



Department
for Environment
Food & Rural Affairs

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Pesticides Evidence Plan

Policy portfolio: Food and Sustainable Economy

**Policy area within portfolio: Chemicals and
Emerging Technologies**

Timeframe covered by Evidence Plan: 2013/14 to 2017/18

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This evidence plan was correct at the time of publication (March 2013). However, Defra is currently undertaking a review of its policy priorities and in some areas the policy, and therefore evidence needs, will continue to develop and may change quite rapidly. If you have any queries about the evidence priorities covered in this plan, please contact StrategicEvidence@defra.gsi.gov.uk.

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1. Policy context

What are the key policy outcomes for the policy programme/area?

The use of pesticides delivers substantial benefits for society, including helping to secure an economic food supply. Industry figures suggest that production costs would be 75% higher and land use at least 65% higher without pesticides. However, pesticides are designed to be toxic and have the potential to harm people, wildlife and the environment. These externalities are not reliably prevented by the market and so regulation has a part to play (alongside voluntary actions undertaken by the pesticides and farming industries). Effective regulation of pesticides also boosts consumer confidence.

The challenge in this policy area is to minimise the risks without losing the real benefits of pesticide use. The pesticides programme therefore aims to deliver an effective and efficient, evidence-based pesticide regulatory system that protects people and the environment while lifting unnecessary barriers to the development and approval of products. It thus supports two broader Defra priorities in particular:

- Improve productivity and competitiveness of food and farming businesses, with better environmental performance
- Adopt a proportionate approach to regulation and remove unnecessary burdens

The two main outputs from the programme are:

(1) A regulatory system that protects people and the environment, meets the requirements of EU pesticides legislation and minimises the regulatory burden

The assessment and management of risks from pesticides is well-established, and is now governed by EU Regulation 1107/2009. There is an ongoing area of work both to assess new active substances/products and to review the assessment of existing ones. Directive 2009/128 on the sustainable use of pesticides also sets requirements for good practice in the use of pesticides so as to reduce risks to people and to the environment.

Delivering these legal requirements is informed in part by transparent monitoring schemes covering levels of pesticide usage, wildlife incidents and levels of pesticides in food (this latter scheme also providing the check on Maximum Residue Levels set under EU Regulation 396/2005). In the course of this work, issues arise and are addressed both in respect of safety concerns and in respect of implications of losing important uses. These may feed back into evidence work or the development of the regulatory system. Equally, new evidence is used to develop the regulatory system and innovative approaches to pesticides use.

The framework of regulation for pesticides is increasingly negotiated and set at EU or global level. Another key driver for developing the regulatory system is therefore new EU legal requirements both in terms of the risk assessment and risk management and also in terms of requirements for the safe use of pesticides. The EU legislation places duties on the UK covering technical input into EU regulatory processes, enforcement and the provision of expert support for business, particularly those most in need such as SMEs. By active participation in the ongoing policy development and implementation, Defra

protects and promotes UK interests through a proper balance between the paramount requirement for high levels of protection for human health and the environment and the needs of business for transparent and proportionate regulation.

Regulation has a tendency to accumulate if left unchecked. An important policy imperative is therefore the need to pursue simplification and harmonisation of arrangements and to ensure that restrictions put in place are proportionate to risks. Current areas of work of this type include the setting of EU criteria for endocrine disruptors and the establishment of a zonal system for pesticide authorisations.

(2) A partnership with industry and other stakeholders that develops and delivers best practice in the use of pesticides

Regulation can be seen as setting a baseline standard. The Government works with industry and other stakeholders to encourage the development of further effective and flexible measures. The industry Voluntary Initiative on pesticides has been highly influential and its key elements – including schemes for ongoing user training and for testing of equipment have been taken up by many users. Current action in this area includes the development of a Code of Practice and work to promote Integrated Pest Management.

2. Current and near-term evidence objectives

What are the current and near-term objectives for evidence and how do they align to policy outcomes?

