understand what he's doing and say old Jo there's chopping that wood down, but he's not really, all he's doing is improving it but just supposing he had to go through planning to coppice the wood.

No, I really meant if he wanted to rip out the whole thing and put cereals in?

Well no he shouldn't be allowed to do that but do you think honestly in this day and age there are still farmers about that are prepared to do that? I don't think so. I can't think of any in Bedfordshire anyway.

But there are some about, because they're the ones that cause all this fuss aren't they?

Well there's this one in Kent who did it but he did it to spite someone didn't he (Did he?). No man in his senses would do what he did. No man would go into a wood with 4 machines and within 48 hours the wood was cleared. He did that to spite someone. Possibly someone came along and rubbed him the wrong way about something, perhaps he'd been burning some straw and someone had been decorating their house and all the bits stuck or they had an accident with a sprayer and sprayed his garden -they're all accidents really but people don't really appreciate that. I've heard people in the village complaining - people work at Vauxhall and they have their holidays, at harvest time and they're going to decorate the house. They should have more sense shouldn't they, they know that there's going to be straw burning through July, August and September and they should make plans to have the outside of the house decorated at some other time, now, you have to, everyone's got to fit in.

Once it wouldn't have mattered but now you've got more and more people and

you've each got to consider other people.

That's right, but it all comes back to the farmer not considering others, but the others don't consider you. Things change, you have to adapt. The wildlife is adapting really, it's now switching to the motorways and people walk the footpaths and expect to see wildlife and they can't because the wildlife has moved out voluntarily ^{in lots of cases} to a better environment which is on the motorway banks, don't you think?

Well I do really but conservationists would say it's being restricted to smaller and smaller areas and eventually some of them do die out don't they?

I agree. I think it's going to be very difficult - the environment in Eastern England is going to be harder to manage than say some parts of say Yorkshire, Cornwall and Devon. (Why, because this is prime agricultural land?) Well yes, prime agricultural land and all the building that's going on. If they take 50 or 60 acres ^{of farmland} to build houses they can't really have a lot to say when the farmer says you've had 50 acres of my best land I shall have to get rid of that wood over there. (Yes I'm going to see one or two people round Luton. I'm sure they'll feel quite strongly about that sort of thing). Yes and the more and more their land is pinched to buy houses the more and more they get into trouble when it comes to harvest time because these people they come in from London or wherever you like and they don't understand the countryside, they throw their rubbish in the cornfields and combines get smashed, the kids set fire to crops before they can harvest them, and if they survive that they have to turn round and burn the straw straight away and control burn it before the kids go in and it will sweep through a 100 acres or more and this is where a lot of people can't understand about straw burning, because a lot of it has to be done because the farmer himself controls it. For all we hear about farmers being fined and it getting out of hand I personally feel if a farmer has a fire get out of hand it's jolly bad luck, I'd have thought a 100% surely take the necessary precautions and if his fire gets out of control it's either because the wind's changed or he's overlooked some silly little thing, it could be just a few wisps of straw leading off somewhere, and with a little wind it can develop into an inferno in minutes and I don't think a farmer would go and put a match to straw and leave it. When they had that big fire in N Bedfordshire last year and it burnt trees and hedgerows and standing crops. (I wasn't aware of it last year. I know there's a councillor in N. Beds who's very up in arms about it all isn't there?). There's several of them, Councillor Hendry I think he's for the farmers. It'll come up again this year, same old hardy annual. My wife's ~~mo~~ mother lives in Bedford, she's a country woman and when her husband died she had to move into town. The ~~wome~~

7:12

woman next door shes a town woman bred and born and they get this problem at harvest time and she pastes to high heaven about farmers, so if I go and see my mother-in-law at harvest, she'll come out and get on to me about the farmers and say 'I'm going to take my garden rubbish and tip it' and I say you do that he'll stand and laugh at you, she says 'I've got to retaliate somehow'. (Can you explain to her?) No, she's ^{and she} not going to buy any more English food, she'll buy all foreign food and all that sort of thing. Absolutely obsessed by it and no doubt a lot of people are, and I can see her side of it, I can appreciate that poor woman one afternoon she' goes shopping and comes home and finds she's left something on the line and it's a mass of bits, but we must adapt and she must remember will someone burn some straw this afternoon, yes of course they will, I better get my washing in, it's so simple really, isn't it.

I don't know what the answer is because I object to the smell from London Brickworks.

So do I. (Diversion about acid rain).

So do you think there should be some sort of restriction on the people producing that pollution and isn't farmers pollution the same?

Yes they're all equal really. Everyone is contributing in some way to ←
damaging the environment, but when we talk about the environment how far
back do we go, do we think of the environment as it used to be when we were
young, as a boy I was brought up on the River Ouse at Oakley and we could
jump in and out of that river and fish there anywhere on a 5 mile stretch of
the Ouse and no one to stop me and now it's taken over by angling clubs and
the rivers polluted anyway, my nephew farms that farm now but he could
never swim in it, his children couldn't swim in it. Slowly it becomes
polluted, and its all let to angling clubs, its money, and they leave their ←
rubbish on the river banks, hooks, litter, bits of nylon gut and lead weights
and the duck and moorhens and swans come along, see the lead weights and it
looks like food and they swallow it and then they die.

As you came in all this grass verge was all rubbish full of nettles and
hemlock and for picnickers an unattractive site, now they've cut it down
and within two days theres a conglomeration of plastic containers where these
young people they come out of pubs they go the take-away, park in there and ←
chuck their plastic things out of the car window, then the wind comes and
blows them into our fields, y cattle eat them and can't digest them, it will
lie there in their stomachs until it creates a blockage and then they die.
It all comes round to the environment, were all partly to blame for the ←
problems.

You said that neighbour in Bedford gets on to you has anyone else ever got on to you in that sort of way?

7:15

Oh yes people in the village complain sometimes. (What sort of things are they on about?) I don't think they complain about me, probably I'm putting a halo round my head now but I don't really see how anything that I'm doing could upset anybody, we have bird scarers for one thing. I complain about bird scarers and the people up the village do, we had an incident here only last week for 2 nights a bird scarer going all night on the .
Whoever had got it going had got the clock all wrong, (Contacted estate manager. In the past has volunteered to patrol with a gun to avoid use of scarer).

Appendix C

Farmer questionnaire

INTRODUCTION

The aim of the survey is to find out the views of farmers on conservation, as a guide for advisers, researchers and policy makers.

The questions are based on the opinions of Bedfordshire farmers and members of local conservation groups on farming and conservation from a previous survey. I am interested in what you do on your own farm, and how you feel about other peoples' opinions.

Firstly, can you give me some background information about the farm itself?

What size is ita/ha

Are you the owner
manager
or tenant?

What acreage of the following do you have:a/ha
Wheat
Barley
Other cereals
Oil seed rape
Potatoes
Sugar beet
Vegetables
Forage crops, excluding grass
Temporary grass
Permanent grass
Rough grazing
Woodlands
Other areas

Do you have any area of greenhouses? Heated ft²/m²
Unheated

What livestock do you have:
Dairy cows in calf or milk
Beef cows in calf or milk
Cattle 2 years old and over
Cattle one year old
Cattle under 12 months
Intensively reared beef calves, already included above
.....
Total pigs
Total sheep
Laying hens
Growing pullets
Broilers and other table fowl
Turkeys
Ducks
Horses

How many people do you employ on the farm:
Full-time, including family
Regular part-time, including family
Casual workers
Months in which casual workers are employed.....

CONSERVATION IN GENERAL

The people I spoke to earlier had a wide range of views about conservation on farms. These are some of the things they said: can you tell me how likely you think they are to be true (CARD 1):

Being committed to conservation on the farm:

(i) makes it a nicer place to live and work.....

(ii) benefits game.....

(iii) costs the farmer money from his own pocket.....

(iv) attracts attention to the farm.....

(v) makes everywhere look overgrown.....

(vi) makes for good relations with the public.....

(vii) is all part and parcel of managing the farm.....

(viii) attracts wildlife.....

(ix) puts you at a disadvantage with your competitors...

(x) makes the farm less productive.....

Which three of these opinions (page 2) most affect the way you feel about conservation on your own farm? (Please tick.)

I would also like to know how good or bad you think each of the points just mentioned is (**CARD 2**):

- (i) making the farm a nicer place to live and work.....
- (ii) benefiting game.....
- (iii) costing the farmer money from his own pocket.....
- (iv) attracting attention to the farm.....
- (v) everywhere looking overgrown.....
- (vi) good relations with the public.....
- (vii) being part and parcel of managing the farm.....
- (viii) attracting wildlife.....
- (ix) being at a disadvantage with your competitors.....
- (x) the farm being less productive.....

Compared with other farmers, how committed would you say you are in general to conservation on your farm?

| | |
|------------------------------|--------------------------|
| a lot more than average..... | <input type="checkbox"/> |
| a little more..... | <input type="checkbox"/> |
| about average..... | <input type="checkbox"/> |
| a little less..... | <input type="checkbox"/> |
| a lot less..... | <input type="checkbox"/> |

(a) Which topics do you see as being involved in conservation?

(Probe) Are there others?

(b) Do you think any of the following topics are involved?

