Northern Ireland Assembly

Queen's University Belfast

Ulster University

The Open University Ireland

Stranmillis University College
A College of Queen's University Belfast

St Mary's University College
A College of Queen's University Belfast

Knowledge Exchange Seminar Series (KESS)

KESS SERIES 9 PROGRAMME

Floodplain Meadows: Farming with Nature in Areas with Natural Constraint

Professor David Gowing david.gowing@open.ac.uk
Mrs Olivia Nelson olivia.nelson@open.ac.uk
Ms Emma Rothero emma.rothero@open.ac.uk

School of Environment, Earth and Ecosystem Sciences, The Open University

November 2026

KESS Policy Briefing

...is a forum that encourages debate on a wide range of research findings, with the overall aim of promoting evidence-informed policy and law-making within Northern Ireland

Key points:

- Habitat restoration has multifunctional benefits for both the environment and society and depends on enabling land managers to contribute.
- Environmental considerations should be included as part of an agricultural payment scheme.
- The Bill proposes reintroducing payments for farmers operating in Areas of Natural Constraint. Floodplain land can be considered as land with natural constraints.
- There is extensive potential in Northern Ireland to use floodplain land for public goods whilst maintaining agricultural productivity.
- The Floodplain Meadow Partnership's research indicates that investment in floodplain meadows, a grassland habitat which depends on regular management, can provide public goods cost-effectively.
- Data and research have been used to evidence and support the effective use of public money to delivery services including food production
- A new scheme in England offers a payment for floodplain meadow management and restoration - reflecting the value of services provided.
- Payments for public goods in areas of natural constraint offers value for money but is most effectively delivered alongside training, advice and support for land managers.
- Technical support and evidence are important to help land managers, including understanding which land would be eligible and most suitable for the scheme (e.g. tools like a site assessment survey, webinar support programme, site visits etc).
- Too slow a roll out for payments poses a major risk to the management of existing grasslands if farmers feel they must use the land in an alternative fashion to raise income. It is therefore vital that Advisors receive support through training and guidance.
- An equivalent payment rate for maintenance as well as for restoration is key. Alternative approaches risk consequences like ploughing up established grassland. This equality rewards those farmers who are already managing remaining meadows along with the ecosystem services described.
- Investing in research to collect and analyse datasets to provide evidence is key – filling those gaps.
- Explore potential for advice on funding for grassland management and restoration.
- There is scope to feed in the concepts discussed in this paper to the following upcoming legislative programmes:

Sustainable Agriculture Programme and the future Agricultural Policy Framework

Farming for Carbon Scheme.

The Landscape scale strand of the Farming with Nature Package by 2027.

Just Transition Fund for Agriculture.

Draft Nature Recovery Strategy.

Draft Climate Action Plan.

KESS does not support or promote perspectives or messages stated in this Briefing.

The opportunity to apply to present at KESS is open to all academics in the five university partners; and is promoted through their internal communication channels and social media: contributions from all perspectives are encouraged, as they make for a richer annual KESS Programme.

The Challenge: managing land with natural constraints

The Areas with Natural Constraints (Payments) Bill (ANC Bill) proposes the reintroduction of payments to farmers operating in Areas with Natural Constraints (ANCs). The aim of the Bill is to highlight that farming in upland areas or on marginal, poorer-quality land, makes farming more difficult and less productive, and therefore requires additional payments to alleviate the burden for farmers and allow for continued agricultural land management. A previous farm support scheme ended in 2018, and there is now no specific targeted funding for severely disadvantaged areas (as there was through the EU CAP programme). The changes outlined in the ANC Bill to agricultural funding are being implemented through DAERA's Sustainable Agriculture Programme (SAP) which is providing options for all farm businesses in Northern Ireland.

The evidence base gathered by the Floodplain Meadows Partnership (FMP) indicates that a focus on agri-environment payments, can support objectives in the ANC Bill, with proven success. Their complex hydrology, exacerbated by climate change renders floodplains as areas with natural constraints.

