Overview

Potato Council is a Division of the Agriculture and Horticulture Development Board (AHDB). Potato Council supports the development of a sustainable GB potato industry by improving competitiveness and sustaining demand¹.

Potato Council engages in activities to deliver benefits to the industry including:

- **Research and Development** to improve competitiveness of the sector;
- **Knowledge Transfer** to improve the flow and uptake of knowledge throughout the supply chain;
- **Seed and Export** initiatives that support the high health status of GB seed and promote exports; and
- **Marketing** activities that deliver consumer campaigns and educational projects which bring business reward.

Within the wider AHDB remit the Potato Council works with **Market Intelligence** to deliver robust and reliable market information, price information and crop statistics.

As a sector business within AHDB, our objectives are derived from the overarching objectives² agreed by the AHDB Board.

**AHDB corporate objectives**

1. Deliver value for money for levy payers in everything we do
2. Improve efficiency and productivity in the industry to help levy payers have thriving businesses
3. Improve marketing in the industry to help profitability and customer awareness
4. Improve services that the industry provides to the community
5. Improve ways in which the industry contributes to sustainable development

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Potato Council
Research and Development

Technical challenges to increasing marketable yield and improving competitiveness in GB are considerable.

There have been significant increases for input costs and greater competition for resources e.g. healthy soils and water availability. Just over half the potato growing area has irrigation available but the Water Framework Directive is starting to create change in what is allowable. Water for agriculture is being impacted both by regulation and climate change, and consequently improvements in the efficiency of water use are essential. New information is needed on soil and water management to allow growers to meet compliance targets without compromising productivity.

Plant health issues have been identified as a particular concern by the potato industry and have been a focus for increased Potato Council corporate activity. The plant health concerns relate to both established pests and diseases, such as Potato Cyst Nematode (PCN) and late blight, and to the risk of new threats to GB seed and ware production e.g. *Epitrix* and *Dickeya*. In particular the loss of Plant Protection Products (PPP) following the review of EU Directive 91/414 is having an impact on the options available for pest and disease and weed control.

The minimisation of PPP residues is also important, so optimising their use to minimise any risk of exceedance through, for example, development of integrated crop management protocols is crucial in the field and store. The development and adoption of Integrated Crop Management strategies is a key part of the recently introduced Sustainable Use Directive. In GB about 55% of the total crop is stored and delivery of potatoes which meets end-user requirements for the fresh, processing and seed sectors is crucial.

Challenges relate to consumer and process quality, effective sprout control and minimising energy costs. These factors can contribute significantly to the environmental footprint of potatoes and better information is needed that can relate carbon footprinting to business performance, with improved efficiency also delivering against agriculture’s green-house gas emissions targets. Potato Council recognises the existence of a ‘sweet spot’ where efficiency gains and potential cost savings coincide with environmental benefits and will seek to exploit this.

AHDB PESTLE and Potato Council SWOT

The R&D strategy responds directly to a number of agreed high and medium priority issues identified by the Potato Council Board in the AHDB corporate PESTLE3 and from the potato sector SWOT which was developed during consultations with industry – see Annex 1.

R&D strategy drivers

The previous R&D strategy (to 2011) positioned Potato Council for its integration into AHDB and provided for the continuity of research programmes which were a priority to the potato industry. The new R&D strategy seeks to consolidate the established research programme, develop a response to the newly identified industry priorities and exploit the cross-sector opportunities provided by the AHDB for the benefit of potato levy payers. A number of key drivers have been identified from the AHDB PESTLE, Potato Council SWOT and industry consultations.

- Potato industry continues to consolidate with 2388 grower and 330 purchaser levy payers (January 2012)4
- Need to improve business performance – increase marketable yield
- Reduction and rebalancing of government research spend
- Improving recognition of the importance of applied research
- ‘Food security’, political agenda, climate change impacts – on production and plant health
- Crop protection toolbox is compromised
- Sustainability agenda increases – water efficiency and energy use

4. AHDB Market Intelligence
Key points from the review

1. Potato Council will focus on the R&D activities that deliver greatest practical benefits to the industry in terms of competitiveness and costs. We will continue to invest the majority of its R&D funds into near-market research, delivering outcomes in a 3–5 year timescale, and taking account of the needs of end-users and the compliance and environmental issues affecting sustainable production.

