



Department
for Environment
Food & Rural Affairs

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Plant Varieties and Seeds Evidence Plan

Policy portfolio: Plant Health

**Policy area within portfolio: Plant Varieties and
Seeds**

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

Date of Evidence Plan: March 2013

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?

Plant Varieties and Seeds is an area under the Plant Health Policy programme.

This area contributes to three of the Defra Departmental Objectives;

- Help to enhance the environment and biodiversity to improve quality of life
- Support a strong and sustainable green economy, including thriving rural communities, resilient to climate change
- Prepare for and manage risk from animal and plant disease

There are 5 key outcomes for this policy area which require evidence;

- Evidence generated and used effectively to support Defra policy on plant varieties and seeds
- Policy on varieties and seeds informed by evidence, agreed by stakeholders and delivery bodies, promoted successfully in negotiations and implemented.
- Infrastructure and non-chargeable 'public good' services related to National Listing, Plant Breeders' Rights and Seeds Marketing maintained and developed.
- Services for National Listing and Plant Breeders' Rights delivered to the UK industry.
- Seeds marketing regulations implemented in England and Wales.

With respect to varieties and seeds, the total value of UK crop output in 2010 was £7.54 billion. For Plant Varieties and Seeds the benefit to cost ratio (before present value) varies depending on crop type. In 2012 the ratios were estimated to range from 9.2 for oilseed rape to 31 for cereals. These data are derived from an economic analysis carried out in 2012 and planned for publication in 2013¹.

The regulatory controls are based on EU and UK legal provisions. The rationale for Government intervention in this area relates to the issue of market failure and ensuring a single market. Market mechanisms alone may not provide adequate consumer protection and may fail to prevent or correct negative economic and environmental impacts that could arise from growing a limited selection of crops and varieties. Possible consequences are increased vulnerability to pests and diseases and loss of resilience to changing economic and environmental factors, thereby reducing UK agricultural output, increasing production costs and damaging ecosystems. The evidence supports delivery of these controls balanced with the need to minimise regulatory burdens on the seeds industry.

The objectives of the underpinning legislation are to encourage improvements in plant varieties and maintain seed quality, through services for National Listing and Plant Breeders' Rights for the UK and seeds marketing for England and Wales. For agricultural

¹ Figures are from the final report for Project PH0442 – 'Gathering the economic evidence for the bee health, plant health, varieties and seeds sectors and interventions' to be published on the Defra science pages following approval.

crops, National Listing gives a statutory basis to drive improvement in new varieties and provide information on performance to farmers and growers. Plant Breeders' Rights allow breeding companies to control reproductive material and collect royalties to give a return on their long-term investment. UK PBR legislation is now mainly to enforce EU PBR, with the primary interactions at a European and global level. Seeds marketing legislation assures the quality of seed and other reproductive material bought by farmers, growers and the public.

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?

Current and near term objectives cover work that is already underway and that will be delivered in the next 1-3 years.

Evidence is commissioned to support underlying policy issues and implementation of National Listing of varieties, plant breeders' rights and seed marketing. Evidence needs in this area are largely specific to implementation of these statutory services, with a small customer base of plant breeding and seed producing companies, so there is no formal prioritisation process.

The main evidence needs are:

- Assessing the disease resistance of new varieties as part of National Listing.
- Monitoring populations of cereal diseases (eg yellow rust of wheat) for increased virulence.
- Review of the testing programme for National Listing, primarily funded by plant breeding companies, to ensure that it sufficiently addresses traits likely to deliver environmental benefits and facilitate adaptation to climate change, and
- Better understanding of the economic status of plant breeding for the UK and its ability to provide a continued supply of improved varieties adapted to UK conditions.
- Better understanding of the market, consumer demands and impact of the European Commission's proposed changes to legislation for vegetable seed sold to gardeners.

The monitoring programme for increased virulence in cereal diseases Disease resistance testing of candidate varieties for National Listing is jointly funded by Defra with the Home Grown Cereals Authority (part of the Agricultural and Horticulture Development Board) through the UK Cereal Pathogen Virulence Survey (UKCPVS). This joint industry and government funding recognises the economic benefits to farmers and the strategic importance of anticipating epidemics and identifying susceptible lines in early generations of breeding programmes to ensure that the UK has improved agricultural varieties that are suited to UK conditions.

The UKCPVS also identifies pathotypes to ensure that candidate varieties for National Listing are tested against newly emerging pathotypes and that inocula of these pathotypes is available to plant breeding companies for use in their selection programmes. Funding for disease resistance testing is under review, to identify those diseases which cannot easily be tested in the normal performance trials and therefore have clear business cases for continued public funding.

The plant breeding industry generates royalty income for agricultural crops of about £40 m, compared with the £7.54 billion value of crop production, with the market size limited by the UK's agricultural area. It is very difficult for breeders to capture value beyond sale of seed, despite for example significant benefits of new varieties in food processing, meaning they have a relatively short term and market driven focus. This is reflected in the National List testing process, which is strongly driven to reduce costs to applicants and closely linked to the various industry funded Recommended Lists providing more detailed information on variety performance. Consequently there would be little economic advantage for breeding companies to fund tests for traits primarily benefitting the environment, beyond the current requirements of disease resistance testing.

