

FINANCIAL ANALYSIS OF A POSITIVE FIELD MARGIN STRATEGY ON ORGANIC AND CONVENTIONALLY MANAGED LAND.

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ABSTRACT

Boarded Barns Farm field margins have been managed by leaving at least a 1m wide grass strip at the base of hedges and where necessary an additional 3m wide mown access path. Given the fact that weed species increase with proximity to hedges particularly species such as *Galium aparine* (Cleavers), cropping these areas carries a yield penalty.

By the careful use of conventional herbicides and grassed margins, farmers can crop the more responsive field areas whilst maintaining valuable habitats without incurring a financial penalty.

INTRODUCTION

Boarded Barns Farm has been managed and farmed over the last twenty years on behalf of the owners by Rhône-Poulenc, although there were links between the farm and the Company prior to this period. The farm adjoins the Rhône-Poulenc Agriculture, Ongar, Essex site and slopes gently down to the River Roding on the Eastern boundary.

Covering a total area of 57 hectares the land is cropped with an arable rotation on 43.6 hectares, the remainder of the land being down to permanent pasture, woodland, ponds, access paths and buildings.

The soil is a medium loam over chalky boulder clay, which can produce very good yields provided care is taken to work the soil in optimum conditions to minimise soil damage by compaction. A comprehensive drainage system allows limited working in a wet season. The land is farmed with a comprehensive range of modern machinery utilising proven crop husbandry and pest control techniques on the conventionally cropped section of the farm. In the past twenty years the crop rotation had involved wheat, barley, oilseed rape, beans and peas. The emphasis on recent cropping has been to produce quality bread milling wheat with break crops of beans and oilseed rape.

From 1989, following discussions and detailed planning, part of the farm was managed with a system complying with recognised organic farming standards and is registered with United Kingdom Register of Organic Food Standards (UKROFS) as an organic arable production unit. Five fields, Shelley, Brook, Further, Well East and Well West were devoted to the organic study. Another five fields with similar soils, Folyats, Stocklands South, Stocklands North, Barn North and Barn South continued to be managed using conventional methods.

Following a mandatory two year conversion period our first organic crop of Mercia Winter wheat was grown on Shelley field in 1991/92. Brook and Further fields were sown with organic crops for 1992/93, and Well field is fully converted to organic food production for the 1993/94 season, giving a total of 15.2 hectares of crops in the organic rotation.

This paper outlines the field margin management at the farm, the opportunity offered by the organic system to monitor weed levels and describes the financial balance between cropping every last square metre of field and establishing grass field margins.

FIELD MARGINS MANAGEMENT AT BOARDED BARNS FARM

Field margins are managed to provide maximum advantage for the agricultural operations on the farm in conjunction with enhancement and return from the environment.

Hedge and ditch boundaries around all fields have a one metre rough vegetation strip left between the crop and the field edge. By not ploughing and cultivating at the immediate edge of the field erosion and even collapse of ditch banks is avoided. Experience has shown that these rough strips must be trimmed once per year or encroachment of vegetation from the ditch bank or hedge will occur.

To ensure that the one metre strip is not sprayed or fertilised the operator at Boarded Barns Farm is well trained and uses modern well maintained equipment with a good "cut-off" at the end of the sprayer or spreader pattern.

Farm operator involvement and a full understanding of the importance of all conservation matters on the farm is imperative if full advantage is to be gained from any conservation project.

The margin strip is a haven for wildlife including small mammals and birds which can benefit from the cover provided. Beneficial insects such as rove beetles, ground beetles, parasitic wasps, hover flies and also hunting and money spiders can over winter in the diverse cover. (Brown. R, 1995).

The grass access paths are quite resistant to mechanical wear and are mown 2 to 3 times a year to keep the grass to a reasonable height, this allows birds and small mammals an open area for drying, preening and feeding.

Access paths at Boarded Barns Farm are used for both machinery, equestrian and pedestrian purposes and are sown with a hard wearing grass mix, the horse gallop mix is ideal on this particular soil type.

