

Behavioural ecology of farmers: what does it mean for wildlife?



John Davis

Chris Stoate

Management decisions made by farmers influence the extent and value of habitats which are available to wildlife. These decisions are in turn influenced by a wide range of factors associated with the farmland environment, the market for agricultural products, and the social and cultural background of the farmer. Environmental and economic influences are readily quantified and lend themselves to objective analysis. Cultural influences, on the other hand, are inconveniently qualitative and are often overlooked for this reason.

Culture has been defined as 'the publicly shared collection of principles and values used ... to justify behaviour' and 'the individual's sense of social environment' (Douglas 1996). 'Farming

culture exists within individual farmers' minds as a set of values or attitudes that they use to make sense of their relationship with the environment' (Young *et al.* 1995). The interaction between farming culture and farmland ecosystems is central to landscape management today, and has been for millennia. Culture is not only an influence on farmland ecology, but also a product of it.

Cultural ecology

Across a range of cultural groups, we tend to have an aesthetic preference for woodland savanna-type landscapes comprising trees and open spaces (Orions & Heerwagen 1992). As with many features of human behaviour, this preference is thought to be a genetically determined aspect of



Dehesa with cattle under Cork Oaks in the Sierra de las Nieves, south-west Spain – a classic European woodland savanna-type landscape. Bob Gibbons

human psychology. Such cultural evolution would have occurred during the Pleistocene over millennia of evolution of humans as hunter-gatherers in savanna environments. Habitat selection would be necessary several times during the lifetime of any individual, and would be a strong influence on survival and reproductive success, and therefore a powerful selection factor.

The aesthetic preference for woodland savanna-type environments appears to be stronger in children than in adults, whose judgements have been influenced by environmental and social experience (Orions & Heerwagen 1992). So, genetically determined cultural values can be modified according to environmental influences arising from an individual's experience. However, underlying mechanisms provide the framework for such modification. This is illustrated most convincingly for language. The language that we each adopt is culturally determined according to our social environment.

Most cultural changes occur very much faster (within single generations) than evolutionary

of pork have long had strong cultural associations. Pigs were prohibited within Islam for reasons of collective identity, to establish cultural boundaries between this religion and others (Diener & Robkin 1978). As well as removing pigs from the

Muslim farming system, the absence of lard as a cooking fat encouraged the establishment of olive groves within agricultural landscapes for oil production. It is perhaps because of this role in cultural identity that the Olive tree *Olea europaea* continues to occupy an important place in Muslim *Sunna*. Traditional olive groves are an important habitat for a wide range of wildlife (Pain & Pienkowski 1997), and olives themselves are an important food source in the Mediterranean for migratory birds such as Robin *Erithacus rubecula*, Song Thrush *Turdus philomelos* and Blackcap *Sylvia atricapilla* (Rey 1995).

Franklin (1999) argues that meat consumption developed as a highly socialised activity in parallel with the domestication of livestock, an agricultural practice that had, and continues to have, a profound impact on the



The olive groves and oak woodlands of southern Europe are important habitats for birds such as this Hoopoe.

Kevin Carlson/Nature Photographers

nature of farm and semi-natural ecosystems. Meat consumption was a key metaphor of social status. This has direct implications for wildlife species associated with livestock systems (Pain & Pienkowski 1997).

Both food and non-food items are used as expressions of identity through competitive consumption within farming communities. Thomas (1996) describes prestige exchanges 7,000 years ago between the LBK (*Linearbandkeramik*) people of central Europe and the communities immediately to the north in southern Sweden and Denmark. Of the latter, Ertebølle people are recorded as adopting LBK 'point-butted' pottery and other exotic artefacts, enhancing the social position of individuals within these foraging bands. Signs of domesticated plants and animals appeared amongst Ertebølle communities at the same time. It is likely that such food items were also prestige items before they became the staple diet and the focus for agricultural activity in northern Europe (Thomas 1996).

Domestic items and food and the means of producing them have therefore been an expression of cultural identity for thousands of years, and continue to be so today. Rausing (1998) provides a modern example of the adoption of western (Swedish) culture in an Estonian farming community being articulated in terms of the appropriation of western objects, ranging from farm equipment and clothing to empty shampoo bottles decorating bathroom shelves. Here again, cultural influences are reflected in both agricultural and domestic behaviour within agricultural communities, with a consequent impact on both agricultural and domestic environments. These cultural influences combine with socio-economic, demographic and technological influences to determine the nature of the modern farmland environment (Giampietro 1997).

