

Digging into our rural past

How archaeology is revealing the ways we used to live

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Scottish Consortium
for Rural Research

SCRR Newsletter
Issue 101
Summer 2023

www.scrr.ac.uk

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The road ahead: rural Scotland 2098

As SCRR celebrates 75 years of groundbreaking work, our key annual event, the SCRR / RSE Peter Wilson Lecture, looked to the future. Dr Leslie Mabon, lecturer in environmental systems at The Open University, reports

AS SUMMER ARRIVES, the media's attention inevitably turns to warming weather conditions, and to the question of what our lived environments will look like in the coming decades under a combination of social and environmental change. The 2023 Peter Wilson Lecture, held jointly by SCRR and the Royal Society of Edinburgh on May 23, addressed this very question, asking three panellists to present their thoughts of what rural Scotland could and should be like in 2098.

One of the overarching themes to come out of the contributions and subsequent discussions was that a lot of the technology that will power rural Scotland in 75 years' time already exists. Katie Dubarry's contribution in particular reminded us that even if we can't imagine exactly how they

will evolve, technologies like artificial intelligence and precision farming are already in use in rural Scotland today. 2098 might seem like a long way off, but decisions we make today about research and development – especially for innovations like AI that have a significant ethical component – will have a bearing on what rural Scotland could be like at the end of the century.

Another theme cutting across the talks and presentations concerned the people of rural Scotland in 2098: what kinds of skills will they have, what jobs will they do, what kind of society will they make up? Jessica Giannotti brought this to life vividly with her narration of her Crùbag enterprise, a design business based in Argyll that works with marine scientists to develop new designs and techniques. Her story

Pictured above:
rural road and its
historic predecessor
in Glencoe

illustrates powerfully how support for a vibrant creative sector, and for research and development among small enterprises, will be vital in ensuring the 2098 rural economy is vibrant, diverse and sustainable.

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This issue in acronyms and abbreviations

SUPERB is a forest project that demonstrates how to do regeneration at scale – **page 2**

The new £27 million Advanced Plant Growth Centre at James Hutton is the **APGC** for short – **page 5**

The Rural Development Programme for England is the **RDPE** but we can not confirm that its For Flock's Sake programme is FFS – **page 6**

SHARP genetic analysis aims to be Simple, compreHensive, Accurate, Rapid, Powerful – **page 7**

EAPR is the European Association for Potato Research – **page 8**

About SCRR

THE SCOTTISH CONSORTIUM FOR RURAL RESEARCH exists to promote sharing of ideas and techniques among a group of organisations active in research into land, freshwater, coastal and marine resources, and their uses.

Our member organisations have bases throughout Scotland and are at work all over the world: further details can be found on the back page.

Members' reports

Forest Research

From page 1

A final cross-cutting theme related to changing rural land- and sea-scapes. Landscapes and seascapes are not static and change in response to human activity and environmental pressures. Prof Sir Ian Boyd, in his contribution and remarks, put this squarely in the context of land use.

Again, it might be difficult for us to imagine now what the rural landscape will look like in 2098. But what is clear is that we – as researchers, decision-makers and practitioners – will have to think about how the land and the sea can be used differently to support biodiversity and ecosystem services.

Perhaps the headline message we can take from all this is: the people who are going to research and manage rural Scotland in 2098 will be entering their scholarly careers in the coming decades. How can we, as rural



researchers, best equip them with what we've learned from past decades, and what we know today, to help them respond to the challenges ahead?

Panel discussion at the 2023 SCRR / RSE Peter Wilson Lecture

AT QUEEN ELIZABETH Forest Park near Aberfoyle, in the Loch Lomond and Trossachs National Park, work is under way involving Forest Research and Forestry and Land Scotland to develop a Scottish forest restoration 'demonstration'. The project is part of the EU Horizon 2020 Research and Innovation Programme and is known as 'SUPERB' – Systemic solutions for upscaling urgent ecosystem restoration for forest-related biodiversity and ecosystem services.

Led by the European Forest Institute, it is a €20 million, four-year project with 36 partners in 16 countries. It will restore thousands of hectares of forest landscape across Europe, building on 12 large-scale forest restoration demonstrators in forests that are experiencing a range of stresses and challenges. The aim is to implement adaptation measures to provide the ecosystem services that people will need from forests as the climate changes.