2. The R&D strategy will focus on improving marketable yield and optimising the use of resources. This will contribute to improved efficiency and productivity and will prepare the industry for future challenges to improve sustainability.

3. Potato Council recognises the need to maintain a pipeline from basic > strategic > applied research and that the most appropriate research centres need to have the resources to address the gaps in knowledge and exploit opportunities to deliver innovative solutions to the industry. Potato Council recognises the importance of strategic research which is relevant to the industry and will seek to exploit linkages and co-sponsorship to support areas of importance.

4. The invigoration of the R&D strategy will also include the establishment of Potato Council Research Fellowships to help retain key technical skills within the industry. We will also encourage new entrants to the industry through supporting suitable PhD studentship projects that address priority topics as part of the R&D programme.

5. Knowledge Transfer is an integral part of the R&D process. A new KT strategy will be developed to enhance the delivery of outcomes to the whole industry.

Industry feedback

A comprehensive survey ‘Have your Say on R&D’ was carried out during 2011 to identify industry priorities and consultation meetings have been held with key stakeholder organisations.

The analysis establishes and confirms that the profitability of business is crucial to the industry. Ensuring that challenges posed by pests and diseases are addressed, exploiting water resources, addressing the needs of the consumer, seed use and supply chain integration were the next five areas identified as business challenges. Research can play a part and deliver against a number of these concerns and the R&D will integrate with the other Potato Council functions on KT, seed and marketing.

Industry research priorities

The priority topics identified as being most relevant to business concerns and competitive industry position were:

- **Potato Cyst Nematodes:** population management and yield modelling, loss of nematicide control options, understand the potential of biofumigants
- **Crop nutrition:** soil management and exploiting inputs, NPK and micronutrients, nutrition for maximising seed productivity
- **Blackleg and soft rots:** blackleg contamination of seed crops and control, store ventilation management, epidemiology and control of Dickeya
- **Water use:** resource availability and exploiting soil water and irrigation, precision application systems
- **Late blight** (*Phytophthera infestans*): population monitoring and maintaining control strategies
- **Consumer preference determinants:** understanding flavour and texture and managing crops, new market opportunities
- **Common scab:** options for control with limited water resources
- **Minimising bruising and damage:** improved understanding and advice
- **New emerging pests and diseases:** monitoring incidence and developing control strategies e.g. rotational management of FLN’s and Alternaria
Storage management: stored crop quality and sprout suppression

Energy use and Carbon foot-printing: reducing direct costs in production and storage, information to support business and supply chain performance

A number of these priorities are already being addressed to varying degrees within the current research programme, for example crop nutrition, soil management and disease control strategies. The reprioritisation reinforces the need for these particular programmes and the importance of their continuity. Other topics have emerged with a higher priority than previously e.g. PCN and blackleg, and energy use and carbon foot-printing. These will need to be addressed through a combination of commissioning new research; conduct of reviews to establish current state of knowledge and identify gaps; and by the collation, interpretation and dissemination of already completed R&D.

These identified topics should integrate with other research to exploit synergies and opportunities that exist within the R&D strategy, for example to examine integration of control measures for blemish diseases and exploit fungicides effectively and manage resistance. Seed health (including powdery scab and Potato Mop Top Virus), seed multiplication (for seed) and utilisation (for ware) are also important concerns for the seed sector and their customers and the ability to use disease diagnostics for both seed and ware can be improved by understanding how to deploy them effectively with improved soil sampling strategies (cross-sector). The cross-sector approach can also be related to rotations and gaining a better understanding of impacts on pests, diseases and weeds including improving volunteer potato control and being able to respond to changes in herbicide availability.

Industry focused and industry engagement

The priorities are identified by the industry and Potato Council requires research that responds to those challenges. Improved linkage and collaborations between researchers and industry is crucial to improve understanding of the issues and delivery of relevant outcomes. The R&D strategy will exploit the active involvement of industry in the projects and the engagement with R&D and KT teams will help to ensure that results are robust and practically relevant and available to the whole industry.