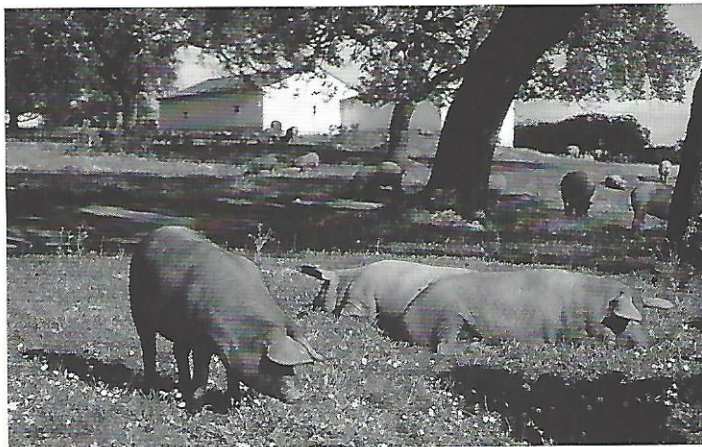
Taste is culturally determined, and differences in diet and in eating times and places reflect social status and cultural identity. There are, in fact, conflicting influences of novelty and tradition (and even the 'invention of tradition') in our diet (Warde 1997). Farmers' behaviour also accommodates both activities perceived as traditional, such as shooting, and those perceived as progressive, such as field enlargement and adoption of the latest technology, often with opposing influences on the farmland environment and wildlife. For

example, while widespread adoption of modern high-yielding autumn-sown cereal crops has contributed to the loss of winter food for birds on stubbles, gamecrops planted for shooting provide an alternative source of food for these birds (Boatman *et al.* 2000).

Hunting and shooting are explicitly social, but such cultural and social processes may also be involved in explicitly economic behaviour such as the purchase of new machinery or the adoption of novel technology by farmers. The harvest of one crop and the planting of the next can be a competitive activity within farming communities. This has influenced the local adoption of 'auto-casters', which broadcast oilseed-rape seed into a standing cereal crop while it is being harvested. This enables the rape crop to establish earlier than might otherwise be the case (A Leake pers. comm.). Although some recently developed technology has been a major factor driving wildlife population declines, other modern technology can be beneficial in terms of wildlife conservation. Recent interest in integrated crop management and minimum-tillage technology provides an

Cultural influences can both encourage and hinder the adoption of new farming techniques, which in turn can have a major impact on wildlife. Bob Gibbons





Portuguese montados combine production of crops, livestock, cork and charcoal. Black Alentejo pigs feed on the acorns of Holm Oaks, and rest in their shade. A wide range of pork products, including the diverse chouriça sausages, are a prominent feature of traditional Portuguese diet. Chris Stoate

example of the latter.

Social influences can also delay 'progressive' behaviour or restore traditional behaviour. On the Pevensey Levels (Sussex), some farmers explained their reluctance to convert wildlife-rich permanent pasture to arable (in spite of Common Agricultural Policy incentives to do so) in terms of a moral imperative (Burgess *et al.* 2000). For them, managing the farmland environment 'in tune with nature' was an expression of their cultural identity. Burel & Baudry (1995) provide a similar example in relation to hedge removal in Brittany.

There has recently been a resurgence of interest in many traditional farming methods across Europe, as well as in their associated food products, landscape and other cultural values. Such foods, championed by the Italian-based 'Slow Food' movement, often achieve a premium over more conventional products, helping to maintain wildlife, as well as the livelihoods of people in rural areas. Examples include the 'Pinzgauer' cattle which graze and therefore maintain Austrian meadows and provide milk and distinctive beef, and the goats of the Swiss Alps which produce traditional 'Cicitt' sausages. Similarly, a complex culture has evolved around the diverse 'Chouriça' sausages, the product of traditional black Alentejo pigs which forage beneath the Cork *Quercus suber* and Holm Oaks *Q. ilex* of southern Portugal, maintaining a park-like habitat (montado) for a wide range of wildlife species. In Spain, the system of transhumance, in which sheep

flocks are annually herded hundreds of kilometres between lowland winter grazing areas and summer mountain pastures, has recently been revived. The system has also revived the cultural identity of people along the traditional routes, as well as those directly involved with the sheep, and has contributed to the conservation of such endangered species as Black Vulture *Aegypius monachus*, Spanish Imperial Eagle *Aquila heliaca adalberti* and Iberian Lynx *Lynx pardina*.