Forests in the Queen Elizabeth Forest Park were originally planted in the 20th century as even-aged crops of predominantly sitka spruce, with timber production as the objective. In recent decades they have been transformed with considerable diversification of structure and species, and the area is now managed for a much wider range of objectives, including timber, recreation, tourism and conservation, and to provide protective services such as reducing soil loss and flooding. As well as being the SUPERB

Upscaling forest restoration – a Scottish demonstration

Working with partners in Scotland and in tandem with others in Europe, Forest Research is testing how to take ecosystem restoration to the next level



Scottish demonstration, the forest here has featured as an adaptation demonstration for the Scottish Government 'ClimateXChange' centre of expertise. Restoration actions now being demonstrated here include:

A visit to the SUPERB project demonstration forest near Loch Lomond

- High-elevation planting above the current treeline of native broadleaf and montane species to enhance biodiversity and reduce soil loss from erosion and landslides.
 - Development of a natural flood management demonstration area, where conifer species have been removed from riparian zones and native broadleaf species are being planted and established. Other measures designed to slow peak stream flow will be installed this year.
 - Expansion of continuous cover forestry to encourage improved species and structural diversity in forest conifer stands originally intended as clearfell-replant systems. This will improve resilience against a range of climate change risks and enhance the benefits for forest visitors.
- In the SUPERB demonstration, Forest Research is linking practical information gathered from on-the-ground restoration actions with scientific monitoring that is under way across the forest. The project team is working with a range of local and national stakeholders and exploring through a series of workshops how to focus activities in the forest, and how to upscale forest restoration and climate change adaptation across the wider landscape in Scotland.

For more details of SUPERB see forestrestoration.eu or contact bruce.nicoll@forestresearch.gov.uk

Members' reports

Society of Antiquaries of Scotland

EARLY IN 2023, the Society of Antiquaries of Scotland awarded funding to 15 archaeological and historical projects committed to researching stories from Scottish history, including several exploring sites in rural locations.

A total of £26,250 will be distributed to projects to investigate, among much else: Scottish rock art across the country; a devastated late-medieval Borders community; and upland seasonal industries in post-medieval Scotland.

The project 'Colouring the Neolithic: searching for pigments in Scotland's prehistoric rock art' will seek to 'revolutionise our understanding' of prehistoric Scotland by searching for evidence that Neolithic rock art was not always plain, uncoloured stone.

'Researchers were inspired by the evidence of colour on neolithic structures and artefacts in Orkney, and examples of painting over carvings on the continent'

The researchers were inspired by the evidence of colour on structures and artefacts in Orkney and examples of painting over carvings in sites on the continent, which made them think that perhaps we can also find this combination of techniques in Scotland. Dr Joana Valdez-Tullett FSAScot, prehistorian, rock art specialist and technical specialist at Wessex Archaeology, and Dr Louisa Campbell FSAScot, Lord Kelvin Adam Smith leadership fellow in archaeology at the University of Glasgow, will use rock



'The Community of the Twelve Towers of Rule' project is investigating the people who once lived in the Borders valley – including at Bedrule Castle, reconstructed by Andrew Spratt – which was devastated by Henry VIII's army in 1545

The excavation team from the 'To and From the Braes' project in the south-west Highlands at a large shieling hut and possible illicit still explored in Gleann Leac-na-Muidhe



PHOTOGRAPH: GEMMA SMITH

New funding for research to explore Scotland's rural past

Funding from the Society of Antiquaries of Scotland is supporting research in rural communities the length and breadth of the country

art examples in Scottish museums to develop a pioneering approach to search for these 5,000-year-old traces.

The 'Community of the Twelve Towers of Rule' project, led by Prof Jane Bower FSAScot, chair of the Campaign for a Scottish Borders National Park, aims to piece together the story of a late-medieval Borders community that was devastated by English forces.

In 1545, Henry VIII dispatched an army to lay waste to the valley of the Rule Water and drive out the people who lived there. Thanks to a grant from the Society, together with funding from Scottish Borders Council and the Campaign for a Scottish Borders National Park, the project will bring together dispersed and limited archival records to create a fuller understanding of the economy, society and culture of the valley of the Rule right up to the time it was destroyed.

'To and From the Braes; Shieling Practice and Related Upland Seasonal Industries in Post-Medieval Scotland' aims to explore the relationships and interactions produced by seasonal communities and their environments in

the south-west Highlands. According to Edward Stewart FSAScot, PhD researcher in Archaeology at the University of Glasgow, by exploring the past 'busy-ness' of these upland landscapes we can push back against narratives of highland emptiness which have caused and continue to cause harm to local communities in the Scottish Highlands and Islands. Following walkover surveys, excavations at Glencoe, and a programme of community value workshops, the Society's grant has allowed Mr Stewart to present his findings at the Post-Medieval Archaeology Society conference in Poland in early May 2023.

