The James Hutton Institute

# 2014 Our World 2015

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# Introduction from the Chief Executive

**Iain Gordon**
**Chief Executive**

The James Hutton Institute continues to demonstrate the excellence and value of our science in meeting the complex and interacting challenges of feeding the world without diminishing our environment or threatening the planet's ecosystems.

## Governing Board

A key highlight of the year was the opportunity to welcome five new members to the James Hutton Institute Governing Board. I am delighted that the Board can draw on the new skills, insight, and experience they have to offer. This bodes well for the development of the Institute in the years ahead, and on behalf of us all we look forward to working with our new members, Ian Gambles, Dr Deborah Keith, Stephen Hall, Professor Marian Scott, and Joan MacNaughton. At the same time, we also extend our sincere thanks and appreciation to the retiring members of the Board, Julia Brown, Wayne Powell, David Boxer, and George Salmond, all of whom were an invaluable source of wisdom and expertise to our Institute and with whom we hope to maintain contact.

In March 2014 the Board of the James Hutton Institute made the strategic decision that we needed to reduce staff costs to support our long-term ambitions for investment, growth and focus. This was achieved within the 2014/15 financial year. I recognise that the voluntary exit scheme caused uncertainty and disruption for staff and customers but it repositions the Institute to achieve our aims for the future.

The Institute, therefore, budgeted for a planned deficit in 2014/15 to accommodate the costs of the voluntary exit scheme and capital depreciation. The Board has approved a break even budget for 2015/16; this will be a substantially better year for the Institute and I expect it to make a small operating surplus, to cover the depreciation charge and also recoup the majority of the costs associated with the voluntary exit scheme.

## Research

Our business is translating excellent scientific research into agriculture, food, the environment and rural development, for which we are world-renowned. A notable achievement of the year has been completion of the programme of assessment of our Science Groups, Biomathematics and Statistics Scotland (BioSS) and Research Themes by external, independent, panels of experts. The panel that reviewed the Research Themes was 'thoroughly impressed with the quality of the science underpinning the James Hutton Institute research and delivery of impact through its six research themes'. In its report, the panel made recommendations for consideration when developing our new Corporate Strategy, to be launched in 2015/16. These include:

- aligning our work with government priorities;
- strengthening the focus of our research agenda;
- broadening its impact across a wider community.

On behalf of all my colleagues at the Institute, we extend our sincere thanks to all the panels for their insight and commitment, and our colleagues for their hard work in providing high quality materials and engagement.

The Institute's reputation is based upon the quality of our science and it is particularly important that we develop and nurture the earlier-career researchers. We are also delighted to recognize the achievement of one of our researchers, Dr Lionel Dupuy, in winning a prestigious European Research Council grant worth €1.9M to further his innovative work using "transparent soils". Of particular note in 2014/15 was the Institute's success in securing 11 awards from Innovate UK (formerly the Technology Strategy Board), three of which were under the

Agri-Tech Catalyst scheme which offers funding to innovative researchers to develop solutions to global agricultural challenges, and in winning two prestigious EU Marie Curie Fellowships. Other significant awards were received from the Forestry Commission, Scottish Natural Heritage and the CIMMYT International Maize and Wheat Improvement Centre.

In recent months, our Executive, Theme Leaders, and Science Group leaders have been engaged in developing a coordinated, Institute-wide response to an Invitation to Grant Fund for 2016 to 2021 from the Scottish Government's Rural and Environment Science and Analytical Services Division (RESAS). Funding from RESAS accounts for about 61% of our annual income and a high quality submission for this funding was a key priority for 2014/15. This funding is essential for the Institute to deliver a research programme which delivers to our mission and, in collaboration with partner institutions, to the aims of the Scottish Government.

## James Hutton Limited

In the past year we laid the groundwork for the merger of our two commercial subsidiaries, Mylnefield Research Services and Macaulay Scientific Consulting Limited into our new company, James Hutton Limited. The merger of the two subsidiaries, first announced in the second quarter of 2014, enables us to create a single interface for our commercial activities. The resulting economies of scale will enable them to better serve the interests of their wide range of customers requiring scientific and analytical services.

## New Institute-wide Initiatives

Our vision is to be a world leader in research and engagement, delivering evidence-based solutions to the global challenges facing land and natural resource use. To achieve this, the Institute has been developing exciting new projects in 2014-2015. We are focusing on the development of areas of new science and new ways to deploy it, together with new partners. For example, our planned development of an International Barley Innovation Centre (IBIC) will augment our scientific excellence in this area and create a venue where we can work with industry and other stakeholders to develop new innovative solutions and products. This centre will directly benefit Scotland's second largest industry; food and drink.

Our research platforms not only provide new opportunities for scientific investigation but also improve our operating efficiency, save costs, and yield new sources of revenue to invest in science and affirm our commitment to sustainable operations. For example, we are enhancing our farm research platforms with developments such as renewable energy technologies.

We have also created new independent research fellowships with funding from the Macaulay Development Trust, attracting new recruits with fresh ideas and approaches in areas such as community empowerment in renewable energy, technologies for the water cycle, remote sensing and drone technologies. Three more are planned for the coming year in soil mineralogy, digital soil modelling and land use modelling. We anticipate further progress on these innovative initiatives in the year ahead.

**'Our research platforms provide new opportunities for scientific investigation, improve efficiency and yield revenue opportunities'**

John Swinney MSP hears about our work on barley

## Communicating our Science

Throughout the year we have engaged with the full range of our stakeholders. We value our ongoing close working relationship with the Scottish Government. With colleagues in RESAS we have developed new mechanisms to improve our working processes and to help them and us to increase the profile and impact of the research programme with policy teams across government. With the Scottish Parliament Information Centre and Scottish Universities we are working on improving access to research for Members and Committees of the Scottish Parliament. We collaborated with Scottish Government in its launch, in Scotland, of the Milan EXPO 2015, on Feeding the Planet, Energy for Life.

Internationally, we have contributed to a range of advisory panels working groups including the United Nations Environment Programme on Benefits of Soil Carbon, and the International Organisation for Biological and Integrated Control of Noxious Animals and Plants (IOBC).

In line with our strategies on income generation and knowledge exchange we have been increasing our engagement with policy teams in the European Commission, with visits by Theme Leaders and invitations to chair, and participate in, focus groups in the new European Innovation Partnership (EIP) on agriculture, and ongoing contributions to the EU Joint Programme Inititative on Water Challenges for a Changing World. These types of engagement enable the Institute to contribute to shaping European approaches to linking policy, research and practice.

We will continue to increase our efforts to find new mechanisms for the effective translation of our research to the benefit of our full range of stakeholders, positioning the Institute as an organisation that spans science, policy and business.