(Prompt)

(b) Prompted (a) Unprompted.

| | | |
|------------------------------------|--------------------------|--------------------------|
| Woodland and tree management..... | <input type="checkbox"/> | <input type="checkbox"/> |
| hedge management..... | <input type="checkbox"/> | <input type="checkbox"/> |
| pesticide use..... | <input type="checkbox"/> | <input type="checkbox"/> |
| fertilizer use..... | <input type="checkbox"/> | <input type="checkbox"/> |
| wet areas and pond management..... | <input type="checkbox"/> | <input type="checkbox"/> |
| straw disposal..... | <input type="checkbox"/> | <input type="checkbox"/> |
| footpaths and public access..... | <input type="checkbox"/> | <input type="checkbox"/> |
| surplus food production..... | <input type="checkbox"/> | <input type="checkbox"/> |
| animal welfare..... | <input type="checkbox"/> | <input type="checkbox"/> |
| energy conservation..... | <input type="checkbox"/> | <input type="checkbox"/> |
| others (please list)..... | <input type="checkbox"/> | <input type="checkbox"/> |

HEDGES AND TREES

Many people in the earlier survey talked about hedges and trees in connection with conservation. Can you tell me something about hedge and tree management on your own farm.

Do you have any hedges on the farm? yes
no

What proportion of hedges have you removed in the last 15 years? all
3/4
1/2
1/4
none

Were these boundary hedges
internal hedges
both?

Why did you remove them?

Do you intend to remove any (more)?yes
no

If so, why?

Have you planted any hedges (on the farm)?yes
no

If so, why?

Do you intend to plant any hedges? yes
no

If so, why?

What time of the year do you aim to cut your hedges?

J F M A M J J A S O N D

How regularly do you cut them?every year
every other year
less often

What height do you cut them to?below 4'6"
4'6" and over
coppiced

What shape do you cut them?square
A-shaped

Do you lay any of your hedges?yes
no

What size field suits you best?a/ha

What size is your largest field?a/ha

What size is your smallest field?a/ha

Have you planted any trees on the farm in the last 15 years, and is so what acreage/numbera/ha/no

Why did you plant them?

Which species did you plant?

Have you cleared any woodland or trees in the last 15 years, and if so what acreage/number?a/ha/no

Why did you clear them?

Do you leave any saplings to grow along field boundaries?

yes
no

These are some of the views which other people had about hedges.
Can you tell me in your own opinion how likely they are to
be true (*Card 1*) :

Some said taking out hedges:

- (i) is a way of increasing income
- (ii) makes the land more productive
- (iii) removes awkward corners and odd pieces
- (iv) is destroying an ancient pattern
- (v) allows the use of big modern machinery
- (vi) removes a marker for ditches and boundaries
- (vii) makes it easier to keep the ditches clean and unblocked
- (viii) is the only way to deal with them economically when they are very overgrown
- (ix) opens up the view
- (x) reduces local wildlife
- (xi) removes corridors for wildlife
- (xii) removes a windbreak
- (xiii) encourages soil erosion
- (xiv) tidies up the countryside
- (xv) saves time spent hedgecutting
- (xvi) removes a source of weeds

Some said keeping hedges:

- (xvii) shades the crop and weakens it
- (xviii) means part of the field is always wet
- (xix) creates disease pockets
- (xx) provides a harbour for vermin
- (xxi) provides shelter
- (xxii) is a hazard to motorists
- (xxiii) encourages people to dump rubbish

Which three of these opinions (*Page 8*) most affect the way
you feel about hedges on your own farm? (*Please tick*)

I would also like to know how good or bad you think each of the points just mentioned is (*Card 2*):

| | |
|---|--|
| (i) increasing income | |
| (ii) making the land more productive | |
| (iii) removing awkward corners and odd pieces | |
| (iv) destroying an ancient pattern | |
| (v) allowing the use of big modern machinery | |
| (vi) removing a marker for ditches and boundaries | |
| (vii) making it easier to keep the ditches clean and unblocked | |
| (viii) dealing with hedges economically when they are overgrown | |
| (ix) opening up the view | |
| (x) reducing local wildlife | |
| (xi) removing corridors for wildlife | |
| (xii) removing a windbreak | |
| (xiii) encouraging soil erosion | |
| (xiv) tidying up the countryside | |
| (xv) saving time on hedgecutting | |
| (xvi) removing a source of weeds | |
| (xvii) shading the crop and weakening it | |
| (xviii) part of the field always being wet | |
| (xix) creating disease pockets | |
| (xx) providing a harbour for vermin | |
| (xxi) providing shelter | |
| (xxii) being hazardous to motorists | |
| (xxiii) encouraging people to dump rubbish | |

PESTICIDE USE

Another issue which people in the earlier survey sometimes mentioned in connection with conservation was pesticide use. Can you tell me something about your own pesticide use?

How would you say your pesticide use compares with that of others? Would you say you use

| | |
|----------------------------|--------------------------|
| a lot more than average... | <input type="checkbox"/> |
| a little more..... | <input type="checkbox"/> |
| about average..... | <input type="checkbox"/> |
| a little less..... | <input type="checkbox"/> |
| a lot less..... | <input type="checkbox"/> |

If more or less than average, are there any particular reasons?

In general, are there any pesticides you would not use, and why?

(Probe) Are there others?

When using pesticides are there any precautions you take for environmental or wildlife reasons?

(Probe) Are there other precautions?

Can you tell me about the pesticides you used on your three most important crops last season?

Firstly, which were your three main crops and their acreage? a/ha

| | | |
|-----|--|--|
| (a) | | |
| (b) | | |
| (c) | | |

| | Pesticide | Crop area sprayed (%) | How often | Rate |
|-----|-----------|-----------------------|-----------|------|
| (a) | | | | |

| | | | | |
|-----|--|--|--|--|
| (b) | | | | |
|-----|--|--|--|--|

(Cont.)

| Pesticide | Crop area sprayed (%) | How often | Rate |
|-----------|-----------------------|-----------|------|
| (c) | | | |

Did you take any non-chemical measures to minimise weeds, pests or diseases in the crops, and if so what were these?

| |
|--|
| |
|--|

These are some of the views which other people had about pesticides. Can you tell me in your own opinion how likely they are to be true
(Card 1): (Please give a separate score for insecticides, fungicides and herbicides if you think it necessary).

Some said the use of pesticides:

| | P | I | F | H |
|--|---|---|---|---|
| (i) is essential for high yields..... | | | | |
| (ii) allows us to keep on top of pests, diseases and weeds so they don't build up in future years..... | | | | |
| (iii) leaves toxic residues in the soil, water or crop..... | | | | |
| (iv) provokes worse strains of pest and disease..... | | | | |
| (v) affects our health..... | | | | |
| (vi) increases our income..... | | | | |
| (vii) is now restricted to carefully tested chemicals..... | | | | |
| (viii) ensures we recover all our growing costs..... | | | | |
| (ix) is an essential part of using high input systems..... | | | | |
| (x) harms beneficial insects..... | | | | |
| (xi) makes us over-dependent on chemicals..... | | | | |
| (xii) leads to a build-up of pesticides in the food chain.. | | | | |
| (xiii) has unknown long-term effects..... | | | | |
| (xiv) is a waste of money if done on a routine basis..... | | | | |
| (xv) harms wildlife..... | | | | |
| (xvi) ensures good quality crops..... | | | | |
| (xvii) is being carried out by people without a specialised knowledge of chemicals..... | | | | |

Which three of these opinions (**page 13**) most affect the way you feel about using pesticides?
(Please tick).

I would also like to know how good or bad you think each of the points just mentioned is (Card 2):

| | P | I | F | H |
|--|---|---|---|---|
| (i) ensuring high yields..... | | | | |
| (ii) keeping on top of pests, diseases and weeds so they don't build up in future years..... | | | | |
| (iii) leaving toxic residues in the soil, water or crop..... | | | | |
| (iv) provoking worse strains of pest and disease..... | | | | |
| (v) affecting our health..... | | | | |
| (vi) increasing our income..... | | | | |
| (vii) being restricted to carefully tested chemicals..... | | | | |
| (viii) recovering all our growing costs..... | | | | |
| (ix) using high input systems..... | | | | |
| (x) harming beneficial insects..... | | | | |
| (xi) making us over-dependent on chemicals..... | | | | |
| (xii) leading to a build-up of pesticides in the food chain.... | | | | |
| (xiii) having unknown long-term effects..... | | | | |
| (xiv) wasting money on pesticides..... | | | | |
| (xv) harming wildlife..... | | | | |
| (xvi) ensuring good quality crops..... | | | | |
| (xvii) being used by people without a specialised knowledge of chemicals..... | | | | |

STRAW BURNING

Straw burning is another issue which people sometimes mentioned in connection with conservation. Can you tell me about straw disposal on your own farm?

Firstly, do you grow any cereal crops and, if so, which? Wheat
 Barley
 Other

Is the soil on which you grow wheat mainly heavy
 medium
 light

Is the soil on which you grow barley mainly heavy
 medium
 light

| Wh at acreage do you burn | bale | incorporate | a/ha |
|---------------------------|--------------------------|--------------------------|--------------------------|
| wheat..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| barley..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| other..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Do you intend to change what you do next season?

If you bale, why do you bale?

If you burn, what precautions do you take before burning?

(Probe) Are there others?

Straw-burning can sometimes get out of control, either accidentally or by fires being started by careless people or vandals. Have you had any such accidents which damaged hedges or trees and if so, when and how were they caused?