Attitudes to wildlife

A feature of industrialised and, especially, American culture is the perceived nature/culture, wilderness/cultivation dichotomy (Eder 1996). The strongest advocates of this maintain that farmland should not be regarded as a habitat for birds and other wildlife, but as an area for food production alone, non-farmed areas being used for conservation (Avery 1995). However, the potential for agricultural landscapes to integrate food production, recreation and the conservation of wildlife within a single land-management system is becoming increasingly recognised, as illustrated above (cf. Pain & Pienkowski 1997; Stoate 2001).

Using two questionnaire surveys, Macdonald & Johnson (2000) have shown that a combination of farmers' own interests (especially game-shooting, which was carried out on 64% of farms) and financial incentives from European and national subsidies can contribute to substantial environmental improvements. The proportion of farmers seeking professional advice on such management increased from 10% to 41% between the first survey in 1981 and the second in 1998, while the proportion who claimed to be 'very interested' in wildlife increased from 40% to 62% over the same period.

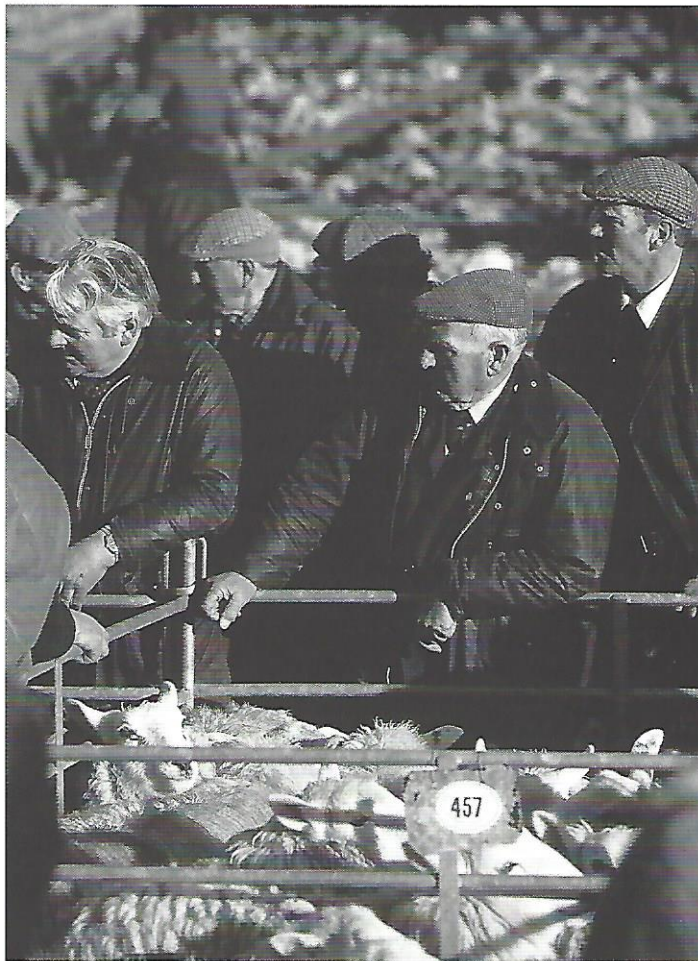
Various studies (Primdahl 1999; Oreszczyn & Lane 2000; Stoate *et al.* 2001) highlight the conflict between the values of farmers as owners and those of farmers as producers, even within the same individuals. Producer interests are associated with short-term economic values and behaviour,

while owner interests accommodate more long-term management, including wildlife conservation.