The Society supports high-quality research and publication relating to Scotland's past by making several grants and awards each year.

They also coordinate projects such as the Scottish Archaeological Research Framework (ScARF) and Dig It!, whose Scotland Digs campaign in summer 2023 will promote archaeological fieldwork taking place across the country with opportunities that are open to everyone.

Members' reports

Royal Botanic Garden Edinburgh



Sex in the countryside is better for British bluebells

For years, it has been assumed that hybridisation with imported plants is a threat to native bluebells – but research at Royal Botanic Garden Edinburgh (RBGE) suggests that the true story is much more complicated

LONG-HELD FEARS of losing the beloved British bluebell species (*Hyacinthoides non-scripta*) through hybridisation with a rampant non-native may have been unnecessary. New research indicates the genetic threat to native plants from ‘Spanish’ bluebells is relatively minor – and has generally been aided by well-intentioned humans bulking-up plant populations.

What’s more, say scientists in the Royal Botanic Garden Edinburgh (RBGE) led study, the ‘invader’ is not what we thought it was.

For centuries the British bluebell has shared habitats with non-natives, commonly referred to as ‘Spanish’ bluebells (*Hyacinthoides hispanica*), and with a hybrid of the two. This has caused widespread speculation that – like the Scottish wild cat and the native wild apple – ongoing interbreeding could intermix the gene-pools to such an extent that pure British bluebells become extinct.

To understand the true nature of the potential threat, the new study set out to quantify the extent of

hybridisation between the native and non-native species. But the starting point had additional complications through taxonomic uncertainty over the exact identity of the non-native bluebells in the UK.

Genetic analyses of 501 bluebell samples from 56 populations around



Right: a rare example of a bluebell that appears to be native, but on analysis was found to be ‘introgressed’, or genetically mixed

Above: sampling site at Balmaha, near Loch Lomond

Britain and the Iberian peninsula brought to light the fact that the non-native bluebells collected in Britain were not actually the ‘Spanish’ bluebell but a hybrid of it and the British species. Furthermore, Portugal, not Spain, was actually the country of origin of the first *H. hispanica* introductions to the UK.

Under close examination, not only did hybrids make up just 16 per cent of the overall number studied, but back-crosses between the hybrid non-native bluebell and the British species were primarily found in public parks.

Of native bluebells sampled from natural habitats, only two per cent showed evidence of introgression – the transfer of genetic information back and forward from one species to another as a result of hybridisation.

Dr Markus Ruhsam, a molecular ecologist at RBGE and lead author on the research paper explained:

‘Not only did hybrids make up just 16 per cent of the overall number studied, but back-crosses between the hybrid non-native bluebell and the British species were primarily found in public parks’

‘Although hybridisation might be frequent in locations where non-native bluebells have been introduced, we found no evidence of large-scale introgression in natural populations.

‘This might explain the widespread nature of the non-native hybrid in the UK. Rather than hybrid vigour and enhanced competitive ability, it is likely that planting of the non-native in private and public gardens – combined with mislabelled nursery stock - [has] facilitated its country-wide distribution.’

Professor Peter Hollingsworth, director of science at RBGE, concluded: ‘The key message emerging is that, while hybridisation might be frequent in locations where non-native bluebells have been introduced on a large scale, gene exchange does not appear to be widespread beyond the immediate contact zone.

‘With lack of human intervention, hybridisation is limited in native bluebell habitats such as woodlands and rural hedgerows. Even in residential areas bordering natural bluebell populations, hybrids [have] rarely spread out of the contact zone.

‘We should be comforted by the fact that, left to their own devices, our native bluebells have massive advantages over non-natives.’

Members' reports

James Hutton Institute



Advanced Plant Growth Centre opens

New centre at the James Hutton Institute will explore ‘controlled environment’ agriculture including vertical farming alongside more traditional methods

THE AGRICULTURAL SECTOR is facing significant pressures – including the challenge of maintaining profitability with rising inputs, labour and energy costs, staff and skills shortages, and the global drive to decarbonise all aspects of life to halt the progression of climate change.

At the James Hutton Institute, the Advanced Plant Growth Centre (APGC), a £27 million innovation centre funded by the Tay Cities Regional Development deal, is seeking to create sustainable

solutions for rural industries, focusing on both field and controlled environment agriculture and.