The industry involvement in the R&D projects will also provide a valuable feedback loop to identify gaps in knowledge and new research that will drive forward innovation.

Research co-ordination and collaboration

‘Market failure’ for R&D in the potato industry is recognised and Potato Council has a crucial role to play in the co-ordination of relevant research. Potato Council will work closely with government sponsor departments, in particular Scottish Government and DEFRA. Science representatives attend meetings of the RKT committee to ensure effective information exchange, discuss co-ordination and engage in the development of new programmes at a formative stage.

Potato Council will further develop research collaborations with the AHDB divisions and work with the Chief Scientist to address issues of wider relevance to agriculture and horticulture such as climate change, soil and water management and disease resistance strategies.

Nationally, Potato Council believes that there is a key role for government departments and their agencies to fund the basic and strategic research relevant to the industry and to support initiatives that enable it to exploit research to deliver propriety value. Potato Council will continue to engage with government and BBSRC to ensure strategic potato industry priorities are recognised. In the area of practical commercial exploitation, the Technology Strategy Board (TSB) has a particular role to play with recent support for an initiative on novel crop protection. Future areas for TSB activity relevant to the potato sector may include food processing and manufacturing and phenotyping and trait...
mapping. Potato Council engagement with TSB will be developed to ensure that the industry is better positioned to exploit these funding opportunities. Potato Council will also support eligible research contractors to help their participation in relevant research council programmes such as BBSRC LINK or Industrial Partnership Awards and engagement with new initiatives such as the Horticulture and Potatoes programme launched in February 2012.

Co-operation with other agricultural organisations where there is a technical interest is also being exploited, for example through Red Tractor Farm Assurance, Linking Environment and Farming (LEAF) and the UK Irrigation Association.

Internationally, Potato Council has established links with other potato and agricultural levy organisations (e.g. Potatoes NZ, AusVeg, Potatoes SA and Canadian Horticulture Council) where there are issues of common interest. Successful collaborations have been established, for example with an international diagnostics project, and Potato Council will continue to explore opportunities for information sharing and international research co-operation where it delivers benefit to the GB industry.

EU research funding has not been a significant element in Potato Council R&D programmes, although historically there has been engagement in a number of initiatives, either directly e.g. EuroCrop (arable crop production) or support for UK research contractors operating within their specialised areas and gaining benefit for the industry from their engagement in EU programmes e.g. Eucablight (blight) and Euphresco (plant health). Potato Council will work with the AHDB Chief Scientist to ensure national agriculture and horticulture priorities are recognised and improve the opportunity for UK research centres to compete for EU Framework and Regional development grants in areas of practical value to the industry.

Adding value to the levy

Potato Council has a good record of working with government research sponsors, commerce and stakeholders to leverage additional funding and ‘in kind’ support for potato R&D. Potato Council will actively seek additional support for future potato programmes, nationally and internationally.

There have already been cross-sector projects on e.g. volunteer control and pack-house diagnostics (with HDC) and Sclerotinia (with HGCA) and a more holistic approach to common issues through collaboration with other AHDB divisions helps the levy payers integrate outcomes across their businesses. Using AHDB and the Chief Scientist gives the potato industry the opportunity to deliver its message with additional authority when making representations on issues of concern.

The investment in research and the establishment of research fellowships and a studentship scheme will help ensure that critical skills and resources required by the industry remain available.

The outcomes of the R&D programme based on sound evidence deliver an increased understanding of issues and practical advice for the industry. The R&D programme also delivers technical information that supports responses to government consultations and the management of wider generic issues relating to e.g. pesticide legislation and stewardship activities, plant health issues, climate change impacts and GHG emissions.

Strategic objectives

In developing the R&D strategy, consideration was given to the key drivers affecting the GB potato business and its competitiveness and to the importance of different elements of a research strategy including, national and international R&D programmes, mechanisms of funding, contributions of basic science through to applied research, and opportunities for cross-cutting programmes of generic value.