Yes

No

Year

Cause:

These are some of the views which other people had about straw disposal. Can you tell me in your own opinion how likely they are to be true (**card 1**)

Some said burning straw:

| | |
|--|--|
| (i) upsets the general public..... | |
| (ii) cleans the fields of weeds, pests and disease..... | |
| (iii) kills some insects which do good..... | |
| (iv) allows following crops to be drilled as early as possible.. | |
| (v) creates a hazard..... | |
| (vi) keeps costs down..... | |
| (vii) creates smuts..... | |
| (viii) causes pollution..... | |
| (ix) prevents damage to soil structure caused by heavy machinery | |
| (x) wastes a useful resource..... | |
| (xi) allows minimum cultivation, so saving fuel..... | |
| (xii) harms wildlife..... | |
| (xiii) damages hedges and trees..... | |
| (xiv) returns goodness to the soil..... | |
| (xv) spoils the look of the countryside in summer..... | |
| (xvi) avoids moisture loss caused by ploughing..... | |

Some said incorporating straw:

- (i) leads to slug problems.....
- (ii) means using more nitrogen.....
- (iii) means lower yields.....
- (iv) leads to toxins as the straw rots down, which affects germination of the next crop.....
- (v) adds humus to the soil.....
- (vi) means buying extra machinery.....
- (vii) increases power requirments.....
- (viii) means unrotted straw is there for a long time afterwards.....
- (ix) turns the land into a wet sticky mess.....
- (x) makes the seed-bed cloddy.....
- (xi) damages soil structure.....
- (xii) is time-consuming.....
- (xiii) affects the efficiency of autumn sprays.....
- (xiv) means large areas of standing straw for some time after harvest, which would be a fire hazard.....

Which three of these opinions (**page 17/18**) most affect the way you feel about straw disposal on your own farm? (**Please tick**).

I would also like to know how good or bad you think each of the points just mentioned is (*Card 2*)

| | |
|--|--|
| (i) upsetting the general public..... | |
| (ii) clearing the field of weeds, pests and disease..... | |
| (iii) killing insects which do good..... | |
| (iv) drilling following crops as early as possible..... | |
| (v) creating a hazard..... | |
| (vi) keeping costs down..... | |
| (vii) creating smuts..... | |
| (viii) causing pollution..... | |
| (ix) preventing damage to soil structure..... | |
| (x) wasting a useful resource..... | |
| (xi) allowing a minimum cultivation, so saving fuel..... | |
| (xii) harming wildlife..... | |
| (xiii) damaging hedges and trees..... | |
| (xiv) returning goodness to the soil..... | |
| (xv) spoiling the look of the countryside in summer..... | |
| (xvi) avoiding soil moisture loss..... | |
| (xvii) leading to slug problems..... | |
| (xviii) using more nitrogen..... | |
| (xix) lowering yields..... | |
| (xx) creating toxins which affect germination..... | |
| (xxi) adding humus..... | |
| (xxii) having to buy extra machinery..... | |
| (xxiii) increasing power requirements..... | |
| (xxiv) having unrotted straw in the soil..... | |
| (xxv) the land being a wet sticky mess..... | |
| (xxvi) the seed-bed being cloddy..... | |
| (xxvii) damaging soil-structure..... | |
| (xxviii) being time-consuming..... | |
| (xxix) affecting the efficiency of autumn sprays..... | |
| (xxx) being a fire hazard..... | |

Who would you go to if you ever needed advice about conservation on the farm?

How likely are you to act on the opinions of the following groups of people in decisions on the farm (card 3):

| | HEDGES | TREES | PESTIC. USE | STRAW DISPOSAL |
|--|--------|-------|-------------|----------------|
| ADAS..... | | | | |
| Neighbouring farmers..... | | | | |
| Neighbours who are not farmers..... | | | | |
| Family..... | | | | |
| Agricultural reps..... | | | | |
| Landlord..... | | | | |
| Scientists..... | | | | |
| Bank manager..... | | | | |
| NFU (National Farmers Union)..... | | | | |
| CLA (County Landowners association)..... | | | | |

How likely is it that these same groups of people think farmers should (card 1):

| not burn Straw | reduce pesticide use | plant more trees | not remove hedges |
|----------------|----------------------|------------------|-------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Finally, can you tell me something about your own background.

Are (a) you or (b) any of your family a member of the following:

| | (a) | (b) | (c) |
|---|-----|-----|-----|
| National Farmers Union (NFU)..... | | | |
| Country Landowners Association (CLA)..... | | | |
| Young Farmers Club (YFC)..... | | | |
| Game Conservancy | | | |
| Farming and Wildlife Advisory Group (FWAG)..... | | | |
| Royal Society for the Protection of Birds (RSPB)... | | | |
| Naturalists Trust | | | |
| Natural History Society..... | | | |
| Ramblers Association (RA)..... | | | |
| Local Preservation Society | | | |
| Friends of the Earth | | | |
| Greenpeace..... | | | |
| World Wildlife Fund..... | | | |
| RURAL..... | | | |
| Soil Organisation | | | |
| Parish Council | | | |
| District Council..... | | | |
| County Council..... | | | |
| Church warden..... | | | |
| School governor..... | | | |

Are you (c) a committee member or official of any of these groups?

Are you a member of any other group connected with conservation?

Do you shoot.....
 or let the shooting on the farm...

To what extent are you completely dependent of the farm income for a living?

| | |
|---------|--------------------------|
| Totally | <input type="checkbox"/> |
| >3/4 | <input type="checkbox"/> |
| >1/2 | <input type="checkbox"/> |
| >1/4 | <input type="checkbox"/> |
| Less | <input type="checkbox"/> |

Do you take part in any social activities which involve more non-farmers than farmers?

| | |
|-----|--------------------------|
| YES | <input type="checkbox"/> |
| NO | <input type="checkbox"/> |

Of your six closest acquaintances, other than relatives, how many are farmers?

What do the others do for a living?

What is your nearest town, and how far is it?

What is your nearest village, and how far is it?

Do any of your fields adjoin the village/town?

| | |
|-----|--------------------------|
| YES | <input type="checkbox"/> |
| NO | <input type="checkbox"/> |

Were you brought up on a farm?

| | |
|-----|--------------------------|
| YES | <input type="checkbox"/> |
| NO | <input type="checkbox"/> |

How old were you when you left school?

How old are you now?:

Do you have any formal agricultural qualifications?

City and Guild
National Diploma
HND
Degree
Other

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

Do you have any other formal qualifications?

THANK YOU FOR ALL YOUR HELP

Appendix D

Conservationist questionnaire

INTRODUCTION

The aim of the survey is to find out the views of conservation groups and farmers about conservation in the countryside (and particularly on farms) as a guide for advisers, researchers and policy makers.

The questions are based on the opinions of Bedfordshire farmers and members of local conservation groups from a previous survey. I am interested in your comments on these opinions and whether you feel there is anything you yourself can do to further conservation in the countryside.

Firstly, can you tell me something about the extent of your own interest in conservation and farming.

Are (a) you or (b) any of your family a member of the following:

| | (a) | (b) | (c) |
|--|-----|-----|-----|
| RSPB..... | | | |
| Naturalists Trust..... | | | |
| Natural History Society..... | | | |
| Ramblers Association..... | | | |
| Local Preservation Society..... | | | |
| Friends of the Earth..... | | | |
| Greenpeace..... | | | |
| World Wildlife Fund..... | | | |
| Responsible Use of Resources in Agriculture and on the Land. | | | |
| Soil Organisation..... | | | |
| National Farmers Union..... | | | |
| Country Landowners Association..... | | | |
| Young Farmers Club..... | | | |
| Game Conservancy..... | | | |
| Farming and Wildlife Advisory Group (FWAG)..... | | | |
| Parish Council..... | | | |
| District Council..... | | | |
| County Council..... | | | |
| Church Warden..... | | | |
| School Governor..... | | | |

Are you (c) a committee member or official of any of these groups?

Are you a member of any other group connected with conservation?

Were you brought up in the country?

| Yes | No |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |

Do any of your relatives farm?

| |
|----------------------|
| <input type="text"/> |
|----------------------|

| Yes | No |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |

Do you have any farming friends?

| |
|----------------------|
| <input type="text"/> |
|----------------------|

| Yes | No |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |

Have you ever worked or stayed on a farm?

| |
|----------------------|
| <input type="text"/> |
|----------------------|

| Yes | No |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |

Are you in a job which involves either agriculture or conservation?

| |
|----------------------|
| <input type="text"/> |
|----------------------|

| Yes | No |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |

CONSERVATION IN GENERAL

The people I spoke to earlier had a wide range of views about conservation on farms. These are some of the things they said; can you tell how likely you think they are to be true (CARD 1):

Commitment to conservation on the farm:

| | |
|---|--|
| (i) makes the countryside a nicer place to live in and visit..... | |
| (ii) benefits game..... | |
| (iii) costs the farmer money from his own pocket..... | |
| (iv) attracts attention to farms..... | |
| (v) makes everywhere look overgrown..... | |
| (vi) makes for good relations between farmers and the public..... | |
| (vii) is all part and parcel of managing a farm..... | |
| (viii) attracts wildlife..... | |
| (ix) puts the farmer at a disadvantage with his competitors..... | |
| (x) makes farms less productive..... | |

Which three of these opinions most affect the way you feel about conservation on farms (PLEASE TICK)?

I would also like to know how good or bad you think each of the points just mentioned is (CARD 2):

| | |
|--|--|
| (i) making the countryside a nicer place to live in and visit..... | |
| (ii) benefiting game..... | |
| (iii) costing the farmer money from his own pocket..... | |
| (iv) attracting attention to farms..... | |
| (v) everywhere looking overgrown..... | |
| (iv) good relations between farmers and the public..... | |
| (vii) being part and parcel of managing a farm..... | |
| (viii) attracting wildlife..... | |
| (ix) the farmer being at a disadvantage with his competitors..... | |
| (x) farms being less productive..... | |

Compared with other people how committed would you say you are in general to the idea of conservation on farms?

| | |
|------------------------------|--------------------------|
| A lot more than average..... | <input type="checkbox"/> |
| A little more..... | <input type="checkbox"/> |
| About average..... | <input type="checkbox"/> |
| A little less..... | <input type="checkbox"/> |
| A lot less..... | <input type="checkbox"/> |

Which topics do you see as being involved in conservation on farms?