The investment in facilities such as crop storage research chambers, state-of-the-art phenotyping (in essence, plant characterisation at a given developmental stage), controlled environment systems and vertical farming is beginning to reveal scientific and potential commercial insights that could benefit Scottish rural industries.

Vertical farming represents an interesting paradigm for land use and food production, two issues at the heart of Scottish rural industries. These ‘farming-in-3D’ systems are highly productive with low inputs and can deliver high quality and nutritional produce all day and year-round. Research has shown that, if linked to renewable energy sources, potentially on-farm, vertical farms are as sustainable as field production systems. They are now progressing from salad to protein crops, highlighting their utility.

The research environment is providing fruitful grounds for collaboration with industry, with numerous collaborative grants secured in the last three years, one example being the application of cold plasma technologies for seed cleaning as part of vertical farming to eliminate disease.

The work is funded by Innovate UK in collaboration with Vertical Future Ltd., Zayndu Ltd and the National Institute of Agricultural Botany.

The APGC is also mining the impact of climate change adaptation and mitigation via a phenotyping centre, and ultimately crop storage. It aims to develop a portfolio of solutions for future agriculture to ensure crop production, productivity and suitability for the secondary processing sector and the consumer.

More information at apgc.org.uk or contact Professor Derek Stewart, derek.stewart@hutton.ac.uk

SCRR’s knowledge exchange lunches resume

SCRR’S POPULAR member lunches started back up again in 2023, following a break during the pandemic.

First up to host was the British Geological Survey, where SCRR’s own Scientific Director, Sarah Skerratt, and BGS’s Maarten Krabbendam, Chief Geologist for Scotland, led the discussions.

The Global Academy of Agriculture and Food Systems at the University of Edinburgh ran the next event, where SCRR members enjoyed talks by Geoff Simm, the academy’s director, and Lindsay Jaacks, Chair of Global Health and Nutrition.

Later in 2023, SCRR is looking forward to a visit to the Royal Botanic Garden Edinburgh.

For details of SCRR members’ lunches, see scrr.ac.uk/meetings

Our host for SCRR’s first meeting back was Maarten Krabbendam of BGS, Chief Geologist for Scotland, pictured with Prof Sarah Skerratt, Scientific Director of SCRR





Moredun scientists fight sheep scab across the four nations of the UK

A project is under way at Moredun that aims to limit the spread of this condition through the use of a blood test that gives early warning of its presence

SCIENTISTS AT MOREDUN are leading the fight for the control of sheep scab across all four nations of the UK. Sheep scab, caused by infestation with the ectoparasitic sheep scab mite, is endemic in the UK, causing significant production and welfare problems to the sheep industry, with UK-wide costs estimated to be over £80 million a year. Treatment relies on organo-phosphate (OP) plunge dips and macrocyclic lactone (ML) injectables. However, as populations of scab mites resistant to the MLs have been confirmed in the UK, it is imperative to use these compounds only when needed and make a concerted effort to bring scab under control. The projects build on the development of a blood test for scab, which can detect the disease before



The project to control sheep scab is already under way on the Western isles of Lewis and Harris (left and below)

the appearance of clinical signs, meaning we can find scab before it has a chance to spread, targeting treatments to limit further development of resistance. Moredun are leading scab control projects using the blood test in England, in Northern Ireland and in a new project controlling scab on the Western Isles of Lewis and Harris. It was also involved in pilots ahead of the proposed All Wales Sheep Scab Eradication Programme. In England the 'For Flock's Sake' project funded by the Rural Development Programme for England (RDPE) involves 300 farmers working in clusters, either as contiguous properties or using common grazing, across three hotspot regions for scab: the North (coordinated by Cumbrian Farmers Network); the Midlands (coordinated by ADAS); and the South West (coordinated by National Sheep Association). The project offers a combination of on-farm advice, best practice training

'The levels of engagement and enthusiasm have been really promising. In some clusters the coordinators have more farmers than can be funded. Local vets have been fantastic'

and free blood testing, and has filled an important gap in scab control, with an incredible response from the farmers. Dr Stewart Burgess from Moredun, who is leading the project, said: 'The levels of engagement and enthusiasm have been really promising. In some clusters the coordinators have more farmers than can be funded. Local vets have responded fantastically with some leading their own clusters, encouraging their clients to get involved.' The project in Northern Ireland, 'Northern Ireland Sheep Say Stamp Out Scab', is funded by the Biotechnology and Biological Sciences Research Council (BBSRC). In Scotland, the project on Lewis and Harris is funded by the Scottish Government and aims to use the blood test to screen flocks at scanning during 2023, identifying areas where further support is required to better control sheep scab.

