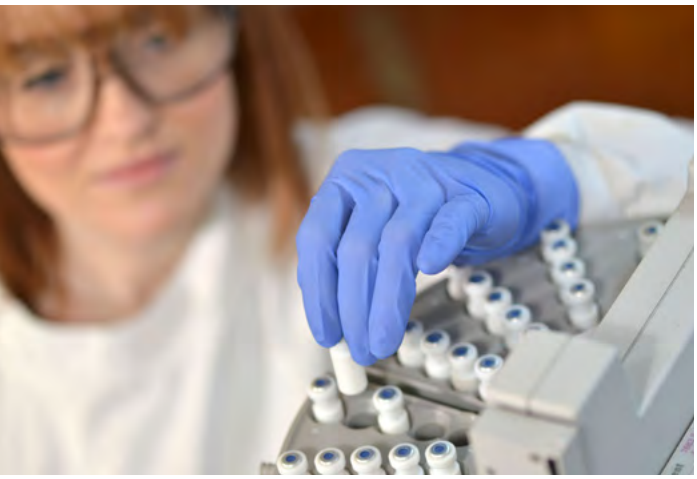
Science Strategy Framework 2020-2035



Sustainability *at the heart of a living, working, active landscape valued by everyone.*

Department of
Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

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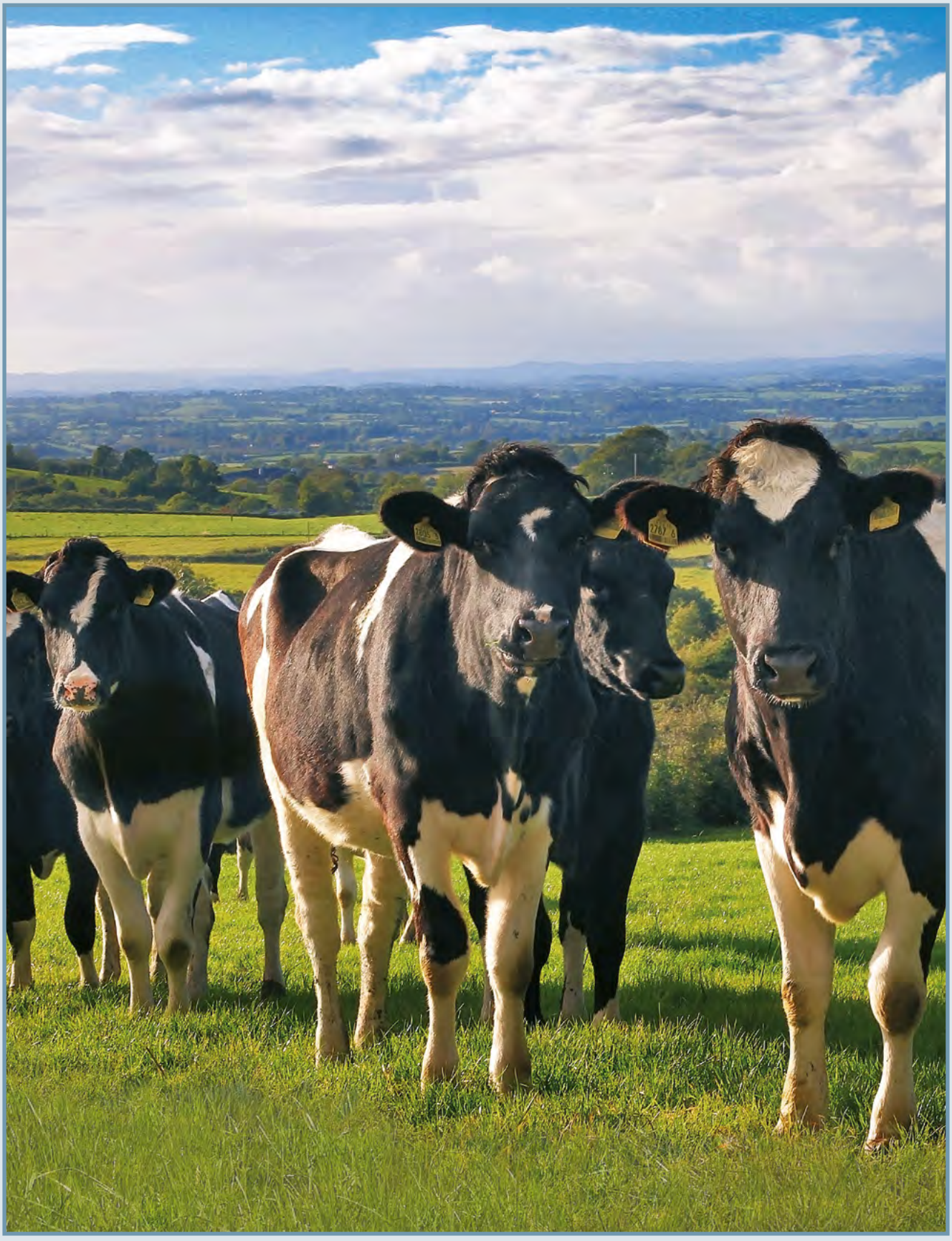
Contents



Ministerial Foreword

The Coronavirus pandemic has presented us with many difficult challenges for our health, society and economy, with scientists across the world engaged in research, innovation and collaboration in response to the pandemic.

The relevance of science, and its impact on our lives, has never before been more publically recognised than it has been in recent times.

In that context the timing of this Science Strategy Framework could not be more appropriate. Science is fundamental to the work of my Department. It provides an evidence-based foundation for DAERA's policies, to help develop the sustainable agri-food, fisheries, forestry and waste management business sectors essential for growing and rebalancing the Northern Ireland economy.

This Science Strategy Framework aims to ensure that the science secured by DAERA will be innovative, collaborative and transformative and can support a healthy and sustainable economy, environment and rural community.

DAERA invests significantly in science and I believe, that to ensure the best return on this investment, we must be very clear about the science we need and why; that the optimal path for obtaining science is used; and that science outcomes and benefits are shared as widely as possible. This is particularly important when, as now, budget pressures require us to make the most effective use of the monies available to us.

Science technologies are advancing rapidly. We need to be open to adopting new technologies and innovative ways of working, to meet ambitious environmental and sustainability targets, while supporting economic growth in agriculture and agri-food industries and rural areas.

With the departure of the United Kingdom from the European Union, the need for science evidence is even more important to underpin our policies, for protecting our environment, habitats and rural areas; dealing with challenges such as climate change and waste management; encouraging sustainable economic growth in our agri-food and marine and fisheries industries and facilitating international trade.

By collaborating and working in partnership with others in industry, research and education, and the environment and voluntary sectors, locally, nationally and globally, I believe we can exploit emerging opportunities and ensure that DAERA's science is robust, relevant, accessible and used for the benefit of all our stakeholders.

I am happy to publish this strategy, which I believe will provide an effective guide for how we optimise our use of science to help deliver Departmental and Programme for Government objectives, contribute to the furthering of international commitments and to DAERA's Vision for sustainability at the heart of a living, working, active landscape, valued by everyone.