The Potato Council R&D strategy will deliver primarily against:

- Potato Council Objective 2: Improve efficiency and productivity in the industry to help levy payers have thriving businesses and
- Potato Council Objective 5: Improve ways in which the industry contributes to sustainable development
Prepare the industry to deal with future challenges

- Resistance management strategies
- Identifying and exploiting health benefits of potatoes
- Effective alternative sprout suppression strategies
- Responding to challenges of climate change
- Preparing for new pesticide and environmental legislation
- Dealing with new pest and disease threats
- Understanding costs and benefits of new technologies

Table: Improve marketable yield

- Understanding and meeting end-user quality requirements for fresh and processing sectors
- Increasing yield potential through better soil management
- Improving production and exploitation of seed
- Dealing with production constraints from weeds, pests and diseases
- Making the best use of the potato’s genetic potential
- Reducing wastage in field and store

Table: Optimise use of resources

- Improving efficiency of nutrient use
- Managing soils sustainably
- Exploiting available water resources efficiently
- Managing use of plant protection products
- Improving energy efficiency for production and storage
- Utilising precision technologies

In meeting these objectives, the research will deliver value for money to levy payers (Potato Council Objective 1).

Continuity will be provided with the current research programme and the priorities identified by the 2011 industry consultation will fit into three strategic areas. Exploiting opportunities to address environmental issues and common problems faced by other AHDB divisions through cross-sector collaborations will be a key consideration across all themes.

Potato Council will seek to ensure all projects under the R&D strategy fit within these key areas. The new project funding will be guided by industry prioritisation and concentrated in those areas that are likely to make the greatest difference and where there is a high likelihood of success. This commissioning will include new research that supports the Potato Council’s plant health strategy.

Improving the competitive position of the GB potato industry by improving the marketable yield, reducing defects and reducing input costs will enable it to better respond to the challenges from constraints on available resources (water and soil), pest and disease pressures (including resistance management), plant health legislation and the availability of plant protection products.

To optimise crop potential and deliver yield, quality and safety, there is a requirement to exploit opportunities, remove constraints and reduce wastage relating to Genetics x Environment x Management interactions. The potential offered by the recent sequencing of the potato genome and from the increasing range of potato pests and pathogens is significant. Exploitation of the new knowledge requires a greater understanding of gene function, utilisation of high throughput screening technologies and exploiting bioinformatics. Integrating these technologies with robust practical evaluation of phenotypes will be a challenge but would provide new cultivars with enhanced characteristics for the industry or identify new targets for crop or disease management intervention.
Industry engagement and stakeholder consultation will remain a crucial part of Potato Council’s on-going research strategy. This will ensure the programme remains focused on industry priorities and that there is accountability to the industry for its conduct and delivery.

Two new initiatives will be developed as part of the R&D strategy to improve delivery and protect skills for the future.

**Sutton Bridge Crop Storage Research (SBCSR)**

Storage R&D programmes have been identified as a priority in consultations with stakeholder groups and an established programme of R&D work is in place, utilising the resources and facilities at the wholly-owned Sutton Bridge Crop Storage Research. The programme of storage R&D was subject to separate discussion when Potato Council was investing in new storage and training facilities. The current storage programme has been commissioned against identified knowledge gaps and addresses priorities for seed, fresh and processing storage. The emphasis is on sprout suppression, energy efficiency and disease management. This programme will continue and greater integration will take place between the storage research projects and crop agronomy/protection work. The opportunities for cross-commodity work on storage are being pursued as part of the SBCSR business plan. Sutton Bridge will also continue to deliver KT outputs from the Potato Council storage projects and undertake commercial R&D contracts for the potato industry.

**Commissioning new projects**

Calls for new projects will be issued by Potato Council based on the R&D strategy. These will be identified on the website and Potato Council will conform to AHDB procurement guidelines.

The project proposals will be assessed using the following criteria to judge the risks and benefits:

- **Strategic relevance** – fit to Potato Council plan and R&D strategy
- **Economic benefit** – potential to improve competitive production
- **Confidence in the approach** – scientific quality status of knowledge, confidence in contractor
- **Collaborations** – are there appropriate national or international links
- **Research cost** – cost to completion, added value through co-operation
- **Research pipeline** – nature of the project, radical or incremental benefit
- **Environmental impact** – environmental considerations and legislative issues

**Potato Council Fellowships**

Establishment of a Potato Council ‘Fellowship Scheme’ to provide essential support for individual specialists working in a research area that contributes to industry competitiveness and sustainability.