Within the farmland environment, wildlife is most strongly associated with hedges in field boundaries. Although attitudes to hedge management differ considerably between farmers and the public, 'emotional views' can be shared between these groups and are expressed by farmers in their management of certain hedges and other non-crop features, as demonstrated by Oreszczyn & Lane (2000). However, in their study, such attitudes were not shared by conservation 'experts', who took a narrow objective approach, considering, for example, numbers of species, as opposed to qualitative aspects of hedgerow structure. Harrison & Burgess (2000) provide a similar example of differing cultural values among farmers, conservation experts and the wider community, and also identify values that are common to all groups. Perceptions of environmental risks, and proposed action to prevent or alleviate them, therefore depend on moral commitments to particular 'cultural filters' (Macnaghten & Urry 1998). As with traditions and fashions, these may evolve through time.

Influences on farmers

Farmer behaviour can be influenced by the attitudes of the wider community ('social norms') (Carr & Tait 1991; Lynne *et al.* 1995; Beedell & Rehman 2000) and by the preferences of individuals, including family members and advisors. In the Netherlands, van der Meulen *et al.* (1996) suggest that 'confidence in the contact person' is the most important aspect for adopting conservation behaviour. In Wiltshire, I found that farmers who were most influenced in their crop-management decisions by agricultural advisors had lower



Farmers at a sheep sale at Ruthin, North Wales. Various studies have highlighted the conflict between the values of farmers as owners and those of farmers as producers, even within the same individuals.

David Woodfall/Woodfall Wild Images

hedges on their farms (Stoate *et al.* 2001). This would reduce overall bird abundance and species richness but may benefit some species (e.g. Whitethroat *Sylvia communis*, Skylark *Alauda arvensis* and Grey Partridge *Perdix perdix*). Adoption of novel farming practices may be influenced as much by information from other farmers as by the press, buyers or professional advisors. Lowe *et al.* (1997) describe Devon dairy farmers' changes in attitude to environmental pollution as people from different cultural backgrounds and with different environmental values joined the rural community, and as younger farmers were influenced through the education system.

Farmers' attitudes can be a greater influence on their behaviour than the constraints imposed by the physical character of their farms. In south-

west England, 'traditional' farmers were more likely than more 'commercial' farmers to associate their understanding of environmentally friendly farming with their definition of good husbandry (Battershill & Gilg 1996). Diversifying income sources, including off-farm activities, was also associated with a favourable attitude towards conservation. In Denmark, Primdahl (1999) reported more conservation-oriented behaviour in part-time than in full-time farmers, while on Scottish farms Ellis *et al.* (1999) found that farmers' involvement in off-farm activities was associated with higher botanical diversity in grass swards.

Whereas, in the most productive farming areas, larger, more economically viable farms are more likely to participate in conservation schemes (Gasson & Potter 1988; Kazenwadel *et al.* 1998), in more marginal areas it is the less economically viable farms that participate more (Battershill & Gilg 1996). Farming systems most strongly associated with otherwise threatened wildlife are often low-intensity systems which survive in parts of Europe because of environmental constraints on farming operations (Pain & Pienkowski 1997), although their contribution to wildlife is also dependent on the knowledge, attitudes and socio-economic status of individual farmers (Aughney & Gormally 1999).

Farmers' attitudes to conservation have important implications for the adoption of agri-environmental payments for such practices as organic farming and specific environmental management measures. This is particularly relevant today, as financial support for farmers switches from production-linked payments to schemes with environmental objectives. Farmers entering these schemes purely because of the economic incentives are less likely to achieve environmental benefits than are those sharing the aims of the schemes. Battershill & Gilg (1996) found that 'traditional' farmers were more reluctant than more 'commercial' farmers to participate in agri-environmental schemes, although, having done so, 56% of the 'traditional' farmers said that the schemes had had a positive effect on their attitudes to conservation. Agri-environmental schemes therefore perform an often understated role in influencing the attitudes of farmers towards environmental management, and subsequently their behaviour.

On the basis of work with farmers considering participation in an agri-environmental scheme

(Environmentally Sensitive Area) in the Sussex downs, Morris & Potter (1995) described farmer behaviour in terms of a continuum from 'non-adoption' through 'passive adoption' to 'active adoption'. Active adopters already have positive attitudes towards conservation management and use the ESA scheme to enable them to continue or develop work that they are already doing, while passive adopters participate in the scheme for purely financial reasons. The scheme therefore provides important support for the positive behaviour of active adopters, but long-term conservation behaviour of passive adopters is unlikely to continue once the financial incentives are withdrawn, unless farmers' motives, values and attitudes change during the funding period. This is most likely to be the case if the scheme accommodates existing cultural values. An understanding of passive adopters' farming culture is therefore crucial to changing their behaviour in terms of improving the farmland environment.