Edwin Poots MLA
Minister of Agriculture Environment and Rural Affairs

Section 1

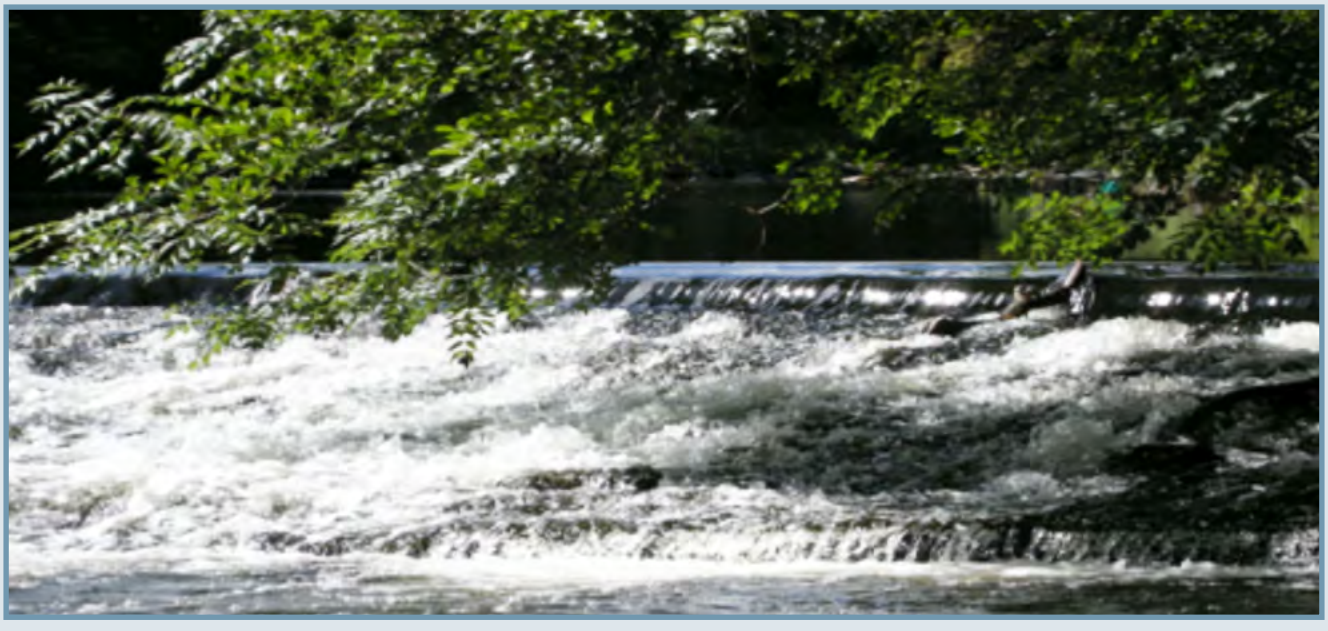
1. Preface

The Department of Agriculture, Environment and Rural Affairs (DAERA) invests around a quarter of its annual budget on science services. These services include monitoring and surveillance testing and research and development. Science outputs are used to inform policy development, meet statutory obligations, measure outcomes, provide advice and information, promote innovation, manage risks to society and the environment, and support rural affairs.

DAERA is implementing a Science Transformation Programme. This programme aims to ensure that the science DAERA secures and uses is innovative, collaborative and transformative and will support a healthy and sustainable economy, environment and rural community, including delivering on Programme for Government outcomes.

As part of the Science Transformation Programme, this DAERA Science Strategy Framework has been developed. This will guide how DAERA can optimise its use of science to help deliver Departmental and Programme for Government objectives, including the furthering of international commitments.

The Science Strategy Framework outlines a Vision for DAERA science; defines high level principles to be adopted; describes the desired end-state goals to be achieved in terms of providing leadership, understanding needs, optimising investment in resources and having effective governance. It then defines milestones to reach the goals in terms of providing better leadership for science; becoming more informed customers and users of science; better targeting of science funding; pursuing value for money; and ensuring impact of science products.

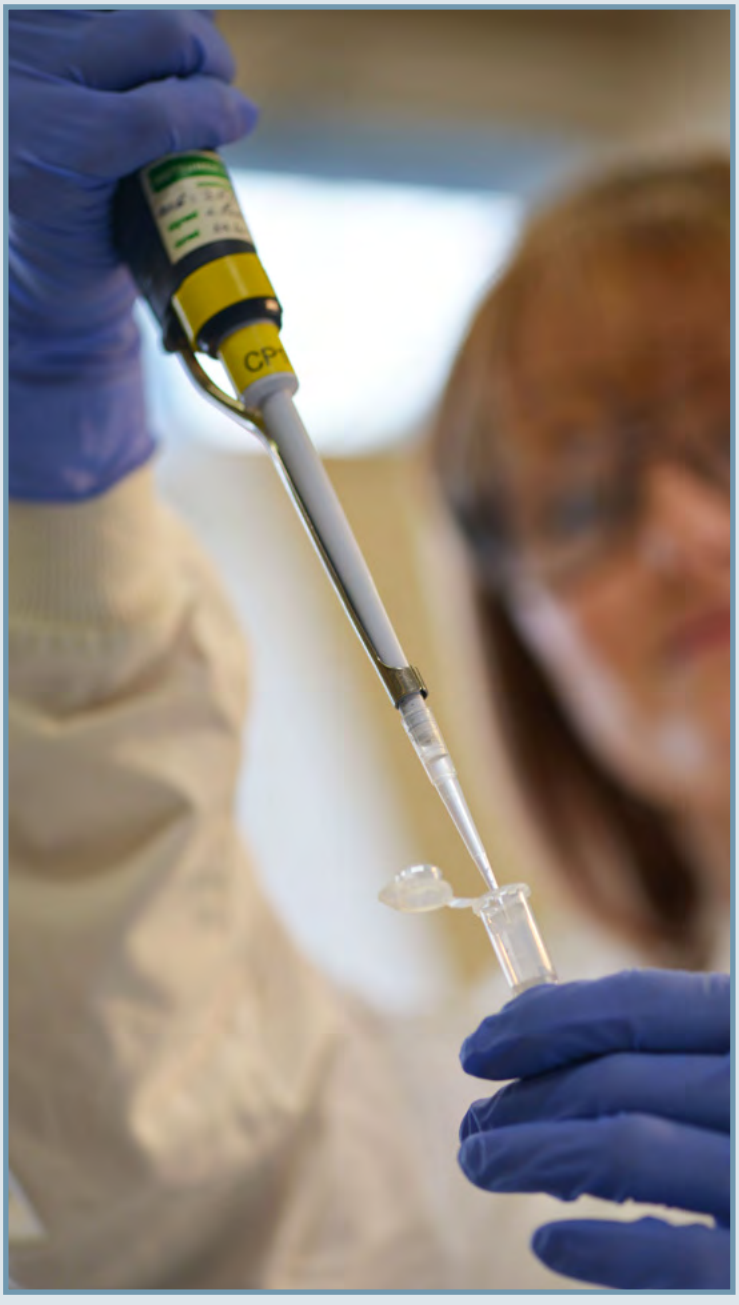


Section 2

2. Introduction

2.1 This framework outlines a set of high level, long-term principles for DAERA to optimise its use of science to help deliver Departmental and Programme for Government objectives, including the furthering of international commitments. It also outlines key goals for DAERA to better identify, prioritise, commission and evaluate, science services required, so that the impact from the Departmental investment in science is optimised. These goals are framed in a general way, so they can apply to the very wide range of circumstances where DAERA utilises science to support its work.

2.2 In keeping with the goals and principles established by this Science Strategy Framework, DAERA will develop and implement science policy and operational strategies for Innovation, Emergency Response Capability, Research and Development and Monitoring and Surveillance. These will encompass all science services commissioned and managed by DAERA at a sectoral level.



2.3 There will also be a review of the organisation of science resources, to identify the optimal organisational structure and arrangements for the proportion of science services that we need to directly control, and a review of the science estate to ensure it is fit for the purpose of delivering these science services over the next 15 years.

3. Background

3.1 DAERA was established in 2016, bringing functions from the former DARD, DOE, DCAL and OFMDFM into a single Department. DAERA has responsibility for the environment, farming, certain aspects of food, marine and fisheries, forestry and sustainability policy and regulation and the development of the rural sector in Northern Ireland.

3.2 The Department's Vision is for ***'Sustainability at the heart of a living, working, active landscape, valued by everyone'***. In support of this, the Department assists the sustainable development of the environment, agri-food, fishing and forestry sectors of the economy, having regard for the needs of consumers, the protection of human, animal and plant health, the welfare of animals and the conservation and enhancement of the natural environment, including decarbonisation and adaptive capacity. It has four strategic outcomes it is seeking to achieve:

- **Sustainable agri-food, fisheries, forestry and waste management business sectors,** helping to improve the economic and environmental performance of wider industrial and business sectors, but with particular focus on land-based, marine, and food processing sectors.

- **A clean, healthy environment, benefitting people, nature and the economy,** through developing and implementing policy and legislation to educate, incentivise and regulate organisations, businesses and individuals to protect and improve the environment.