The current evidence base

Pesticides have been a significant area of research around the world for many years, in recognition that they bring substantial economic benefits but can carry risks to people and to the environment. A great deal is known about: the properties of pesticides; the mechanisms by which they can reach and affect human health and the environment; ways to assess and manage risks; and the interactions of pesticides with target species, including the development of resistance. The Defra pesticides R&D programme has collected a wealth of information. In recent years much of this has been aimed at developing the pesticides assessment process and implementing the requirements of the EU Thematic Strategy for the Sustainable Use of Pesticides.

Around a quarter of the evidence spend is allocated to monitoring the patterns and effects of pesticide use and checking pesticide formulations. There are four main areas:

- (i) monitoring of pesticide residues in food, overseen by an independent expert committee on Pesticides Residues in Food. The main analytical work is carried out by the Food and Environment Research Agency (Fera) and LGC and is focussed on checking compliance with Maximum Residue Levels (which indicate that the pesticide has been used according to good practice). Results are published on a rolling, quarterly and annual basis. In recent years the programme has increasingly delivered the requirements of EU legislation;

(ii) an ongoing programme of Pesticide Usage Surveys, which collects quantitative and qualitative data on pesticides used in agriculture, horticulture and food storage in England and Wales. Information on changes in usage can throw light on changing pest pressures, the development of pest resistance or changes in user preferences between types of product and classes of chemicals. The work is carried out by Fera and GFK Kynetic;

(iii) the Wildlife Incident Investigation Scheme (WIIS) investigates the deaths of wildlife, including beneficial insects and other animals, throughout the UK. The WIIS monitors pesticide use after approval, so that product approvals can be revised if necessary. Analytical work is carried out by Fera, and field work by Natural England and the Animal Health and Veterinary Laboratories Agency;

(iv) the analysis of pesticide formulations by Fera is principally a compliance activity, assessing whether pesticides on sale are in line with the product formulations approved.

Industry funds a significant part of the monitoring costs through a charge on turnover. In addition to its own programme, Defra also draws on monitoring carried out by other organisations. In particular, there are a number of schemes to monitor the human health impacts of pesticides. These are currently being reviewed to identify strengths and weaknesses and to assess the feasibility of a more integrated system with better coverage. Cost benefit analysis will be an important part of establishing the final preferred options.

Monitoring work is increasingly heavily dictated by EU requirements. There is some read-across between the monitoring and R&D work; for example, between the chemistry research and the pesticides residues and wildlife incidents monitoring.

Current objectives

Current R&D priorities can be grouped into five themes:

Human Health. Developing the health risk assessment for operators, consumers, residents and bystanders, including monitoring and epidemiological data to identify any impact of developments in application technologies and techniques. Improving the analytical methods used for food residue or wildlife monitoring programmes and in formulation analysis. This theme also provides evidence and opportunities to develop risk management and mitigation measures which may benefit the range and types of pesticide products available thereby supporting sustainable crop protection.

Environment. Environmental fate and behaviour - to provide the evidence to enable the use of appropriate and validated exposure assessment models. This work contributes to climate change adaptation; as weather patterns change and rainfall events and drainflow become less predictable, knowledge of mobility of pesticides into water and their subsequent degradation enable an assessment of changing climatic conditions which will ensure that water protection goals are met. Ecotoxicology - evidence to support the regulatory risk assessment and on wider ecosystem/biodiversity issues associated with the sustainable use of pesticides.

Alternative Plant Protection. Evidence to help reduce reliance on conventional chemical pesticides and encourage the development of novel alternative technologies by the relevant sectors. This is important for sustainable food production and links with elements of the Crops evidence programme on the development of integrated control systems incorporating monitoring, genetic resistance, rotation, cultural control, natural enemies and biological control. Increasing regulatory demands have contributed in part to increasing numbers of pesticides being withdrawn from use under the EU pesticides legislation. This has in turn left producers of some major crops with few or no practical options for reducing losses due to pests, diseases and weeds.