## Our Future Scientists

Our thriving Postgraduate School continues to provide excellent supervision and mentoring, and valuable practical experience for our 114 PhD students, who enrich our organisation in many different ways and add to the academic rigour of the Institute's contribution to knowledge. They are our future scientists and, from an analysis of our Alumni database, many go on to important jobs around the world not just in academia but also in public service and industry. We have thought carefully about how we give additional, and unique, value to the training they get from their host university. As well as skills courses in biomathematics and statistics with BioSS, we have grant writing and science presentation competitions that have been both fun and informative ways of helping students learn generic skills. At the Institute they also get experience of working in an environment focussed on translation of excellent science into solving real-world problems and have the opportunity to work with a wide range of other disciplines and learn about multi-,inter- and trans-disciplinary approaches, if needed, in their project.

Winners of the PhD student event held in March 2015

Our students again did very well in the inter-MRP speaking competition with Graham Motion taking top prize at the Science for Life Lecture at the Royal Society of Edinburgh. Our students have also been successful in oral and poster sessions in various other scientific society events which shows the benefit of the training that backs up their talent and commitment. The Postgraduate School is truly international and we are proud to host students from 24 different nationalities of which 51% are British, 40% from the rest of the EU, and 9% from outside the European Union. We have student representation on our Postgraduate Committee and they are also full participants in our Athena Swan task force aimed at advancing the careers of women in science. The school itself has a gender balance of 54% female and 46% male. Our students are registered at 28 different universities in the UK and around the world and they represent a network of collaborations with partners in science with many benefits, principally allowing us to share knowledge and expertise much more widely. There will be another 14 students in the 2015 intake and we will again welcome students from the HydroNation Scholars Programme (www.crew.ac.uk/hydro-nationscholars), and students funded by the Macaulay Development Trust and the new Doctoral Training Centre on soil called STARS (www.starsoil.org.uk).

Last year we also saw the second student exchange with McGill University, Canada, using the Douglas Macaulay endowment fund. Marie Pages from the Socio-Economics and Geographical Sciences group spent last summer at McGill in the Department of Biology working on volunteer engagement in invasive species control.

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2015
International
Year of Soils

## UN International Year of Soils

The Food and Agriculture Organisation of the United Nations designated 2015 the International Year of Soils. With our expertise in all aspects of soils, we are making a coordinated effort to highlight the excellence of our soils research and the importance of this vital resource across the full range of our stakeholders and customers, from international congresses, Parliamentary and industry focused events throughout the year. For example, working with partners in Africa, the ALTER project, funded by the Ecosystem Services for Poverty Alleviation (ESPA) programme, demonstrates how improved knowledge about soil degradation can be used to address poverty issues.

**'The Institute strives to provide leadership and solutions to global challenges such as food, climate and water security'**

## The Challenge Ahead

With the United Nations projecting a global population of about 9.5bn by 2050, and increased needs for food (50%), water (30%), energy (50%), and land, (120 million hectares needed in developing countries), our natural resources continue to face unprecedented pressure. Of particular note is the Institute's work with VSO on the governance of waters in Africa, Scottish Government Hydro-Nation Climate Justice Fund, and South America supported by the European Commission. The James Hutton Institute strives to provide leadership and solutions to these challenges and we look forward to another year of producing excellence in science.

Despite a year of significant change our staff remain passionate about their science and are committed to making a difference to real-world problems. I would personally like to thank all the staff, students, visitors and associated partners - as well as all those with whom we engage - for their support over the past year.

# Safeguarding Natural Capital

**Professor Alison Hester,** Theme leader

A major focus of our research in this theme is designing appropriate management strategies and policy development for sustainable management of natural capital. Recipients range from local land managers, national governments/agencies, and the European Commission up to 'global land managers' (e.g. government-related or multinational companies). Natural capital, the world's 'stock' of resources, provides a whole range of 'ecosystem goods and services' on which we all depend for survival. These 'Ecosystem services' can be defined as the benefits provided to humans from natural resources like land, water, vegetation and atmosphere into a flow of essential products and services such as clean air, water and food.

A key area of research on sustainable management of natural capital involved mapping of natural capital and Ecosystem Services to aid decision-making, particularly for Scottish/UK/EU Land Use Strategies and the Rural Land Use Pilot areas (e.g. Aberdeenshire). Our research on responses of soil, species and habitats to management actions, including exploring habitat connectivity, habitat networks and 'future-proofing' for climate and other changes, is helping ensure that management practices achieve their desired aims both now and into the future. A major highlight this year has been analysis of ecological impacts of tree diseases such as ash dieback and design of responses (e.g. management 'toolkits') for land managers and policy makers.

Analysis and mapping of soil assets and providing soil management advice is also a priority task, including producing easy-to-use soil apps for farmers and land managers. Linked with all the above is our continued active input into strategy development and application, such as the EU Species and Habitats Directives and the Scottish Biodiversity Strategy, through our involvement in a range of committees taking these forward at EU and country levels.

*Valuation* of natural capital - in other words the value of natural resources and the services they provide) and incorporation in international/national decision-making (governance) is a major focus area for many governments and global organisations. We are researching how best to analyse (in a common 'currency') costs, benefits and trade-offs, incorporating risk analysis of different decisions in relation to the multiple potential consequences for natural resources and human wellbeing.

## 'We are actively involved in committees developing species, habitat and biodiversity strategy at country and EU level'

Payments for protection or improvement of natural resources have been in use for a long time (e.g. agri-environment schemes) but the recent development of more explicit payment schemes based on wider impacts on natural resources and resource users (e.g. PES: Payments for Ecosystem Services) requires in-depth research to assess their potential for success.

Another important component of safeguarding natural capital is restoration. Our restoration research focuses mainly on key habitats listed as of global or European importance for restoration, e.g. (a) peatlands, where we have an excellent example of the power of combining in-depth research findings with spatial analysis and economic information to develop a decision-support tool for land managers to prioritise areas for restoration (WISE tool) and (b) native woodlands, where we combine long-term data with field experiments and habitat suitability modelling, to understand what drives woodland change, identify potential conflicts with other land uses (both current and under future climate change) and propose appropriate restoration action into the future.

Funding won this year came from a diverse range of sources, international and UK – for example from the EU, UK and Scottish Governments and Agencies, Research Councils and Universities, and a variety of other funding organisations. Funding highlights include several high profile grants on tree resilience to disease, pests and pathogens, focusing primarily on ecological issues and genetic diversity; soil survey, sampling and monitoring contracts for a range of customers; a major European project on native seed science, technology and conservation; and monitoring and management guidance for the threatened mountain hare in Scotland.

# Managing Catchments and Coasts

**Dr Marc Stutter,** Theme leader

This theme translates scientific knowledge into solutions across local to national scales for the potentially conflicting demands on our water resources. Our work seeks to identify opportunities for multiple benefits for land, water and people that are cost-effective and resilient to future changes in climate, land use and policy.