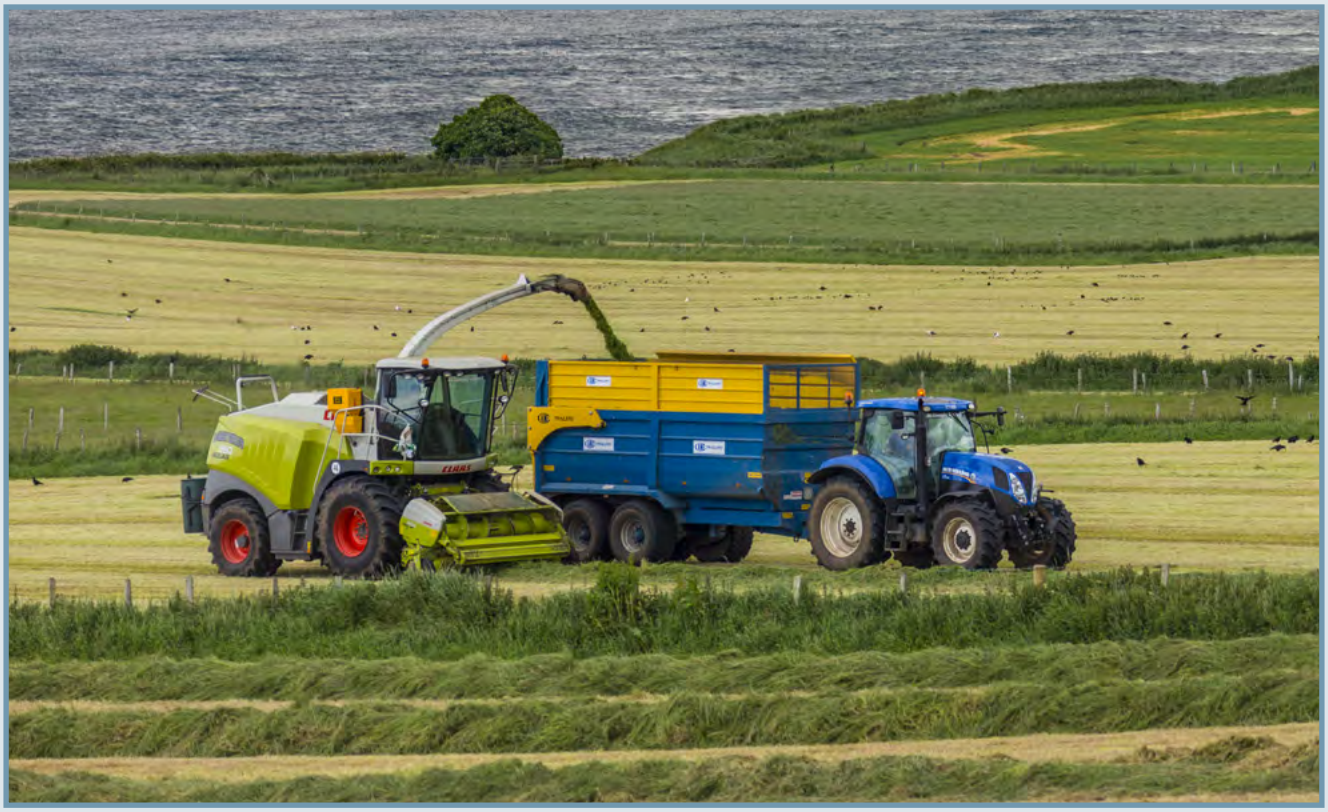
- **A thriving rural economy, contributing to prosperity and wellbeing,** through working to ensure the needs of rural communities are clearly identified, recognised and addressed across government.

- **A well-led, high performing organisation focused on outcomes,** investing in its people to develop new and more efficient means of delivering its services and meeting its strategic objectives.

3.3 DAERA recognises the strategic importance of science in addressing the economic, environmental and social challenges associated with growing and re-balancing the Northern Ireland economy. We need new technologies, radical approaches and solutions based on robust science across all areas, in line with the developing Green Growth Strategy, which aims to transform our society and achieve net Zero Greenhouse Gas (GHG) emissions targets by 2050, protect and enhance our environment and sustainably grow our economy. We will support a knowledge based bio-economy[1] which will help agriculture and agri-food businesses become economically, environmentally and socially sustainable; support economic growth in rural areas; and assure the protection and enhancement of the environment to safeguard wellbeing and health.

3.4 The strategic context underpinning the importance of science is detailed further in Appendix A.

3.5 DAERA science services are currently undertaken directly by DAERA staff in the Department, including in the Northern Ireland Environment Agency (NIEA) and the Veterinary Epidemiology Unit; provided by the Department's Arms-Length Body, the Agri-Food Biosciences Institute (AFBI); and by a range of other science providers.



1 The bioeconomy is all economic activity derived from bio-based products and processes which contribute to sustainable and resource-efficient solutions to the challenges faced in food, chemicals, materials, and energy production; and in health and environmental protection.

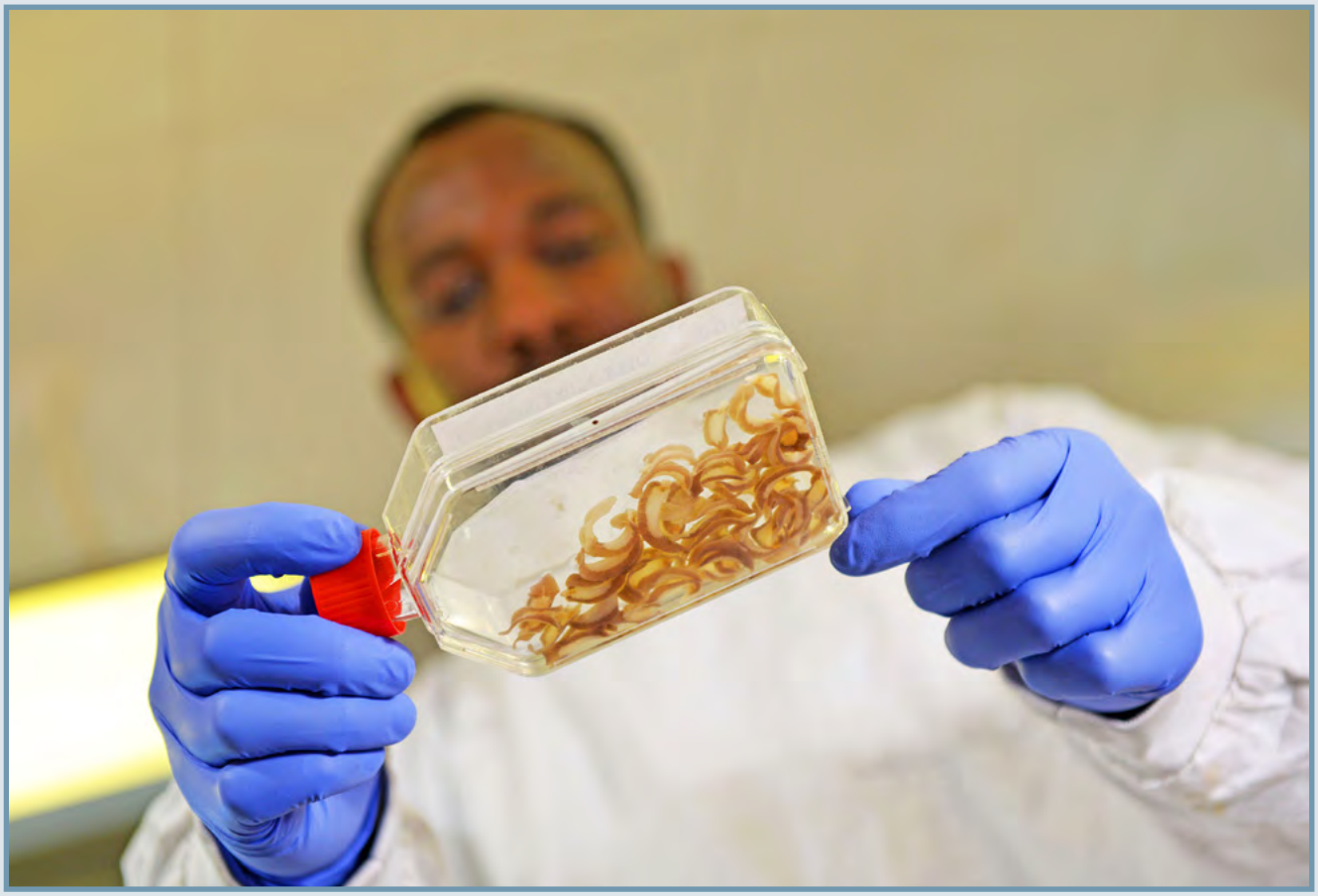
Section 4

4. Key Science Functions and Applications

4.1 There is a clear need for DAERA to commission (i) **monitoring and surveillance science,** which supports important government functions such as technical standards setting and regulation, emergency response provision and important government policies in the areas of animal, plant and environmental health and animal welfare; and (ii) **research and development science**.

