Pesticides and integrated farm management
Pesticides help farmers and growers to produce a constant and economic supply of produce for the market, but when using pesticides, you must be aware of the possible effect they may have on people’s health and the environment.

Farmers and growers use pesticides to protect their crops from pests, diseases and weeds, but it is essential that you use these products with care, to limit any possible harmful effects on people’s health and the environment.

The most effective way you can respond to these concerns is by using integrated farm management (IFM) techniques on your farm.

IFM essentially involves combining traditional and modern farming practices with measures which protect the environment. These practices include targeting pesticides and fertilizers more effectively to reduce possible harmful side effects on the environment. IFM can also help to control or even reduce costs.

This booklet explains some methods of husbandry that could form part of an IFM system on your holding. However, using IFM depends on the nature of your business, so this booklet aims to help you make informed decisions about when to use pesticides, and to guide you towards other sources of help.

Names of relevant organisations appear throughout the text, but there are full contact addresses for a wide range of organisations on pages 9 to 11.
One of the first questions to consider when planning to use a pesticide is whether there are other strategies you can use. For example, can you use a combination of cultural and chemical methods, such as those used in an integrated farm management (IFM) system?

All pesticide use involves some risk, whether it is run-off, residues or the risks associated with getting rid of waste products and packaging. A main purpose of IFM is to reduce or avoid these risks. You may also benefit by saving money.

LEAF (Linking Environment and Farming) can help you carry out a whole farm assessment to aid the implementation of an IFM approach on your farm. Contact LEAF for more details.

**What cultural controls can help to reduce pesticide use?**

There are a wide range of cultural controls that you can use to reduce your use of pesticides. Here are some examples.

- **Crop rotation**
  
  Crop rotation is important in controlling pests, diseases and weeds. As many diseases survive in plant debris a break of two to five years between the same type of crop in a field allows time for diseases to decline to insignificant levels.

- Rotational set-aside allows you to control grass weeds by cutting or destroying with non-selective herbicide – preferably after 1 June to help protect wildlife.

By using this type of combination, integrated farm management can be less vulnerable to the kind of problems (such as pesticide resistance) that can emerge if you repeatedly use only one type of defence.

You can find more information on COSHH requirements in the *Code of Practice For the Safe Use of Pesticides on Farms and Holdings* (The ‘Green Code’), which you can get free of charge from Defra Publications (phone: 08459 556000).

Under the Control of Substances Hazardous to Health Regulations (COSHH) 1999, all those who work with pesticides must assess the health risks from the substances they work with and take action to prevent or control people’s exposure to these substances.
Different cultivations

Cultivations have long been recognised as a way of controlling pests, diseases and weeds. It is important that you choose the right tool and timing for specific crop and soil combinations.

Ploughing helps to bury weed seeds that are shed in cereal stubbles to depths where germination and seedlings growing would be difficult. Plant debris (which may act as a source of disease) may be buried by ploughing, so breaking the disease cycle.

On light soils ploughing can bury organic debris and also help produce a better seedbed for residual herbicides to work long after they have been applied. However, on heavy soils ploughing can lead to a rough and uneven seedbed which could encourage slugs and not help the effectiveness of the herbicides that you use.

Late sowing and stale seedbeds

Delayed sowing of winter wheat will encourage grass weeds to grow, which may then be controlled by cultivation or by fewer herbicide sprays. A further benefit is that disease levels are lower on later drilled crops. In sugar beet or potatoes, preparing a ‘stale seedbed’ will encourage an early flush of weeds to grow, which can be destroyed by preparing the later seedbed.

Crop competition

A healthy crop will withstand pests, diseases or weeds much better than a poor one. The success of residual herbicides used before or after crops appear relies on the crop achieving 100% cover early in its life, to suppress any weeds that grow later. This is particularly effective in potatoes, sugar beet and oilseed rape.

Note: Ploughing may not always be the most suitable method of cultivation in an IFM system. As a result, we strongly recommend that you take relevant advice if you are not sure whether it is appropriate.
Crop varietal resistance and tolerance

Varieties of the same crop type have different patterns of resistance or tolerance to pests or diseases. This can reduce or delay the damage caused by pests and diseases, which in turn may mean fewer sprays of pesticide or, in some cases, lower doses.