Do you think any of the following topics are involved?

| | Prompted | Unprompted |
|------------------------------------|--------------------------|--------------------------|
| Woodland and tree management..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Hedge management..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Pesticide use..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Fertilizer use..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Wet areas and pond management..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Straw disposal..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Footpaths and public access..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Surplus food production..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Animal welfare..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Energy conservation..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Others (please list)..... | <input type="checkbox"/> | <input type="checkbox"/> |

Many people in the earlier survey talked about hedges and trees in connection with conservation on farms. These are some of the views they had. Can you tell me in your own opinion how likely they are to be true (CARD 1):

Some said taking out hedges:

- (i) is a way of increasing farm income.....
- (ii) makes the land more productive.....
- (iii) removes awkward corners and odd pieces.....
- (iv) is destroying an ancient pattern.....
- (v) allows the use of big modern machinery.....
- (vi) removes a marker for ditches and boundaries.....
- (vii) makes it easier to keep ditches clean and unblocked.....
- (viii) is the only way to deal with them economically when they are very overgrown.....
- (ix) opens up the view.....
- (x) reduces local wildlife.....
- (xi) removes corridors for wildlife.....
- (xii) removes a windbreak.....
- (xiii) encourages soil erosion.....
- (xiv) tidies up the countryside.....
- (xv) saves the farmer time spent hedgecutting.....
- (xvi) removes a source of weeds.....

Some said keeping hedges:

- (xvii) shades the crop and weakens it.....
- (xviii) means part of the field is always wet.....
- (xix) creates disease pockets.....
- (xx) provides a harbour for vermin.....
- (xxi) provides shelter.....
- (xxii) is a hazard to motorists.....
- (xxiii) encourages people to dump rubbish.....

Which three of these opinions most affect the way you feel about hedges on farms? (PLEASE TICK).

I would also like to know how good or bad you think each of the points just mentioned is (CARD 2):

| | |
|--|--|
| (i) increasing farm income..... | |
| (ii) making the land more productive..... | |
| (iii) removing awkward corners and odd pieces..... | |
| (iv) destroying an ancient pattern..... | |
| (v) allowing the use of big modern machinery..... | |
| (vi) removing a marker for ditches and boundaries..... | |
| (vii) making it easier to keep ditches clean and unblocked..... | |
| (viii) dealing with hedges economically when they are overgrown..... | |
| (ix) opening up the view..... | |
| (x) reducing local wildlife..... | |
| (xi) removing corridors for wildlife..... | |
| (xii) removing a windbreak..... | |
| (xiii) encouraging soil erosion..... | |
| (xiv) tidying up the countryside..... | |
| (xv) saving time hedgecutting..... | |
| (xvi) removing a source of weeds..... | |
| (xvii) shading the crop and weakening it..... | |
| (xviii) part of the field always being wet..... | |
| (xix) creating disease pockets..... | |
| (xx) providing a harbour for vermin..... | |
| (xxi) providing shelter..... | |
| (xxii) being hazardous to motorists..... | |
| (xxiii) encouraging people to dump rubbish..... | |

Another issue which people in the earlier survey sometimes mentioned in connection with conservation was pesticide use. These are some of the views which other people had about pesticides. Can you tell me in your own opinion how likely they are to be true (CARD 1):

Some said the use of pesticides:

- | | |
|---|--------------------------|
| (i) is essential for high yields..... | <input type="checkbox"/> |
| (ii) allows farmers to keep on top of pests, diseases and weeds so they don't build up..... | <input type="checkbox"/> |
| (iii) leaves toxic residues in the soil, water or crop** | <input type="checkbox"/> |
| (iv) provokes worse strains of pest and disease..... | <input type="checkbox"/> |
| (v) affects our health..... | <input type="checkbox"/> |
| (vi) increases farmers income..... | <input type="checkbox"/> |
| (vii) is now restricted to carefully tested chemicals... | <input type="checkbox"/> |
| (viii) ensures farmers recover all their growing costs... | <input type="checkbox"/> |
| (ix) is an essential part of using high input systems.. | <input type="checkbox"/> |
| (x) harms beneficial insects..... | <input type="checkbox"/> |
| (xi) makes farmers over-dependent on chemicals..... | <input type="checkbox"/> |
| (xii) leads to a build-up of pesticides in the food chain..... | <input type="checkbox"/> |
| (xiii) has unknown long-term effects..... | <input type="checkbox"/> |
| (xiv) is a waste of money if done on a routine basis.... | <input type="checkbox"/> |
| (xv) harms wildlife..... | <input type="checkbox"/> |
| (xvi) ensures good quality crops..... | <input type="checkbox"/> |
| (xvii) is being carried out by people without a specialised knowledge of chemicals..... | <input type="checkbox"/> |

Which three of these opinions most affect the way you feel about pesticide use? (PLEASE TICK).

I would also like to know how good or bad you think each of the points just mentioned is (CARD 2):

| | |
|---|--|
| (i) ensuring high yields..... | |
| (ii) keeping on top of pests, diseases and weeds so they don't build up..... | |
| (iii) leaving toxic residues in the soil, water or crop. | |
| (iv) provoking worse strains of pest and disease..... | |
| (v) affecting our health..... | |
| (vi) increasing farmers income..... | |
| (vii) being restricted to carefully tested chemicals.... | |
| (viii) the farmer recovering all his growing costs..... | |
| (ix) using high input systems..... | |
| (x) harming beneficial insects..... | |
| (xi) making farmers over-dependent on chemicals..... | |
| (xii) leading to a build-up of pesticides in the food chain..... | |
| (xiii) having unknown long-term effects..... | |
| (xiv) wasting money on routine spraying of pesticides... | |
| (xv) harming wildlife..... | |
| (xvi) ensuring good quality crops..... | |
| (xvii) being used by people without a specialised knowledge of chemicals..... | |

STRAW BURNING

Straw burning is another issue which people sometimes mentioned in connection with conservation. These are some of the views which other people had. Can you tell me in your own opinion how likely they are to be true (CARD 1):

Some said burning straw:

- (i) upsets the general public.....
- (ii) cleans the field of weeds, pests and disease.....
- (iii) kills some insects which do good.....
- (iv) allows the farmer to drill crops as early as possible.....
- (v) creates a hazard.....
- (vi) keeps farm costs down.....
- (vii) creates smuts.....
- (viii) causes pollution.....
- (ix) prevents damage to soil structure caused by heavy machinery.....
- (x) wastes a useful resource.....
- (xi) allows minimum cultivation, so saving fuel.....
- (xii) harms wildlife.....
- (xiii) damages hedges and trees.....
- (xiv) returns goodness to the soil.....
- (xv) spoils the look of the countryside in summer.....

Some said incorporating straw:

- (xvi) leads to slug problems.....
- (xvii) means using more nitrogen.....
- (xviii) means lower yields.....
- (ixx) leads to toxins as the straw rots down, which affect germination of the next crop.....
- (xx) adds humus to the soil.....

| | |
|---|--------------------------|
| (xxi) means the farmer has to buy extra machinery..... | <input type="checkbox"/> |
| (xxii) means unrotted straw is there for a long time afterwards..... | <input type="checkbox"/> |
| (xxiii) is time consuming..... | <input type="checkbox"/> |
| (xxiv) means large areas of straw in fields for some time after harvest, which would be a fire hazard.. | <input type="checkbox"/> |

Which three of these opinions most affect the way you feel about straw disposal on farms? (PLEASE TICK).

I would also like to know how good or bad you think each of the points just mentioned is (CARD 2):

| | |
|---|--|
| (i) upsetting the general public..... | |
| (ii) cleaning the fields of weeds, pests and disease.. | |
| (iii) killing insects which do good..... | |
| (iv) allowing the farmer to drill following crops as early as possible..... | |
| (v) creating a hazard..... | |
| (vi) keeping farm costs down..... | |
| (vii) creating smuts..... | |
| (viii) causing pollution..... | |
| (ix) preventing damage to soil structure..... | |
| (x) wasting a useful resource..... | |
| (xi) allowing minimum cultivation, so saving fuel..... | |
| (xii) harming wildlife..... | |
| (xiii) damaging hedges and trees..... | |
| (xiv) returning goodness to the soil..... | |
| (xv) spoiling the look of the countryside in summer... | |
| (xvi) leading to slug problems..... | |
| (xvii) using more nitrogen..... | |
| (xviii) lowering yields..... | |
| (xix) creating toxins which affect germination..... | |
| (xx) adding humus..... | |
| (xxi) the farmer having to buy extra machinery..... | |
| (xxii) having unrotted straw in the soil..... | |
| (xxiii) being time consuming..... | |
| (xxiv) the large areas of straw after harvest being a fire hazard..... | |

GENERAL OUTLOOK

It has been suggested that conflict between farmers and the rest of the community is sometimes the result of a different outlook on life in general rather than about specific advantages and disadvantages of conservation itself. Can you tell me something about your own outlook by commenting on the following opinions (CARD 4):

- | | |
|--|--|
| (i) Science and technology provide man with his best hope for the future..... | |
| (ii) We are in danger of letting technology run away with us. | |
| (iii) The bad effects of technology outweigh its advantages... | |
| (iv) Science and technology can solve our problems by finding new sources of energy and materials, and ways of increasing food production..... | |
| (v) Industrial societies are 'good' societies in that they provide a high level of well being for most people who live in them..... | |
| (vi) There are forces at work in modern societies which stimulate a lot of artificial wants for things that we do not really need..... | |
| (vii) Vigorous industrial output is the mark of a healthy society..... | |
| (viii) We attach too much importance to economic measures of well being in our society..... | |
| (ix) The business community works for the good of the nation. | |
| (x) Our present way of life is much too wasteful of resources | |
| (xi) It is important that the country maintains a high rate of economic growth..... | |
| (xii) People should have more say in important government decisions..... | |
| (xiii) People should have more respect for law and order..... | |
| (xiv) People should have more say in how things get decided (at the local level and at work)..... | |
| (xv) It is important to keep the rate of inflation down..... | |

Do you do anything to encourage wildlife in your own garden?