4.2 Monitoring and Surveillance includes routine scientific and technological activities, such as informing the provision of education and training, the provision of information, general purpose data collection, routine software development and feasibility studies, surveys, monitoring, surveillance, mapping, testing, analytics, diagnostics, advice and representation.

4.3 Approximately two thirds of DAERA's annual investment in science is currently in Monitoring and Surveillance services.



4.4 Research and Development (R&D) is defined in the Frascati Manual[2] as 'creative and systematic work undertaken in order to increase the stock of knowledge, including knowledge of human kind, culture and society, and to advise new applications of available knowledge. R&D is original investigation to acquire new knowledge directed primarily towards a specific practical aim or objective.

4.5 Research and Development and Monitoring and Surveillance functions provide results which feed into DAERA's 4 key **science applications**. They are:

a. the development, implementation and evaluation of evidence-based strategies and policies;

b. the assurance of compliance with statutory requirements;

c. the management of risk, including emergency response capability; and

d. the support and promotion of innovation.

a. Development, implementation and evaluation of evidence-based strategies and policies

Science is one of the evidence sources used to inform the development of policies and strategies and to inform the evaluation of their impact/relevance. It is also used to support their implementation.

All relevant evidence includes findings from existing research and development and monitoring and surveillance science results, as well as from newly commissioned research and development where there are gaps in the knowledge/evidence base.

b. Assurance of compliance with statutory requirements

DAERA is the competent authority for assuring the health and compliance of Northern Ireland animal, plant and derivative products with export standards; and also for protection and conservation of nature and the environment. As such, DAERA has a responsibility to implement regular, ongoing monitoring and surveillance science testing regimes to assure compliance with statutory standards (that is standards which are applicable by law). Research and Development updates and supports this assurance by having the right information available to ensure that the Department's legislation and regulatory practices are appropriately targeted, are effective and impose the minimum necessary administrative and compliance cost.

2 Frascati Manual, OECD 2015

c. The management of risk, including Emergency Response Capability

DAERA needs to ensure there are sufficient contingencies and resources in place to provide the necessary scientific support (such as analyses of samples and diagnostic assistance) to any serious environmental emergency or to a widespread outbreak of any serious animal, plant or fisheries disease in Northern Ireland, or in response to a serious threat to the integrity of the Northern Ireland animal food-chain. This relates to risk management, and is referred to as Emergency Response Capability.

d. Support and promotion of innovation

Innovation is a process 'which proceeds from the conceptualisation of a new idea to a solution of the problem and then to the actual utilisation of a new item of economic, environmental or social value'[3]. DAERA's strategic context described in Appendix A, demonstrates the breadth of DAERA's remit. Emphasis is given to encouraging and supporting innovation by DAERA and the agri-food, environmental, fishing, forestry and rural sectors to achieve environmental, social and economic benefits.

These are the key functions and applications considered within the DAERA Science Strategy Framework.

3 S Meyers and DG Marquis, Successful Industrial Innovations. National Science Foundation, 1968.

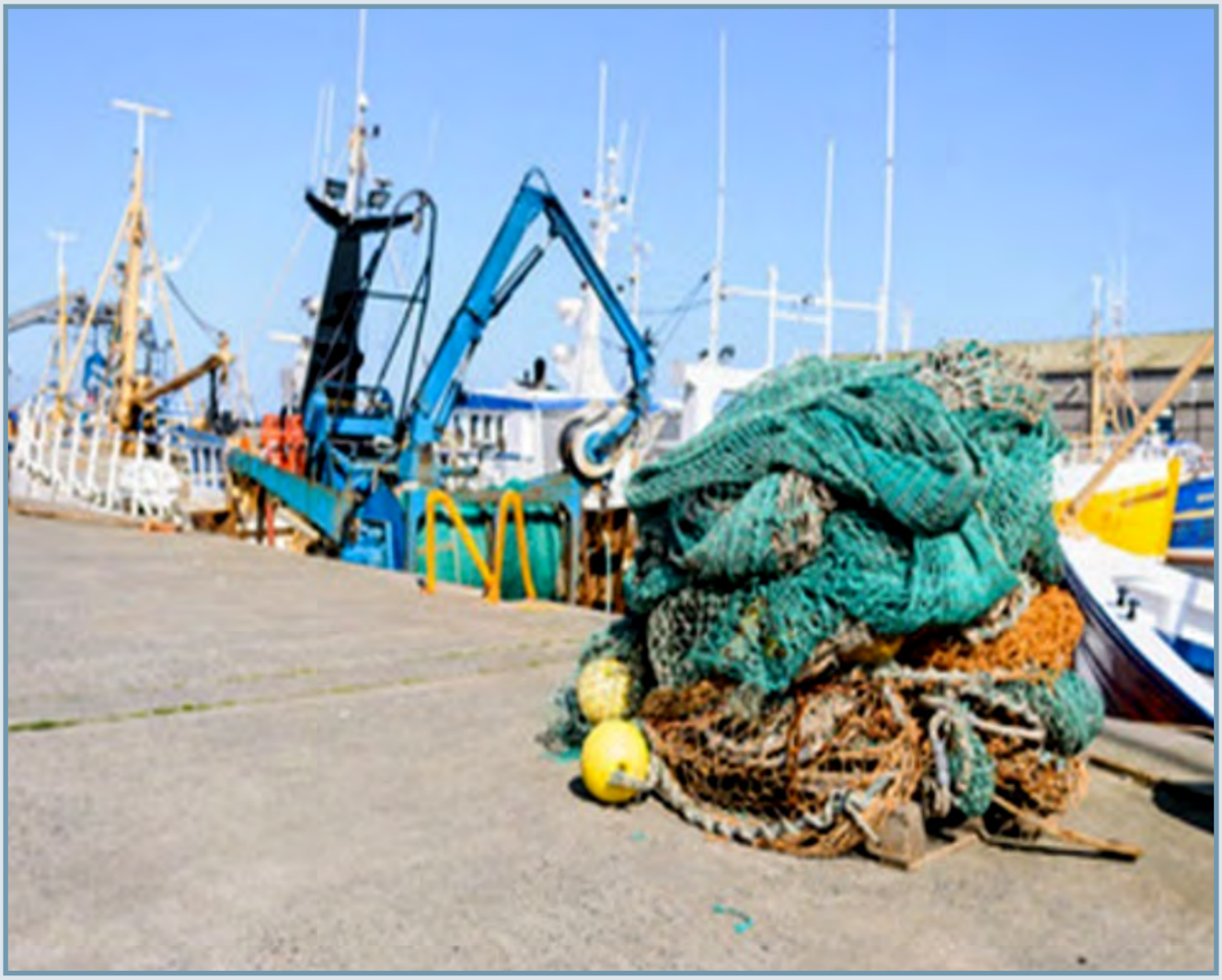
Section 5

Vision

5.1 The science secured and used by DAERA will be innovative, collaborative and transformative. It will support a healthy and sustainable, environment, rural community and economy; help deliver the Programme for Government outcomes and contribute to the DAERA Vision of ***Sustainability at the heart of a living, working, active landscape, valued by everyone'***.

Mission

5.2 To commission[4] relevant, fit-for-purpose, impartial science efficiently, from high quality scientists, and to maximise and evaluate the impact achieved from it, facilitated by fit for purpose infrastructure and robust governance mechanisms.



4 Specify, order and /or authorise the production of work.

Section 6

Principles

What

6.1 Science funded by DAERA will support the development and implementation of strategies and policies across the DAERA remit.