Resistance. Evidence supporting the development of resistance management strategies to support secure and sustainable crop production. As climate change produces new problems from new or existing pests, weeds and diseases, work in this programme will help to develop crop protection strategies to address these. The programme will also help to maximise the longevity of different modes of action of pesticides and maintenance of as wide a range of tools and techniques as possible for pest management and in doing so contribute to the sustainable food production challenge.

Support to regulatory policy. Evidence to answer specific policy issues/evidence gaps to support the sustainable use of pesticides and the implementation of the EU thematic strategy on the sustainable use of pesticides.

The first two themes primarily support the first policy objective. The remainder support both objectives and some key issues are highlighted below. In broad terms, the first two themes are the highest priority as the underpinning to the regulatory regime. However, work on alternatives and resistance is increasingly important to support more sustainable farming systems such as Integrated Pest Management and to combat the impacts of reductions in the range of chemicals available.

(1) A regulatory system that protects people and the environment, meets the requirements of EU pesticides legislation and minimises the regulatory burden

We continue to develop areas of the risk assessment to ensure that it responds to the latest science and that it continues to provide a high degree of protection. A current example concerns bees, which are important pollinators. Recent research has highlighted possible risks which are not explicitly addressed by the current risk assessment – including risks to bumblebees and possible interactions between pesticides and disease. We are carrying out research to help fill the gaps in our knowledge and are using this in discussions in Europe to develop the risk assessment process and inform proportionate decisions.

At the same time, we are well aware that the current regime is one of the factors that makes the development of new pesticides expensive and protracted and that the range of available products is now limited for some situations. A developing focus under this policy objective is therefore to assess the scope for reducing regulatory burdens without removing protection to people and the environment.

The monitoring programme is also under continuing development. This includes new or more efficient analytical techniques, but also more fundamental changes. A particular current focus is monitoring relating to the exposure of people to pesticides. Evidence is

needed to establish both what is needed to develop the system and how this can be done most efficiently. The pesticides evidence programme will contribute to this in collaboration with other Departments with an interest.

(2) A partnership with industry and other stakeholders that develops and delivers best practice in the use of pesticides

Economics and social research are growing in importance. They are important in developing our understanding of regulatory impacts and in looking for effective and resource-efficient means to understand the behaviours of pesticide users and to develop these towards best practice in the sustainable use of pesticide products. We will draw on Defra and cross-Government work on relevant issues such as behaviour change wherever possible. It will also be important to improve our knowledge of the concerns and understanding that the public has about the use of pesticides. In this area we will build on existing FSA work on consumer attitudes.

Technology/Information transfer to partners and interested parties is important to help develop innovative, effective and efficient crop protection. There are a variety of means by which this is pursued, including publications and several stakeholder fora. Information on resistance is passed on to the relevant resistance action group. We are often able to share data with a range of partners and work together to present this effectively to a wide range of audiences.

3. Future evidence needs

What are the longer-term evidence needs for the policy area/ programme?

We are not anticipating any fundamental shift in the programme in this area. The essential objectives are not expected to change. Overall we are trying to fund research that will support the Government aim of helping UK business to operate safely and competitively.

In terms of monitoring, the broad legal and policy drivers remain the same and so the focus will be on improving efficiency (including through better co-ordination and use of the programmes) and responding to specific new challenges. These are likely to include developing EU requirements under the Statistics Regulation and the Directive on the sustainable use of pesticides. There will also be changes in relative priorities and new pesticides. A particular challenge in this area will be to link those programmes funded by Defra/industry with those funded by other Departments. The work to develop the human health monitoring system mentioned in the previous section is a key example of this.

The R&D programme makes a substantial contribution to a number of Defra's long-term evidence challenges. In broadly descending order of priority, this includes:

Sustainable food supply. Identifying alternatives to conventional pesticides to enable growers to continue to tackle the major crop losses caused by pests, diseases and weeds against a background of declining availability of chemical pesticides. Ensuring that there is no risk to consumers from residues of pesticides used in crop production (examples include identifying methods of controlling spray drift when using increased boom heights and implementation of liquid chromatography time of flight mass spectrometry (MS) & tandem MS for rapid screening of pesticide residues in fruit and vegetables.