Parallel approaches are already being considered in Wales and Scotland, where the FMP are advocating for payments for farmers working on land deemed to be constrained by its flood risk. The FMP welcomes the opportunity to share learnings and research findings with the Northern Ireland Assembly as Members of the Legislative Assembly (MLAs) consider how best to compensate farmers in ANCs.

The case study: floodplain meadows and the ecosystem services they provide

Once common across Britain and Ireland, floodplain meadows have become one of the most threatened habitats in the UK, occupying less than 3,000 ha. These vibrant, flower-rich landscapes, likely once widely seen along rivers like the Lagan, Bann and Erne—support an incredible range of plants, pollinators and other wildlife. In terms of management, they require an annual hay cut and typically aftermath grazing. The Northern Ireland Lowland Meadow Habitat Action Plan in 2005 estimated that there were 937 ha of high-quality dry species rich grassland of ASSI quality (20 species per 4m2), but it is likely that alongside other habitat decline, this estimate will have reduced since the HAP was written 30 years ago. The report did not highlight the extent of wetter species-rich grassland separately. The floodplains of Lough Neagh, Lough Beg and Upper Lough Erne hold most of N.I species rich floodplain meadow resource and are largely protected as ASSI's. Following a field visit by the FMP in May 2026 it became evident that there is a possible need to better understand the scientific interest on the floodplains so that habitats are correctly identified and monitored, and correct management can be applied.

The Floodplain Meadows Partnership brings together scientists, practitioners, policymakers and local communities, to develop an appreciation of how to restore and manage floodplain meadows across the UK. It is hosted by the Open University, supported by Natural England, the Environment Agency, Natural Resources for Wales and NatureScot, alongside the UK Centre for Ecology and Hydrology and a range of NGOs. It has been financially supported for the past 20 years by funding from Defra, the Environment Agency, the Esmée Fairbairn Foundation, the John Ellerman Foundation and the Foundation for the Third Millenium.

The FMP have carried out extensive research into floodplain-meadow management and restoration, along with quantifying the extent of ecosystem service delivery, collecting evidence about what works and developing case studies to show examples. We are therefore confident about promoting an approach based on evidence.

Countryside Stewardship Higher Tier (CSHT) has been introduced to support land management in England to protect, restore and enhance the environment and contribute to the mitigation of climate change. It will support important environmental and historic sites (e.g. Sites of Special Scientific Interest) and priority habitats. Whilst the scheme is not explicitly aimed at alleviating the burden of production costs in difficult farming environments, as the ANC supplement is envisaged to be, it recognises the need to support land management and agricultural use of the land in order to obtain public goods.

KESS does not support or promote perspectives or messages stated in this Briefing.

The opportunity to apply to present at KESS is open to all academics in the five university partners; and is promoted through their internal communication channels and social media: contributions from all perspectives are encouraged, as they make for a richer annual KESS Programme.

A new agri-environment action (CGS18 Floodplain Meadows) within CSHT supports farmers whose land is increasingly difficult to manage. This action illustrates how payments can support farming in areas with natural constraints (floodplains) by recognising the range of ecosystem services provided. Research by the FMP was used to help shape and justify the action's payment rate.

The conservation and restoration of floodplain meadows is a good example of where actions to restore the natural capital of a functional habitat can help achieve several "public goods" cost-effectively. The habitat requires no artificial fertiliser or other agrochemicals yet remains productive during drought and recovers rapidly after a flood. It supplies many benefits to society, including storage and cleansing of floodwaters, sequestration and storage of carbon and an aesthetic contribution to the landscape. Extreme flood events, already prevalent and predicted to worsen, should prioritise resilient agricultural systems that accommodate flood storage, yet bounce back to provide public goods. These goods are itemised below:

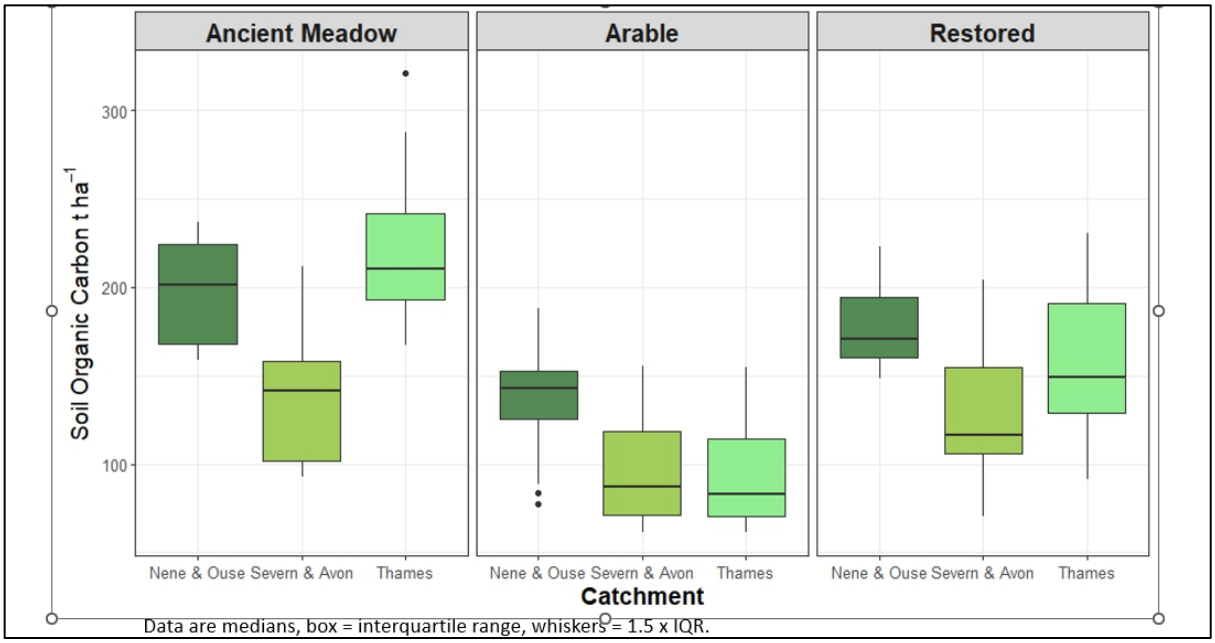
Provision of diverse wildlife habitat

Floodplain meadows support some of the most diverse plant communities in Britain or Ireland (Wallace and Prosser 2015). They provide habitat for a wide range of invertebrates offering a seasonal resource of pollen and nectar for bees, sawflies, hoverflies and various beetles (Potts et al. 2010).This abundance of invertebrates offers a rich habitat for a range of birds throughout the year and a range of amphibians and small mammals when the meadows grow tall.

Soil carbon

Meadows are able to store large amounts of carbon in their soils, which would otherwise be released to the atmosphere. Much of the CO2 that plants convert into sugar via photosynthesis is used to feed fungi living around their roots, which in turn store it deep in the soil (a process called sequestration). Here it is protected from being released back into the atmosphere. Recent research by the FMP shows that floodplain meadow soils can store more soil carbon per hectare in their deep alluvial soils than many woodlands, and almost as much as some peat soils. The amount of carbon stored in the top 50 cm of soil in ancient floodplain meadows is over 200 t/ha in some catchments, compared to about 50 t/ha in arable soils in the same catchment (Figure 1).

Figure 1. The cumulative soil organic carbon stock (t ha-1 0 - 50 cm depth across three catchments in England



Water storage

A well-structured floodplain soil can be 80% void space and can absorb 3,000 tonnes of water per hectare, in addition to the flood water stored above ground. The amount of water stored and transmitted beneath our feet as groundwater is under appreciated. Soils are therefore able to mitigate flooding by absorbing water rather than it running-off into the river

KESS does not support or promote perspectives or messages stated in this Briefing.

The opportunity to apply to present at KESS is open to all academics in the five university partners; and is promoted through their internal communication channels and social media: contributions from all perspectives are encouraged, as they make for a richer annual KESS Programme.