6.2 It will optimise the value of the investment we make in science to inform policy development, meet statutory obligations, measure outcomes, promote innovation and manage risks to society in Northern Ireland and will also contribute to strategy and risk management at UK level.

Why

6.3 Science provides transparent, robust and impartial evidence. Scientists provide expertise and capability to inform decision-making.

6.4 Science enables the development and evaluation of evidence based strategies and policies; assurance of compliance with statutory requirements; the development of innovative applications; and the management of risk.

How

6.5 DAERA will seek to optimise the value of its investment in science through always:

- Providing effective leadership for science;
- Engaging with stakeholders to inform a comprehensive and accurate understanding of its future-proofed science needs and becoming a more informed customer for science;
- Adopting a collaborative approach for commissioned science wherever practical;
- Applying effective governance mechanisms to all DAERA-funded science;
- Commissioning science evidence on the basis that data and findings will be accessible and usable, with results made available as early and as widely as possible;
- Evaluating science investment through assessing the impact of science outcomes on the industry/sectors/environment;
- Supporting the exploitation of science outputs for innovation; and
- With respect to Research and Development, prioritising science funding primarily on innovative Applied and Experimental Development research activities to deliver on the Department's strategic policy objectives. This will not preclude the undertaking of more basic research and development if there is a sound argument for doing so and a local benefit can be identified.

Section 7

Goals of the strategy

7.1 The desired end-state of how DAERA will manage and operate science after the implementation of this strategic framework is outlined as seven goals in this section. (Please note these are in no particular order of priority).

7.2 GOAL 1: DAERA provides effective leadership for science

a. DAERA's investment in science is prioritised and targeted to align with its remit and the strategic priorities of the Northern Ireland Executive (currently defined in the draft Programme for Government) and the Department.

b. DAERA publishes its priorities and its strategic aims for science.

c. DAERA works in concert with other NICS Departments, UK Government, Devolved Administrations, where relevant on an all-island basis, with EU and international institutions, to collaborate where appropriate and optimise the value from science investment across Government.

d. DAERA has effective links with relevant regional, national and international science funding bodies, influencing the direction of their science interest and optimising Northern Ireland-relevant opportunities to collaborate and draw down funding.

e. DAERA's science leadership is aware of external changes, so the Department can react effectively to better serve its overall mission, in partnership with others.

7.3 GOAL 2: DAERA understands its science needs

a. DAERA has a holistic and forward-looking, evidence-based understanding of its science needs, driven by its strategic objectives, including the proportion of the science portfolio that needs to be taken forward under its control and locally (that is in Northern Ireland).

b. DAERA is informed by a good understanding of past, current and future science investment by all other relevant bodies/parties, via linking into effective co-ordination and horizon-scanning mechanisms and by undertaking meaningful engagement with relevant scientific, industry and sector stakeholders.

7.4 GOAL 3: DAERA optimises its investment in science

a. DAERA commissions science services from the most appropriate provider in terms of mitigating risk, obtaining quality, relevance, delivering efficiently, value for money and meeting DAERA's needs effectively.

b. DAERA's investment in specialised scientific staff resources and facilities is informed by the proportion of the science portfolio that needs to be taken forward under its control and locally.

c. Wherever practical, DAERA engages in collaborative science programmes, to optimise the synergies and value achieved through investment in science, avoid duplication and holistically address issues.

d. Where appropriate, a problem-solving based approach (i.e. grand challenge) is adopted to ensure multi-disciplinary teams define and address science needs relating to the environment, society and industry.

e. DAERA optimises leveraging of funding from others, such as charities, businesses and other private and public funders, where appropriate, maximising the additional impacts achieved from finite public funding[5].

f. An effective and efficient end-to-end knowledge generation/knowledge exchange process is in place, including directed by the DAERA Knowledge Framework[6], which facilitates effective two-way communication and optimises transfer of knowledge from science to the agri-food, environmental and rural sectors.

g. DAERA encourages and supports innovation through fostering an enabling environment for knowledge generation, exchange and exploitation, including the adoption of an appropriate risk appetite.

h. DAERA knows and communicates the outcomes of its investment in science in as visible and accessible a manner as possible to science, industry and sector stakeholders.

5 The general principles determining funding considerations are: - there will be a greater reliance on public funding when science primarily provides an evidence base for government policy, or wider societal or public good benefits, or is high risk, and therefore, unlikely to be progressed by industry; - there will be more of a focus on leveraging private funding when science provides benefits to industry e.g. increased market access/industry growth or profitability; The public sector will aim to ensure that it does not crowd out, displace or duplicate private science provision. Rather, all opportunities to use public funding to leverage private investment in science (i.e. where this would not otherwise happen) will be explored.

6 DAERA Knowledge Framework: https://www.daera-ni.gov.uk/publications/daera-knowledge-framework-document

7.5 GOAL 4: DAERA works with high quality scientists

a. DAERA has access (both internally and externally) to appropriately skilled staff to undertake science; to provide expert scientific advice and specialist opinion; and to collate and analyse data to optimise the learning DAERA derives from scientific data.

b. Science excellence is promoted through commissioning from providers who assure the quality of their scientists and science through peer review arrangements and adherence to best practice quality standards.

c. Science excellence is encouraged, through fit for purpose recruitment and continuous professional development programmes.

d. Common structures and systems facilitate communication, collaboration and flexibility between science teams.

e. Team leading scientists have the appropriate "standing", experience and expertise to assure the necessary objectiveness and robustness of science evidence.

7.6 GOAL 5: DAERA has fit-for-purpose science infrastructure

a. Modern and fit-for-purpose infrastructure to accommodate those science functions that are identified as needing to be undertaken locally and under the control of DAERA are in place.

b. DAERA science infrastructure is designed and resourced to maximise collaboration and co-operation between scientists and science functions and optimise the flexible use of science staff resources.

7.7 GOAL 6: DAERA maximises the use of IT and Data for science

a. DAERA has policies, procedures and systems in place which facilitate the appropriate and efficient collation, handling, management, access to and control of data; which optimise the efficient storage, sharing, use and exploitation of data (through data science) in line with Departmental priorities. This includes within the DAERA family and externally across Departments, sectors, stakeholders and the public.