The Fellowships will help to maintain expertise in these fields by:

- Enabling Fellows to produce a review of knowledge in their specialist area and conduct research and deliver knowledge that is identified as priority for the industry
- Enabling Fellows to contribute to the training needs of the next generation of applied researchers and technical staff
- Allow Fellows to source additional funding for research or knowledge generation from new sources
- Supporting the continuation of the Fellows employment

The Fellowship Scheme will be an integral part of the R&D strategy and three Fellowships will be awarded during the next three years.

**Potato Council Studentships**

There is a growing realisation that there has been a lack of investment in the next generation of scientists with the appropriate skills for conducting the research needed by the industry. This training requirement has been recognised and a more pro-active position will be adopted with the establishment of a studentship scheme with 2–3 awards granted annually in areas that relate to industry R&D priorities.
End user relevance – how important are outcomes to end-users

Sustainable benefit – will the project deliver continuing industry benefit

Knowledge transfer – does the proposal identify routes for dissemination

Proposals will be subject to peer review where specific external expertise may be sought to ensure a thorough evaluation of the submissions.

Review of programmes and projects

Annually the Research and KT committee will review the strategy and R&D programme to ensure that it reflects progress and continues to meet the industry needs.

R&D projects will continue to be monitored by staff against delivery milestones and budgets and the progress reported to the RKT Committee. Individual projects will be assessed on completion to establish that they have delivered against the objectives of the work, that the outcomes are scientifically robust and that effective knowledge transfer has been carried out and that the work has delivered value for money.

The Potato Council will also improve the post-completion evaluation of the impacts of the R&D projects to better demonstrate benefits.

Knowledge Transfer

To ensure that Knowledge Transfer activities are integrated into the R&D programme, each project will have a KT Executive assigned to it. The Executive will become part of the R&D project group and they will be responsible for developing and executing a communication plan to ensure that outcomes are delivered to the benefit of the whole industry.

The 2011 R&D consultation showed that a wide range of KT outputs were used by the industry and its advisors. These included research reports, grower advice and technical guides e.g. on store management. Access to information via the Potato Council website is very important and this was complemented by a range of field days and technical forums. Detailed information about ongoing KT activities is available on the Potato Council website5.

To ensure that the most effective Knowledge Transfer activities are exploited in future, the KT strategy will be reviewed separately and the aims and delivery mechanisms will be documented.

5. See www.potato.org.uk/knowledge-hub
Annex 1: Potato Council Analysis of the Strengths, Weaknesses, Opportunities and Threats • Issues that relate to R&D

### Strengths

#### Industry structure
- Highly integrated and rationalised
- Relatively stable production
- Contract/commitment approach exists between growers/buyers
- Heavy investment on farm and supply chains
- Strong co-operation via Potato Council on key issues
- Sector supported by strong strategic/applied science
- GB sector is a world leader in environmental sustainability

#### Growers and supply chain
- World leading grower base
- High quality production vs. competition through high quality specifications and expertise
- Good compliance to protocols vs. competition
- High commitment to storage: 3.5-4m tonnes (~50:50 fresh:processed)
- Responsive industry to consumer needs – e.g. health
- Good career prospects for industry entrants

#### Product
- Valuable domestic market (£743m ex-farm; £3.5bn consumer value)
- High consumer penetration at 97%
- Sophisticated, leading retail environment
- Demonstrates positive characteristics – healthy, filling, value for money
- Further growth potential in chilled product development
- Perceived as inherently ‘British’, engaging current consumers
- Favourable climate
- Island status has safeguarded market and health status of crop
- Excellent break crop in the rotation

#### Export
- Seed industry free from certain organisms (Ring rot, Dickeya etc.)
- Key exporter of seed
- Safe Haven scheme recognised worldwide
- Government support in export
- Increasing range of proprietary varieties for export

#### Industry bodies
- Potato Council has a track record in improving competitiveness
- Trade strengths through relevant organisations such as NFU, BPTA, PPA, FPSA, NFUS, PBGA

