

Chapter (non-refereed)

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more people to enjoy more choice, both in food and non-food items. Allowing it to be used only to increase farm output not only imposes dangerous stresses on the EC budget, but results in high economic costs as the opportunity to release resources which have higher values in other uses is lost.

Many, but not all, of those resources are rural. The changing nature of farming creates a need, too, for a changing rural society. If people in the countryside are to enjoy a full and secure life, they need new ways of earning their living which make use of rural resources. While the abrupt cessation of agricultural support could lead to rural desolation, a positive policy which attracted resources into some of these non-farming activities, including the conservation and development of wildlife, might play a positive role in reshaping the continually changing and dynamic balance which is the country life.

7 Summary

Rapid technical change in agriculture has had a major impact both on the ecology of the countryside and on the economics of farming and agricultural support policies. In Europe, the system of support employed under the CAP means that heavy costs fall on the

budget of the Community when self-sufficiency is exceeded. The system also encourages Member States to encourage farmers to expand their output. The result is a growing threat to the Community's solvency. Despite this situation, farm incomes remain relatively low and are under continual pressure; depopulation continues and rural communities decline. The issue for today's policy-maker is to employ the new techniques so as to produce food at low cost, and to devise a variety of alternative activities, outside traditional agriculture, which may sustain rural community life. Today's emphasis on the value of conserving wildlife may play a positive role.

8 References

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What are the main recent impacts of agriculture on wildlife? Could they have been predicted, and what can be predicted for the future?

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That specific agricultural practices have had effects on wildlife has long been known. It is certainly possible to search the pre-War literature and find examples such as 'the elimination of the beautiful cowslip, green winged orchid, moonwort and adderstongue has been accomplished by the repeated use of fertilizers' (Horwood & Noel 1933), but all such examples seem to be considered as isolated rather than of general occurrence, and of local rather than national importance. In no part of this particular work do the authors appear deeply antagonistic to farming or the developments in farming over the previous century, although such developments are described in detail in their introduction.

Now, it is only too easy to find sweeping condemnations of most agricultural developments in almost any area (eg Paskell 1984), and it is clear that many conservationists consider British agriculture in its present form as their prime target for reform. Attitudes have thus changed very dramatically in the last 50 years, but when and why did they change?

The evidence for the time of change seems to me to indicate that it came after 1960. The early post-War conservation literature mentions agriculture, but with no significant degree of condemnation. The Ministry of Town and Country Planning (1947, see paras 132-135) discusses agriculture and predicts no important conflicts, but rather that farming might benefit from the activities of the Biological Service (Nature Conservancy) that was proposed. With the benefit of hindsight, we can see that part of this opinion was based on false premises, for example that the cultivation of marginal land was uneconomic and likely to remain so for the foreseeable future. The first Annual Reports of the Nature Conservancy almost ignore agriculture, although certain interactions are noted here and there. For example, the effects of myxomatosis on grasslands, eagles and mountain lambs are discussed, but in no way is agriculture cast as the villain. Despite the careful temperate phrasing of the Nature Conservancy Council's recent (Ninth) Report (1984a), it conveys much more an atmosphere of antagonism over SSSIs in general, and West Sedgemoor in particular.

Similar comparisons can be made with the publications of other bodies. In 1952, the Botanical Society of the British Isles (BSBI) organized a conference on *The changing flora of Britain*. One looks in vain for a mention of the pressures of agriculture in, for example, Sir Arthur Tansley's contribution (Tansley 1953). However, the BSBI conference in 1969 on *The flora of a changing Britain* gave some prominence to agricultural developments (Trist 1970; Fryer & Chancellor 1970), and assessments of their impacts on the native flora (Perring 1970).

Even as late as 1960, W H Pearsall, when speaking on the problems of nature conservation in Great Britain at the centenary celebration of an agricultural institute, felt able to cover agricultural impacts in relatively few words. He saw industrial development and urbanization as the main pressure points. Similarly, J P Savidge (in Savidge *et al.* 1963) castigates industry and urban sprawl, before mentioning only the drainage of peat mosses as the agricultural impact; together they reported the extinction of 54 species of plants from south Lancashire.

At the same time, the problems of pesticide use were emerging (Rudd & Genelly 1956) and being widely advertized (Carson 1962). The early 1960s saw several publications (eg Cramp & Conder 1961; Moore 1962) on this particular aspect, especially as it affected birds, though plants were not entirely forgotten (Yemm & Willis 1962).

The next 2 impacts, hedgerow removal and the ploughing up of pasture, first became obvious or serious, according to our viewpoint, in the next few years (Moore *et al.* 1967; Wells 1968), and at the same time began a sequence of conferences on *The countryside in 1970*.