IMPACT OF MARGIN MANAGEMENT ON WEED POPULATIONS

As part of the environmental impact monitoring on the study the weed populations were measured. Paired sets of permanent quadrats were established every 10 metres around the edge of each winter wheat field, one and six metres into the cropped area.

The organic system offered the opportunity of monitoring weed numbers and species. Under this system only mechanical cultivations are permitted and so species diversity and densities were well developed (Table 1). Evaluating weed distribution and dynamics became a possibility.

Table 1 - Assessment of "Margin" flora on an organically farmed field
Shelley Field : 1991 - 1992
Order of frequency (occurrences) * at 1m from field boundary

Date of Assessment	28/11/91	05/03/92
Species	Before harrowing	After harrowing
<i>Stellaria media</i>	10	8
<i>Veronica persica</i>	7	5
<i>Poa annua</i>	6	8
<i>Trifolium repens</i>	5	4
<i>Sinapis arvensis</i>	4	0
<i>Matricaria spp.</i>	3	1
<i>Rumex spp. **</i>	3	6
<i>Cichorium intybus</i>	2	7
<i>Galium aparine</i>	2	8
<i>Elymus repens</i>	0	3
<i>Lamium purpureum</i>	0	2
<i>Lolium sp.</i>	0	2
<i>Myosotis arvensis</i>	0	2
<i>Agrostis stolonifera</i>	0	1
<i>Anthriscus cerefolium</i>	0	1
<i>Capsella bursa-pastoris</i>	0	1
<i>Poterium sanguisorba</i>	0	1
<i>Veronica hederifolia</i>	0	1
Total No. of species present	9	17

* Total of 10 quadrats assessed (does not include the start and finish transects on each diagonal transect)

No uncultivated controls left on field margins

** *Rumex spp.* - mainly *Rumex obtusifolius*, however, a few *Rumex crispus* also found, some plants also appeared to be hybrids of the two.

On the organically managed fields the only weed control practice carried out was the use of a harrowcomb weeder. The original weed species present and the effect of a passage of the harrowcomb at 1m into the crop.

Agronomic assessments were employed to decide when the weeder should be used. On average 2/3 passages are used per season which is similar to that reported by Rasmussen (1991). *Stellaria media* is the most frequent occurring species on both occasions. By March the second most frequently occurring species changed from *Veronica* to *Poa annua*. The number of species increased from 9 to 17 between November and March.

The species present 6m into the crop (Table 2) show a similar trend of increasing species present with time despite the use of a harrowcomb weeder.

Table 2 - Assessment of "Margin" flora of an organically farmed field
Shelley Field : 1991 - 1992
Order of frequency (occurrences) * at 6m from field boundary

Date of assessment	28/11/91	05/03/92
Species	Before harrowing	After harrowing
<i>Stellaria media</i>	10	8
<i>Trifolium repens</i>	10	9
<i>Veronica persica</i>	9	4
<i>Matricaria spp.</i>	5	3
<i>Poa annua</i>	5	7
<i>Geranium molle</i>	1	0
<i>Polygonum persicaria</i>	1	0
<i>Veronica hederifolia</i>	1	1
<i>Galium aparine</i>	0	3
<i>Lolium sp.</i>	0	4
<i>Myosotis arvensis</i>	0	2
<i>Papaver rhoeas</i>	0	1
<i>Rumex spp.</i> **	0	1
Total No. of species present	8	11

* Total of 10 quadrats assessed (does not include the start and finish quadrats on each diagonal transect).

No uncultivated controls left on field margins.

** *Rumex spp.* in this case *Rumex obtusifolius*.

There was no clear pattern of annuals or perennial species with distance from the full edge. The only exception was *Galium aparine*. During Autumn only two quadrats contained *Galium* and these were in the field edge. This spring germination of *Galium* conforms to expected pattern. Use of the Harrowcomb in the autumn has not been repeated on the study because it was thought to have stimulated a new flush of weed seedlings.