### Weaknesses

#### Environment
- Limited availability of land and clean soil (issues of soil-borne pathogens)
- High user of energy, water and fertiliser, pesticides; residue concerns
- Lacks knowledge of performance in relation to carbon/water footprints
- Reliance on CIPC sprout suppressant that is a huge industry risk

#### Growers and supply chain
- Grower base can be significantly change averse
- Variance between top 20% of growers and others (80/20 rule)
- Older age profile of industry at upper end across all sectors
- Lack of promotional, marketing, NPD expertise within industry
- Industry failing to use new knowledge effectively or is this KT failure?
- Significant defects affect marketable yield, estimated at £90m loss pa
- Packing/processing rejects not utilised industrially (flake, granular)
- Storage profile creates major need for reinvestment e.g. bulk for processing

#### Product
- Significant rise of processed imports over time
- Age profile skewed to older consumers/heavy users
- Misperception of nutritional status and lack of positive endorsement

#### Export
- Lack of promotional resources vs. overseas competition
- Increasing financial risk in seed production
- Increased freight costs via sea/air will impact exports (and imports)

#### Financial
- Retailer dominance has affected farm gate
- Significant increase in external costs e.g. energy, fertiliser and transport
- Price and credit availability has affected ability to undertake capital investment

#### Knowledge gaps
- General lack of understanding/knowledge of some critical diseases
- Slow rate of varietal improvement and uptake
- Limited penetration of KT at middle-lower end of grower ability/scale
- Limited understanding of key components of physiology, biochemistry
- Lack of ‘health related’ research in pipeline
- Lack of new industry entrants – growers, scientists and technologists
Opportunities

Technology
- Compulsory food education/cookery in schools
- Improvements in food processing
- Develop understanding of key issues such as diseases, pests, inputs/costs
- Develop KT tools further
- Utilise communication developments for KT
- Store control/building design to improve efficiency e.g. energy losses
- Advanced computing for improved knowledge e.g. CIPC and PCN
- Accelerate exploitation of DNA technologies e.g. PCR diagnostics
- Genomics/GM technology, but longer term

Product/consumer
- Improve potato perception for versatility, convenience, health
- Capitalise on move towards scratch cooking, ‘naturalness’
- Exploit ‘Britishness’ through differentiation on quality rather than price
- Address competition from pasta/rice
- Engage consumer press with access to reliable potato information
- Develop further ‘brand’ opportunities for fresh/processed

Export
- Increasing demand for British seed potatoes
- Collaboration/education to develop demand/tackle export restrictions
- GB science and technology delivering solutions for seed industry issues
- Evaluate and develop new markets (e.g. China)

Collaboration
- Cross sector linkages through AHDB
- Address sustainability from environmental/economic viewpoints
- Engage with levy payers/stakeholders more
- EU potato promotion across until 2012, subject to funding

Threats

Climate change
- Growing risk of adverse and unpredictable climate conditions
- Introduction of new pathogens affecting field and storage
- Increased virus/blight/pest and volunteer potato pressure

Legislation
- Limited pesticides availability, high cost alternatives will affect production
- Water and soils will impact on current growing practices
- Labour impact on availability of workers and/or costs
- Environmental e.g. water and fat disposal in processing sector
- Acrylamide: potential to damage fresh and food service sectors

Product/consumer
- Reduction in demand
- Diminishing cooking skills, changing eating habits
- Imports (ref. eastern Europe)
- Further growth of rice and pasta
- Negative media coverage e.g. waste, pesticides, GM
- FSA saturated fat campaign, impact on chips
- Trading climate influencing industry to sell on price, as a commodity

Export
- Tightening of import conditions in some export markets
- Increase move to ware in Scotland impacting on clean land for seed

Research
- Declining GB research base, a lack of practitioners for KT process
- Reduced crop-specific funding due to government policy
- Science results slower to come through than required for key issues
- Fractures in research chain from basic science to applied research

Growers and supply chain
- Reduced margins/cash flow issues a potential risk to supply base
- Large scale production not always compatible with precision farming
- Lack of succession/skills drain into other industries
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