Reviews of the situation, written from different standpoints for different audiences, also started appearing (Christian 1966; Weller 1967). The main pre-occupations of the mid-1960s continue, but differences in emphasis can be found (Bonham-Carter 1971; Davidson & Lloyd 1977; Mellanby 1981). At some point in this period, the average conservationist and the average farmer became antagonists. I estimate this point around 1969-70, and suggest that the blame lies with the Silsoe Experiment and its successors.

The Silsoe Experiment (Barber 1970) attempted to bring the 2 sides together on a national scale, and subsequent attempts have been made on a local scale. While I regard those attempts as laudable and to be encouraged in every way, their success has been limited. There is no visible sign to the average conservationist that British agriculture has changed, or that the average farmer has changed, as a consequence. Some farmers may have become better conservationists, but others have become worse (very

possibly not because of their personal wishes, but driven by external circumstances). Given the impacts of current farming practices, it is not surprising that an intransigent attitude has developed among conservationists. With hindsight, our expectations of immediate results from Silsoe were possibly too sanguine.

That the current impacts of farming upon wildlife are many, various, and important, and that they are more significant than forestry or building, cannot be doubted in the face of the evidence that is now accumulating. In 4 years (1978-82), 17 prime sites (204 ha) were affected by agriculture and none by forestry or building in a rural county like Shropshire (Paskell 1984). On a national scale, high percentages of important conservation areas are disappearing: 95% of herb-rich hay meadows destroyed, 80% of calcareous grasslands, 60% of lowland heaths, 50% of lowland fens, 50% of lowland woods, and 30% of upland grasslands, heaths and mires (Nature Conservancy Council 1984b).

Impacts can be ranked in a variety of ways; the statistics given above provide a ranking of sorts, and other rankings have been attempted. For flora, Perring (1970) gives natural causes as the primary impact, with land drainage a close second, arable changes (= herbicide use?) third, and ploughing up of pasture close behind in fourth place, well ahead of habitat destruction. A little later, Perring and Farrell (1977), again discussing flora, put arable weeds as most in danger, with wetland species second, implying that herbicides have been more damaging than drainage. However, the highest number of species at risk (71 out of 321) grow in lowland pasture, although only one has actually become extinct.

Such statistics are meaningful or meaningless depending upon the framework of strict definition in terms of space and of time within which they are gathered. The recent losses in Shropshire sound very bad indeed, as do the national figures, but, in the case of the figures given by Ratcliffe, we are not told either the time span over which these losses occurred or the areas involved. What did Perring (1970) mean by 'land drainage'? Was it only tile draining, or were major works on main rivers included? Also, if Perring and Farrell (1977) find arable weeds most endangered, am I right to infer damage from herbicides? Could the sources of cereal seed and seed cleaning techniques have changed over the period of time in which the arable weeds have declined?

Many such questions can be answered crudely to give a more quantitative, if still inexact, ranking of the losses of wildlife habitat and species. For example, being familiar with the terminology of habitat types used by Ratcliffe (NCC 1984b), it is possible to suggest that herb-rich hay meadows occupied 10 000 ha, calcareous grasslands 45 000 ha, lowland heaths 100 000 ha, lowland fens 12 000 ha and upland grasslands, heaths and mires 6 000 000 ha.

There must, therefore, remain only 500 ha of herb-rich hay meadows, or 4 000 000 ha of upland grasslands, heaths and mires.

An alternative method of estimating the extent of losses from a particular habitat is that the area must be increased 10-fold to double the number of species, and *vice versa* (Darlington 1957). If a habitat with 100 characteristic species is reduced in area by 90%, 50 species should still survive.

Applying such methods without discrimination to convert loss into an impact upon species can be very misleading. For example, if we accept that an average English hedge has 20 nests per km and the loss of hedges between 1946 and 1970 took place at an average rate of 7000 km each year, it is tempting to multiply 7000 by 20 to assess the loss of nesting hedgerow birds; but the result would be erroneous. Underlying assumptions imply that bird population size on farmland is limited by nest sites in hedgerows and that all hedgerows provide equivalent nest sites. Neither implication is correct. Hedges differ in provision of nest sites: big hedges with several kinds of hedgerow plant are better than pure hawthorn which, in turn, is better than hedges composed entirely of elm. The availability of nesting sites for hedgerow birds seldom becomes limiting until hedge density falls below about 30 km of hedgerow per 1000 km of land (Pollard *et al.* 1974).

Two more factors complicate the matter. First, the best hedges in terms of bird habitat tend to be those on farm boundaries and are less often removed than internal hedgerows. Birds nesting in hedges often have low reproductive success which is insufficient to replace mortality in that habitat. Populations are then maintained by immigration from nearby woods (Williamson 1969). In the long run, the loss of woodland habitat will be most serious for the many birds now found in hedges.