(PROMPT for example, provide water, nesting boxes, leave wild areas, plant sources of food).

Do you use chemicals in your own garden and if so which ones do you use?

Do you buy organically grown fruit and vegetables whenever you have the choice?

On the question of shooting, are you for or against it, or prepared to accept it as an important factor encouraging farmers' interest in conservation?

Finally can you tell me:

How old were you when you left school?

How old are you now?

Do you have any formal qualifications gained since leaving school?

| |
|--|
| |
| |

Appendix E

Frequency data for attitude, belief and value scores

Table E.1 *Attitude scores of farmers (F) and conservationists (C) for conservation in general*

| <i>Conservation:</i> | | % with a bxe score of: | | | | | | |
|--------------------------------------|---|------------------------|----|----|----|----|----|----|
| | | -4 | -2 | -1 | 0 | 1 | 2 | 4 |
| Makes the farm a nicer place to live | F | 0 | 0 | 0 | 8 | 18 | 22 | 47 |
| | C | 0 | 0 | 0 | 0 | 2 | 26 | 72 |
| Is all part of management | F | 0 | 0 | 0 | 27 | 35 | 18 | 14 |
| | C | 2 | 4 | 2 | 10 | 8 | 28 | 36 |
| Attracts wildlife | F | 0 | 0 | 0 | 10 | 18 | 29 | 41 |
| | C | 0 | 0 | 0 | 2 | 8 | 16 | 74 |
| Benefits game | F | 2 | 2 | 0 | 16 | 16 | 22 | 39 |
| | C | 0 | 0 | 0 | 34 | 16 | 18 | 32 |
| Puts the farmer at a disadvantage | F | 4 | 8 | 8 | 53 | 10 | 8 | 6 |
| | C | 2 | 14 | 16 | 48 | 8 | 8 | 2 |
| Makes the farm less productive | F | 6 | 10 | 18 | 35 | 12 | 8 | 4 |
| | C | 0 | 4 | 12 | 54 | 10 | 14 | 4 |
| Improves public relations | F | 0 | 4 | 0 | 14 | 20 | 31 | 29 |
| | C | 0 | 4 | 2 | 12 | 20 | 26 | 34 |
| Attracts attention to the farm | F | 2 | 2 | 10 | 45 | 27 | 8 | 6 |
| | C | 2 | 0 | 4 | 30 | 32 | 22 | 10 |
| Costs money | F | 8 | 14 | 6 | 43 | 10 | 12 | 0 |
| | C | 0 | 6 | 14 | 58 | 16 | 2 | 0 |
| Makes everywhere look overgrown | F | 4 | 8 | 4 | 33 | 29 | 18 | 2 |
| | C | 4 | 12 | 10 | 44 | 10 | 14 | 4 |

Table E.2 *Belief and value scores of farmers (F) and conservationists (C) for conservation in general*

| <i>Conservation:</i> | | % with a <i>b</i> score of: | | | | | %with an <i>e</i> score of: | | | | |
|----------------------|---|-----------------------------|----|----|----|----|-----------------------------|----|----|----|----|
| | | -2 | -1 | 0 | 1 | 2 | -2 | -1 | 0 | 1 | 2 |
| Makes the farm a | F | 0 | 0 | 2 | 39 | 55 | 0 | 0 | 8 | 25 | 65 |
| nicer place to live | C | 0 | 0 | 0 | 20 | 80 | 0 | 0 | 0 | 10 | 90 |
| Is all part of | F | 0 | 8 | 12 | 57 | 22 | 2 | 2 | 20 | 45 | 22 |
| management | C | 2 | 6 | 10 | 30 | 42 | 0 | 0 | 0 | 22 | 78 |
| Attracts wildlife | F | 0 | 0 | 2 | 31 | 65 | 2 | 0 | 0 | 45 | 45 |
| | C | 0 | 0 | 0 | 18 | 82 | 0 | 0 | 2 | 16 | 82 |
| Benefits game | F | 0 | 0 | 4 | 35 | 59 | 2 | 4 | 16 | 29 | 49 |
| | C | 2 | 2 | 14 | 28 | 54 | 2 | 2 | 26 | 36 | 34 |
| Puts the farmer at a | F | 14 | 39 | 10 | 25 | 8 | 25 | 27 | 47 | 0 | 0 |
| disadvantage | C | 20 | 26 | 6 | 42 | 4 | 22 | 30 | 44 | 2 | 0 |
| Makes the farm less | F | 10 | 31 | 10 | 35 | 10 | 25 | 35 | 31 | 2 | 2 |
| productive | C | 16 | 36 | 14 | 24 | 6 | 10 | 32 | 46 | 8 | 2 |
| Improves public | F | 2 | 6 | 8 | 33 | 49 | 0 | 2 | 6 | 43 | 47 |
| relations | C | 0 | 6 | 10 | 40 | 42 | 0 | 2 | 2 | 32 | 64 |
| Attracts attention | F | 8 | 12 | 14 | 45 | 18 | 2 | 2 | 35 | 47 | 14 |
| to the farm | C | 6 | 10 | 16 | 42 | 24 | 0 | 6 | 20 | 52 | 22 |
| Costs money | F | 0 | 6 | 2 | 39 | 53 | 12 | 18 | 41 | 22 | 6 |
| | C | 4 | 16 | 18 | 48 | 12 | 2 | 26 | 48 | 20 | 0 |
| Makes everywhere | F | 10 | 59 | 10 | 8 | 10 | 20 | 49 | 27 | 2 | 2 |
| look overgrown | C | 40 | 42 | 8 | 6 | 2 | 6 | 26 | 40 | 20 | 6 |

Table E.3 Attitude scores of farmers (F) and conservationists (C) for removing hedges

| <i>Removing hedges:</i> | | % with a bxe score of: | | | | | | |
|---------------------------------|---|------------------------|----|----|----|----|----|----|
| | | -4 | -2 | -1 | 0 | 1 | 2 | 4 |
| Is a way of increasing income | F | 0 | 2 | 6 | 29 | 20 | 22 | 18 |
| | C | 2 | 4 | 6 | 42 | 10 | 26 | 8 |
| Makes the land more productive | F | 2 | 2 | 8 | 29 | 20 | 18 | 16 |
| | C | 8 | 4 | 10 | 34 | 12 | 20 | 6 |
| Allows the use of big machinery | F | 0 | 2 | 4 | 18 | 18 | 16 | 39 |
| | C | 8 | 20 | 2 | 34 | 4 | 18 | 10 |
| Removes awkward corners | F | 0 | 0 | 0 | 14 | 10 | 29 | 37 |
| | C | 8 | 18 | 8 | 32 | 10 | 10 | 6 |
| Removes a source of weeds | F | 0 | 2 | 4 | 20 | 20 | 25 | 27 |
| | C | 6 | 14 | 10 | 36 | 22 | 6 | 2 |
| Removes a marker for boundaries | F | 6 | 10 | 20 | 55 | 4 | 0 | 0 |
| | C | 16 | 34 | 20 | 26 | 0 | 0 | 0 |
| Destroys an ancient pattern | F | 12 | 20 | 25 | 37 | 2 | 0 | 2 |
| | C | 44 | 22 | 6 | 28 | 0 | 0 | 0 |
| Economic if overgrown | F | 0 | 2 | 4 | 39 | 14 | 10 | 18 |
| | C | 0 | 4 | 12 | 40 | 14 | 12 | 10 |
| Reduces local wildlife | F | 21 | 29 | 27 | 18 | 0 | 4 | 0 |
| | C | 76 | 16 | 4 | 4 | 0 | 0 | 0 |
| Reduces wildlife corridors | F | 18 | 35 | 29 | 10 | 4 | 0 | 0 |
| | C | 72 | 16 | 8 | 4 | 0 | 0 | 0 |
| Removes a windbreak | F | 25 | 29 | 8 | 27 | 4 | 2 | 0 |
| | C | 72 | 16 | 4 | 6 | 0 | 2 | 0 |
| Opens up the view | F | 14 | 16 | 14 | 22 | 16 | 8 | 4 |
| | C | 6 | 24 | 14 | 28 | 4 | 10 | 4 |
| Saves time hedgecutting | F | 0 | 6 | 4 | 16 | 18 | 33 | 18 |
| | C | 6 | 16 | 10 | 32 | 6 | 22 | 6 |
| Tidies up the countryside | F | 0 | 4 | 12 | 39 | 22 | 10 | 8 |
| | C | 2 | 8 | 2 | 42 | 8 | 14 | 24 |
| Makes ditches easier to clean | F | 2 | 2 | 8 | 29 | 25 | 16 | 16 |
| | C | 4 | 8 | 10 | 40 | 10 | 20 | 6 |
| Encourages soil erosion | F | 8 | 14 | 12 | 35 | 0 | 18 | 10 |
| | C | 64 | 18 | 4 | 12 | 0 | 0 | 2 |