Increasingly, there are social pressures from farmers and others, not only to avoid damaging behaviour, but also to adopt positive conservation management. Individual farmers often see themselves as representing their industry to the general public and are prepared to adapt their farming to maintain landscape and wildlife. Within the farming community, and within local rural communities, it is increasingly regarded as unacceptable to continue farming in ways that are damaging to the landscape, or to aquatic or terrestrial ecosystems.

Management of landscape features, such as hedges and woods, continues also to be an expression of individual identity, but this is now extending to more ephemeral habitats, for example in the form of managed set-aside or other managed habitats close to footpaths. Attitudes of farmers, especially those who are already interested in the management of wild gamebirds, are becoming more sympathetic to wildlife, so that a new farming culture is developing. Conservation is becoming socially acceptable within farming communities, and farmers' behaviour is becoming more integrated with the ecology of the land on which they live and work. Positive conservation management is made possible by increasing financial support under the EU Rural Development Regulation, which encourages novel and diverse approaches to the use of natural resources on farmland. The success of these in terms of wildlife

conservation is dependent not only on farmers' participation in them, but on their interest and commitment as well.

Farmland landscapes will continue to evolve in response to a combination of processes, with farmers at their heart. Cultural values of farmers interact with financial considerations in influencing their conservation behaviour. Cultural values within society as a whole also influence farmers' conservation behaviour through social pressures, by supporting markets for environmentally sympathetic production, and through political support for direct payments for environmental management. However, in the end it is still the diversity of farmers' cultural values, as well as the diversity of the physical characteristics of agricultural land, that sustains agricultural landscapes and the wildlife they support.

Just as genetic diversity is essential to the evolution and survival of species, so cultural diversity is essential to the evolution and survival of farmland ecosystems. Whether for agricultural, environmental or social objectives, future support for farmers must recognise the important diverse roles of farmers as individuals, within different farmland landscapes, if the farmland ecosystems which we value are to survive.