For details, contact Dr Stewart Burgess stewart.burgess@moredun.ac.uk

SCOTTISH SCIENTISTS HAVE won £360,000 in funding to commercialise a technology that unlocks how plants and animals modify their genes when faced with disease or environmental change. The technology offers major advances in medical diagnosis such as identifying cancers and in the development of new crops because it enables scientists to identify changes in gene activity related to diseases like cancer or reactions to high temperatures or drought.

'Studies have already included research on diabetes, prostate cancer and fat deposition in humans, how climate change impacts tropical coral fish, bacterial disease in honey bees and climate stress in crops'

The technology will be commercialised through a new company, SHARP Genomic Analytics, spun out of The James Hutton Institute in Dundee. It is based on advanced software developed by a team at the Hutton, together with Professor John Brown from the University of Dundee, which automates the otherwise highly complex gene sequencing analysis involved in this work. 'Animals and plants have tens of thousands of genes which are turned



New technology offers game-changer for genetic analysis

A system that makes it far easier to see when plants and animals are faced by disease or stress will now be commercialised at James Hutton Institute

on or off or up or down in different cells or conditions,' says Professor Brown. 'The challenge that we have addressed is to detect these changes in gene activity, quickly and accurately, using our advanced software.

'Although the technology was developed while working on plant data, it could have far-reaching impacts. Studies using this platform have already included research on diabetes, prostate cancer and fat deposition in human, how climate change impacts tropical coral fish, bacterial disease in honey bees and climate stress and disease in crops.'

The £360,000 funding from three sources – the first phase of Scottish Enterprise's High-Growth Spinout Programme, the Biotechnology and Biological Sciences Research Council and Innovate UK's ICURe Explore programme – will mean that the team can offer this advanced analytics capability to third parties as an online commercial service.

'Transcriptomics is still a relatively new and highly specialised field,' explains Dr Runxuan Zhang, a computational biologist at JHI. 'Doing this work can take non-specialists months... [if] they get it done commercially, the costs can be prohibitive. Instead, we can now do it all online and in days if not hours for much less cost.'

The technology builds on analytic software developed by Dr Wenbin Guo, a bioinformatician at The James Hutton Institute and released in 2019. Since then it has already been used by more than 10,000 people globally.

SCRR expresses its thanks to former Scientific Director

PROFESSOR STUART MONRO, former scientific director of SCRR, was presented with an engraved quail on behalf of the SCRR Executive Committee and members. Professor Sarah Skerratt, the current scientific director, made the presentation at the prestigious Peter Wilson annual event and gave heartfelt thanks to Stuart for his decade of service at the helm of SCRR and many years of generous service to its predecessor incarnations. A geologist, Prof Munro was the founding scientific director of Dynamic Earth, was the first independent co-chair of the Scottish Science Advisory Council, which advises ministers on science policy, and is an Honorary Professor in the School of Geoscience at the Edinburgh University. He has an OBE for services to science.



James Hutton appoints new chair

Susan Davies, previously the chief executive of the Scottish Seabird Centre, will head up the James Hutton Institute from September 2023

A WELL-KNOWN and respected Scottish environmentalist has been named the new chair of the James Hutton Institute – the globally recognised Scottish research institute focussed on the sustainable use of land, crops, and natural resources.

Susan Davies has been Chief Executive of the Scottish Seabird Centre since 2019 and is also a former Director of Conservation at the Scottish Wildlife Trust.

She has been on the Hutton board since 2017 as a trustee, and previously held a range of operational, policy and science roles at Scottish Natural Heritage (now NatureScot).

Originally from Peebles in the Scottish Borders, Ms Davies spent her early career as an adviser and head of unit with the UK Joint Nature Conservation Committee, where she was involved in the development and implementation of nature legislation and species and habitat recovery programmes across the UK and at a European level.



She is also a Fellow of the Royal Society of Biology and is currently a member of the Scottish Government's First Minister's Environmental Council.

Ms Davies said: 'I couldn't be prouder to be taking over as chair of what is quite rightly considered one of the world's leading research institutes. The James Hutton Institute helps

societies across the globe respond to ever-growing challenges around food security, sustainable management of our natural resources and net-zero.

'We are all at a milestone moment in working together to build the economic, environmental, and societal resilience to climate change and tackling nature loss.