Avoid disease or pest resistance to pesticides

On the other hand, pests and diseases can develop resistance to pesticides. This can lead to unnecessary pesticide use because treatment is not effective and follow-up sprays of an effective pesticide will be needed. Preventing resistance to pesticides is better than cure and cheaper in the long term.

Avoid resistance. Use cultural as well as chemical methods of control – do not use products from the same chemical group throughout the season. Get expert advice if you suspect resistance.
Using naturally occurring insects to control pest species in biological control programmes has been well developed for glasshouse crops.

Agents such as fungi, bacteria and nematodes are becoming available to control other glasshouse pests (for example, thrips, leafminers and caterpillars).

However, be aware that you may need selective pesticides if the natural enemies fail to give adequate control.

Biological control can work well within the controlled environment of a glasshouse. Outside in the field, variable weather conditions and other agronomic factors make the technique more difficult to apply, but there has been some success in orchards. However, enemies cannot always prevent the build-up of epidemic pest populations, and insecticide treatments are sometimes necessary.

Despite this, certain predators and parasitoids (such as ladybirds, lacewings, hoverflies, parasitic wasps, spiders and ground beetles) can help reduce pest levels. You can encourage these beneficial insects to develop by improving habitats around and within the farm (for example, by establishing conservation headlands, beetle banks, grassy field margins and strips of pollen and nectar mixture). All of these management options are funded under the agri-environment measures.

Examples of natural organisms include the parasitic wasp Encarsia (to control whitefly) and the predatory mite Phytoseiulus (which feeds on the two-spotted spider mite).

Manage hedgerows sympathetically, use selective pesticides where possible and try not to spray in the field margins.

You can get more information on managing conservation headlands from the Game Conservancy Trust.

You can get more information on using natural enemies from ADAS, Rothamsted Research and Horticulture Research International (HRI).

You can get more information on field margins from ADAS, the Game Conservancy Trust, Farming and Wildlife Advisory Group, English Nature, Rothamsted Research, SAC, and Scottish Natural Heritage.
Routine pesticide applications are wasteful and can damage the environment. Consider how you make your spraying decisions. How can you improve these to reduce reliance on using pesticides and reduce damage to the environment?

Monitoring crops and diagnosing problems

It is important to monitor your crops by regularly walking through them, and to make sure you identify problems quickly and correctly. You will then be better able to forecast whether a pest or disease will reach levels at which it will be necessary to protect the crop.

Many farmers use a BASIS qualified agronomist to help them monitor crops and diagnose problems.

Forecasting for pests and diseases

Weather forecasting is one obvious way of predicting whether a particular pest or disease (for example, potato blight, Septoria in wheat and apple scab) is going to be a problem.

Precision farming techniques and weather programmes also help to target spraying. In-field diagnostic kits are another source of help to make sure you use pesticides correctly.

Decision thresholds

Decision-making for pest control is increasingly based on treatment or economic thresholds, because a pest, weed or disease may not always justify a pesticide treatment. For example, the crop may be past the most susceptible stage of growth for economic damage to happen, the pest may not be present in high enough numbers to cause significant damage, or its population may be reducing and so not cause further damage.

Weather monitoring can help to forecast pest and disease thresholds.
The potato aphid trap is a useful on-farm forecasting system for seed potatoes.

Having decided to use a pesticide

If you must use a pesticide, it is vital that you do so correctly to make sure it has the best effect on the target pests and as little effect as possible on the environment and non-target species.

Choosing the right product

Choosing the right product to do the job is essential, particularly bearing in mind the need to protect people's health and the environment. When choosing, be selective. For example, when tackling aphids, choose an aphid-specific insecticide such as ones containing pirimicarb, which will cause as little harm as possible to beneficial species such as ladybirds.

Use the appropriate dose

Although the appropriate dose for a pesticide is usually the one on the product label, it may be possible under certain circumstances for you to reduce the dose or to split it over a period. Perhaps, when using fungicide mixtures, you could lower the dose for one or more component and still maintain satisfactory levels of disease control.