Economic analyses

An economic analysis of plant varieties and seeds has been carried out to gain a better understanding of the businesses subject to varieties and seeds regulations, including assessment of sector structure, costs, income and demography (see footnote¹). This also included a cost-benefit analysis to understand the full impact of Government intervention and which should allow the costs of any future changes to be calculated.

Vegetable seed sold to gardeners

The European Commission's proposals for new legislation for plant reproductive material, with formal proposals expected in 2013, risk requiring the UK to take a more prescriptive approach to control of seed sold to gardeners. This would increase costs and probably reduce the range of varieties, impacting on consumer choice including of heritage varieties. Defra's longstanding light touch approach to this sector (which we consider entirely appropriate) means more information is needed to support the negotiating position and inform implementation of any changes. The main issue is registration of varieties and whether there is significant marketing of the same variety under different names and errors in production and control leading to the wrong variety being sold.

3. Future evidence needs

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

There is a longer term need to understand in more detail the economics of plant breeding and the impact of the European Commission's proposals for new legislation for plant reproductive material. Formal proposals are expected in 2013. The context is increasingly focussed on breeding for northern Europe rather than just the UK or other individual countries, to allow a sufficient market to sustain breeding programmes, which are

necessarily long term. This is important both for the main agricultural crops grown in the UK, including herbage and forage maize, and for minor and or emerging crops, such as field beans, field peas, soya beans and sunflowers, which are likely to be of increasing importance as agricultural systems face challenges in response to climate, economic and political changes. The underlying policy issue is ensuring that in an increasingly European market, UK companies or subsidiaries of European companies continue to breed and select varieties suited to UK conditions.

For performance testing of new varieties, the longer term issues are whether changes in testing processes are needed to assess traits likely to deliver environmental benefits, facilitate adaptation to climate change, and support sustainable intensification. This includes nitrogen use efficiency (a Defra project is underway managed by the Sustainable and Competitive Farming Strategy Team but follow up is likely to be needed), water use efficiency, increased disease resistance to reduce use of pesticides, and increased yield. Similarly, the policy issue is whether the current relatively short term and market driven focus of breeding companies will meet the requirements of UK agriculture and fulfil government objectives in the longer term. There is a fundamental question of whether reliance on a rolling two year trials programme, assessing year on year incremental advances in breeding of the main agricultural crops, gives sufficient direction to breeding programmes in terms of identifying varieties and genotypes which will give adaptation to climate change.

These objectives are shared with Defra's crops programme and while current research has been coordinated with them, this needs to be repeated for future work.

There is a need to better understand the factors taken into account by farmers when choosing varieties, in cooperation with industry partners such as HGCA. There appear to be barriers to uptake of varieties with for example increased disease resistance, implying that potential for increased yield outweighs almost all other considerations, and probably linked to simplifying crop management. This could be a significant barrier to uptake and therefore breeding of traits with environmental benefits.

4. Meeting evidence needs

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

The UK Varieties and Seeds Advisory Forum made up of Government, DA's and relevant stakeholders has been established and which provides input on evidence priorities.

A large proportion of the evidence (at least 70%) comes from programmes within the Food and Environment Research Agency (Fera) including; the Inspectorates Programme (which encompasses the Plant Health and Seeds Inspectorate); the Plant Protection Programme and the Fera Varieties and Seeds Delivery Team. The main sources of evidence are:

- Surveillance and monitoring data gathered from inspection activities which by their very nature contribute to evidence, although this is not necessarily their primary purpose and they are funded partly through statutory fees.
- Changes and trends in business volumes for National Listing of plant varieties and for seed certification. Issues arising from testing programmes
- Longer term evidence needs relating to performance testing of varieties will be scoped through discussion with other interested organisations such as HGCA, Agricultural Industries' Confederation (AIC) and British Society of Plant Breeders, and within Fera and Defra, to scope the issues.

Evidence is also gathered from Government colleagues in other EU member states and other EU organisations, for example the Community Plant Varieties Office.

Informal collaborations are maintained with colleagues with responsibility for meeting evidence needs in other Defra departments including Biodiversity, Crops and Pesticides. Joint evidence activities with these programmes could be considered in the case of a high priority need.

5. Evaluating value for money and impact

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

Achievement of the policy objectives will be assessed against success criteria or Key Performance Indicators given under the Plant Varieties and Seeds Policy section of the Business Plan and the Fera MoU to be agreed on an annual basis.

Where evidence is gathered from research projects, value for money is ensured through governance by a steering group, whose membership includes the end-users of evidence and, where relevant, other scientists and stakeholders. This ensures that objectives are relevant, fit-for-purpose and delivered on time and to a high standard (e.g. underpinned through quality standards such as GLP, GEP, Defra's code of practice and ISO).

Stakeholder meetings are held quarterly and more immediate information is made available through press releases, to inform farmers of newly emerging pathotypes. Information on new pathotypes is directly available to plant breeding companies, who can also buy samples to use in their evaluation of breeding lines. The results of disease resistance tests are used in decisions on National Listing of new varieties and the data is made available to HGCA. This is combined with HGCA's own data to produce disease resistance ratings for the HGCA Recommended Lists, which are the starting points for selection of varieties by almost all farmers and agronomists. It could therefore be argued that the evidence is subject to ongoing peer review.