By March the population had expanded both 1m and 6m into the field. The 1m sample contained a higher frequency of plants. This confirms that established picture for *Galium* where it colonises the field edges and then progressively moves into the cropping area.

As you move away from the field margin the number of weed species declined. The more pernicious weeds like *Galium* follow this pattern which has implications for margin and crop management.

FINANCIAL ASPECTS OF FIELD MARGIN MANAGEMENT

Farmers always have a choice between using every last square metre of available field space or allowing space next to hedges.

By planting the last 1m under a hedge or around the field margin the following costs are incurred per kilometre:-

Crop inputs (winter wheat) 1994 harvest per ha (Noble, L, 1994).

Seed	£6.00
Fertiliser	£9.00
Chemicals	£15.00
Cultivations	<u>£25.00</u>
	£55.00

For this investment in seeds, fertiliser, chemicals and cultivations the return across the field as a whole in terms of gross margin was £800. However as a result of increased competition for water, light, fertiliser, compaction and the predation of birds and mammals the crop yields at the margin is substantially lower than the average for the field. Experience of the RP Farm Manager leads to the estimate that yields are about 50% of the overall average. On this basis the return per hectare of the 1m wide field margin is £400 or £40 per kilometre. The overall financial result is a loss of £150/ha or £15.00 per kilometre of field margin for those farmers who crop right up to the hedge bases.

At Rhône-Poulenc's Farm Study, in addition to the 1m wide uncut grass area at the hedge base, a 3m wide mown grass access strip is also used.

The cost of establishing these access paths is:-

Grass seed per hectare	£50.00
Cultivations per hectare	<u>£60.00</u>
	£110.00

It is quite conceivable that yield reductions even during the establishment year will off-set these costs.

By adopting a strategy of grassed hedge bases at twice annually trimmed grass access paths/roadways can make financial sense.

SUMMARY

Margins can be managed to give environmental benefits and improve both operational and public access. The costs involved in establishing and maintaining margins can be more than off-set by not losing yields. Weeds within the cropped areas can be managed as shown by the conventional study area (Turner, 1995.) Careful use of herbicides can enable farmers to grow high quality crops whilst maintaining the stability of field margins.

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LANDSCAPE MANAGEMENT - CENTRAL TO THE WHOLE FARM POLICY

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ABSTRACT

Integrated Crop Management, (ICM), offers a realistic solution for positive landscape management. Practical examples, using the LEAF Environmental Audit as a management tool, show just how farmers are taking action, by ensuring the decisions for landscape management are fully integrated into the whole farm philosophy and the flow of land is paramount to the vision of the farm and the fabric of the countryside.

INTRODUCTION

The countryside is at the heart of the sustainability debate, and our long term aims are for an environmentally healthy countryside, a beautiful countryside, a diverse countryside, an accessible countryside and a thriving countryside.

Sustained development is impossible without sustainable agricultural land use. Indeed land is one of our most precious natural resources. Our landscape needs to be managed as part of the whole farm system as inappropriate management can represent a permanent and irreversible loss of an irreplaceable asset, resulting in a loss of valued countryside and reducing the long term capacity of the UK agriculture sector to produce both agricultural and environmental goods.

Integrated Crop Management (ICM) is a whole farm philosophy that is site specific, bringing together the farming system and the positive management of landscape and wildlife and habitat features. In the management of the landscape one of the key factors to address is the flow of the land and its features. The starting point is appropriate planning of the area and this is where the good housekeeping and the discipline of an ICM system can help, through identifying the already existing features and mapping them and their value. From here there is a value in aiming to maintain or enhance the existing features. It is essential that if the landscape is altered assessing the impact that any changes may make is vital. This means the consideration of cropping, tree planting, creation of hedgerows or beetle banks as well as the consideration of more dramatic land changes, such as merging existing and new buildings into the environment, excavations, gravel digging etc. Although these irreversible losses of land and landscape are to be avoided.

