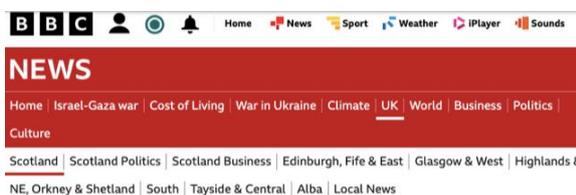




Welcome to the January 2024 edition of The Spark, [SEFARI Gateway's](#) (Centre of Expertise for Knowledge Exchange & Innovation) newsletter, a monthly update on the latest research developments from the [Scottish Government's Environment, Natural Resources and Agriculture \(ENRA\)](#) strategic research programme. The ENRA Research Portfolio provides evidence for policy and practice across environment, climate change, biodiversity, land use, agriculture, food, and rural community agendas.



## Scotland's climate has already changed

ENRA research made the headlines in December as SEFARI researchers revealed that Scotland's climate is changing faster than expected. The James Hutton Institute has analysed historical climate data to detect trends and extremes in precipitation and temperature, and compared these with UKCP18 climate projections.

Two reports, summarised [here](#), show how November, December and January's mean monthly precipitation totals have already increased since the 1960-1989 baseline period to amounts greater than those projected for the 2020-2049 period. In some parts of the country, temperatures in February, for example, have risen 2.5°C, since 1960. This observed change is comparable to the lower range of what climate scientists had projected for the future period 2020-2050, implying we are on course to reach the projections of higher temperatures. Whilst the winter is projected to get wetter, the summer is likely to be hotter and drier. The number of days of consecutive dry weather – an indicator for drought and wildfire risk – are expected to increase in drier months, such as September.



*Above: Mike Rivington, SEFARI researcher who led the research at the James Hutton Institute*

Cabinet Secretary for Transport, Net Zero and Just Transition Màiri McAllan said: “These findings underline that the climate emergency is not a distant threat – it is with us today. Storms have battered Scotland in recent months and 2023 is set to be the hottest year on record.

“The impacts of climate change are affecting families, communities and businesses across Scotland. That is why we are taking action to make Scotland more resilient in the face of a changing climate.”

## **Hemp helping Net Zero, nutrition and food security**



*Madi Neacsu, SEFARI researcher co-leading the hemp research*

With net zero and food security at the top of Scottish Government’s agenda, agricultural hemp could become a new ‘cash-crop’ for Scottish agriculture and play a key role in helping to address both net zero and food security. Thanks to the long-term visionary support from SG’s Environment, Natural Resources and Agriculture (ENRA) funding, SEFARI research by the Rowett Institute has identified that the low carbon agricultural crop has an exceptional nutritional profile. This evidence was instrumental in persuading Scottish farmers to grow hemp and resulted in the

production of the first commercial hemp cold-pressed oil in 2022. Rowett scientists are supporting the network for this new sector and are founding members of the Scottish Hemp Growers Group. Looking at the many ways in which commercial hemp food products can be incorporated into the food supply chain to aid a healthier diet is a key area of research. Utilising every part of the crop is a priority to avoid wastage and improve the economic return for farmers. By-products from hemp oil production

such as hemp cake (hemp flour) are being researched as nutritional supplements as well in animal feed for both cattle and chickens to replace imported soya. SG funding has helped leverage substantial funding from other sources. Scientists are also developing the processing sector and have secured funding from Innovate UK to explore replacing imported wheat with hemp flour in staple bakery goods consumed by hard-to-reach communities and are working with a large bakery company currently supplying several major supermarkets. The [impact of this research](#) has been recognised UK-wide, winning the 2023 UKRI Green Gown Award.

## ENRA Research helping the Rural Voice be heard in SG policies



Ensuring that the rural voice is heard across all Ministerial portfolios, including using a rural lens during policy development, implementation and evaluation, is an SG priority. ENRA funded SEFARI scientific research is advising on the best way to do this.

Building on her strong knowledge of how rural policy has evolved in Scotland since WW2 and

previous research on rural proofing (including the contribution to a recent [European Network for Rural Development Thematic Group on Rural Proofing](#), SRUC researcher, [Jane Atterton](#) obtained funding for a SEFARI Gateway Specialist Advisory Group to support Scottish Government policy officials to develop Rural Lens guidance for policymakers. The work is now also reviewing international examples of rural visions, frameworks, data and indicators for measuring progress, in order to inform methods for evaluating the impact of the Rural Lens and the forthcoming Rural Delivery Plan.

## CarbonXtras® commercialising greenhouse gas inventory research developed in Strategic Research Programme

The COP28 Emirates Declaration on sustainable agriculture, resilient food systems and climate action identifies the need to maximise climate and environmental benefits associated with agriculture and food systems. Greenhouse gas emissions (GHG) from the agriculture sector have plateaued, indicating that more robust policies and associated infrastructure are needed to achieve net-zero targets. Accurate measurement of emissions will be key to reduction.

CarbonXtras® is a spinout company of James Hutton Institute, commercialising research tools from projects funded through the Scottish Government Strategic Research Programme (SRP) CarbonXtras® is developing a methodology for inventorying and reporting emissions and removals for cropland in line with IPCC (UN's Intergovernmental Panel on Climate Change) Tier 3 requirements. [Its system](#) uses near real-time field collection data, tested at two Institute research farms, to provide a data-driven Monitoring, Reporting and Verification system that tracks and predicts greenhouse gas emissions and carbon sequestration.

Outputs are designed to reduce uncertainties in the national greenhouse gas inventory, and identify management interventions to balance agricultural production and net greenhouse gas emissions at

the farm level. Additional funding was secured from Scottish Enterprise to scale up operations and conduct field trials in collaboration with two major agri-food companies to develop a business model.

## Estimating the health and wellbeing natural capital value of NHS estates



A jointly funded SEFARI Gateway and Public Health Scotland [Fellowship](#), in partnership with NatureScot, is aiming to assess the applicability of a method for evaluating green and blue spaces across NHS estates.

Access to green (e.g., gardens, trees etc.) and blue (e.g., ponds, rivers etc.) spaces are important for our physical, social and mental health. The NHS in Scotland owns a considerable amount of these

spaces and the NHS Scotland Climate Emergency and Sustainability strategy requires all health boards to conduct an assessment that attaches a value to the benefits that arise from these natural capital resources, and biodiversity that can be found within them.

Just how we put a value on the contribution these spaces make to the health and well-being of patients, staff and communities is the challenge that the winning Health Economics Research Unit at the University of Aberdeen will undertake – and we are very much looking forward to working with them!

### Latest publications from SEFARI:

- Our latest [booklet](#) provides recent examples of our livestock research.
- The latest [Soil Sentinel newsletter](#) provides information about soil work being carried out in the Scottish Government's Strategic Research Programme.
- Our latest [case study](#) investigated whether UK consumers are willing to pay a price premium for value-added pork products.

We'd love to hear from you and receive your feedback on how we can improve our newsletter. Please contact us at [info@sefari.scot](mailto:info@sefari.scot) with your suggestions.

*Scotland is playing a central role in developing environmental solutions to the global climate and nature crises, and the Scottish Government response is based on the strongest possible scientific evidence. The Environment, Natural Resources and Agriculture research programme is key to achieving this.*