During this year the Managing Catchments and Coasts Theme aligned activities around the three theme pillars: water quality and pollution; hydrology, flooding and physical river habitat; and resource efficient water and waste water systems.

This year saw key outputs supporting the implementation of EU policies in river water quality and pollution at the national level. Firstly, research brought evidence together from separate strands of modelling and monitoring evaluation to support changes in the designation of Nitrate Vulnerable Zones (NVZ) in Scotland. Secondly, extensive work was done to help ensure effective targeting of agri-environment options, supporting the implementation of Scottish Rural Development Programme measures under the recent revisions of the Common Agricultural Policy. The MCC theme secured the Institute's first grant under the EU's new Horizon 2020 Programme, on marine spatial planning and aquaculture (Aquaspace), coordinated by the Scottish Association for Marine Sciences (SAMS), thus also delivering on the Partnership agreement between the two organisations.

'This theme secured the Institute's first grant under the EU's new Horizon 2020 Programme'

A highlight from pollution science was the publication of *Assessing Recovery from Acidification of European Surface Waters in the Year 2010: Evaluation of Projections Made with the MAGIC Model in 1995 in Science for Environment Policy*, a news service published by the European Commission's Environment Directorate-General. A Danish collaborative project BufferTech was funded during the year to work on riparian buffer strips – areas of land planted with vegetation to prevent water runoff and soil erosion - incorporating novel vegetation, biomass production and controlled hydrology. Several water quality engagement and international development projects were funded in Africa through the Scottish Government's Climate Justice Fund.

In the area of natural flood management, notable events were around an initiative 'Holding Water' with a joint UK-international group (The Flow Partnership). Our initiative seeks to replicate multiple small water-holding features in catchments to ease floods and droughts, protect soils for cost-effective measures for small to medium floods and reinforce traditional flood measures.

Strong engagement and PR was gained from meetings with ministers and a keynote speech at the Economist World Water Forum. Our research catchments of Tarland (River Dee), Bowmont (River Tweed) and Lunan Water, reported development in water quantity management science at several prestigious meetings and fora.

The area of resource-efficient water and waste water systems was part of a successful funding application to the Natural Environment Research Council (NERC) in the Resource Recovery from Wastes programme. We worked with Lancaster University and industry partners in Stopford Environment Ltd and Aqua Enviro Limited, to develop novel soil conditioners and fertilisers from blending ash and anaerobic digestate waste streams. The appointment of a senior fellowship in Resource Efficient Water Systems funded through the Macaulay Development Trust was of great assistance to the project.

The Centre of Expertise for Waters (CREW) has established user groups focused on the main governmental policy areas of Sustainable Rural Communities, River Basin Management Planning, Flood Risk Management and Coastal Erosion, and Drinking Water. These groups helped to identify, prioritise and co-ordinate research and other activity between policy makers, their implementation partners and researchers. They will ensure that CREW projects deliver added value by informing not just one user organisation but the wider community.

In 2014/15 CREW completed 18 projects with ten currently underway and 21 in development. CREW will continue to run the Hydro Nation Scholars Programme, with the ongoing student cohort reaching 14 in 2015/16 year. This prestigious graduate school draws flagship PhD students both from the UK and internationally to Scottish institutions and universities.

In 2014/15 scholars attended a series of events arranged with Scottish Government, SEPA, Scottish Water, Water Industry Commission Scotland, Scottish Parliament, and the Hydro Nation Forum.

In 2015/16, four scholars will enter their third year, and will have bespoke training, including placements. Preparations are being made to recruit the next intake of scholars in 2016/17, which will potentially increase the cohort to 20.

# Enhancing Crop Productivity and Utilisation

**Professor Derek Stewart**, Theme leader

Population growth and demands on land, coupled with the impacts of changing climates, have increased the need for a second "green revolution" to improve and stabilise yield. This theme focuses on the multidisciplinary research needed to deliver into the marketplace knowledge and products which fulfil these requirements.

The year has been a significant period for the translation of our science through collaborations and partnerships on a range of projects with stakeholders, predominantly in industry. In particular, fruit research at the Institute has seen a marked burst of activity. Funding for multiple public-private partnership projects, including Innovate UK, the UK government-funded innovation agency, have been targeted at developing genomic resources in raspberry, blueberry and blackcurrant. These deal with issues such as yield improvement and stability, biotic and abiotic stress resistance and tolerance, and climate change adaptation. Industrial collaboration has been further extended by the signing of new breeding contracts for raspberry (£1.22M) and blackcurrant (£0.65M) with a mixed industry/government consortium and Lucozade Ribena Suntory respectively.

To further cement the translation of the fruit science to our stakeholders, the Institute was instrumental in the creation of a Scottish Fruit Common Interest Group (CIG) via Interface Food and Drink, a government programme to connect business to academic and institutional innovation. This Fruit CIG will prove an important conduit and feedback mechanism for our fruit research.

Industrial engagement and impact has also been a focus of our cereal research, with a diversification into oats via direct industry and Innovate UK funding. Barley research at the Institute, in collaboration with the University of Dundee, has had a very successful year with several important Biotechnology and Biological Sciences Research Council (BBSRC) projects funded.

## 'In addition to fruit, several potato breeding programmes were awarded to the Institute in 2014/15'

We helped lead a Scotch Whisky Cereals Supply Chain Summit, in collaboration with the Scottish Government and industry, in which the research requirements for the short, mid and long term were laid out and the plans for their delivery scoped. This helped feed into our plans for, and subsequent submission to, the UK Agritech Centres of Excellence call for a Centre for Cereal Innovation and Sustainability. The Bid is in collaboration with the Scottish Whisky Research Institute, Campden BRI and the Institute of Biological, Environmental and Rural Sciences (Aberystwyth University). The outline Bid was approved for a full submission.

Potato, like our other target crops, also attracted major funding for specific aspects of research on potato genetics in collaboration with industry and other partners. In addition to fruit, several potato breeding programmes were awarded to the Institute in 2014/15

The year saw our aims of a broader utilisation of our crops realised with the EU FP7 industry collaborative projects DISCO (www.disco-fp7.eu) and BachBerry (www.bachberry.eu) starting up. Their aim is in mining potato and soft fruit phytochemical diversity, respectively, for bioactive and functional components to be exploited via breeding and/or industrial biotechnological routes. More recently, this has been supported by the Institute's membership of the Bio-Based Industries Consortium (www.biconsortium.eu) and the Industrial Biotechnology Innovation Centre (www.ibioic.com). These organisations aim to generate new and innovative products from sustainable resources.

# Sharing Our Science

Just as important as "doing" the science here at the Institute, is sharing that science with those who can make use of it. This includes international and national bodies, policy makers, researchers, commercial companies and the public. Many of our events - and the use of online media - attract public audiences, enabling us to raise the profile of the impact and importance of our research amongst the wider public in different countries.