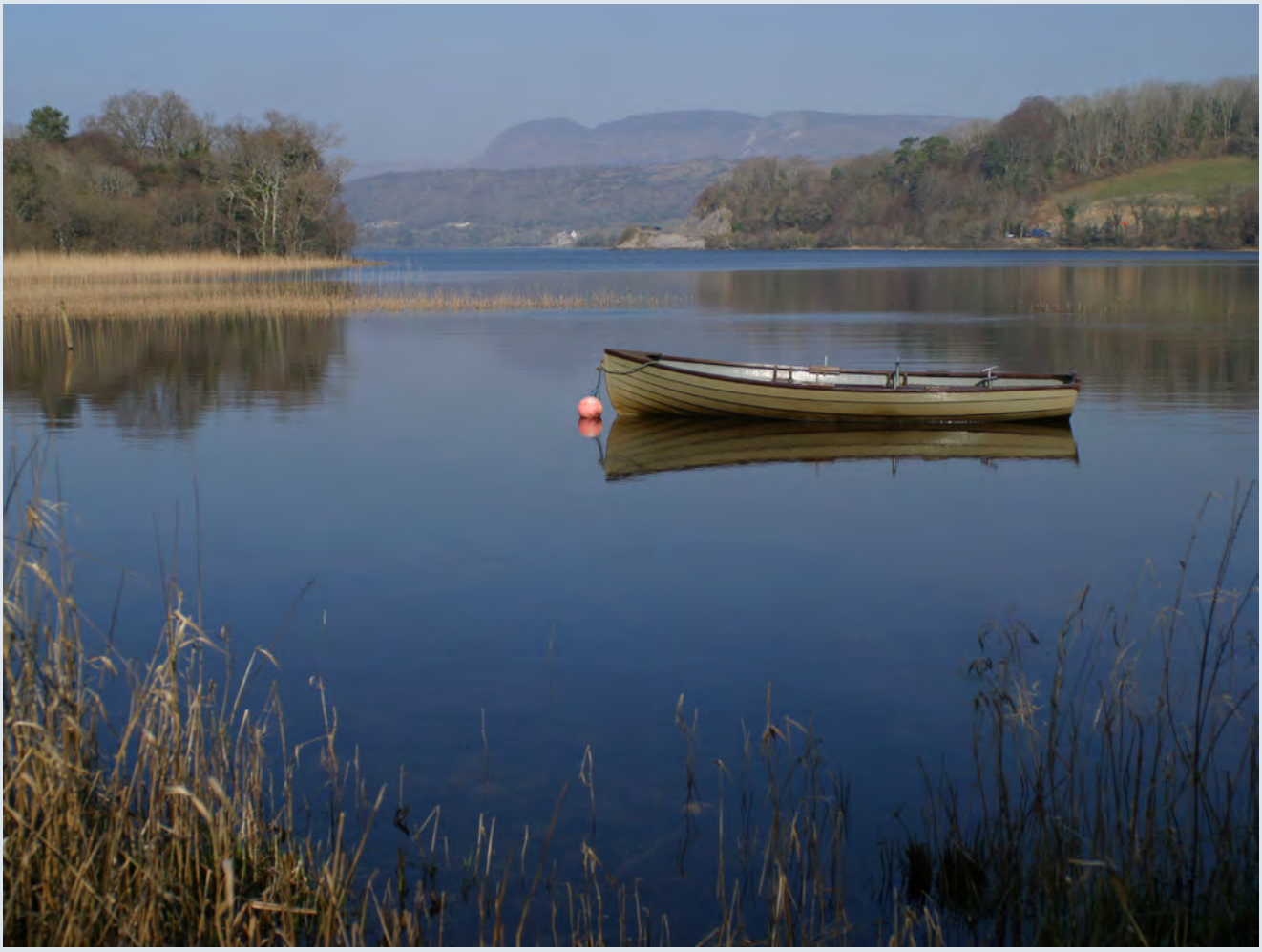
b. DAERA makes science data available as early and widely as possible, in line with the Open Data Strategy for Northern Ireland[7].

7 Open Data Strategy for Northern Ireland, 2020 - 2023.

7.8 GOAL 7: DAERA has effective oversight of its science use

a. DAERA has governance mechanisms in place which optimise investment in its priorities and facilitate commissioning from the most appropriate provider in terms of meeting its science needs effectively, obtaining quality science evidence (assured through use of peer review), mitigating risk and delivering efficiently.

b. DAERA has access (both internally and externally) to appropriately skilled staff to effectively direct, lead, govern and evaluate its use of science and science outcomes.



Section 8

Milestones

8.1 Becoming a more informed customer (contributing to Goals 1 and 2)

a. Stakeholder Engagement: By June 2022, building on existing practice, to identify and establish new stakeholder engagement mechanisms to facilitate DAERA having a holistic insight on the current and future issues which could impact the environment and agri-food and rural sectors in Northern Ireland, to inform its science identification, prioritisation, and commissioning.

8.2 Providing leadership and prioritisation (contributing to Goals 1,2,4,5,6,7)

a. Encourage Joining Up of NICS and UK Government Science: From January 2021, building on existing practice, DAERA to engage at Senior Civil Service level to develop a co-ordinated approach to science across Northern Ireland Government Departments, relevant UK Government, Devolved Administrations and as relevant on an all-Island basis, so that the impact of investment in science is optimised.

b. Priority Setting Framework: By October 2021, to establish and apply; a Framework to guide investment in and use of science by DAERA, in line with its remit and the strategic priorities of the Northern Ireland Executive; the principle of prioritising Research and Development funding towards Innovative Applied and Experimental Development research activities, to deliver on the Department's strategic policy objectives.

c. Publishing Operational Science Priority Strategies: By January 2022, to establish and publish appropriate operational strategies for (i) Monitoring and Surveillance,(ii) Research and Development, (iii) Emergency Response Capability and (iv) Innovation, that are fit for the purpose of implementing this Strategy Framework. Additionally, to identify the proportion of the DAERA science portfolio that needs to be taken forward under Departmental control and locally (that is in Northern Ireland).

8.3 Protecting the investment in science and pursuing Value for Money (contributing to Goals 1,3,4,5,6,7)

a. Intellectual property (IP) and Contract Design: By June 2022, building on existing practice, (including by securing expert IP and contract design advice), to continue to ensure there are clear accountabilities in place to maximise the benefits of science to the Northern Ireland (and UK) economy.

b. Commissioning: By October 2022, to commission science services directed by new operational strategies from the most appropriate provider in terms of mitigating risk, obtaining quality, delivering efficiently and meeting DAERA's needs effectively.

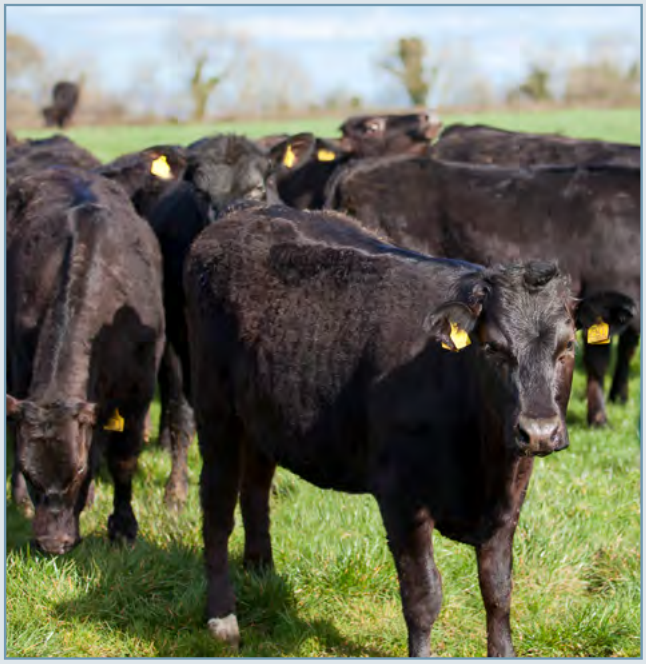
c. Skills investment: By October 2022, to ensure relevant People Strategies assure appropriately skilled scientific resources are in place to facilitate the necessary quality, objectiveness and robustness of science evidence, for the proportion of the DAERA science portfolio that needs to be taken forward under Departmental control and locally (that is in Northern Ireland).

d. Infrastructure Investment: By December 2022, to produce a development programme to deliver modern and fit-for-purpose facilities for the proportion of the DAERA science portfolio that needs to be taken forward under its control and locally (that is in Northern Ireland).

e. Information/Data management: By May 2025, to develop and deliver a centralised, science management information environment and associated function, which effectively and efficiently facilitates the collation, storage, handling, management and analysis of scientific information across the DAERA family, including supporting integration and collaboration between internal and external science teams.

8.4 Ensuring Impact (contributing to Goals 1,3,6,7)

a. Knowledge Exchange: By March 2023, to develop and deliver a strategic approach for the systematic dissemination of DAERA scientific data and findings as appropriate within DAERA and externally across Departments, sectors, stakeholders and the public and to review the Knowledge Framework governance mechanisms so they are fit for the purpose of implementing this strategy.



b. Reporting: DAERA will engage with its counterparts across the UK, to agree a framework to measure the impact of science and benchmark, wherever possible, to assess the return on investment by September 2023. DAERA will refine this approach and be in a position to publish an Annual Report, outlining the impact its investment in science has on the industry and sectors from September 2024. DAERA will adjust its approach to improve its performance, on the basis of Annual Reports.