Table E.4 *Belief and value scores of farmers (F) and conservationists (C) for removing hedges*

| <i>Removing hedges:</i> | | % with a <i>b</i> score of: | | | | | %with an <i>e</i> score of: | | | | |
|---------------------------------|---|-----------------------------|----|----|----|----|-----------------------------|----|----|----|----|
| | | -2 | -1 | 0 | 1 | 2 | -2 | -1 | 0 | 1 | 2 |
| Is a way of increasing income | F | 4 | 8 | 4 | 55 | 29 | 0 | 2 | 25 | 35 | 35 |
| | C | 10 | 2 | 6 | 32 | 48 | 2 | 10 | 40 | 34 | 12 |
| Makes the land more productive | F | 6 | 12 | 4 | 49 | 27 | 0 | 6 | 25 | 37 | 31 |
| | C | 14 | 12 | 14 | 28 | 26 | 6 | 12 | 24 | 28 | 24 |
| Allows the use of big machinery | F | 0 | 0 | 4 | 31 | 63 | 0 | 6 | 18 | 33 | 41 |
| | C | 2 | 0 | 0 | 12 | 86 | 10 | 22 | 34 | 20 | 10 |
| Removes awkward corners | F | 4 | 4 | 6 | 29 | 55 | 0 | 2 | 14 | 29 | 47 |
| | C | 2 | 4 | 2 | 40 | 50 | 16 | 22 | 30 | 20 | 6 |
| Removes a source of weeds | F | 2 | 10 | 2 | 33 | 53 | 0 | 4 | 20 | 47 | 27 |
| | C | 14 | 30 | 6 | 26 | 22 | 8 | 32 | 34 | 22 | 2 |
| Removes a marker for boundaries | F | 0 | 14 | 12 | 45 | 29 | 6 | 37 | 51 | 0 | 0 |
| | C | 2 | 2 | 4 | 32 | 54 | 20 | 50 | 26 | 0 | 0 |
| Destroys an ancient pattern | F | 6 | 10 | 2 | 49 | 33 | 14 | 43 | 35 | 4 | 2 |
| | C | 2 | 2 | 8 | 10 | 76 | 48 | 30 | 22 | 0 | 0 |
| Economic if overgrown | F | 8 | 31 | 12 | 22 | 22 | 6 | 8 | 35 | 20 | 18 |
| | C | 34 | 30 | 16 | 10 | 8 | 14 | 22 | 28 | 28 | 0 |
| Reduces local wildlife | F | 2 | 2 | 8 | 35 | 53 | 25 | 57 | 12 | 4 | 0 |
| | C | 0 | 0 | 0 | 12 | 88 | 82 | 14 | 4 | 0 | 0 |
| Reduces wildlife corridors | F | 2 | 6 | 4 | 31 | 55 | 16 | 67 | 10 | 2 | 2 |
| | C | 0 | 0 | 0 | 14 | 86 | 76 | 20 | 4 | 0 | 0 |
| Removes a wind-break | F | 0 | 6 | 2 | 27 | 61 | 31 | 41 | 25 | 2 | 0 |
| | C | 0 | 2 | 0 | 6 | 92 | 74 | 20 | 6 | 0 | 0 |
| Opens up the view | F | 0 | 16 | 2 | 33 | 47 | 18 | 29 | 20 | 22 | 4 |
| | C | 12 | 8 | 4 | 38 | 30 | 24 | 36 | 26 | 8 | 0 |
| Saves time hedgecutting | F | 2 | 2 | 2 | 33 | 61 | 0 | 12 | 16 | 49 | 18 |
| | C | 2 | 0 | 0 | 28 | 70 | 10 | 24 | 32 | 28 | 4 |
| Tidies up the countryside | F | 10 | 35 | 20 | 25 | 10 | 6 | 14 | 27 | 37 | 12 |
| | C | 50 | 14 | 18 | 10 | 6 | 36 | 18 | 36 | 8 | 2 |
| Makes ditches easier to clean | F | 2 | 22 | 12 | 29 | 35 | 2 | 4 | 18 | 51 | 22 |
| | C | 6 | 6 | 10 | 42 | 36 | 10 | 10 | 34 | 38 | 6 |
| Encourages soil erosion | F | 29 | 27 | 12 | 20 | 12 | 39 | 29 | 29 | 0 | 2 |
| | C | 4 | 4 | 2 | 16 | 74 | 76 | 12 | 12 | 0 | 0 |

Table E.5 *Attitude scores of farmers (F) and conservationists (C) for keeping hedges*

| <i>Keeping hedges:</i> | | % with a bxe score of: | | | | | | |
|-----------------------------------|---|------------------------|----|----|----|----|----|----|
| | | -4 | -2 | -1 | 0 | 1 | 2 | 4 |
| Shades the crop | F | 8 | 25 | 18 | 31 | 8 | 2 | 4 |
| | C | 0 | 2 | 10 | 56 | 14 | 14 | 0 |
| Means part of the field is wet | F | 14 | 14 | 25 | 33 | 8 | 4 | 0 |
| | C | 0 | 2 | 2 | 66 | 18 | 6 | 2 |
| Creates disease pockets | F | 10 | 6 | 31 | 37 | 6 | 6 | 0 |
| | C | 2 | 4 | 10 | 60 | 12 | 6 | 2 |
| Encourages people to dump rubbish | F | 47 | 12 | 12 | 20 | 0 | 4 | 2 |
| | C | 8 | 12 | 14 | 42 | 4 | 10 | 10 |
| Harbours vermin | F | 20 | 16 | 31 | 20 | 4 | 4 | 0 |
| | C | 6 | 4 | 14 | 48 | 12 | 6 | 6 |
| Provides shelter | F | 0 | 4 | 2 | 20 | 16 | 25 | 31 |
| | C | 0 | 0 | 0 | 0 | 14 | 24 | 62 |
| Is a hazard to motorists | F | 0 | 12 | 4 | 47 | 16 | 10 | 2 |
| | C | 2 | 6 | 6 | 54 | 16 | 10 | 4 |

Table E.6 *Belief and value scores of farmers (F) and conservationists (C) for keeping hedges*

| <i>Keeping hedges:</i> | | % with a <i>b</i> score of: | | | | | %with an <i>e</i> score of: | | | | |
|-----------------------------------|---|-----------------------------|----|----|----|----|-----------------------------|----|----|----|----|
| | | -2 | -1 | 0 | 1 | 2 | -2 | -1 | 0 | 1 | 2 |
| Shades the crop | F | 8 | 18 | 8 | 31 | 29 | 16 | 49 | 31 | 2 | 0 |
| | C | 28 | 34 | 16 | 14 | 6 | 4 | 36 | 54 | 2 | 0 |
| Means part of the field is wet | F | 4 | 29 | 8 | 33 | 25 | 22 | 47 | 29 | 0 | 0 |
| | C | 34 | 42 | 14 | 2 | 4 | 2 | 24 | 60 | 10 | 0 |
| Creates disease pockets | F | 4 | 25 | 14 | 37 | 18 | 16 | 49 | 31 | 0 | 0 |
| | C | 24 | 22 | 32 | 18 | 2 | 14 | 44 | 38 | 0 | 0 |
| Encourages people to dump rubbish | F | 2 | 8 | 14 | 16 | 59 | 59 | 22 | 16 | 0 | 0 |
| | C | 30 | 18 | 12 | 30 | 10 | 40 | 26 | 34 | 0 | 0 |
| Harbours vermin | F | 2 | 8 | 6 | 45 | 37 | 25 | 53 | 16 | 0 | 0 |
| | C | 12 | 16 | 14 | 42 | 14 | 12 | 28 | 36 | 12 | 8 |
| Provides shelter | F | 0 | 4 | 4 | 29 | 63 | 0 | 6 | 20 | 37 | 35 |
| | C | 0 | 0 | 0 | 20 | 80 | 0 | 0 | 0 | 32 | 68 |
| Is a hazard to motorists | F | 16 | 35 | 14 | 20 | 8 | 16 | 33 | 45 | 0 | 0 |
| | C | 38 | 38 | 6 | 12 | 2 | 16 | 28 | 54 | 2 | 0 |

Table E.7 Attitude scores of farmers (F) and conservationists (C) for using pesticides

| <i>Using pesticides:</i> | | % with a bxe score of: | | | | | | |
|------------------------------------|---|------------------------|----|----|----|----|----|----|
| | | -4 | -2 | -1 | 0 | 1 | 2 | 4 |
| Increases income | F | 0 | 0 | 0 | 4 | 27 | 27 | 43 |
| | C | 0 | 8 | 4 | 30 | 26 | 22 | 10 |
| Ensures high yields | F | 0 | 0 | 0 | 6 | 12 | 20 | 61 |
| | C | 0 | 2 | 12 | 32 | 24 | 16 | 12 |
| Recovers growing costs | F | 0 | 4 | 0 | 18 | 22 | 35 | 18 |
| | C | 4 | 8 | 6 | 52 | 12 | 10 | 8 |
| Is essential to high input systems | F | 2 | 2 | 8 | 18 | 10 | 29 | 22 |
| | C | 4 | 6 | 18 | 32 | 18 | 4 | 12 |
| Ensures quality crops | F | 0 | 0 | 0 | 6 | 18 | 33 | 43 |
| | C | 0 | 4 | 18 | 28 | 22 | 14 | 14 |
| Keeps on top of pests | F | 0 | 4 | 0 | 6 | 22 | 22 | 45 |
| | C | 0 | 2 | 8 | 18 | 40 | 18 | 14 |
| Is restricted to well tested chems | F | 0 | 4 | 0 | 6 | 12 | 27 | 49 |
| | C | 10 | 14 | 6 | 34 | 10 | 16 | 10 |
| Wastes money if routinely used | F | 31 | 16 | 12 | 20 | 6 | 12 | 2 |
| | C | 18 | 22 | 16 | 36 | 4 | 4 | 0 |
| Leaves toxic residues | F | 4 | 12 | 10 | 53 | 2 | 12 | 6 |
| | C | 52 | 22 | 6 | 10 | 0 | 2 | 2 |
| Builds up in the food chain | F | 4 | 6 | 6 | 65 | 8 | 8 | 2 |
| | C | 64 | 20 | 6 | 4 | 2 | 0 | 2 |
| Affects our health | F | 2 | 8 | 6 | 55 | 4 | 18 | 6 |
| | C | 38 | 30 | 6 | 16 | 4 | 2 | 0 |
| Has unknown long term effects | F | 4 | 20 | 8 | 57 | 2 | 6 | 2 |
| | C | 60 | 20 | 12 | 6 | 0 | 0 | 2 |
| No specialist knowledge | F | 2 | 8 | 8 | 33 | 12 | 20 | 12 |
| | C | 48 | 32 | 6 | 6 | 2 | 2 | 2 |
| Harms beneficial insects | F | 14 | 29 | 16 | 29 | 2 | 8 | 2 |
| | C | 60 | 12 | 14 | 6 | 4 | 4 | 0 |
| Harms wildlife | F | 6 | 31 | 14 | 31 | 6 | 12 | 0 |
| | C | 76 | 16 | 4 | 2 | 2 | 0 | 0 |
| Leads to over-dependence | F | 12 | 20 | 39 | 16 | 4 | 0 | 0 |
| | C | 40 | 34 | 16 | 2 | 6 | 0 | 2 |
| Leads to worse pests | F | 6 | 22 | 16 | 41 | 4 | 8 | 0 |
| | C | 20 | 40 | 14 | 18 | 2 | 2 | 4 |