Floodplain meadows receive sediment from the river during a flood and can absorb nutrients attached to that sediment to produce a crop of hay the following year. They therefore actually benefit from flooding to provide sustainable food, whereas more intensively managed crops are often destroyed by a flood. Meadows are able to mitigate the effects of a flood, because they allow flood surges to spread across the floodplain dispersing the flood peak. Their deep, permeable soils allow flood water to infiltrate and be stored. These mechanisms reduce the volume of water in the channel and lower the peak discharge.

Meadows can withstand inundation with flood water at any time of year and they, unlike more intensive crops, can recover quickly. Their network of shallow drainage channels allows surface water to return to the channel once the flood peak has passed, making space available to absorb the next flood.

Nutrient uptake and export

Floodplain meadows can improve the water quality of rivers by trapping sediment carried in floodwaters, exploiting the nutrients they contain to feed plant growth, then exporting them out of the river system in the form of hay. Following the 2007 summer floods, up to 40 tonnes of sediment per hectare were deposited on various floodplain meadows across five catchments, yet these floodplain meadows maintain their diversity and productivity. Restoring floodplain meadows, particularly on arable land, removes the need for artificial fertiliser inputs, especially phosphorus. Phosphorus already in the soil is taken up during the growing season, then removed via the hay crop. A single hectare of floodplain meadow will typically export 5 kg of elemental phosphorus from its river system annually, highlighting their potential as a nature-based solution to eutrophication if they are restored at scale (Rothero et al. 2016).

Lessons from England and Wales: how research informed policy development and support mechanisms

England

The CGS18 action for land presenting 'Natural Constraints.' illustrates how an agri-environment payment can support sustainable farming, whilst also delivering a range of ecosystem services.

Extensive FMP research was used to help inform and shape the Action and our contribution has been described as pivotal. Reference to the support and guidance the FMP can provide is referred to within the CGS18 action information. We also provided costings for various management tasks from our own experience, and management advice, ensuring there was a real-world contribution to the payment rate.

The FMP took part in a series of meetings over two years to help provide evidence and support in writing the new Action, provided case studies from farmers across England through the FMP network, highlighting management issues and resolutions, and subsequently supported Natural England to produce their own internal guidance for staff when applying the action with applicants. A series of webinars and field visits for training purposes for land managers and practitioners was also delivered in 2026. Therefore, research and expertise has been used throughout the process to ensure practical requirements are underpinned by research. Funding for FMP input has largely come through philanthropic sources or from the Open University, as a part of delivering its own Research Impact objectives.

Natural England also supports this new option commenting: "a new action that pays £1,070 per hectare for managing species-rich floodplain meadows is timely and will reward those farmers working with and storing water for the benefit of others ".

The new option was launched in 2026 and alongside it, there is a very ambitious target for Favourable Conservation Status target for MG4/8 of 74,800 ha published by Natural England under FMP guidance, that the new option can in part be used to deliver.

There are limitations to the England scheme as it is currently 'invitation only'. Natural England has advised that the total amount of money spent on all Higher Tier applications will be approximately £72m per year. Each of the 12 Areas of Natural England is expected to process 1100 CSHT applications in each year for the next few years (more than double the 500 processed in the last 3 years). Floodplain meadows are being seen as a priority because this habitat has been under recognised historically.

KESS does not support or promote perspectives or messages stated in this Briefing.

The opportunity to apply to present at KESS is open to all academics in the five university partners; and is promoted through their internal communication channels and social media: contributions from all perspectives are encouraged, as they make for a richer annual KESS Programme.

Wales

The Optional Layer of the Sustainable Farming Scheme (SFS) was published in September 2026 and includes a separate habitat option for floodplain meadow management and creation. FMP evidence was used to help shape this offer through feeding in research via the Wales Environment Link Group to Welsh Assembly Government and Natural Resources Wales. This included providing evidence to the SFS through the Carbon Sequestration Evidence Review Panel. The Panel concluded that habitat creation or restoration could be considered a carbon sequestration action (in addition to the existing drive for tree planting) and should be supported through the Optional layer, with a particular focus on grassland habitat restoration and creation.