Section 9

Benefits

Benefit name	Description
Improved science performance and management	*Benefits in **external impact** such as:* - Better targeted and more effective policies to tackle challenges to our agri-food, forestry and fishing industries, environment and rural society; and the expansion of human knowledge, e.g. new scientific discoveries, solutions to problems; - Wider exploitation of new technologies and the development of new products or processes, which will promote economic prosperity and environmental sustainability. *Benefits to **internal management of DAERA,** such as:* - Improved strategic alignment to key objectives, more effective internal management processes re science needs identification, prioritisation, commissioning, result generation and sharing; including feed-through to knowledge and technology transfer and performance evaluation, with a greater focus on science excellence and delivery against needs.
Improved collaboration and strategic alliances	*Benefits in **use of networks** such as:* • Improved collaboration both internally and externally, building reputation as a trusted partner in Northern Ireland and across UK/Europe/Globally; improved skills transfer and development.
Improved value for money	*Benefits in **use of public money,** such as:* • Increased investment (due to collaboration and attracting external co-funding partners and more effective budget utilisation), including better and more targeted outcomes (tracking benefits, return on investment, reach and impact of investment). • Efficiencies in Surveillance and Monitoring resulting from investment in R&D and innovation on new approaches and techniques.
Improved customer service	*Benefits to **customers**, such as:* • Service excellence; quicker response to queries, improved organisational resilience to customer needs, maintenance of emergency response, maintenance of compliance with statutory obligations, improved policy development and advice; greater public availability of DAERA-funded science data.
Improved utilisation of estate	*Benefits to **estate** such as:* • Enhanced estate planning and management, future proofing of (modern and fit-for-purpose) facilities and lower running costs, resulting in more efficient and effective service provision.
Improved staff experience	*Benefits to **staff** such as:* • Increased staff flexibility, increased productivity, better integration, improved staff morale, better working environment and ways of working, improved training and competence development, making DAERA Science a great environment within which to work.

Implementing this strategy successfully will improve DAERA's ability to support its strategic outcomes:

- sustainable agri-food, fisheries, forestry and waste management business sectors;
- a clean, healthy environment, benefitting people, nature and the economy;
- a thriving rural economy, contributing to prosperity and well-being; and
- a well-led, high performing organisation focused on outcomes.

Section 10

Rural Needs Considerations

10.1 DAERA has a statutory duty to screen decisions to consider the likely impacts of proposed decisions on rural areas.

10.2 A rural needs assessment has been completed and is available here.

10.3 While potential impacts of the strategy on rural areas have been identified, the rural needs assessment template is a living document and will be kept under review.

Section 11

Equality Considerations

11.1 A High Level Impact Assessment has been completed for this Science Strategy Framework, to evaluate the equality issues as set out in the Section 75 equality legislation. All policies that will cascade from this strategy will be equality screened and where necessary, a full Equality Impact Assessment will be completed by the project manager. This is in line with the DAERA Equality Scheme.

Appendix A

Strategic Context

Political

1 The Northern Ireland Executive's draft Programme for Government (PfG) 2016 – 2021, outlines priorities to be delivered in Northern Ireland for the purpose of "improving wellbeing for all - by tackling disadvantage and driving economic growth". This includes a range of priorities relevant to DAERA, including those focused at achieving a strong, competitive, regionally balanced economy (Outcome 1); living and working sustainably - protecting the environment (Outcome 2); enabling the enjoyment of long healthy lives (Outcome 4); becoming an innovative, creative society, where people can fulfil their potential (Outcome 5); and creating a place where people want to live and work, to visit and invest (Outcome 10). DAERA is the lead Department of Outcome 2, "We live and work sustainably, protecting the environment".

2 The Northern Ireland Economic Strategy - Priorities for sustainable growth and prosperity (2012), identified five strategic themes aimed at rebalancing the local economy. Stimulating innovation, Research & Development (R&D) and creativity is one of these themes. The strategy also recognises agri-food, as one of the areas in Northern Ireland with greatest potential for growth.

3 Innovate NI - the Innovation Strategy for Northern Ireland 2014 – 2025, takes forward the 'Stimulating innovation, Research & Development and creativity' theme identified in the Northern Ireland Economic Strategy 2012. This aims to stimulate a step change in innovation across the economy. It also outlines that skills, design and collaboration between sectors locally, nationally and internationally are essential for innovation.

4 The draft Economy 2030 - Industrial Strategy for Northern Ireland (2017), outlines five 'Pillars for Growth', including 'Accelerating innovation and research.' The strategy provides priorities under this pillar and also identifies agri-food as one of the six broad sectors of the economy where Northern Ireland has world class capabilities.

5 DAERA has developed a draft Future Agricultural Policy Framework[8] for Northern Ireland. This recognises that science and innovation are important drivers of long term productivity growth; and that science assists in anticipating and mitigating the unintended consequences of innovation associated with the past intensification of production systems. The draft policy framework places an increased emphasis on the use of science to support higher productivity growth, which is compatible with environmental sustainability; and to deliver high animal health and welfare standards.

8 Draft DAERA Future Agriculture Policy Framework for Northern Ireland: https://www.daera-ni.gov.uk/consultations/northern-irelandfuture-agricultural-policy-framework Science Strategy Framework 2020 - 2035

DAERA has also initiated work on Northern Ireland's first Environment Strategy. This will form the basis for a coherent and effective set of evidence-based interventions, intended to deliver real improvements in the quality of the environment and thereby improve the health and well-being of citizens, create opportunities to develop our economy and play our part in protecting the global environment for future generations.

6 The developing NI Green Growth Strategy, which DAERA is currently leading on across NICS Departments, has the aim of transforming our society to achieve net Zero GHG emissions by 2050, protect and enhance our environment and sustainably grow our economy.

7 There is also a range of other strategies, policies and commitments at local, national and international level which identify the importance of using science to deliver solutions to complex issues.

8 To summarise, science and innovation are identified as being vital to the development and support of a strong, competitive, healthy and adaptive economy and environment.

Economic

9 Agriculture makes an important contribution to the Northern Ireland economy, accounting for 1.4% of Gross Value Added (GVA), compared to 0.5% across the UK. It is a significant profession, with 16,964 full-time and 13,721 part-time self-employed farmers in Northern Ireland in June 2018. A further 3,411 people were employed as farm workers on a full-time basis and 4,340 on a part-time basis.

10 The food and drink industry had a projected gross turnover of £4,952 million in 2018. It is a major employer, accounting for a projected 24,818 employees in 2018. Some 75.7% of Northern Ireland produced food and drink was sold outside Northern Ireland in 2017, representing total sales of £3,641m. This sector is one of the most strategically important sectors to the Northern Ireland economy, so its development is of significant importance to the economic strength of the region.

Social

11 DAERA as rural champion, seeks to ensure the needs of rural communities are recognised and addressed across government. Building on the 'rural vision' as articulated in the Executive's Rural White Paper Action Plan, the Rural Needs Act (Northern Ireland) 2016, supports DAERA's advocacy role, providing a statutory duty on public authorities to have due regard to rural needs when developing, adopting, implementing or revising a policy, strategy or plan and when designing or delivering a public service.

12 Under the Northern Ireland Rural Development Programme 2014 - 2020, DAERA is currently implementing a number of measures that support rural society including LEADER - an initiative for assisting rural communities in improving the quality of life and prosperity in their local area; and a Rural Tourism scheme, which is investing in natural and built heritage projects that can act as key drivers for encouraging rural tourism and particularly out of state visitors whilst preserving the natural assets of the rural community.

13 DAERA manages and implements the Tackling Rural Poverty and Social Isolation (TRPSI) Programme, which aims to tackle poverty and isolation in rural areas, by implementing a broad range of innovative initiatives in collaboration with both central and local government, statutory providers and voluntary and community sector partners. The policy Framework was underwritten by a robust evidence base, utilising the Agri-Food and Biosciences Institute (AFBI) social science research.

14 An overview of urban/rural comparisons for key social statistics, along with data on the 10 most affected rural SOAs (Super Output Areas) for measures of multiple deprivation are given at:

www.daera-ni.gov.uk/sites/default/files/publications/daera/DeprivationRural_0.docx

www.daera-ni.gov.uk/publications/northern-ireland-rural-urban-statistics

15 DAERA's managed forest, country parks and protected areas cover approximately 200,000ha. These environmental assets form an essential part of our Natural Capital[9] and support recreation and other activities for health and well-being, rural enterprise and the wider social economy. Collaboration between a wide range of stakeholders and partners across government, non-government organisations, landowners, business and the public, underpinned by DAERA science expertise, provides a robust evidence base for innovative solutions across complex policy and operational interfaces.

Technological

16 DAERA seeks to collect and manage the data it holds in line with its statutory obligations and best practice. Technology is a key enabler for exploiting the value of science and there are strategic drivers to optimise its use in this regard.