'Whilst our roots are in Scotland, the Hutton team collaborates with a vast range of global stakeholders including governments, business, researchers, land managers and communities from around the world. I look forward to working with them to ensure science continues to have a positive and lasting impact for us all.'

Colin Campbell, Chief Executive of James Hutton Institute said: 'Susan Davies has had a long and distinguished career in nature conservation and responsible stewardship of land and natural resources. Having her as Chair will be a fantastic asset as she brings a wealth of experience and knowledge to the Institute, and I very much look forward to working with her.'

Ms Davies will be stepping into the role of Chair in mid-September and will be working closely with current Chair Ian Gambles in the interim, to ensure a smooth transition between the two.

Top scientists appointed to lead flagship initiatives

TWO TOP SCIENTISTS have been appointed to head up flagship initiatives being carried out at The James Hutton Institute - the globally recognised Scottish research institute that focusses on the sustainable use of land, crops, and natural resources.

Professor Ian Toth has been appointed the first Director of its ground-breaking National Potato Innovation Centre (NPIC), being planned to accelerate potato breeding and discovery, resilient production systems and innovative products and create skilled jobs in new industries.

Dr. Tim George has been named Deputy Director of the International Barley Hub, which aims to bolster barley growing worldwide by researching new varieties and techniques to increase yield, resilience, and the climate-change credentials of Scotland's biggest grain crop.

A plant pathologist specialising in potato diseases, Professor Toth is currently Director of Scotland's Plant Health Centre – the multi-organisation

virtual operation led by the Hutton and funded by the Scottish Government, to help tackle plant health in the country.

In 2020 he received a British potato industry award for lifetime contribution to the industry and he will become President of the European Association for Potato Research (EAPR) in 2024.

Barley, meanwhile, is the UK's second largest crop, and is grown on about half of Scotland's arable land. It supports 40,000 jobs in Britain, largely down to its pivotal role as a food, feed and main ingredient in Scotch whisky and beer.

The International Barley Hub (IBH), together with the Advanced Plant Growth Centre, is part of the Tay Cities Regional Deal partnership supported by £45m from the UK Government and £17m from the Scottish Government.

New IBH Deputy Director Dr. Tim George is a plant physiologist and soil scientist with a notable track record in leading teams of scientists in projects funded by the European Union and UK Research and Innovation.

New appointees:
Dr Tim George (top)
and Prof Ian Toth



Students start on UK's first rural animal health gateway programme

A innovative offering will encourage a new generation of young people to work with animals at Scotland's Rural College (SRUC)

WHAT WILL FUTURE veterinary and animal science careers look like for students embarking in the coming months on SRUC's new HND Rural Animal Health 'Gateway to Veterinary Medicine' programme, the first of its kind in the UK?

From day one of their studies, these students will be immersed in a learning environment where they benefit from a high level of engagement with industry and develop alongside agriculture, veterinary, veterinary nursing and rural business students and apprentices. This is how SRUC can build the veterinary teams that are critical to the success of the future rural economy.

These students may not be following a conventional pathway to veterinary or animal science careers.

SRUC's contextualised admissions takes a mission-led approach, going beyond academic achievement, recognising aptitude and enabling entry to higher level study. The embedding of enterprise, equality and diversity and sustainability in the curriculum helps to equip students for success. Wherever possible during their learning journey, students are also offered opportunities to complete additional, industry relevant accredited qualifications.

On completion of HND studies, options might include employment as a veterinary technician in a rural veterinary practice or a work-based pathway including further training to become an animal health officer.

Some may continue to study veterinary sciences at SRUC's new school of veterinary medicine, due

to launch soon. For others, skills and knowledge gained in their studies will support progression into employment in critical shortage areas such as rural veterinary businesses, food safety and government animal health.

SRUC's students benefit from an unparalleled level of interaction with industry networks and our own veterinary surveillance, diagnostics, livestock health, science and business consultancy services. This brings learning journeys to life, offering opportunities for internships, work placements and research projects.

Some students, inspired by SRUC's impact-focused research, will join our postgraduate community and work to address the major challenges

'From day one of their studies, these students will be immersed in a learning environment where they benefit from a high level of engagement with industry and develop alongside agriculture, veterinary, veterinary nursing and rural business students'

of growing global demand for food and nutrition security, climate change and dwindling natural resources. Close ties between research and industry bring opportunities to build important networks and progress to varied employment opportunities on completion of their studies.

SRUC's excellent alumni role models inspire students to develop innovative tools such as the Qualitative Behavioural Assessment (QBA) app which pioneers the assessment of wellbeing in animals or launched businesses such as MiRNA, an award winning biotech venture.