Table E.8 *Belief and value scores of farmers (F) and conservationists (C) for using pesticides*

| <i>Using pesticides:</i> | | % with a <i>b</i> score of: | | | | | %with an <i>e</i> score of: | | | | |
|------------------------------------|---|-----------------------------|----|----|----|----|-----------------------------|----|----|----|----|
| | | -2 | -1 | 0 | 1 | 2 | -2 | -1 | 0 | 1 | 2 |
| Increases income | F | 0 | 2 | 2 | 39 | 57 | 0 | 0 | 2 | 41 | 57 |
| | C | 0 | 4 | 4 | 44 | 48 | 4 | 8 | 26 | 50 | 12 |
| Ensures high yields | F | 0 | 0 | 0 | 16 | 84 | 0 | 0 | 6 | 31 | 63 |
| | C | 6 | 24 | 6 | 42 | 22 | 0 | 6 | 30 | 42 | 20 |
| Recovers growing costs | F | 2 | 8 | 12 | 55 | 20 | 0 | 0 | 6 | 37 | 57 |
| | C | 16 | 10 | 36 | 28 | 10 | 0 | 2 | 30 | 48 | 20 |
| Is essential to high input systems | F | 0 | 2 | 2 | 27 | 69 | 2 | 10 | 18 | 35 | 27 |
| | C | 2 | 16 | 10 | 40 | 32 | 8 | 32 | 28 | 16 | 10 |
| Ensures quality crops | F | 0 | 2 | 4 | 41 | 53 | 0 | 0 | 2 | 33 | 65 |
| | C | 6 | 14 | 14 | 44 | 20 | 0 | 8 | 22 | 40 | 30 |
| Keeps on top of pests | F | 2 | 2 | 6 | 33 | 57 | 0 | 0 | 2 | 37 | 61 |
| | C | 8 | 10 | 8 | 54 | 20 | 0 | 10 | 14 | 52 | 20 |
| Is restricted to well tested chems | F | 0 | 4 | 6 | 31 | 57 | 0 | 0 | 0 | 22 | 78 |
| | C | 16 | 22 | 32 | 20 | 10 | 0 | 6 | 8 | 28 | 56 |
| Wastes money if routinely used | F | 4 | 29 | 8 | 27 | 33 | 61 | 22 | 16 | 0 | 0 |
| | C | 2 | 8 | 30 | 32 | 28 | 38 | 48 | 14 | 0 | 0 |
| Leaves toxic residues | F | 12 | 14 | 47 | 22 | 4 | 53 | 22 | 25 | 0 | 0 |
| | C | 2 | 2 | 10 | 26 | 54 | 86 | 12 | 2 | 0 | 0 |
| Builds up in the food chain | F | 8 | 31 | 45 | 10 | 6 | 39 | 29 | 31 | 0 | 0 |
| | C | 2 | 2 | 2 | 26 | 68 | 86 | 10 | 2 | 0 | 0 |
| Affects our health | F | 16 | 22 | 45 | 14 | 2 | 59 | 20 | 20 | 0 | 0 |
| | C | 0 | 4 | 16 | 38 | 38 | 84 | 12 | 2 | 2 | 0 |
| Has unknown long term effects | F | 6 | 16 | 45 | 25 | 8 | 55 | 22 | 22 | 0 | 0 |
| | C | 2 | 0 | 6 | 32 | 60 | 84 | 14 | 2 | 0 | 0 |
| No specialist knowledge | F | 18 | 43 | 10 | 16 | 12 | 43 | 25 | 29 | 0 | 0 |
| | C | 2 | 2 | 4 | 32 | 58 | 76 | 20 | 2 | 2 | 0 |
| Harms beneficial insects | F | 6 | 14 | 14 | 45 | 20 | 47 | 31 | 22 | 0 | 0 |
| | C | 0 | 8 | 6 | 20 | 66 | 76 | 24 | 0 | 0 | 0 |
| Harms wildlife | F | 2 | 25 | 22 | 41 | 10 | 55 | 31 | 14 | 0 | 0 |
| | C | 0 | 2 | 0 | 16 | 82 | 88 | 10 | 2 | 0 | 0 |
| Leads to over-dependence | F | 0 | 4 | 8 | 59 | 27 | 29 | 55 | 10 | 0 | 0 |
| | C | 2 | 6 | 2 | 30 | 60 | 56 | 44 | 0 | 0 | 0 |
| Leads to worse pests | F | 4 | 20 | 20 | 45 | 10 | 35 | 31 | 33 | 0 | 0 |
| | C | 6 | 4 | 16 | 50 | 24 | 70 | 24 | 6 | 0 | 0 |

Table E.9 Attitude scores of farmers (F) and conservationists (C) for burning straw

| <i>Burning straw:</i> | | % with a <i>bxe</i> score of: | | | | | | |
|--|---|-------------------------------|----|----|----|----|----|----|
| | | -4 | -2 | -1 | 0 | 1 | 2 | 4 |
| Spoils the look of the countryside | F | 14 | 6 | 14 | 45 | 12 | 6 | 2 |
| | C | 52 | 18 | 12 | 10 | 2 | 6 | 0 |
| Prevents damage to soil structure | F | 4 | 6 | 6 | 20 | 16 | 20 | 25 |
| | C | 6 | 16 | 8 | 46 | 12 | 6 | 4 |
| Allows early drilling | F | 0 | 0 | 0 | 6 | 10 | 18 | 63 |
| | C | 0 | 0 | 6 | 40 | 22 | 18 | 12 |
| Avoids soil moisture loss ^a | F | 2 | 0 | 8 | 18 | 20 | 16 | 29 |
| Kills beneficial insects | F | 16 | 18 | 33 | 18 | 10 | 2 | 0 |
| | C | 50 | 24 | 18 | 6 | 2 | 0 | 0 |
| Creates smuts | F | 31 | 27 | 29 | 10 | 0 | 4 | 0 |
| | C | 76 | 14 | 8 | 2 | 0 | 0 | 0 |
| Upsets the public | F | 37 | 29 | 25 | 4 | 2 | 2 | 0 |
| | C | 58 | 30 | 4 | 6 | 2 | 0 | 0 |
| Keeps costs down | F | 0 | 0 | 0 | 2 | 12 | 25 | 61 |
| | C | 0 | 0 | 4 | 50 | 30 | 14 | 2 |
| Allows minimum cultivation | F | 0 | 0 | 0 | 4 | 18 | 20 | 57 |
| | C | 2 | 2 | 16 | 36 | 28 | 10 | 6 |
| Cleans the soil of weeds | F | 0 | 2 | 0 | 2 | 6 | 16 | 74 |
| | C | 0 | 6 | 4 | 34 | 20 | 26 | 8 |
| Returns goodness to the soil | F | 0 | 2 | 2 | 18 | 39 | 14 | 22 |
| | C | 6 | 16 | 6 | 38 | 16 | 8 | 8 |
| Creates a hazard | F | 16 | 12 | 18 | 22 | 4 | 20 | 4 |
| | C | 62 | 22 | 12 | 2 | 0 | 0 | 0 |
| Causes pollution | F | 14 | 6 | 31 | 33 | 10 | 6 | 0 |
| | C | 64 | 18 | 8 | 8 | 0 | 2 | 0 |
| Damages hedges and trees | F | 12 | 8 | 10 | 18 | 16 | 20 | 14 |
| | C | 68 | 22 | 0 | 4 | 2 | 2 | 0 |
| Harms wildlife | F | 12 | 10 | 29 | 20 | 18 | 8 | 2 |
| | C | 68 | 18 | 6 | 2 | 4 | 2 | 0 |
| Wastes a useful resource | F | 2 | 8 | 12 | 45 | 12 | 10 | 6 |
| | C | 28 | 20 | 26 | 12 | 8 | 4 | 0 |

^a This item was not included on the conservationists' questionnaire.

