

DAERA Research and Development Strategy



To get the best R&D, at the best value and make the best use of it to support the achievement of the DAERA purpose.



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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IN PEOPLE**



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DAERA - Research and Development Strategy Our Mission

To get the best R&D; at the best value; and make the best use of it to support the achievement of the DAERA purpose.



**Best Research
& Development**



**Best
Value**



**Best
Use**



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Ministerial Foreword

My Department has a long track record of investing in Research and Development and supporting the translation of new findings into locally relevant policies, advice and education programmes.

The importance of research and development is highlighted in, and embedded throughout the Executive's draft Green Growth Strategy for Northern Ireland. Through innovation; research and development; and investment, we can lay the foundations for a green revolution, the next industrial revolution which can rejuvenate our economy following the Covid-19 crisis.

Evidence from research underpins policies and strategies which impact across all sectors, and is vital in order for us to meet challenges and realise new opportunities which lie ahead; whether they be in food; farming; waste management; sustainability; climate change; the environment; fisheries; forestry; or the development of the rural sector.

This R&D Strategy builds on the foundation provided by the Science Strategy Framework (SSF), and will work in tandem with the recently published DAERA Innovation Strategy to ensure that the research my Department invests in will be innovative, collaborative and transformative.

By collaborating and working in partnership with others in industry; research and education; and the environment and voluntary sectors, I believe we can exploit emerging opportunities and ensure that DAERA's science is robust, relevant, accessible and widely used by my Department and all our stakeholders.

I am therefore very pleased to publish this strategy, which will guide how we optimise our use of science to help deliver Departmental and Programme for Government (PfG) objectives, contribute to the furthering of international commitments and to achieve DAERA's vision for sustainability at the heart of a living, working, active landscape, valued by everyone.



Edwin Poots MLA

Minister for Agriculture, Environment and Rural Affairs



Section 1

Preface

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

A DAERA Science Strategy Framework (SSF) has been established to guide how DAERA optimises its use of science and technology to help deliver Departmental and PfG objectives. This R&D Strategy, derives from the Science Strategy Framework and is integral to its implementation.

DAERA has established a Science Transformation Programme (STP) to implement the SSF and the development of this operational strategy is an objective of it.



Section 2

Introduction

- 2.1. DAERA (and its predecessors), has a long track record of funding and carrying out research within the areas of agriculture, environment, fisheries, forestry and food. Much of this research has found its way into practical applications on farm, food processing, rural businesses, and environmental protection. Research has a vital role in regulation, both in its development and in helping measure effectiveness in protecting and benefiting people, businesses and the environment. It has also helped shape government policy on agri-food, environmental and rural affairs issues and has represented a considerable investment of government funds in the development of these important sectors.
- 2.2. DAERA sees research and innovation as central to best-practice evidence-based policy development and implementation. Funding Research creates career pathways for appropriately skilled staff to undertake science, and supports the maintenance of a pipeline of scientists across a broad range of disciplines that can be drawn on to help fulfil the DAERA purpose.
- 2.3. DAERA's responsibilities are technically complex and require high quality evidence to inform key decisions. In the context of the UK leaving the EU and the repatriation of policy development and regulation, the importance of science evidence is further enhanced. Furthermore, collaborative research funding, particularly with international partners, represents a significant 'soft power'¹ asset for DAERA, and contributes to international relationship building.
- 2.4. This operational strategy applies across the DAERA remit of agri-food; environment; fisheries; forestry; and rural affairs, and is integral to cross cutting sustainability, climate change and Green Growth policies. Going forward, DAERA's sectoral strategies and policy frameworks will further embed R&D as a key tool in promoting the integrity, efficiency and quality of our land and sea produce and associated terrestrial and aquatic environments.



What is Research & Development?