WORLD DEMAND

From the Earth Summit 1992 (Quarrie, 1992) in Rio the priority for agriculture was set to maintain and improve the capacity of higher potential agriculture lands to support an

expanding population, whilst conserving and rehabilitating the natural resources on lower potential lands in order to maintain sustainable man/land ratios.

This included the importance of management related activities such as the need:

- ▶ To formulate and implement integrated agricultural projects that include other natural resource activities;
- ▶ To ensure people's participation and promote human resource development for sustainable agriculture.

This component bridges policy and integrated resource management. The greater the degree of community control over the resources on which it relies, the greater will be the incentive for economic and human resources development. It is on these policies that Integrated Crop Management (ICM) offers a positive approach to farming, environment and landscape management.

THE LANDSCAPE

Land means different things to different people. This makes it difficult to find a single emotive and meaningful indicator. To many people the primary purpose for landscape is as a resource for the production of food and other products and as an ecosystem for vital organisms. However, overall, the need to protect the countryside for its wildlife value, landscape, natural resources, recreational and agriculture and to balance the competing demands for urban land is of prime importance (Baldock 1992).

It is possible to identify two broad but distinct types of concern; a question of the quality of the resource (soil quality), and a question of quantity (land use). It is clear that valued features of the countryside have been lost at an alarming rate. This includes the removal of hedges, ponds and ancient woodland. But despite the facts and the concerns of many there is much action taking place and in some incidences this has been going on for years, there is in effect a '*quiet revolution*'. This is where ICM comes into its own.

In order to achieve a healthy soil and environment a fully integrated system for farming needs to be adopted taking account of the environment in every agronomic decision whilst ensuring an economically viable return. Agriculture has not been in a more financially healthy situation for a long time and although there is uncertainty as to the long term nature of policy decisions all fingers point in the direction of future support being more in line with the need to supply environmental criteria. Indeed we need only look to the new countries that have joined us in the EU to see where they are coming from. Sweden and Austria, both have a very strong commitment to the environment. Furthermore Denmark insists that new farmers and tenants take up training for environmental and agricultural skills.

Whether we like it or not our countryside has been fashioned by the changes over centuries, and more often than not we see history repeat itself. Today, however we have that historic knowledge and we have technology to help us overcome the mistakes of the past. It is important that we are realistic about the demands of the future. We need a thriving countryside, and the landscape that we fashion is a function of the health of the countryside.

AN INTEGRATED SYSTEM

Integrated production systems accept moderate and environmentally appropriate use of external inputs - mainly fertilisers and pesticides - in combination with measures to make maximum use of internal nutrient recycling, biological pest control and symbiosis between different crops and livestock. Integrated pest management, integrated plant nutrition, soil conservation, and efficient and non-exhaustive water use are mutually reinforcing measures. They should be applied together within the farming system at levels appropriate to the physical and socioeconomic conditions; the optimum strategies are highly specific to individual farms. However given the diversity of ecosystems, land resource potentials, preferences of farmers and consumer demands there is opportunity for the co-existence of different systems - organic and integrated - in a manner that respects the environment.

The overall aim is to develop and adopt diverse and improved plant production systems in which the optimal utilisation of inputs maximises economic returns to the farms and protects the environment.

THE AGENDA FOR ACTION TO ACHIEVE AN INTEGRATED SYSTEM IS TO:

- ▶ promote diversification and integration of agricultural production systems;
- ▶ optimise use of on farm inputs, biological processes and local natural resources;
- ▶ minimise the use of external inputs, while increasing productivity and farmers income;
- ▶ disseminate information and redirect and increase support to agricultural research and technology development to promote sustainable land use systems;
- ▶ use tradition indigenous technologies, as well as strategic research, on biological processes that govern agricultural production.