A major objective for the Institute is to increase its visibility among peer groups outside the UK and, in tandem with that, in the UK and international media. Being able to respond rapidly yet still with authority to topical media stories as they emerge and develop is a way to achieve coverage and profile that we have begun to embrace with some success. Focussing on the impact of our work for funders and the public is another key means to attracting interest: answering the 'so what?' and 'what's in it for me?' questions. For audiences of our peers, visibility and reputation are factors in being seen as an attractive research partner. We are addressing the former with specific plans to participate in and host more European events, and to bid for international conferences and meetings.

Over the year, significant numbers of viewers are being attracted by our increasing use of YouTube and social media, highlighting notably the animated soil characters and scenario planning for environmental management (in Spanish and English). Below are some of the ways in which we did this and some of the highlights of our year.

## Industry Events

Over the year to March 2015, we co-organised or contributed to a wide range of industry leading events. Our Potatoes in Practice event continues to be the largest field-based potato event in the UK, and we value the close working relationship developed with partners in the **Potato Council**, **SRUC (Scotland's Rural College)**, **Agrii**, and our media partner, **Potato Review**. Similarly, the Cereals in Practice event with SRUC and SSCR enabled us to showcase variety trials and current research for agronomists, industry and scientists working with cereals.

We are continuing to create opportunities to increase the impact from our research platforms, activities and findings. We have worked with industry and policy teams in the planning and delivery of high profile and high impact events which bring together different perspectives on common themes. In 2014 this included the Water Scotland Conference, delivering to the Scottish Government Hydro Nation strategy, LEAF (Linking Environment and Farming) Technical Days for Farmers, All Energy and Agri-Energy on renewable energy, and Offshore Europe. We thank all of our partners in these and other events for their ongoing support over the year.

## Public Events

We presented some of our whisky-related science to the public at the Edinburgh International Science Festival at the start of the year and rolled this and some other topics and activities out at the Royal Highland Show, as usual, in early summer.

> 'We continue to create opportunities to increase the impact from our research platforms, activities and findings'

In September 2014, we were delighted to support the Macaulay Development Trust in welcoming Professor Bill Sutherland of the University of Cambridge to give the 37th TB Macaulay Lecture, at the Royal Society of Edinburgh, with a stimulating and timely talk on Policy, Practice, Science – My Distant Relatives.

The Drambusters Whisky Festival in Dumfries in November provided a great opportunity to surprise and enthuse people outside our habitual geographical orbit with our contribution to their favoured tipple, and was a good opportunity to push our usual boundaries and deepen our events collaboration with SRUC.

# Highlights of the Year

**Our colleagues' daily efforts in their individual disciplines provide the basis for the high-profile, headline-grabbing and visible impacts and successes that we continued to achieve over the past year, across the Institute's areas of research.**

**May** *2014*

### Raspberry IPM system featured in global hub

Our work on Integrated Pest Management for raspberries has been showcased at a recently launched IPM global hub, sponsored by the Organisation for Economic Co-operation and Development (OECD). The OECD's global hub will highlight the best IPM systems around the world, so is a good measure of the James Hutton Institute's success in this area.

**June** *2014*

### Researchers in twin breakthrough against blight

Scientists from international consortia including the James Hutton Institute are making headway in the fight against blight, a plant disease responsible for major famine and loss of life throughout history. They have managed to track down the origins of *Phytophthora infestans*, the pathogen responsible for blight of potato, tomato and other related hosts, and map its distribution across Europe. As potato late blight continues to be a major threat to global food security and billions of pounds are spent each year trying to combat it, mostly due to the cost of fungicides and substantial yield losses, this line of research is essential in the fight against the disease.

# Highlights of the Year

**July** *2014*

### Aberdeen team in top three in world for clay mineralogy

Researchers from the James Hutton Institute demonstrated they are best in the UK and in the top three in the world in an international competition, which is considered by some as the world championship in mineralogy. At the 51st Annual Meeting of The Clay Minerals Society at Texas A&M University, in the USA, Steve Hillier, Helen Pendlowski, Nia Gray and Ian Phillips were awarded second place in the seventh international Reynolds Cup.

### Berry promising future for new raspberry variety

The soft fruit industry got the first glimpse of new raspberry variety Glen Dee at the Fruit for the Future event. Glen Dee boasts a seven percent increase in yield compared to the popular Glen Ample variety and is attracting a lot of attention.

**August** *2014*

### Hutton involved in innovative flood-forecasting piloted at the Glasgow Commonwealth Games

An innovative pilot project to improve surface water flood forecasting in urban areas was implemented in Glasgow during the 2014 Commonwealth Games. The project assessed how this approach could be integrated into SEPA's existing flood forecasting mechanisms to deliver real-time information on the severity of surface-water flooding impacts in urban areas. The surface forecasting model is the first of its kind in the UK and provides a novel approach for forecasting the impacts of surface water flooding in real-time. It provided useful surface-water flooding alerts to the Games organisers and emergency responders. The project was led by the Scottish Flood Forecasting Service, with expertise provided by researchers from the James Hutton Institute, SEPA, the Centre for Ecology and Hydrology, and the Met Office.

**November** *2014*

### Young horticultural scientist scoops Business Leader of Tomorrow award

Daniel Smith, a young researcher from the James Hutton Institute, was awarded the Business Leader of Tomorrow prize at the prestigious Knowledge Transfer Partnerships (KTP) Awards in London. Daniel works for the Institute as part of a Knowledge Transfer Partnership with S&A Group in Herefordshire. He has been developing optimal ways to apply fertilisers, soil amendments and other water-soluble products via irrigation, a process known as fertigation. His work is already having an impact, with some of the changes yielding benefits well beyond what was anticipated when the KTP was initiated.

**February** *2015*

### Our barley research making the headlines

As the world's fourth most important cereal crop and the UK's second largest, grown on about half of Scotland's arable land, barley is sure to get the attention of researchers, growers and industry. Ken Macdonald, BBC Scotland Science Correspondent, visited the James Hutton Institute in February to learn more about research on barley and the Barley Innovation Centre initiative, and produced a report that was aired on BBC One Scotland and BBC Radio Scotland. Robbie Waugh,

Joanne Russell and Kelly Houston from the Cell and Molecular Sciences group provided an overview of our research on barley, while Iain Gordon offered insight into the plans for a new barley Innovation Centre in Invergowrie. Given the importance of barley for our economy, in the coming months we anticipate more interest in the Barley Innovation Centre project from the brewing, distilling and food industries, as well as the agricultural sector and the general public.