Timing the application correctly

It is crucial to time pesticide applications correctly for any crop protection programme to be successful. Incorrect timing may result in a failure to control the pest and may also mean that more pesticide is being used to control the problem.
The Voluntary Initiative

The industry-led Voluntary Initiative (VI) encourages farmers and growers to reduce the harmful effects pesticides may have on the environment. In 2003 the VI launched its Crop Protection Management Plan scheme, which encourages farmers and growers to adopt best environmental practice including integrated farm management measures. The VI is also promoting good practice by developing a National Register of Sprayer Operators and testing spray machinery under the National Sprayer Testing Scheme each year.

Organic farming

Farming organically offers an alternative to standard production systems that avoids using most pesticides. Defra published the ‘Action Plan to Develop Organic Food and Farming in England’ in 2002, and there are similar initiatives in other parts of the UK (for example, the Scottish Executive Organic Action Plan). These plans aim to promote organic production in the UK.

The Organic Farming Scheme provides financial help to farmers to convert land to organic methods of production and ongoing payments once conversion has been carried out. For more information on the Organic Farming Scheme, see contact details on page 11.

The Organic Conversion Information Service provides free advice to farmers who are considering converting to organic production.

You can get information on the Organic Action Plan and on organic production from Defra’s Organic Farming Branch.

The Organic Farming Branch
Defra
Area 5F Ergon House
Horseferry Road
London SW1P 2AL.
Phone: 020 7238 5605
www.defra.gov.uk/farm/organic

You can also phone the Organic Conversion Information Service on 0117 922 7707.

Assured Produce Scheme
You can get more details from their website at www.assuredproduce.co.uk

When spraying, take account of other things such as wind speed. You should also consider ‘spot’ spraying, and make sure that you use the appropriate machinery and that it is correctly adjusted.

You should make sure that anyone who sprays pesticides is properly trained and certificated.

How can you reduce your use of pesticides?
ADAS
ADAS Wolverhampton
Woodthorne
Wergs Road
Wolverhampton WV6 8TQ
Phone: 01902 754190
Website: www.adas.co.uk
Advice and research on environmental, agricultural and horticultural practice

Agricultural Industries Confederation
(AIC) formerly UKASTA
Confederation House
East of England Showground
Peterborough
Cambridgeshire PE2 6XE
Phone: 01733 385230
Website: www.agindustries.org.uk
Organisation representing agrochemicals distributors

Association of Independent Crop Consultants
Agriculture House
Station Road
Liss
Hampshire GU33 7AR
Phone: 01730 895354
Website: www.aicc.org.uk
Largest professional organisation for independent crop consultants in Europe

BASIS (Registration) Ltd
34 St John Street
Ashbourne
Derbyshire DE6 1GH
Phone: 01335 343945
Website: www.basis-reg.co.uk
Certification, standards and training for pesticides advisers and distributors

British Crop Protection Council
7 Omni Business Centre
Omega Park
Alton
Hampshire GU34 2QD
Phone: 01420 593209
Website: www.bcpc.org
Certification, standards and training for pesticides advisers and distributors

Country Land and Business Association
16 Belgrave Square
London SW1X 8PQ
Phone: 020 7235 0511
Website: www.cla.org.uk
Representative organisation for landowners and rural business

Countryside Council for Wales
Maes-y-Ffynnon
Penrhosgarnedd
Bangor
Gwynedd LL57 2DW
Phone: 0845 1306229
Website: www.ccw.gov.uk
Advice on nature conservation in Wales

English Nature
Northminster House
Peterborough
Cambridgeshire PE1 1UA
Phone: 01733 340345
Website: www.englishnature.org.uk
Advice on nature conservation in England
Contacts for more advice and information

Environment Agency
Evenlode House
Howbery Park
Wallingford
Oxfordshire OX10 8BD
Phone: 01491 828544
Website: www.environment-agency.gov.uk
Advice on pesticide pollution