WHAT TO DO - PLAN, DESIGN, COLLABORATE

As part of an integrated system design is one of the most important aspects in the improvement of the landscape's value. A range of actions assist in improving the design of new development and the landscape in rural areas and particularly on farm and include:

- ▶ a landscape and wildlife plan for the whole farm, to integrate nature conservation with the cropping programme;
- ▶ priority for the maintenance and enhancement of existing features;
- ▶ attention for non farmed and farmed areas, it must be remembered that much potential also lies in cropped land.
- ▶ consideration that mixed farms and rotations, which include a large range of crops, offer a wider range of options for wildlife.
- ▶ communication at all levels. Staff and contractors should be aware of areas of conservation value.;
- ▶ ensuring that new development draws on the best design in terms of layout, use of space and management of traffic;
- ▶ ensuring that new development should be complementary to existing buildings and in harmony with the surrounding countryside;
- ▶ avoiding irreversible losses of land and landscape at all costs.

When planning the environmental enhancement and management programme for the farm, existing habitats and landscape features should take a priority. At all costs damage to landscape features and wildlife areas should be avoided.

However, despite the fact that there are substantial savings that can be made through the attention to detail from an Integrated Crop Management system and that there are many grants for some specific conservation projects and developments, it must be remembered that conservation can cost money. Land taken out of production still incurs rent or mortgage charges. The overheads of the farm business become spread less widely than before. If trees are planted, the ultimate crop is unlikely to produce income during the lifetime of the forester or his successor but weeding and thinning must still be paid for.

In spite of these constrictions, farmers who care to devote a little throughout to a matter can to help sustain a varied population of wildlife. Any farming system can sympathetic to the environment. Many farmers have begun to understand that, for the sake of game and other species as well as general economic reasons, herbicides and fungicides should be used not as a matter of routine but only when essential. Time of application of chemicals can be chosen carefully to avoid undue damage to birds and many other species in the wildlife chain. Hedge bottoms can be allowed to become slightly wider and field work can be planned so that disturbances from noise and the human voice is arranged in such a way that game and other birds and mammals are encouraged towards shelter rather than away from it. Tranquillity is an essential part of sympathetic farm management. It does not exist in urban life and therefore should be all the more important to countrymen.

COMMUNITY INVOLVEMENT

It has been estimated that in 1994 some 590 million visits were made to the countryside. This level of public access inevitably gives rise to conflicting pressures. In some areas it is difficult to reconcile the privacy of ownership and conservation objectives with public access. Most local people value in both aesthetic and recreational terms, elements of their landscape, yet they are rarely involved in the decisions and processes that shape it. As land managers and owners, farmers clearly should be making decisions about how to best farm their land. But if responsibility is assigned to both farmers and the communities for landscape conserving activities, where local people are encouraged to become involved in local farming in an indirect way, then again more understanding would be created among different interests.

Indeed there are village specialists that help out on some of the LEAF Demonstration Farms. They come from all sectors and classes of the community and facilitate the integration of marginalised groups, so allowing their skills and knowledge to influence development priorities. Given the chance local people are able to monitor environmental change and so take action when required. (Pretty, 1994). Coupled with this it is of course the need for a better understanding of farming and the countryside by the public in the first instance and again this is where the LEAF Demonstration Farms have an active role to play.

There are thus many demands for the role of both the countryside and the landscape it needs to be:

- ▶ **an environmentally healthy countryside**

biodiversity is one of the key requirements of the Rio Summit and commitment from global governments. So much of our landscape features provide the habitats for a rich and varied wildlife ranging from birds to small insects.

▶ **a beautiful countryside**

visual appearance of the countryside is perhaps the most obvious impact for the countryside as it the most easily measured and most likely to cause concern in the public's eyes. This obviously includes the loss of habitats, such as hedgerows, trees, ancient woodland and grassland, the colour of the countryside, the introduction of oilseed rape and linseed ranging to the complete change in use of the countryside through gravel extraction and the creation of roads

▶ **a diverse countryside**

this indicates the importance of biodiversity and also the need for correct planning and control. Here the local topography and natural flow of the land is essential on the planning of the structure.