**£3.5m Innovate UK success**

We have been highly successful in the second and third rounds of the Innovate UK funding calls. Institute researchers have secured 11 grants worth in excess of £3.5m across three categories; Agri-Tech Catalyst, Crop and Livestock and Industrial Biotech.

**March** *2015*

### €1.98 million ERC grant for artificial soils research

Dr Lionel Dupuy was awarded a highly prestigious European Research Council (ERC) Consolidator Grant worth €1.98 million to undertake research on a new generation of artificial soils. The five-year study will combine principles of optics, chemical engineering, physics, chemistry and biology of soils to image and characterise nitrogen movement in soil. A better understanding of how nutrients move in soil will lead to substantial progress in the development of more efficient fertilisers. This project builds on the development of transparent soils to develop the technology further to visualise the transport of nutrients in soils. This research will ultimately make it possible, for the first time, to unravel nitrogen pathways through soil at the microscopic scale.

### China-UK dialogue on science, policy and food security

To ensure food security for its sizeable population, China needs to find ways of overcoming pressing environmental challenges and developing a science to policy interface. This was the key message of the China-UK Summit for Environmental Science to Policy Roundtable held in March 2015 in Beijing, featuring leading Chinese and UK scientists. Researchers from the Chinese Academy of Sciences and China Agricultural University met with colleagues from the UK's Centre for Ecology & Hydrology, James Hutton Institute and Lancaster University to share current experience and best practice from UK, Europe and China. The Institute is at the forefront of these discussions and Professor Bob Ferrier co-chaired a session on science to policy experiences during the Roundtable. He said: "The best environmental policies are those supported with robust scientific understanding and that requires the policy and research communities to work closely together. We aim to share experiences between our countries to meet that challenge."

# Sustainable Production Systems

**Dr Tim Daniell,** Theme leader

Highly productive, profitable agriculture can benefit from biodiversity and environmental sustainability. This theme addresses current challenges facing our farming sector. These include: depleting fuel and fertiliser resources, freshwater shortages, increasingly erratic weather patterns, and loss of biodiversity and degradation of the soil resource which all threaten the global supply of food.

The year has seen significant success in securing funding for our science both in terms of fundamental and more applied areas of work. This has come from a wide variety of sources but of particular merit are the following.

A prestigious European Research Council (ERC) Consolidator Grant was won by Lionel Dupuy. These grants are designed to support researchers at the stage at which they are consolidating their own independent research team or programme. Worth £1.4M, this five year project will enable work on the development of transparent soil to continue, advancing the area of research to explore nutrient dynamics in the complex soil system. This grant includes significant collaboration both within the Institute alongside fellow colleagues and with Montpellier. A Marie Curie Fellowship has been awarded to Paula Pongrac from the University of Ljubljana, Slovenia, to work at the Institute for two years. Valued at £164k the project will explore phosphorus and zinc interactions in the roots of Brassica species.

We successfully secured two Innovate UK grant applications. The first "Poptical" explores the utility of in-field optical detection for early diagnosis of potato disease. A global leader in crop intelligence systems, Ursula Agriculture is the lead industrial partner bringing a total value of approximately £930k, with £448k to James Hutton Group (i.e. the Institute and James Hutton Ltd.).

The second "SoilBio", in collaboration with BioSS and with Soil Essentials as the industrial lead partner, will further develop applications to improve the monitoring of soil health, with a total value of over £1.34M, with £566k to the James Hutton Group. A BBSRC SARISSA grant was won, in collaboration with the Universities of Aberdeen, Dundee and Southampton with a total value of £1.34M, with £122k to the James Hutton Group.

We have been strengthening links with policy partners including the European Commission. Notably this year a representative from our Theme coordinated the nomination of thematic experts from a range of science groups to the 2015-22 European Evaluation Helpdesk for Rural Development, led by Metis GmbH, Vienna. Another member has been appointed as the coordinating expert for the New Entrants into Farming Focus Group, and representatives from our Theme sit on other European Innovation Partnerships (EIPs) panels (Brassica Integrated Pest Management (IPM), IPM of soil borne diseases, and optimising profitability of crop production through Ecological Focus Areas respectively). Other interactions with policy makers have included supporting implementation of the post 2015 CAP reforms, developing briefs for Scottish Government on a diverse range of topics including effects of flooding and/or tillage on soil, delivery on actions in the Scottish Government Agri-renewables Strategy Research and Innovation Focus Area, and involvement in a Houses of Parliament Parliamentary Office of Science and Technology POSTNOTE on greenhouse gas emissions from crops.

## 'The year has seen significant success in securing funding for fundamental and applied areas of work'

We were heavily involved in the successful Linking Environment and Farming (LEAF) Technical Day at Balruddery aimed at farmers working with the farm staff and the Communications team. The theme contributed a series of activities and presentations at the 2014 Royal Highland Show as well as inputs to the RESAS Strategic Research Programme event on Sustainable Intensification and family activities in the Children's Discovery Centre.

In relation to academic stakeholders we have been involved in the organisation or giving of invited presentations at a number of international science conferences and had representation on one of the University Research Excellence Framework (REF) assessment panels focussing on output.

# Controlling Weeds, Pests and Diseases

**Professor Ian Toth,** Theme leader

The main goal of this theme is to reduce the impacts of pests on plants, animals and humans through improved understanding and the development of methodologies and pest-resistant crops. Weeds, pests and diseases cause major reductions in crop yields if uncontrolled; novel and sustainable strategies are needed to manage or counter these threats.

The Scottish Government's Rural and Environment Science and Analytical Services Division (RESAS) continues to be our main funder but we have matched that funding from a variety of other sources during the year including BBSRC, AHDB, Innovate UK, commercial, and other Government funds. Notable research funding secured was on topics of pest and disease resistance, biocontrol, epidemic modelling, novel diagnostics, population biology, and the interaction of human pathogens with plants.

Plant health is becoming an increasingly important topic – particularly within Europe through the European Union Pesticides Directive, which aims to reduce the use of certain pesticides over the coming years. To support this Directive a statutory mandate was issued requiring each member state to implement an integrated pest management (IPM) strategy from 2014 onwards.

Multiple other UK and Scotland-focused strategies relevant to plant health have emerged over the last year, including the Tree and Plant Biosecurity Action Plan, the Plant Biosecurity Strategy for GB, the formation of the UK Plant Risk Register, Animal and Plant Health in the UK and the formation of the Animal and Plant Health Agency (APHA). In line with such policies, Scotland has formed the Scottish Tree Health Advisory Group (STHAG), and is forming a Plant Health Centre of Expertise, with both committees including representatives from this theme.