The FMP are currently bidding for funds from philanthropic and Government sources to start helping to shape how this opportunity is applied from a strategic perspective. https://www.gov.wales/sfs-optional-habitat-review-general-guidance-html . The costs are considerably lower than the English scheme, and there is a discrepancy of payments with a much lower payment for management compared to creation – a concern we hope to address.

FMP and NRW are working together on exploring the historic extent of the habitat, which will feed into targeting priority areas for restoration. We produced bilingual resources for Farming Connect for inclusion on their internal training hub to raise the profile of floodplain meadows with their network of on-farm advisors. Farming Connect have also tested Open University online training resources on floodplain meadows which was launched this year.

Scotland

The FMP have been carrying out research into similar plant communities in the Western Isles, resulting in the publication of a new series of plant community definitions. These are now being used to shape SSSI Guidelines. The FMP are also working on a project to explore the historic extent of floodplain meadows across six catchments in Scotland. It is anticipated that the new plant communities defined, alongside the wider FMP research into ecosystem services and historic extent will be used when the Scottish parliament start to develop the new agri-environment scheme, expected to start in 2030. NatureScot already sits on the FMP Steering Group and is helping to shape evidence needs.

Delivering value for money and further sources of funding

The FMP offer support to land managers applying for the Countryside Stewardship action in England, helping with data gathering and interpretation, plus wider training and awareness, minimising the chances of funds being wasted on restoration at inappropriate sites. We have developed a means of collecting data and assessing a site to ensure it would be eligible and capable of being restored, using this for a number of site and catchment strategies.

Accessing finance to restore and manage grassland habitats can be complex, with farmers facing a maze of public schemes and emerging private nature markets. Recognising the limits of the UK Government's budget for farmers, the FMP have worked with partners to develop a Grasslands Toolkit ('Realising Grassland Potential https://floodplainmeadows.org.uk/keep-updated/news/new-toolkit-supporting-farmers-access-funding-grassland-restoration) funded by the Natural Environment Investment Readiness Fund (NEIRF), to help farmers see how they might find alternatives to government funding. This toolkit provides an accessible resource to empower farmers to make informed decisions about the opportunities offered by green finance and nature markets. The toolkit is designed to take farmers through a series of steps to increase understanding and knowledge of the range of options available for creating or improving grasslands as well as any associated risks. It enables informed decision making around options for their own landholding. Key features of this Toolkit include:

- Breakdown of grassland funding available in public schemes like Countryside Stewardship (CS) and the Sustainable Farming Incentive (SFI).
- An analysis of private finance options, including Biodiversity Net Gain (BNG), Grassland Carbon, Nutrient Neutrality, and Water Payments, ranked using a 'Market Readiness Assessment' to help farmers evaluate the risks and viability of different nature markets.

- Guidance on project development and how to 'stack' multiple funding sources for the same parcel of land.
- Real-world case studies and indicative cost estimates for different grassland interventions to help build a high-level business case.

With the concerns expressed at the current situation where DAERA, along with all the other Executive Departments, is facing considerable pressure in relation to the size of its budget and the demands being placed upon it, there may be an opportunity to explore the potential for a similar Toolkit for N.I. grasslands.

Relevance to Northern Ireland: potential learnings for future policy and scheme design

Since the Brexit referendum, central Government in Westminster and the devolved governments in Northern Ireland, Scotland and Wales have focused efforts on reshaping farming subsidies. Removal of the Basic Payment Scheme in England and Wales means that governments are having to look afresh at how farmers are paid to deliver what is required by society in a resilient and sustainable manner.

We propose that the new action in England is relevant to the ANC Bill in Northern Ireland because it illustrates how farmers could be rewarded for providing public goods in areas of Northern Ireland that are increasingly difficult to farm. Creating options for the management and restoration of floodplain meadows allows farmers and land managers to consider seasonably flooded land to be part of a farm business economic model rather than an increasingly risk investment or at risk of being abandoned or planted with woodland.

The FMP continues to work with policymakers to support the restoration of floodplain meadows across England, Wales and Scotland. Northern Ireland has considerable potential for meadows to be restored across its floodplains, delivering the benefits itemised above, Land managers require a suitable incentive to change their management systems, the ANC Bill represents an opportunity to provide that.