Hence, though we may be readily convinced that agricultural change has had great impacts upon wildlife and its habitats over the last 40 years, we have yet to measure these impacts and explore their ramifications. Even for hedgerows, which are perhaps better documented than some habitats, there are no reliable estimates of status more recent than 1972. A starting point for further research could, therefore, be a more defined, accurate, survey of land uses and the trends of change taking place.

It may be said that we already possess accurate statistics of change in land use. Since 1866, figures for major land uses have been compiled annually, and, despite doubts about certain categories (eg for woodland, see Peterken 1983), these data show the major trends in land use. They also suggest to me that most of the impacts of agriculture upon wildlife which are now decried were predictable 20 years ago.

Most current trends are long established, though not all as long as the decline in area of oats. This decline began nearly a century ago, and has continued ever since. Some crops have increased, some have decreased, and some have remained static since the Second World War. Wheat and permanent grassland have not changed very much, turnips and mangolds have decreased, and barley has increased (MAFF 1968, 1983).

More significant still are the measures of intensification. The wheat acreage may have remained static, but the yield per unit area doubled between 1946 and 1966, as did the yield of barley. Numbers of combine harvesters in Britain increased 20-fold in the same period, from 3000 to 60 000, while the regular labour force was virtually halved and has now been halved again: 900 000 in 1946, 480 000 in 1966, 233 000 in 1982. Most surprising of all, amid this tremendous increase in the yield of arable land, is the fact that livestock increased too. There were 20M sheep in 1946, 29M in 1966, and 33M now (MAFF 1968, 1983).

Additional figures showing similar trends can be collected from other sources. In England in 1946, only about 12 000 ha were drained with mole and tile drainage; in 1956, 30 000 ha were drained, and in 1966 52 000 ha (Green 1973). The trends in farming that existed nearly 20 years ago had already existed for 20 years, and have continued to the present. Those trends produced impacts which were all recognized in quality, if not in quantity, 20 years ago, so it should have been possible to predict our present state.

Because the trends have been continuous over the last 40 years, it seems simplest to assume that they will continue into the future, and that the impacts on wildlife will continue also. Nevertheless, this prognosis is not entirely certain, for what drives these trends is Government policy, which in turn depends upon public opinion, reflecting the views of the public on its environment. There is evidence that views are changing.

Wibberley (1980) charged agriculturalists with being 'willing prisoners to a set of beliefs' which he felt could be challenged. The commonly held belief that farmland has been under increasing pressure from urban development for many years has been proven false by Best (1984). The fastest loss of farmland to house building took place 50 years ago. Mills (1983) has compared French with British farming, and found the latter wanting. He is but one of a number of recent critics of financial, rather than economic, cost benefit analysis. He suggests that the farmer's benefit is at public cost. That sort of argument, however, is very often based upon wine lakes or butter mountains in the European Economic Community. At its peak, the EEC butter mountain would have fed the Community for 6 weeks. On a world scale, grain reserves are only enough to feed the world's population for 30 days.

Given that sort of statistic, it seems likely that an efficient farming system will be maintained, present trends will continue, possibly more slowly, and wildlife will feel more impacts, perhaps the more deeply for having felt them for the past 40 years.

Summary

Separate, specific impacts of agriculture upon wildlife have long been recognized by conservationists as important. Such recognition of impacts was, however, of isolated issues of local significance, often by individual conservationists with narrow interests. It was not until some time between 1960 and 1970 that conservationists as a body began to think of British agriculture as inimical to wildlife.

Two causes can be adduced. The first is that many conservationists saw impacts as important issues, and the second is that the many attempts to bring about a rapport between farming and wildlife interests produced no quick, easy solutions. As a result, conservationists' attitudes hardened.

The first important issues in the mid-1960s were the use of pesticides, ploughing up of pasture, drainage, and hedgerow removal. A little later, field sizes, monocultures, and reclamation of marginal land produced the twin problem of fragmentation and isolation. More recently still, issues such as straw burning have been raised, and the latest impact issue to receive attention has been the financial, rather than economic, basis for agricultural accounting.

All these issues are still with us to some degree, although the relative importance of each varied in time and still varies from place to place. Could they have been predicted? The answer must be 'yes'. Most major trends in British agriculture have been continuous and regular since 1945. Acreages of barley have persistently increased; oats, turnips and swedes have decreased; sheep and cattle have increased; the work force has declined; and mechanization has increased. Whether these trends continue, and whether continuation of the impacts can be predicted, depends upon the view the general public takes of agriculture as an industry. There are calls for a re-evaluation of the role of agriculture in the national scene not only from conservationists. However, given the size, and therefore inertia, in the controlling systems, the individual financial interests, and powerful political lobby represented by agriculture in Britain, these calls are unlikely to be heard and acted upon before the next century. The impacts will continue.

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