In response to the new EU mandate on IPM, and following a recommendation from the Institute's Income Generation Review (IGR), a new Institute Centre for IPM was formed with input from our Theme and that on Delivering Sustainable Production Systems as well as from our commercial subsidiary. This represents a considerable body of expertise from scientists at the James Hutton Institute. In 2014, a very successful workshop was held in this area, that included scientists from across the Institute; the depth and breadth of our expertise being presented to external stakeholders, including EU networks such as PURE and ENDURE. The IGR also recommended an increased emphasis on the development and exploitation of diagnostics, which has resulted in a new diagnostics service, facilitated through our commercial arm with expertise from this and other themes.

## 'While maintaining our focus on current pests and diseases, we recognised the need to begin research on spotted wing drosophila'

While we maintain our focus on current pests and diseases, we have also recognised the need to begin research, through funding from RESAS and the Horticultural Development Company (HDC), on spotted wing drosophila (SWD) – a significant new threat to soft fruit in the UK. While the main threat remains in the south of England, our survey work was first to identify the problem in Scotland and we are working, together with the Government and stakeholders, to minimise its impact in the future.

The concept of 'One Health', defined as 'a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals, plants and the environment', is being recognised as the best means to co-ordinate efforts across the different sectors of health care. Our work across all of these areas makes us ideally suited to address this initiative head-on. For example, through our Centre for Human and Animal Pathogens in the Environment (HAP-E) we have an organisational role in the Cooperative of Zoonoses Experience and Expertise (CoZEE). This has helped to introduce plant health, the role of plants in the spread of zoonotic pathogens and our computational genomics expertise to a wider audience of scientists and stakeholders, including environmental health, pathogen reference laboratories, environmental health departments, Food Standards Agency (FSA), Public Health England, and Institute of Hygiene Munster etc. Through CoZEE, we were also invited to participate in the first workshop of the new agency APHA on the subject of modelling the spread of human and animal pathogens in the environment.

# Nurturing Vibrant and Low Carbon Communities

**Dr Robin Matthews**, Theme leader

This theme brings together the Institute's activities on climate change mitigation and adaptation and the resulting changes transforming rural communities as they explore a low carbon future.

We are contributing our expertise to global research on mitigating climate change. Results from the EU-funded REDD-ALERT project involving international partners in Indonesia, Vietnam, Cameroon and Peru, which investigated ways in which international carbon finance could be used to help reduce GHG emissions from tropical deforestation, were published in a Special Issue of Mitigation and Adaptation Strategies for Global Change in April 2015 (Vol 18 Issue 6). The work has helped to clarify the impact of clearing forests in Indonesia for oil palm plantations, and to understand the complexity of compensating farmers at the tropical forest margins for not clearing trees to grow crops. This has provided evidence for the United Nations climate change conferences.

A major area of research within our Theme is aimed at understanding the factors influencing the transition to a more sustainable and low carbon society (EU TESS project). A related project, GLAMURS ("Green Lifestyles, Alternative Models and Upscaling Regional Sustainability"), also funded by the EU, is researching transitions to more sustainable lifestyles and a greener economy, focusing on the areas of energy use, housing, work-leisure balance, food consumption, mobility and the consumption of manufactured products. Early results show that, for example, flexible working hours are more effective than building a bypass in reducing travel time and CO2 emissions.

While it is essential to move towards more sustainable ways of living in the future, it is important not to forget about the wellbeing of people living now. Theme members working on the Territorial Dimension of Poverty and Social Exclusion in Europe (TiPSE, EU ESPON funded) project helped produce the first comprehensive and detailed regional maps of poverty and social exclusion across Europe. These showed that in the majority of European countries, especially those of the East and South, a combination of low incomes and higher living costs result in particularly high levels of poverty and exclusion in rural, remote, sparsely populated, insular and agriculturally-focused regions.

One of the key recommendations from this was that EU 2020 anti-poverty policy targets should take account of the particular challenges faced by such areas. In related work, a key highlight was the development of a new Socio-Economic Performance (SEP) Index which summarises the key differences in social and economic development across Scotland. The Index is being used as a tool for

those responsible for the design and delivery of rural service and development interventions under the 2014-20 EU funding period, and the new LEADER programme in particular.

## 'We recommended that EU2020 anti-poverty targets should take account of challenges in rural, remote, sparsely-populated, insular and agricultural areas'

With the Scottish Government having missed its interim targets for GHG emission reductions four years in a row, the pressure is now on to identify and implement new ways of reducing emissions.

We are progressing with our work to find ways in which the rural land-use sector can contribute to achieving these targets. Both restoration of degraded peatlands and expanding the area of woodlands have been identified as ways to capture and store CO2 from the atmosphere. Soil sampling has shown that there is a gain in soil carbon of around 1 tonne of carbon per hectare per year under woodland – in addition to other positive benefits on biodiversity conservation targets, drinking water quality and surface water management.

Our modelling work is helping to identify the areas in Scotland best suited for these options. Interestingly, the sampling of arable soils has shown that a significant increase in topsoil thickness was sufficient to compensate for observed decreases in carbon concentration, such that there was no detectable change in carbon stocks. The results will contribute to subsequent revisions of the *Low Carbon Scotland: Meeting the Emission Reduction Targets 2016-2027: Report on Proposals and Policies*, the Scottish Government's roadmap to achieving these targets.

# Connecting Our Institute

We work with many different organisations and bodies here in Scotland, the UK and around the globe. Two of those with which we work most closely are the Scottish Crop Research Society and our commercial subsidiaries. In addition we constantly seek new opportunities to keep the Institute at the forefront of new opportunities in the furtherance of research and development.

SSCR
Scottish Society for Crop Research

While the Society is fast approaching 100 years of existence in the fast changing world of agriculture and horticulture, one thing which has not changed is its role in knowledge transfer, and the pump-priming of funding for important research which would not immediately attract support from the major funding bodies.

The Society continues to help with the organisation and funding of outdoor industry events such as Potatoes in Practice, Cereals in Practice and Fruit for the Future, which it initiated towards the end of the last century, as well as organising indoor winter meetings in these three crop areas where Society members can have an even closer dialogue with the scientists who undertake the research. Membership attendance at these events has been growing year on year, and was again up substantially in 2014 from the previous year.

The Society has recently agreed to continue its support for a further five years for an industry and research-funded consortium to breed new varieties of raspberry. It also funds research into areas as diverse as the growing of wheat for brewing and distilling purposes, through dealing with fungal disease problems in oats, to possible strategies to use against the spread of a new variant of Drosophila soft fruit pest.

The Society administers the prestigious Massalski Prize awarded to the most promising young scientist under the age of 36 working at the James Hutton Institute, as well as contributing to the funding of sabbatical years for scientists who wish to work here.

The Society's membership of almost 300 is at its highest level for many years. The current mix of growers, processors, marketing organisations and scientists, provides an excellent forum for the discussion of any problems in the farming and horticultural industries. It does so through the organisation of the Annual SSCR Lecture on matters as diverse as the future of farming, and debates about GM crops.