▶ **an accessible countryside**

there is a strong interest for the non rural community to visit the countryside but just as it is essential for farmers to be responsible in their roles as custodians of the countryside so it is important for those visiting the countryside to take a responsible attitude to care and concern.

▶ **a thriving countryside**

not only is it essential that there is a rich diversity in the countryside it is also essential that there is a financially thriving countryside.

As has been highlighted previously, Integrated Crop Management (ICM) is one practical and achievable solution for all these demands to be met by farmers. A whole farm system, ICM is not a prescriptive approach but is site specific, allowing flexibility in the system, which can take into account the topography, the importance of local history and design and the natural flow of the land.

ICM incorporates: site, rotations, crop protection, crop nutrition, pollution control, energy use, variety choice, organisation and planning and a positive and whole farm approach to landscape, wildlife and habitats. It brings into account the detail of a diverse variety choice, essential for better control of pests and diseases, cropping plan, a sound rotation is one of the most important contributing factors to better soil structure, better pest and disease control etc. ICM is a '*quiet revolution*', not a flash of dramatic change. It is a gradual process that builds on existing practices through the utilisation of the best of traditional methods and the best of modern technology. It is not only good common sense farming it is also involves commitment from all sides from the industry, from farm managers and farmers, and from farm staff and contractors.

At LEAF (Linking Environment And Farming), we are part of a pan European project that is demonstrating and developing Integrated Crop Management. We now have 17 LEAF Demonstration Farms, selected against stringent criteria, who are promoting Integrated Crop

Management to both farmers and non farmers. Furthermore we have developed both guidelines (LEAF 1994a) for Integrated Crop Management and the LEAF Environmental Audit (1994b). The latter is a unique document. Originally designed as a management tool to help farmers along the route of ICM it now also has potential as a customer assurance and assisting in securing a market, addressing the demands of 'traceability' and 'due diligence'.

Indeed now in its second year the LEAF Environmental Audit has assisted farmers in many ways. It has 'made them think', it has helped them identify areas where they are getting it right and give them credit for that and it has identified areas where risks could have led to environmental destruction and pollution.

ENVIRONMENTAL AUDITING

Environmental auditing is basically the systematic examination of the interactions between any farm operation and its surrounding. This includes all emissions to air, land and water; legal constraints; the effects on the neighbouring community, landscape and ecology; and the public's perception of the farm in the local area.

The LEAF Environmental Audit aims to help safeguard the environment by:

- ▶ facilitating the management control of environmental protection;
- ▶ assessing compliance with farm's policies which would include meeting regulatory requirements.

There are three essential functions to starting a successful environmental audit:

COMMITMENT	-	from management, staff and/or contractors and advisers;
RESOURCES	-	environmental auditing can save money but resources can be required in management time;
LEADERSHIP	-	the audit involves everyone but responsibility does need to be allocated correctly.

OBJECTIVES OF THE LEAF ENVIRONMENTAL AUDIT

- ▶ Firstly define what you want to achieve;
Those carrying out the audit were able to identify areas that did have an impact on the environment. Many of which may have been identified in the past, but using LEAF Environmental Audit helped draw them together.

- ▶ The next step is assessing where changes can be made, by providing answers to the following questions:

What are we doing?

Can we do it better?

Can we do more?

Can we do it more cheaply?

Environmental auditing does not stop at compliance with legislation. Nor is it a 'green token' public relation exercise, although, done well it could bring considerable positive PR.

Rather it is a total strategic approach to the farm's activities.

The LEAF Environmental Audit is a practical, non-prescriptive way for farmers to look objectively at their business, assess strengths and weaknesses and identify cost saving operations and capital expenditure to minimise long term risk; it shows how the integration of the environment with food production can be profitable as well as desirable. The audit is a series of self assessment forms and provides a convenient and structured way which, when carried out on an annual basis, will monitor progress and help in determining priorities on the farm.