Table E.10 *Belief and value scores of farmers (F) and conservationists (C) for burning straw*

| <i>Burning straw:</i> | | % with a <i>b</i> score of: | | | | | % with an <i>e</i> score of: | | | | |
|--|---|-----------------------------|----|----|----|----|------------------------------|----|----|----|----|
| | | -2 | -1 | 0 | 1 | 2 | -2 | -1 | 0 | 1 | 2 |
| Spoils the look of the countryside | F | 12 | 41 | 6 | 20 | 20 | 22 | 35 | 41 | 0 | 0 |
| | C | 0 | 10 | 4 | 16 | 70 | 60 | 32 | 8 | 0 | 0 |
| Prevents damage to soil structure | F | 4 | 12 | 10 | 33 | 39 | 0 | 4 | 20 | 33 | 41 |
| | C | 22 | 26 | 20 | 20 | 10 | 4 | 2 | 34 | 34 | 24 |
| Allows early drilling | F | 0 | 0 | 0 | 18 | 82 | 0 | 0 | 6 | 25 | 67 |
| | C | 4 | 12 | 10 | 34 | 40 | 2 | 4 | 36 | 42 | 14 |
| Avoids soil moisture loss ^a | F | 0 | 6 | 18 | 37 | 35 | 2 | 8 | 10 | 31 | 45 |
| Kills beneficial insects | F | 2 | 14 | 12 | 51 | 20 | 35 | 49 | 14 | 0 | 0 |
| | C | 0 | 2 | 6 | 32 | 60 | 64 | 32 | 4 | 0 | 0 |
| Creates smuts | F | 6 | 4 | 2 | 37 | 51 | 39 | 51 | 10 | 0 | 0 |
| | C | 0 | 0 | 0 | 8 | 92 | 76 | 22 | 2 | 0 | 0 |
| Upsets the public | F | 0 | 4 | 2 | 43 | 51 | 55 | 39 | 4 | 0 | 0 |
| | C | 0 | 2 | 0 | 14 | 84 | 62 | 30 | 6 | 2 | 0 |
| Keeps costs down | F | 0 | 0 | 2 | 22 | 76 | 0 | 0 | 0 | 29 | 71 |
| | C | 2 | 6 | 28 | 44 | 20 | 2 | 2 | 32 | 56 | 8 |
| Allows minimum cultivation | F | 0 | 0 | 2 | 27 | 71 | 0 | 0 | 4 | 33 | 63 |
| | C | 8 | 16 | 14 | 44 | 18 | 2 | 6 | 24 | 56 | 12 |
| Cleans the soil of weeds | F | 0 | 0 | 2 | 16 | 82 | 0 | 2 | 2 | 12 | 84 |
| | C | 6 | 12 | 18 | 38 | 26 | 0 | 8 | 16 | 52 | 22 |
| Returns goodness to the soil | F | 0 | 6 | 14 | 45 | 33 | 0 | 0 | 14 | 55 | 31 |
| | C | 24 | 22 | 20 | 24 | 8 | 0 | 2 | 24 | 38 | 36 |
| Creates a hazard | F | 16 | 25 | 6 | 35 | 18 | 45 | 35 | 18 | 0 | 0 |
| | C | 0 | 0 | 0 | 24 | 74 | 72 | 26 | 2 | 0 | 0 |
| Causes pollution | F | 6 | 25 | 12 | 41 | 16 | 22 | 51 | 27 | 0 | 0 |
| | C | 0 | 2 | 8 | 16 | 74 | 74 | 22 | 4 | 0 | 0 |
| Damages hedges and trees | F | 20 | 41 | 6 | 18 | 14 | 53 | 33 | 14 | 0 | 0 |
| | C | 0 | 4 | 4 | 20 | 70 | 92 | 8 | 0 | 0 | 0 |
| Harms wildlife | F | 8 | 31 | 10 | 35 | 16 | 29 | 55 | 16 | 0 | 0 |
| | C | 0 | 6 | 2 | 22 | 70 | 88 | 12 | 0 | 0 | 0 |
| Wastes a useful resource | F | 25 | 22 | 20 | 22 | 6 | 20 | 37 | 41 | 0 | 0 |
| | C | 0 | 14 | 8 | 36 | 40 | 42 | 52 | 6 | 0 | 0 |

^a This item was not included on the conservationists' questionnaire.

Table E.11 *Attitude scores of farmers (F) and conservationists (C) for incorporating straw*

| <i>Incorporating straw:</i> | | % with a bxe score of: | | | | | | |
|--|---|------------------------|----|----|----|----|----|----|
| | | -4 | -2 | -1 | 0 | 1 | 2 | 4 |
| Leads to slug problems | F | 35 | 18 | 16 | 31 | 0 | 0 | 0 |
| | C | 0 | 4 | 10 | 62 | 10 | 10 | 4 |
| Means using more nitrogen | F | 22 | 18 | 14 | 39 | 0 | 4 | 0 |
| | C | 0 | 4 | 14 | 68 | 10 | 4 | 0 |
| Leads to toxins | F | 27 | 22 | 12 | 29 | 0 | 6 | 0 |
| | C | 2 | 0 | 6 | 64 | 10 | 10 | 6 |
| Standing straw fire hazard | F | 61 | 16 | 10 | 8 | 2 | 2 | 0 |
| | C | 2 | 10 | 10 | 50 | 16 | 8 | 4 |
| Makes the seedbed cloddy ^a | F | 20 | 25 | 12 | 33 | 4 | 6 | 0 |
| Affects spray efficiency ^a | F | 18 | 27 | 14 | 37 | 2 | 2 | 0 |
| Turns the land wet and sticky ^a | F | 33 | 25 | 8 | 20 | 4 | 6 | 2 |
| | C | 0 | 2 | 8 | 62 | 16 | 8 | 2 |
| Means lower yields | F | 25 | 20 | 16 | 33 | 4 | 2 | 0 |
| | C | 0 | 2 | 8 | 62 | 16 | 8 | 2 |
| Means unrotted straw | F | 29 | 29 | 14 | 29 | 0 | 0 | 0 |
| | C | 0 | 2 | 20 | 64 | 12 | 2 | 0 |
| Is time consuming | F | 61 | 22 | 10 | 2 | 2 | 2 | 0 |
| | C | 2 | 4 | 6 | 50 | 30 | 8 | 0 |
| Means buying extra machinery ^a | F | 53 | 29 | 4 | 10 | 2 | 0 | 2 |
| Increases power requirements ^a | F | 63 | 14 | 8 | 10 | 4 | 0 | 0 |
| Adds humus to the soil | F | 2 | 0 | 6 | 31 | 29 | 20 | 12 |
| | C | 0 | 6 | 0 | 24 | 40 | 10 | 18 |
| Damages soil structure ^a | F | 22 | 6 | 4 | 39 | 10 | 10 | 8 |

^a These items were not included on the conservationists' questionnaire.

Table E.12 *Belief and value scores of farmers (F) and conservationists (C) for incorporating straw*

| <i>Incorporating straw:</i> | | % with a <i>b</i> score of: | | | | | %with an <i>e</i> score of: | | | | |
|---|---|-----------------------------|----|----|----|----|-----------------------------|----|----|----|----|
| | | -2 | -1 | 0 | 1 | 2 | -2 | -1 | 0 | 1 | 2 |
| Leads to slug problems | F | 0 | 0 | 25 | 29 | 47 | 43 | 37 | 20 | 0 | 0 |
| | C | 14 | 16 | 56 | 12 | 2 | 22 | 52 | 26 | 0 | 0 |
| Means using more nitrogen | F | 2 | 4 | 33 | 25 | 35 | 35 | 36 | 29 | 0 | 0 |
| | C | 4 | 12 | 54 | 28 | 2 | 16 | 36 | 44 | 4 | 0 |
| Leads to toxins | F | 0 | 8 | 29 | 20 | 41 | 47 | 35 | 16 | 0 | 0 |
| | C | 16 | 24 | 50 | 8 | 2 | 38 | 32 | 28 | 0 | 0 |
| Standing straw fire hazard | F | 0 | 4 | 8 | 18 | 69 | 76 | 22 | 2 | 0 | 0 |
| | C | 24 | 34 | 18 | 20 | 4 | 20 | 42 | 36 | 0 | 0 |
| Makes the seedbed cloddy ^a | F | 2 | 14 | 22 | 29 | 33 | 45 | 35 | 18 | 0 | 0 |
| Affects spray efficiency ^a | F | 2 | 8 | 29 | 29 | 33 | 41 | 37 | 22 | 0 | 0 |
| Turns the land wet/sticky ^a | F | 4 | 12 | 8 | 33 | 39 | 63 | 20 | 16 | 0 | 0 |
| Means lower yields | F | 0 | 4 | 33 | 33 | 31 | 49 | 35 | 14 | 2 | 0 |
| | C | 10 | 42 | 40 | 6 | 2 | 12 | 42 | 40 | 4 | 0 |
| Means unrotted straw | F | 0 | 2 | 10 | 39 | 49 | 43 | 31 | 25 | 2 | 0 |
| | C | 4 | 26 | 22 | 44 | 4 | 0 | 36 | 58 | 6 | 0 |
| Is time consuming | F | 0 | 2 | 2 | 20 | 76 | 71 | 25 | 2 | 2 | 0 |
| | C | 8 | 18 | 16 | 48 | 10 | 0 | 0 | 46 | 52 | 2 |
| Means buying extra machinery ^a | F | 2 | 2 | 2 | 14 | 80 | 59 | 31 | 10 | 0 | 0 |
| Increases power requirements ^a | F | 0 | 4 | 2 | 18 | 76 | 67 | 22 | 10 | 0 | 0 |
| Adds humus to the soil | F | 2 | 14 | 16 | 41 | 25 | 0 | 0 | 25 | 53 | 22 |
| | C | 2 | 6 | 12 | 56 | 24 | 0 | 0 | 22 | 46 | 30 |
| Damages soil structure ^a | F | 8 | 22 | 37 | 8 | 25 | 61 | 18 | 20 | 0 | 0 |

^a These items were not included on the conservationists' questionnaire.