Farming and Wildlife Advisory Group
The National Agricultural Centre
Stoneleigh
Warwickshire CV8 2RX
Phone: 024 7669 6699
Website: www.fwag.org.uk
Conservation advice for farms

Game Conservancy Trust
Burgate Manor
Fordingbridge
Hampshire SP1 1EF
Phone: 01425 652381
Website: www.gct.org.uk
Advice on conservation headlands and selective use of pesticides

Home Grown Cereals Authority
Caledonia House
223 Pentonville Road
London N1 9HY
Phone: 020 7520 3920
Website: www.hgca.co.uk
Advice on cereal and oilseed cropping

Horticultural Research International
Wellesbourne
Warwick
Warwickshire CV35 9EF
Phone: 01789 470382
Website: www.hri.ac.uk
Horticultural science, and Research and Development

Lantra Awards
Stoneleigh Park
Coventry
Warwickshire CV8 2LG
Phone: 024 7641 9703
Website: www.lantra.co.uk
Training courses for operators and spray contractors

Linking Environment and Farming (LEAF)
The National Agricultural Centre
Stoneleigh
Warwickshire CV8 2LZ
Phone: 024 7641 3911
Website: www.leafuk.org
Organisation encouraging farmers to use IFM techniques

National Association of Agricultural Contractors (NAAC)
Samuelson House
Paxton Road
Orton Centre
Peterborough
Cambridgeshire PE2 5LT
Phone: 01733 362920
Website: www.naac.co.uk
Organisation representing agricultural contractors

National Farmers’ Union
Agriculture House
164 Shaftesbury Avenue
London WC2H 8HL
Phone: 020 7331 7200
Website: www.nfu.co.uk
Organisation representing farmers and growers
Contacts for more advice and information

**Organic and Energy Crops National Implementation Team (OECNIT)**
Rural Development Service
Electra Way
Crewe
Cheshire CW1 6GJ
Phone: 01270 754122
Website: www.defra.gov.uk/farm/organic
Advice on Organic Farming Scheme

**Organic Farming Branch**
Defra
Area 5F Ergon House
Horseferry Road
London SW1P 2AL
Phone: 020 7238 5605
Website: www.defra.gov.uk/farm/organic
Registration organisation for organic standards

**Pesticides Safety Directorate**
Mallard House
3 Peasholme Green
York YO1 7PX
Phone: 01904 455775
Website: www.pesticides.gov.uk
Registration and regulation of agricultural pesticides

**Rothamsted Research**
Harpenden
Hertfordshire AL5 2JQ
Phone: 01582 763133
Website: www.rothamsted.bbsrc.ac.uk
Crop management and crop protection research

**Royal Society for the Protection of Birds**
Advisory Section
Conservation Management Department
The Lodge
Sandy
Bedfordshire SG19 2DL
Phone: 01767 680551
Website: www.rspb.org.uk
Advice on land management for birds

**SAC (formerly Scottish Agricultural College)**
West Mains Road
Edinburgh EH9 3JG
Phone: 0131 535 4000
Website: www.sac.ac.uk
Advice on all aspects of plant protection

**Scottish Environment Protection Agency (SEPA)**
Erskine Court
The Castle Business Park
Stirling FK9 4TR
Phone: 01786 457700
Website: www.sepa.org.uk
Advice on preventing pesticide pollution

**Scottish Natural Heritage**
12 Hope Terrace
Edinburgh EH9 2AS
Phone: 0131 447 4784
Website: www.snh.org.uk
Advice on wildlife and countryside matters in Scotland

**Voluntary Initiative - c/o Crop Protection Association**
4 Lincoln Court
Lincoln Road
Peterborough
Cambridgeshire PE1 2RD
Phone: 01733 349225
Website: www.cropprotection.org.uk
Trade association for the agrochemical industry
Summary

- Use pesticides only where absolutely justified.
- Consider combining chemical and non-chemical controls.
- Where possible, treat only when decision thresholds are met or beaten.
- Use the right product at the right time.
- Get expert advice if you are not sure what controls might be used.

We would like to thank all those who contributed to producing this booklet.