Protecting ecosystem services. Understanding the potential direct and indirect impacts of pesticides and their use on terrestrial and aquatic biodiversity. Examples include work mitigating risks through the use of reed beds as a further development on the use of bio-beds for the safe disposal of dilute pesticide waste and on cabbage root fly control through delivery of the predatory beetle *Atheta coriaria*).

Climate change. Work on the fate and behaviour of pesticides looking at movement through soil and water (as weather patterns change and therefore rainfall events and drainflow become less predictable, knowledge of mobility of pesticides into water and their subsequent degradation will become more critical in ensuring Water Framework Directive requirements are met). Understanding and addressing new problems caused by climate change from new or existing pests, weeds and diseases (current projects include challenges from climate change for disease management in sustainable arable systems and an assessment of the impacts of climate change on the fate and behaviour of pesticides in the environment).

4. Meeting evidence needs

What approach(es) will be taken to meeting evidence needs?

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Defra takes the lead on pesticides policy and regulation. Most of the delivery, including management of the R&D and monitoring work, is carried out by the Chemicals Regulation Directorate (CRD) of the Health and Safety Executive. Defra holds the R&D budget on behalf of England and Wales, with CRD managing the programme. Money for the Government-funded parts of the monitoring work (industry meets the greater part of these costs) is paid to CRD on the basis of an annual Memorandum of Understanding. Governance arrangements are in place to ensure the effective linkage of policy and delivery and to ensure that the programme is under the control of Defra Ministers.

A range of science disciplines are required including mammalian toxicology, occupational hygienists, analytical chemistry, ecotoxicology, environmental fate and behaviour, agronomy. The full range of disciplines required for regulatory evaluation is covered in house within HSE.

Within Defra and HSE, other disciplines required (currently only to a relatively modest extent but this is expected to grow) include economics, statistics and social research. These disciplines are not brigaded within the pesticides teams but are drawn from teams in the wider Departments.

Other expertise is normally acquired externally (from a wide range of bodies) including particular scientific expertise and engineering. There are a number of strategic external capabilities and suppliers. Reducing research budgets and consolidation both in suppliers and in funding bodies are tending to reduce the number of these bodies and to increase their vulnerability. The range of suppliers is particularly of concern in a number of areas of environmental science and agronomy. There is generally slightly less concern about the availability of capabilities in relation to toxicology and pesticides exposure.

Collaboration within Defra is important and likely to become more so. Some of the R&D evidence activities under this programme do contribute to meeting the needs of other

Defra programmes including biodiversity, sustainable crop production and water. There is likely to be scope to increase this synergy and this will continue to be explored with other Defra programmes, in particular food and farming, water quality, EA, NE, VMD, FSA. On the human health side we are making more use of links through CRD to HSE. We also work with the Department of Health.

There is also a continuing strong partnership with key pesticide companies and with agriculture / horticulture interests. Previously, this has partly been taken forward through LINK, in particular the research on resistance where all the relevant pesticide approval holders became part of the research consortium. With the ending of LINK and given that much of the relevant work is outside the remit of the replacement Technology Strategy Board Agri-Environment Platform, we have set up direct collaborations. Our recent resistance projects are jointly funded by the Levy bodies and /or the pesticide industry. Wherever the opportunity arises we are joint funding projects; two of our fate mitigation projects have additional funders contributing to the costs so we get more out of the research.

A particularly clear example of this sort of collaboration is a project funded through the Strategic Evidence Partnership Fund to evaluate the use of detention ponds to mitigate transfer of pesticides to surface waters via drainflow. This addresses priorities within the pesticides and water programmes and draws in contributions from the Game and Wildlife Conservation Trust, Anglian Water, Syngenta, BBSRC and the Environment Agency.

We are also making sure that there are partners to take forward work we initiate. For example, work is being developed following a review of methods of slug control. This is likely to involve some initial work on crop ecology (which is of broader application to our regulatory work) as part of the pesticides programme before handing further development to the AHDB in partnership with the Metaldehyde Stewardship Group.