17 The General Data Protection Regulation (GDPR) EU Regulation 2016/679, replaced the Data Protection Directive 95/46/EC in May 2018. It has been designed to harmonise personal data privacy laws across Europe. Non-compliance with this directive may result in significant fines.

9 Natural capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things.

18 International Organisation for Standardisation - ISO/IEC 27000, ensures organisations keep information assets secure. The standards provide an outline specification for an information security management system (ISMS).

19 The DAERA Digital Transformation Programme aims to provide efficient, highly available, usable, accessible, cost-effective and secure digital and data services to internal and external users, making it easy to interact with our digital services and providing a best in class user experience and meet the DAERA digital requirements of the Regulatory Transformation Programme. This will be achieved through exploiting high impact datasets and making these available through innovative digital solutions that span across organisational boundaries, to support evidence-based policy making and increased operational service delivery effectiveness.

20 A range of other Northern Ireland Civil Service (NICS) and Departmental strategies also apply, including the NICS ICT Strategy 2017-2021; Northern Ireland: Implementing Joined-Up Governance for a Common Purpose, Organisation for Economic Co-operation and Development (OECD), 2016; Open Data Strategy for Northern Ireland 2020-2023, Making Lives Better - A Strategy for Digital transformation of Public Services 2017-2021; NI Direct and NICS Citizen Contact Strategy; and DAERA Digital Strategy 2017-2021.

Legal

21 DAERA currently delivers services under a legislative and regulatory framework comprising some 3,105 separate pieces of legislation, ranging across its full remit, including food and farming, animal and plant health, veterinary, environmental, marine and fisheries. Many of these require DAERA as the competent authority to provide assurance of compliance with regulatory standards through monitoring and surveillance science functions.

Environmental

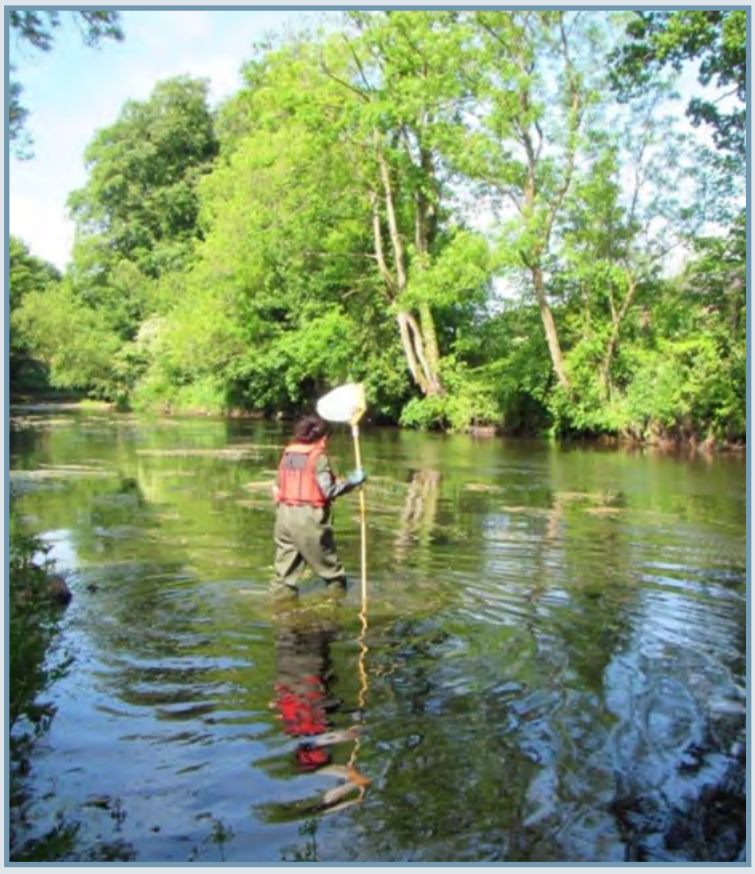
22 Northern Ireland's environment is its most important asset for its population and needs to be valued in a holistic sense. This natural capital is fundamental to the wellbeing of human, animal and plant health. Biodiversity, the variety of all living organisms in land, sea and water, is critical, as it provides our planet's life support. It maintains the balance of our ecosystems, for example, natural recycling and storing nutrients or protecting water resources. Effective care of the environment provides very real benefits in terms of improving health and wellbeing, promoting economic development and addressing the social problems which result from a poor quality environment. The environmental issues that we need to address are wide-ranging and complex, requiring innovative solutions.

23 Climate change has the potential to lead to a net loss in natural capital and negatively impact our ecosystem services,[10] resulting in species loss and habitat degradation. Science and innovation will play a key role in both mitigating the extent of climate change and adapting to its effects. The developing inter-departmental Green Growth strategy, which DAERA leads on, will guide actions across the Northern Ireland environment, economy and society to achieve net Zero GHG targets.

24 The production of food is driven by market mechanisms, some of which can create unintended environmental pressures. These can degrade stocks of natural capital and reduce the flow of beneficial environmental ecosystems services. As markets for beneficial environmental services are largely absent, this can lead to an under-supply compared to the socially optimal level.

25 It is important that we have policies in place to assure the protection and enhancement of the environment, to safeguard livelihoods, wellbeing and health. Current protection is reflected in the suite of statutory controls and international conventions, which address a wide range of environmental topics including water, waste, habitats, birds and air quality.

26 DAERA is currently developing an Environment Strategy,[11] tailored to the conditions and needs of Northern Ireland, which will consider Northern Ireland's wider international context associated with its geographical setting within Ireland, and the protection and enhancement of its particular natural resources under international frameworks.



10 Ecosystem services are the many and varied benefits that humans freely gain from the natural environment and from properly-functioning ecosystems. Such ecosystems include, for example, agroecosystems, forest ecosystems, grassland ecosystems and aquatic ecosystems. These ecosystems functioning properly provides such things like agricultural produce, timber, and aquatic organisms such as fishes and crabs. Collectively, these benefits are becoming known as 'ecosystem services', and are often integral to the provisioning of clean drinking water, the decomposition of wastes, and the natural pollination of crops and other plants.

11 DAERA Environment Strategy https://www.daera-ni.gov.uk/consultations/ESNI-Public-Discussion-Document

Summary of the Strategic Context

27 The delivery of DAERA's policy, operational and regulatory responsibilities are of fundamental importance to the environmental, economic and social well-being of Northern Ireland and its inhabitants. They are also key to Northern Ireland's ability to contribute to meeting UK net Zero GHG Emissions Targets and to the collective challenge of effectively adapting to climate change. DAERA uses science to support its responsibilities as a key enabler for informing policy development, meeting statutory obligations, measuring outcomes, providing advice and information, promoting innovation, managing risks to society and the environment and supporting rural areas, thus supporting DAERA to further its vision for ***"Sustainability at the heart of a living, working, active landscape, valued by everyone".*** DAERA is the Government competent authority for the environment and nature conservation and protection under a range of legislation applicable in Northern Ireland. Also, as the Government competent authority for sanitary and phytosanitary (SPS) controls, DAERA utilises science to underpin trade in Northern Ireland agri-food products, through assuring the health of Northern Ireland animal, plant and derivative products, and verifying their compliance with statutory and international obligations. Consequently, it is important that DAERA has a coherent strategy and associated policies for how it will use science to further its policy aims/meet its statutory duties and optimise the impact it achieves from its investment in science.

Appendix B

Key Enablers

DAERA will focus on the enablers outlined in the table below to implement the goals of this strategy.

Enabler	Function
Funding[12]	Maximising additionality, and targeted in line with DAERA's priorities.
Skills	Assuring DAERA is using appropriately skilled scientists.
Infrastructure	Having modern, fit-for-purpose facilities.
IT/Data	Maximising the use of IT and Data for science and innovation.
Governance	Having effective oversight of its science use and demonstrating value for money.
Dissemination/ Impact	Promoting end-to-end knowledge transfer/exchange and assessment of impact and value for money.
Relationships with key delivery partners	Ensuring effective co-operation and collaboration.

12 Funding includes availability of appropriate resource capability.

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