Key points and recommendations

There is considerable scope to explore the potential for more sustainable management of floodplain land in Northern Ireland, to the benefit of both food production and delivery of ecosystem services. Better understanding of the historic extent and existing resource of floodplain meadows in Northern Ireland could underpin targeted agri-environment support for land managers, based on similar schemes being developed across the UK.

Key points are:

Floodplain land could be considered land with natural constraints

There is extensive potential in Northern Ireland to use this land in a sustainable but still agriculturally productive way.

Nature-restorative practices can be tied to the payment scheme with maintenance and restoration schemes receiving equivalent payments.

Data and research into ecosystems services will contribution to assessment of value for money

Recommendations for future work are:

Explore historic extent of floodplain meadows in Northern Ireland

Undertake desk study work to understand the current extent of species-rich floodplain meadows, and carry out further survey work to fill in the gaps.

Build a network of floodplain land managers.

Offer training and support - providing access to advice to underpin delivery of successful schemes.

Explore potential for advice on funding for grassland management and restoration

KESS does not support or promote perspectives or messages stated in this Briefing.

The opportunity to apply to present at KESS is open to all academics in the five university partners; and is promoted through their internal communication channels and social media: contributions from all perspectives are encouraged, as they make for a richer annual KESS Programme.

Further information

Bowskill, V, Bhagwat, S, & Gowing, D. (2023). Depleting soil nutrients through frequency and timing of hay cutting on floodplain meadows for habitat restoration and nutrient neutrality. Biological Conservation, 283, article no. 110140.

Chamberlain, P. M. Emmett, B. A. Scott, W. A. Black, H. I. J. Hornung, M. & Frogbrook, Z. L. (2010). No change in topsoil carbon levels of Great Britain, 1978–2007. Biogeosciences Discussions, 7, 2267–2311.

Gilbert, Joanne; Gowing, David and Wallace, Hilary (2009). Available soil phosphorus in semi-natural grasslands: assessment methods and community tolerances. Biological Conservation, 142(5) pp. 1074–1083.

Heritage, G. & Entwistle, NS. (2017). The impact of floodplain degradation on flooding in the UK. E-proceedings of the 37th IAHR World Congress. August 13 – 18, 2017, Kuala Lumpur, Malaysia

Lawson, Clare; Rothero, Emma; Gowing, David; Nisbet, Tom; Barsoum, Nadia; Broadmeadow, Samantha and Skinner, Ann (2018). The natural capital of floodplains: management, protection and restoration to deliver greater benefits. The Valuing Nature Programme

https://floodplainmeadows.org.uk/index.php/research/research-areas/soils-and-carbon

McGinlay, J.; Gowing, D.J.G. and Budds, J. (2017). The threat of abandonment in socio-ecological landscapes: Farmers' motivations and perspectives on high nature value grassland conservation. Environmental Science & Policy, 69 pp. 39–49

Michalovà, Dana; Gilbert, Joanne C.; Lawson, Clare S.; Gowing, David J. G. and Marrs, Rob H. (2011). The combined effect of waterlogging, extractable P and soil pH on α-diversity: a case study on mesotrophic grasslands in the UK. Plant Ecology, 212(5) pp. 879–888.

Rothero, E., Lake, S. and Gowing, D. (eds) (2016). Floodplain Meadows – Beauty and Utility. A Technical Handbook. Milton Keynes, Floodplain Meadows Partnership.

Rouquette, J.R.; Posthumus, H.; Morris, J.; Hess, T.M.; Dawson, Q.L. and Gowing, D.J.G. (2011). Synergies and trade-offs in the management of lowland rural floodplains: an ecosystem services approach. Hydrological Sciences Journal, 56(8) pp. 1566–1581.

KESS does not support or promote perspectives or messages stated in this Briefing.

The opportunity to apply to present at KESS is open to all academics in the five university partners; and is promoted through their internal communication channels and social media: contributions from all perspectives are encouraged, as they make for a richer annual KESS Programme.