It addresses 8 principal areas:

Landscape features;	Conservation of energy;
Wildlife and habitats;	Pollution control;
Management of the soil;	Organisation and planning;
Crop protection;	Animal welfare.

As well as taking stock and giving credit to existing practices and identifying areas for future improvement, there are many long term benefits which can result from carrying out the audit.

These include:

- ▶ improving economic performance;
- ▶ enhancing environmental performance;
- ▶ meeting insurance requirements;
- ▶ gaining a marketing edge.
- ▶ ensuring environmental protection;
- ▶ meeting legislative requirements;
- ▶ addressing public concerns;

In this paper practical examples will be sighted highlighting the importance of ensuring that the decisions for landscape management are fully integrated into the whole farm philosophy and that the flow of land is paramount to the vision of the farm and the fabric of the countryside.

The starting point of the audit is the management policy statement which sets out the goals for the whole farm. The farmers are then encouraged to carry out a whole farm plan identifying areas of specific environmental value (eg from FWAG or ADAS). From there the series of self assessment sheets in the LEAF Environmental Audit assists farmers in looking at their farm objectively. Many of the questions are based on standard good agricultural practice but with the rapid advancement of technology there are other areas that can assist farmers in addressing and targeting situations where greater attention to detail is required. The audit makes people think and with increasing pressure on farmers to address both environmental and economic criteria it is a useful management aid.

From the analysis of the returns of the LEAF Environmental Audit (1994) the farmers who carried out the audit recognised that not only are auditing and accountability where the future is going in terms of answering consumer demands, but also that Integrated Crop Management is the way forward for a profitable and environmentally responsible farming system.

There were strong indications that these farmers are 'getting it right' in terms of recognising the need for positive environmental management and responsible farming

practices, and are taking the necessary action. Indeed, in a majority of cases, they have been doing so for many years.

Furthermore, there were some key areas identified by the LEAF Environmental Audit, which farmers wanted to develop and act upon to improve their farm management and achieve set targets.

More specifically, these included:

- ▶ the need to improve staff training and awareness;
- ▶ the implementation or updating of a conservation plan (for example a FWAG whole farm plan);
- ▶ familiarisation with MAFF codes of Practice;
- ▶ improved soil management, for example mapping areas where erosion, leaching or compaction is a problem;
- ▶ formulating an emergency plan;
- ▶ formulating a waste management plan;
- ▶ increasing staff involvement in farm policy and decision making;
- ▶ monitoring - both in terms of physical records, fuel and threshold levels for insects and disease incidence.

A PRACTICAL APPROACH

Landscape management is central to the whole farm policy and to illustrate this further to follow are a few examples of landscape management and whole farm policy on some of the LEAF Demonstration Farms.

At Cold Harbour Farm the landscape is very open and there are beautiful views across the Wolds. There is an absence of natural features on the farm and attention is paid to the hedges and their management. An active programme of hedge regeneration is being implemented on the farm with gapping and coppicing and in recent years over half a mile of new hedgerow has been planted. North south hedges are encouraged to grow larger with infrequent trimming. East west hedges are also allowed to thicken out at the base and trimmed to an A shape at 5-6 feet. Furthermore two tumuli have been grassed down and preserved and there are other Neolithic sites of particular historic interest on the farm.

On another, Ian Brown's farm management policy for Lee Moor Farm includes:

- ▶ Optimising the use of inputs and assets to achieve a profitable return, using appropriate technology in sympathy with the environment
- ▶ Developing areas of the farm unsuited to arable production into intensive conservation development;
- ▶ Encouraging public access for education and recreation.

His most visible influence on the farm however, is the transformation from a rather featureless arable holding to one that has an increasing number of interesting areas with surprises around almost every corner. This reflects Ian's belief that, as custodians of the countryside, farmers can do much to manage, enhance and extend the environmental character of their farms,

while maintaining a profitable business.