References

- Aughney, T C, & Gormally, M J 1999 Attitudes of farmers in the west of Ireland to the Rural Environment Protection Scheme. In: Pienkowski, M W, and Jones, D G (eds.) *Managing High-nature-conservation-value Farmland: Policies, Processes and Practices*. European Forum on Nature Conservation and Pastoralism, 104-107
- Avery, D 1995 Preserving wildlife habitat – with agrochemicals. *The Agronomist*, Spring, 10-12
- Battershill, M R J, & Gilg, A W 1996 Traditional farming and agro-environment policy in southwest England: back to the future? *Geoforum* 27: 133-147
- Beedell, J, & Rehman, T 2000 Using social-psychology models to understand farmers' conservation behaviour. *Journal of Rural Studies* 16: 117-127
- Boatman, N D, Stoate, C, & Watts, N 2000 Practical solutions for birds on lowland farmland. In: Aebischer, N J, Evans, A D, Grice, P V, & Vickery, J A (eds.) *Ecology and Conservation of Lowland Farmland Birds*. Proceedings of the 1999 British Ornithologists' Union Spring Conference. BOU, Tring, 105-114
- Burel, F, & Baudry, J 1995 Social, aesthetic and ecological aspects of hedgerows in rural landscapes as a framework for greenways. *Landscape and Urban Planning* 33: 327-340
- Burgess, J, Clark, J, & Harrison, M 2000 Knowledge in action: an actor network analysis of a wetland agri-environment scheme. *Ecological Economics* 35: 119-132
- Carr, S, & Tait, J 1991 Differences in the attitudes of farmers and conservationists and their implications. *Journal of Environmental Management* 32: 281-294
- Dawkins, R 1976 *The Selfish Gene*. Oxford University Press, Oxford
- Diener, P, & Robkin, E E 1978 Ecology, evolution, and the search for cultural origins: the question of Islamic pig prohibition. *Current Anthropology* 19: 493-540
- Douglas, M 1996 *Thought Styles: Critical Essays on Good Taste*. Sage, London
- Eder, K 1996 *The Social Construction of Nature*. Sage, London
- Ellis, N E, Heal, O W, Dent, J B, & Firbank, L G 1999 Pluriactivity, farm household socio-economics and the botanical characteristics of grass fields in the Grampian region of Scotland. *Agriculture, Ecosystems and Environment* 76: 121-134
- Entec 1995 *Effects of Organic Farming on the Landscape*. Countryside Commission, Cheltenham
- Franklin, A 1999 *Animals and Modern Cultures*. Sage, London
- Gasson, R, & Potter, C 1988 Conservation through land dispersion: a survey of farmers' attitudes. *Journal of Agricultural Economics* 39: 340-351
- Giampietro, M 1997 Socio-economic pressure, demographic pressure, environmental loading and technological changes in agriculture. *Agriculture, Ecosystems and Environment* 65: 201-229
- Harrison, C, & Burgess, J 2000 Valuing nature in context: the contribution of common-good approaches. *Biodiversity and Conservation* 9: 1115-1130
- Kazenwadel, G, van der Ploeg, B, Baudoux, P, & Häring, G 1998 Socio-logical and economic factors influencing farmers' participation in agri-environment schemes. In: Dabbert, S, Dubgaard, A, Slangen, L, and Whitby, M (eds.) *The Economics of Landscape and Wildlife Conservation*. CAB International
- Lowe, P, Clark, J, Seymour, S, & Ward, N 1997 *Moralizing the Environment*. UCL Press, London
- Lynne, G D, Casey, C F, Hodges, A, & Rahmani, M 1995 Conservation technology adoption decisions and the theory of planned behaviour. *Journal of Economic Psychology* 16: 581-598
- Macdonald, D W, & Johnson, P J 2000 Farmers and the custody of the countryside: trends in loss and conservation of non-productive habitats 1981-1998. *Biological Conservation* 94: 221-234
- Macnaghten, P, & Urry, J 1998 *Contested Cultures*. Sage, London
- Morris, C, & Potter, C 1995 Recruiting the new conservationists: farmers' adoption of agri-environmental schemes in the U.K. *Journal of Rural Studies* 11: 51-63
- Oreszczyn, S, & Lane, A 2000 The meaning of hedgerows in the English landscape: Different stakeholder perspectives and the implications for future hedge management. *Journal of Environmental Management* 60: 101-118
- Orions, G H, & Heerwagen, J H 1992 Evolved responses to landscapes. In: Barkow, J H, Cosmides, L, and Tooby, J (eds.) *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. Oxford University Press, Oxford, 555-579
- Pain, D, & Pienkowski, M 1997 *Farming and Birds in Europe*. Academic Press
- Primdahl, J 1999 Agricultural landscapes as places of production and for living in: Owner's versus producer's decision making and the implications for planning. *Landscape and Urban Planning* 46: 143-150
- Rey, P J 1995 Spatio-temporal variation in fruit and frugivorous bird abundance in olive orchards. *Ecology* 76: 1625-1635
- Rausing, S 1998 Signs of the new nation: gift exchange, consumption and aid on a former collective farm in north-west Estonia. In: Miller, D (ed.) *Material Cultures: Why Some Things Matter*. UCL Press, London
- Stoate, C 2001 Reversing the declines in farmland birds: a practical demonstration. *British Birds* 94: 302-309
- Stoate, C, Morris, R M, & Wilson, J D 2001 Cultural ecology of whitethroat (*Sylvia communis*) habitat management by farmers. *Journal of Environmental Management* 62: 329-341
- Thomas, J 1996 The cultural context of the first use of domesticates in continental Central and Northwest Europe. In: Harris, D R (ed.) *The Origins and Spread of Agriculture and Pastoralism in Eurasia*. UCL Press, London, 310-322
- Van der Meulen, H A B, de Snoo, G R, & Wossink, G A A 1996 Farmers' perception of unsprayed crop edges in the Netherlands. *Journal of Environmental Management* 47: 241-255
- Warde, A 1997 *Consumption, Food and Taste*. Sage, London
- Young, C, Morris, C, & Andrews, C 1995 Agriculture and the environment in the U.K.: towards an understanding of the role of 'Farming Culture'. *Greener Environment International* 12: 63-80

Chris Stoate is Senior Ecologist for the Game Conservancy Trust's Allerton Project at Loddington (Leicestershire). He has studied farmland ecosystems and the way in which people use them in England, Portugal and Senegal.