It's not just veterinary and animal science either – SRUC nurtures talent and innovation from school through to postgraduate level and beyond across all our specialist subject areas. Students are supported to turn their groundbreaking ideas into a business venture through the Orchard innovation programme and could eventually base their business at SRUC's Rural and Veterinary Innovation Centre in Inverness where they will benefit from the on site development laboratories, business facilities and burgeoning life sciences community.

By 2030, whether in employment or running their own businesses, SRUC's dynamic entrepreneurial HND students of today will be leading the way for our specialist sectors.

Members’ reports
James Hutton Institute

RESEARCH BY THE James Hutton Institute, from soft fruit breeding to pioneering wastewater testing for covid-19, has helped towards adding up to £680 million to Scotland’s economy.

The figures were revealed in an evaluation report of the Scottish Government’s Environment, Natural Resources and Agriculture (ENRA) strategic research programme from 2016 to 2022.

The programme saw more than £50 million a year invested in research focusing on key issues in the agricultural and environmental sectors.

Significant projects highlighted include the Hutton’s rapid development of covid-19 monitoring capability in Scottish wastewater.

The critical wastewater testing capability was developed by the Hutton’s Centre of Expertise for Waters (CREW), with Biomathematics and Statistics Scotland (BioSS), also based at the institute, providing data analytics.

The work led to the formation of a wastewater monitoring network. By 2021, the network covered around 70 per cent of the Scottish population and helped to provide information to the Scottish Government for the public health response during the pandemic.

The evaluation report also highlights the Hutton’s contribution to £70 million of additional funding from industry in the six-year period. A key example of this is the institute’s royalty income from soft fruit cultivars.

The Hutton’s breeding programme covers both raspberry and blackcurrant and allows exchange with researchers around the world. ‘This helps ensure

fruits are bred with the traits needed to meet the demands of the soft fruit industry and their environments’ and provides an excellent example of the commercialisation of research and innovation, says the report.

Further income comes from intellectual property relating to licensing, which also includes the work in soft fruit.



Research contributions shown to give £680m boost to Scottish economy

Work at the James Hutton Institute that includes soft fruit breeding and testing for covid in waste water has had positive benefits for the nation’s finances

Above: view of JHI’s Dundee campus

In total, 38 research scientific/ analytical tools and methods were developed during the ENRA programme. ‘Examples include a CREW project to develop a method to estimate erosion risk,’ adds the report. ‘The James Hutton Institute developed a new method to separate and analyse microplastics in environmental sediments. This has implications for knowledge development and policy on plastics in the environment since it should enable cheaper and more efficient analysis of samples.’

The institute was also highlighted for its contribution to the transition to Net Zero emissions goals. Together with ClimateXchange (CXC) and SRUC, the Hutton developed a framework methodology to assess greenhouse gas emissions intensity data on Scottish beef farms. Implementing the framework will help inform decision making related to delivery of the Scottish Government commitment to decrease the carbon footprint of food consumed.

Announcing the evaluation report, Mairi Gougeon, secretary for Rural Affairs, Land Reform and Islands, said: ‘The Environment, Natural Resources

and Agriculture strategic research programme has funded world-class research at Scotland’s SEFARI research institutes that addresses nationally relevant goals around protecting and sustaining Scotland’s environment.

‘During the pandemic, the monitoring of Covid-19 in Scottish wastewater was a crucial part of the government’s emergency response – helping us to measure the spread and mutation of the virus and keep people safe.

‘Research has addressed many other challenges including animal and plant health, regenerative farming, water quality, peatland restoration and land reform. Resulting science has helped to shape government policy and support innovation by Scottish producers and land managers.

‘As Scotland’s climate changes, this research has supported business resilience and future-ready communities across the nation.’

The Strategic Research Programme 2016-22 Final Report is available on the SEFARI website at sefari.scot/document/strategic-research-programme-2016-22-final-report