In contrast Guiting Manor enjoys an abundance of natural features; miles of hedges, two streams that run the length of the estate, and hectares of scattered woodland, including an area of ancient woodland with a rich diversity of plants and wildlife. A management policy to maintain the condition and balance of these features has been reinforced entering a 10-year agreement under the Cotswolds Environmentally Sensitive Area scheme to restore and preserve hedges and walls, and limit fertiliser and pesticide use on old pastures. Indeed more than 30000 trees have been established in recent years many on four new plantations covering nine hectares in all under the Farm Woodland Scheme. Also on the estate is a strong commitment to the restoration of the village cottages and today the Trust lets its houses as far as possible to local countryfolk at affordable prices.

And a further example is Henry Cator of Rotac Farms partnership, who sets out the main aims of the estate as follows;

- ▶ To make trading profits while acting as custodians of the countryside for future generations;
- ▶ To preserve the traditional nature of the estate as a whole without sacrificing good husbandry or sound management;
- ▶ To act as the nucleus of a thriving rural village and community.

Conservation activities, sympathy for natural resources, consideration for the environment and a fully integrated cropping approach are all long standing principles on the farm. Management and renewal of the Estate's natural features is an ongoing activity - not something to engage in to collect grants or as a response to public opinion. Hedges have always been maintained and are cut every other year on a rotational basis to ensure there is no shortage of bird nesting sites. Tree planting takes up some 1.6 to 2 hectares a year, extending or supporting existing woodland in some cases, creating new plantations in others. An important Ramsar Site marshland, harbouring rare plant species and a great diversity of wild birds and mammals, falls within the estate's boundary. The Bure Marshes, a Site of Special Scientific Interest (SSSI) are run under a management agreement with English Nature. Other ancient grazing marshes have been reclaimed and ponds periodically dredged to prevent them silting up.

Buildings that are no longer practical for modern farming methods are kept in good condition until an alternative use can be found. Many now house a diverse selection of businesses which include an equestrian centre, an automotive engineer, boat storage and even a small brewery. Two cottages behind the brewery building which has previously housed sheep and animal feed milling equipment, have become the village pub or brewery tap.

A final example is Edward Darling who having restored the farming business to maximum profitability and restructuring the enterprise to separate farming and estate management activities, now includes priorities:

- ▶ Producing a quality product at optimum profitability;
- ▶ Enhancing the environment in which all involved in the farm live and work;
- ▶ Providing opportunities for other people, whether housing, employment or workplace.

One ambition is to see 20 people working on or from the farm again and to provide homes for a similar number. Indeed Mr Darling is well down the way to achieving this ambition.

Today Edward Darling continues the philosophy and combines sound land management with responsible conservation techniques. He has adopted an integrated approach focusing on woodland, hedgerow and grassland with the overriding aim of promoting diversity of habitat alongside economic crop management.

All the above farms are practising Integrated Crop Management. They are farmers who emphasise the importance of a farming business that is commercially viable at the same time as being environmentally sensitive.

CONCLUSION

In the management of the landscape one of the key facts to address is the flow of the land. The starting point is appropriate planning to the area and this is where the good house keeping and the discipline of an ICM system can help.

By identifying the existing features, areas of specific environmental sensitivity and areas for potential, the LEAF Environmental Audit together with a whole farm conservation plan is an excellent starting point for the stepping stone approach of Integrated Crop Management. This starts off by giving highest priority to those existing features that should first and foremost be managed positively.

And to follow is a ten-point plan to assist in planning for landscape management under ICM techniques:

- ▶ adopt a whole farm approach
- ▶ assess the flow of the land
- ▶ manage existing features
- ▶ develop plans in keeping with the local environment
- ▶ identify areas to improve natural flow of the land
- ▶ assess the cropping pattern in the lay of the land
- ▶ remember the importance of landscape goes well beyond the visual appearance of the countryside - the environment offer biological benefits and the cropping pattern can add to the biodiversity of the surroundings and less risk
- ▶ encourage public access across the landscape
- ▶ training for farm staff and the non farming community is essential to spell out the importance of environmental value
- ▶ PLAN.

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