We also look for opportunities for co-operation in Europe. For example, the Government is concerned that an adequate standard of bystander and resident risk assessment should apply throughout the EU, and has provided some matched funding to support UK researchers involved in a European Commission funded project that aims to improve the bystander models and introduce a resident model for the EU. Efforts are also being made to identify EU European Research Area Networks (ERA-NETs) and other links to monitor and link into pesticides work in other member states.

As mentioned above, knowledge sharing (both to acquire knowledge from other parties and to ensure effective use of our data and intelligence) is important and pursued through a number of vehicles. Knowledge transfer is built into the project specification and we make use of the Pesticide Forum and a small number of subject-specific liaison groups. CRD send out a R&D newsletter "RADAR" twice a year to disseminate information, and other research organisations are encouraged to contribute.

In identifying research needs, advice is taken from a number of bodies, including a range of experts within CRD, the independent Advisory Committee on Pesticides (ACP) (statutory committee including a wide range of technical and scientific expertise as well as lay members), the expert committee on Pesticides Residues in Food (science and food chain expertise) and the Pesticides Forum (wide range of pesticide, farming, amenity and environmental interests). These bodies offer particular perspectives on the work and the Pesticides Forum also acts as an effective conduit to a wider collection of stakeholder

organisations. The independent Committees (particularly the ACP and its Panels) offer scientific and technical expertise.

A number of mechanisms are used to prioritise future evidence needs. In particular, an R&D steering group brings together relevant interests such as Defra policy and science leads, some devolved administrations (in particular, we work closely with the Welsh Government as part of a shared evidence budget covering England and Wales) and independent programme advisers to offer advice on particular specialist projects and on the future direction of areas of the programme. Soundings are also taken with industry and academics where appropriate. This is an ongoing process.

5. Evaluating value for money and impact

What approach(es) will be taken to maximise and evaluate value for money and impact from evidence?

R&D work follows standard Defra procedures and the Joint Code of Practice for Research. Where appropriate, monitoring work complies with the requirements of Defra National and Official Statistics.

The Steering Group mentioned above takes an overview of our overall programme and assesses the quality of the research. CRD specialists and the independent programme advisers are used to peer review our research proposals either from open competition or by internal commissioning within Defra (Fera). A project team is set up to monitor each project which consists of the R&D co-ordinator and relevant specialists and programme advisers or additional experts (for example from the ACP) if needed. This team follows the project all the way through to the final report and beyond, as they would also make use of the research.

Knowledge transfer is a key element of each project, and this may be achieved by telling our stakeholders about a change in policy or the regulatory process brought about from the research or by the project suggesting some other ways of using the information and/or making it available to others (such as for the industry Voluntary Initiative to use in its publicity). All our projects once finalised are published on the Defra Website. In a wider context, we collect stakeholder knowledge and needs through a range of fora.

We have an annual meeting where we invite industry and academia and review the suite of environment projects that we fund and also get a chance to see what industry is funding.

Specific reviews of sub-programmes or themes within the R&D programme are undertaken periodically by CRD and programme advisers with additional experts where appropriate, to consider the direction of research in those areas against project findings and wider scientific knowledge. These reviews include consideration of the impact of evidence on the development of policy. Human health research outputs are passed to the ACP for consideration, and environmental research (including WIIS findings) to the ACP's Environmental Panel.

We continue to look for efficiencies in the monitoring work. The pesticides usage surveys were recently put under a new contract following a competitive tender and a tender is currently being taken forward for the procurement of samples from retailers for the

monitoring of pesticides residues in food. The PRiF committee (and its Analytical Sub-Group) reviews the residues monitoring programme results and future monitoring plans and priorities as part of its ongoing work. The residues monitoring is also reviewed by the European Food Safety Authority and the Commission's Food and Veterinary Office as the work contributes to the EU control regime for pesticide residues and also the UK national obligation under this regime.