Members’ reports
BioSS

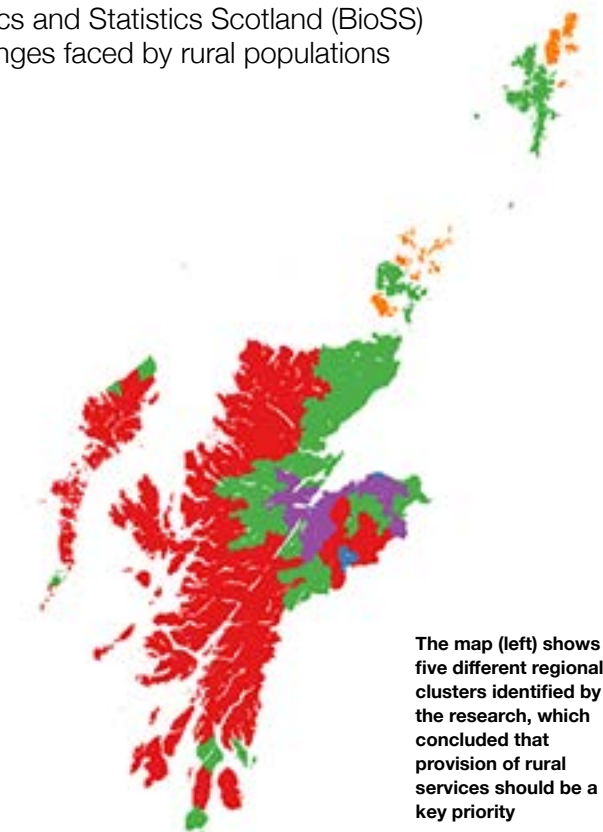
Exploring inclusive growth in the Scottish Highlands and islands

A project involving Biomathematics and Statistics Scotland (BioSS) aims to identify the unique challenges faced by rural populations

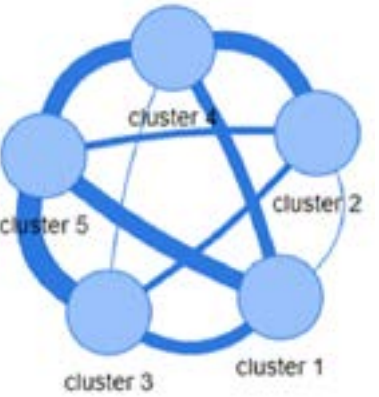
INCLUSIVE GROWTH HAS gained recognition in recent years as a way to measure economic progress beyond traditional measures like GDP. The Scottish Government defines inclusive growth as a combination of increased prosperity and greater equity, creating opportunities for all and ensuring fairness in distributing the benefits of growth. This definition aims to builds core ideas of social justice and equitable development into modern Scottish economics, such as reducing poverty, promoting employment opportunities, addressing income inequality, improving access to basic services (e.g., education, healthcare), and fostering social cohesion.

For Scotland, inclusive growth is especially important, as it aims to address the unique challenges faced by rural Highland and island economies. These regions often experience difficulties like geographical remoteness, limited infrastructure, smaller populations, and a smaller economic base. Inclusive growth strategies aim to foster sustainable economic development that uplifts these regions and helps their communities thrive.

The ‘ToWards Inclusive Growth’ project conducted by the James Hutton Institute, Biomathematics and Statistics Scotland (BioSS), and



The map (left) shows five different regional clusters identified by the research, which concluded that provision of rural services should be a key priority



The diagram (above) indicates the comparison of key factors across the five clusters, each with the others

Highlands and Islands Enterprise (HIE), focused on improving the assessment of socio-economic indicators related to inclusive growth.

The researchers used indicators from Scottish datasets at ‘data zone’ level (areas of approximately 500-1000

demographic characteristics – the age structure, gender balance, and ethnicity of residents – the researchers identified five distinct clusters correlated with settlement type and accessibility to urban areas (see map).

Understanding the differences between these clusters is challenging, but by comparing the average values of each indicator, BioSS researchers were able to visualize the factors that are similar or different for pairs of clusters. This allowed them to define a statistic that identifies which factors most often discriminate between the clusters. This statistic was highest for provision of rural services, identifying this as both the most salient inclusive growth characteristic for policymakers, government bodies and NGOs, and as a top priority for improving economic equality and inclusivity across the Highlands and islands of Scotland.

Through a better understanding of these indicators, this research provides valuable insights for decision-makers to prioritize actions that will enhance economic equality and inclusivity across different regions of Scotland.

Early careers researchers and the future of SCRR

SCRR RECENTLY HELD a successful round table discussion session with Early Career Researchers (ECRs) from a wide range of member institutions.

The aim of the session was to gather feedback from an ECR perspective on what SCRR can do to involve them further as it continues to evolve in future.

Many thanks to all ECRs who took the time to attend and contribute their valuable thoughts. We will keep you updated on any outputs from the event.



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Printed in Scotland on recycled paper (100% post-consumer waste) by The Jane Street Printing Company, Leith, Edinburgh.

Designed in East Lothian by mobo media