**Dr Bill Macfarlane Smith**
**Honorary Secretary, SSCR**

# Commercial Subsidiaries

mylnefield research services

The remit of MRS is to generate commercial income from the exploitation of intellectual property developed at the Institute, diversify the funding base, and reduce the reliance of the Institute on government funding. Turnover for MRS in 2014/2015 was £3.93 million, down 10% on the previous year (£4.38 million in 2013/2014). The company has three main income streams:

## 1: Analytical Services

Mylnefield Lipid Analysis(www.lipid.co.uk) provides specialist analytical services to a wide range of customers in the agriculture, food and drink, pharmaceutical and nutraceutical sectors. In recent years, we have focussed on quality management and now we are one of very few laboratories that have been approved for both Good Manufacturing Practice (GMP) and Good Clinical Practice (GCP).

In 2014, we launched a new analytical service providing diagnostic services based on Polymerase Chain Reaction (PCR analyses) for the agriculture and horticulture sectors. Services offered include authenticity testing, disease testing and screening germplasm for molecular markers for potatoes, fruit and cereals.

## 2: Plant Breeding and Licencing

MRS breeds potatoes, fruit and vegetables for both the fresh and processing markets for a range of UK and international customers. These varieties are licenced all over the world and in 2014/2015 generated income of £630k -30% ahead of target. Increased royalty income came from our Loch Ness blackberry, and our swede varieties Highlander and Airlie. The raspberry varieties; Glen Lyon and Glen Ample, are still the number 1 and 2 royalty earners, respectively followed by the blackberry variety, Loch Ness and the strawberry variety, Symphony. In 2014/2015 the potato variety Churchill was added to the UK National List and other potato varieties, Wizard, Jester and Mistay were granted EU plant variety rights. Applications for plant variety rights in the EU and Norway and a Plant Patent in the U.S. were submitted for the raspberry variety, Glen Dee and one UK National List application for a potato variety was submitted.

## 3: Contract Research Services

MRS offers a comprehensive range of contract research services for the agrifood and environment, sectors.  In 2014/2015, we enjoyed considerable success in winning projects from Innovate UK, including new projects utilising state of the art technology to assess different types of stress in soft fruit, projects to provide tools to maximise returns to growers and to capitalise on the increasing demand for food grade oats.

Projects involving the exploration of the commercial potential and business opportunities of nanodevices in various sectors of the economy. Partners on these projects include PepsiCo, URSULA Agriculture, Marks & Spencer and CelluComp. These new projects alone are valued at over £400K for JHL. We employ a full-time project manager and provide project management services to more than 15 multi-partner projects.

The remit of MSC is the same as that of MRS, namely to generate commercial income from the exploitation of intellectual property developed at the Institute, diversify the funding base and reduce the reliance of the Institute on government funding. Turnover for MSC in 2014/2015 was £1.96 million, down 12% on the previous year (£2.22 million in 2013/2014). The company has three main income streams:

## 1: Analytical Services

MSC provides a wide range of specialist analytical services, mainly to the oil and gas sector, but also to customers in the agriculture, renewable energy, chemicals and environmental industries. The down-turn in the price of oil had a detrimental effect on the income generated by this business area (down 16.4%) but as no customers were lost during this period, we are confident that this business will recover as the price of oil increases. Services offered include x-ray diffraction for quantifying the proportions of different minerals in samples, scanning electron microscopy, organic analysis including HPLC, GC-MS and GC-FID, elemental analysis using ICP-OES and ICP-MS, anion analysis using Ion Chromatography and discrete colourimetry and other techniques such as particle size and general wet chemistry. Other than for XRD, types of samples are predominantly soil and water but also include sediments, sludges, food products, chemicals and problem samples from the Oil and Gas sector. The laboratory is ISO17025 accredited for over 50 techniques (UKAS 7541) and all methods outside 17025 are within the scope of ISO9001.

## 2: Consultancy

MSC provides consultancy services based on the expertise in ecological and environmental sciences at the Institute with a particular focus on soil and water. This income stream was worth £372k and grew by 13.4%.

## 3: Scientific Products and Data

MSC markets and sells a range of products including a unique microplate-based respiration system, MicroResp that enables the user to analyse up to 96 soil, sediment or water samples, a spray drying kit for producing truly random powder samples for x-ray powder diffraction and a comprehensive range of soil maps and digital data.

## People

In 2015, Hans Steuten (Business Manager, MSC) and Dr Nigel Kerby (Managing Director, MRS) both left the organisation. Nigel founded MRS in 1992 and after 23 years here, moved on in April.

MRS enjoyed considerable success and won several awards during his tenure. Nigel was awarded an MBE in 2014 and won the Tayside regional director of the year at the Institute of Directors Scotland awards the same year.

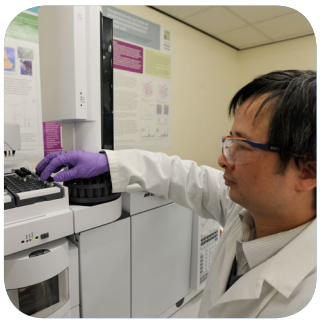
James Hutton Limited

Impact through Science

James Hutton Ltd was formed on April 1 2015 following a merger between Mylnefield Research Services (MRS) Ltd. and Macaulay Scientific Consulting (MSC) Ltd. James Hutton Ltd is now one of the largest specialist analytical services companies in Scotland and can offer a broad range of consultancy and research expertise across many sectors.

## Acknowledgements

MRS, MSC and James Hutton Ltd gratefully acknowledge the support of all James Hutton Institute and James Hutton Ltd staff, for their significant contribution to the successful merger and the continued growth of the company. We would also like to thank our customers and sponsors.



# Future Developments

## International Barley Innovation Centre (IBIC)

The Institute plans to develop a £31M International Barley Innovation Centre (IBIC) at the Inverowrie site, which will accommodate 100 world class scientists and cutting edge equipment. The new-build research facility will be industry facing and support the entire barley value chain and in particular the whisky, brewing and food sectors. Research will focus on barley genetics, yield, processability and flavour. The building will comprise laboratories, flexible office and write up areas, social and meeting spaces, a new site cafeteria and modern seminar facilities. There will also be a flexible-use atrium which can be used for informal meetings, exhibitions and events.

## Reducing Our Carbon Footprint through the use of renewable energy

The Institute uses 17million kW/hrs energy each year at a cost of £1m and is striving to reduce both its carbon footprint and financial impact. Studies are being undertaken to assess the feasibility of on-site generation using wind, solar, biomass, anaerobic digestion and geothermal energy sources. Photo voltaic panels producing 50kW electricity have already been installed at our farm at Glensaugh and a similar project is planned for the Invergowrie site. In the medium term biomass boilers will be installed at Invergowrie to heat the main glasshouses. There is potential to develop an innovative community heating system at our farm at Hartwood using heat extracted from a flooded redundant mine below the site.

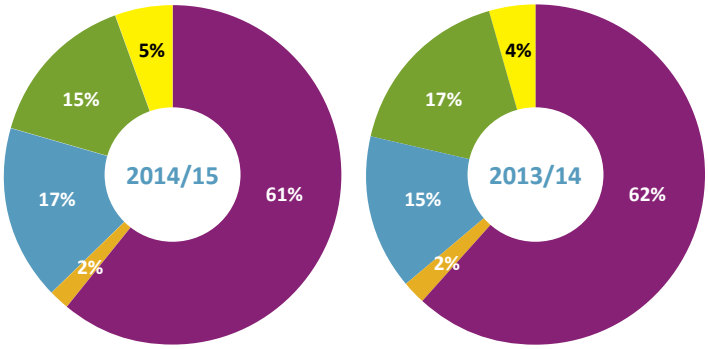
JHL intend to investigate the requirements for carrying out more customer focused analysis in environmental aspects. This will inevitably require training/investment but will ultimately make us more marketable to many more clients. Examples of this are:

- Waste Acceptance Criteria (WAC) testing for landfill sites;
- Environmental Impact Assessment;
- Environmental Site Assessment (ESA) phases 1 to 3.

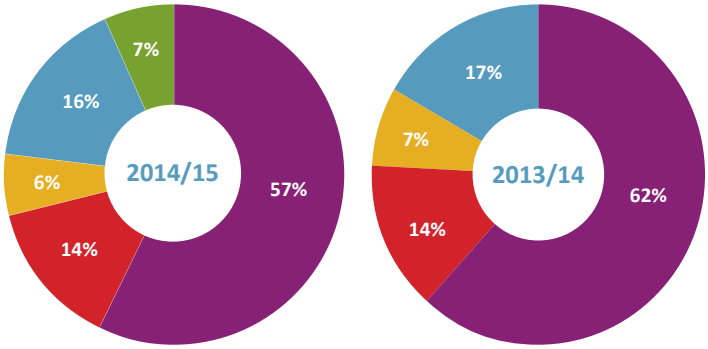
# Accounts

## Group annual report figures

| INCOME | 2014/15 | 2013/14 |
|---|---|---|
| | (£000) | (£000) |
| RESAS - Revenue | 24,121 | 24,203 |
| RESAS - Capital | 789 | 963 |
| | **24,910** | **25,166** |
| Research Grants and Contracts | 6,615 | 5,732 |
| Trading Income from Subsidiaries | 5,884 | 6,604 |
| Other Income | 2,163 | 1,718 |
| **Total Income** | **39,572** | **39,220** |




| EXPENDITURE | 2014/15 | 2013/14 |
|---|---|---|
| | (£000) | (£000) |
| Staff Costs | 25672 | 25,024 |
| Scientific Consumables | 6,194 | 5,731 |
| Depreciation | 2,677 | 2,979 |
| Support Costs | 7,228 | 6,675 |
| Exceptional Costs | 2979 | 0 |
| **Total expenditure** | **44750** | **40,409** |
| | | |
| **Surplus/(Deficit) for the year** | (5,178) | (1,189) |




2014/5 was an exceptional year for the group with the VE scheme and the restructuring of our subsidiaries costing £3m.

These costs were for one year only and will result in future efficiencies for the group.

# Our Funders

**The James Hutton Institute would like to acknowledge the major financial contribution and support it receives as a Main Research Provider to the Rural and Environment Science and Analytical Services Division (RESAS) of the Scottish Government. We are also grateful to the following organisations and businesses for their support during the year 2014-2015.**

Aarhus University
Aberdeenshire Council
African Union Commission
Agrii
Agrinos
AHDB
Aviagen Ltd
BBSRC
Bioforsk
Birmingham City University
Branston Ltd
Bread Matters Ltd
British Mycological Society
British Society for Plant Pathology
Cairngorms National Park Authority
Caithness Potatoes
Carse Association for Continuing Education
Centre for Ecology & Hydrology
China Scholarship Council
Commonwealth Scholarships Commission in the United Kingdom
Cranfield University
Crichton Carbon Centre
Cygnet Potatoes Ltd
Defra
Doga Tohumculuk Ltd
Don & Low Ltd
E Parks & Sons
EBLEX
Ecometrica - UK Space Agency
EFSA (European Food Safety Authority)
Elsevier
Engineering and Physical Sciences Research Council
ESPA (Ecosystem Services for Poverty Alleviation)
ESPON 2013 Programme - Nordregio
EU DG Joint Research Centre: Ispra
EU DG Joint Research Centre: Seville
European Commission
European Research Council
Food and Environment Research Agency
Food Standards Agency
Forestry Commission
Genomia Management Ltd.
Gilmorton Rural Development
Glasgow Natural History Society
Grampian Growers
GWK Ltd
Haytak
Hebridean Seaweed Company Ltd
Higgins Agriculture Limited
IAEA
Innovate UK
Innovation Centres (IBioIC)
Institute of Urban Environment, China
INTERFACE - via University of Aberdeen
International Livestock Resarch Institute (ILRI)/CGIAR
Jeremy Benn Associates
JNCC
King Saud University
Knowledge Transfer Partnership
KTN Bioscience
Lancaster University
Limagrain
Macaulay Development Trust
McCain Foods GB Ltd
Metis GmbH
Moredun Research Institute
NERC
Omex Agriculture Limited
Orbicon A/S
Orkney Wine Company
OroAgrii
PepsiCo
Potato Council Ltd
Produce World Group Ltd
Quality Meat Scotland
Research Council of Norway
Roslin Institute
Rothamsted Research Ltd
Royal Botanic Garden Edinburgh
RSPB
Rural Development Company
S & A Produce UK Ltd
SAC Consulting
Scottish Catholic International Aid Fund (SCIAF)
Scottish Enterprise
Scottish Government
Scottish Natural Heritage
SEPA
Simpsons Malt Ltd
Skea Organics
SRUC
Strathmore Potatoes Ltd
Sveriges lantbruksuniversitet (SLU)
Swedish University of Agricultural Sciences
Syngenta Ltd
Taypack Potatoes Ltd
TEAGASC
The British Council
The Environment Agency
The National Resources Institute
The Royal Society
UK Science & Innovation Network
University of Aberdeen
University of Dundee
University of Edinburgh
Universidada de Evora, Portugal
University of Exeter
University of Leeds
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**Aberdeen**
Craigiebuckler
Aberdeen AB15 8QH
Scotland UK

**Dundee**
Invergowrie
Dundee DD2 5DA
Scotland UK

Tel: +44 (0)844 928 5428
info@hutton.ac.uk
**www.hutton.ac.uk**