- 2.5. An internationally recognised definition for scientific activities which constitute R&D is agreed by the Organisation for Economic Co-operation and Development (OECD), and is described in the Frascati Manual (latest version 2015)². The Manual states that: *Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture*

¹ 'Soft power' is defined as a persuasive approach to international relations, typically involving the use of economic or cultural influence.

² Frascati manual definition of R&D [Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development \(oecd-ilibrary.org\)](https://www.oecd-ilibrary.org/frascati-manual-2015)



and society - and to devise new applications of available knowledge. This definition is used by HM Treasury; UK Research and Innovation (UKRI); and UK government departments in policies relating to science funding and R&D tax credits.

- 2.6. R&D is always aimed at new findings, based on original concepts (and their interpretation) or hypotheses. R&D activities directly contribute to achieving advances in science or technology through the resolution of scientific or technological uncertainty³ For an activity to be considered R&D, it must satisfy core criteria. It must be: novel; creative; uncertain; systematic; transferable and/or reproducible (Frascati Manual 2015).
- 2.7. The way in which R&D activity is funded, and the products of that activity, are distinct and different from other science activities which are non-R&D. HM Treasury consolidated budget guidance⁴ permits R&D to be funded from 'capital' budgets, while non - R&D funding is funded from 'resource' budgets⁵.
- 2.8. In general terms; the purpose of R&D is to extend knowledge (e.g. peer reviewed scientific publications, papers at scientific conferences); and/or development of new knowledge which can be turned into usable products and services. R&D is distinct from Monitoring and Surveillance (M&S) science, which DAERA is addressing in a separate operational strategy.⁶
- 2.9. Innovation often draws on R&D, but R&D is not always part of the activity of innovation. The DAERA Innovation strategy⁷ describes the Department's future intention to develop an innovation ecosystem, an important part of which is innovation-focused R&D which is covered by this strategy.
- 2.10. DAERA research funding is currently focused primarily on 'applied' and 'experimental development' research activities⁸. This is in recognition of the role of other public funders of more basic research and the principles and goals within DAERA's Science Strategy Framework which guides the Department's relatively modest research funding budget (in a national and international context), to deliver maximum impact within a reasonable timeframe to meet strategic policy objectives.
- 2.11. DAERA provides; uses; manages; and commissions a range of science activities, some of which have an element of R&D combined with M&S and/or non-R&D innovation. For example, scientific data sets may be developed and maintained to provide strategic evidence which supports R&D projects, but that component of the work could be classified as M&S science.⁹ In such cases, DAERA classifies the project from a budgetary perspective in line with the corresponding primary science activity.¹⁰

³ <https://www.gov.uk/guidance/corporation-tax-research-and-development-rd-relief>.

⁴ [2021-22_CBG_For_Publication.pdf \(publishing.service.gov.uk\)](#)

⁵ Following the introduction of the 2010 European System of Accounts (ESA 10), expenditure on R&D is treated as 'capital' rather than 'resource' within national accounts.

⁶ M&S (non R&D) science is defined in the Frascati Manual. A separate DAERA M&S strategy is currently under development.

⁷ [DAERA Innovation Strategy 2020-2025 | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

⁸ Basic research; Applied research and Experimental development are defined in the Frascati Manual 2015.

⁹ In such cases, an assessment is made of whether the primary science activity aligns with the Frascati definition of R&D and HM Treasury rules on Qualifying Expenditure and Qualifying Indirect Activities which can be classified R&D spend for budgeting purposes.

¹⁰ If the primary activity is R&D the project is funded from a 'capital' budget, if the primary activity is non-R&D, it is funded out of a 'resource' budget.



2.12. The Mission of this Strategy is *to get the best R&D (informed, influential science from high quality impartial scientists¹¹); at the best value; and make the best use of it to support the achievement of the DAERA purpose.*

2.13. The R&D Strategy outlines three main goals related to achieving this mission:

- (i) DAERA gets the best R&D;
- (ii) DAERA gets the best value from its R&D; and
- (iii) DAERA gets the best use from its R&D.

What we define as best R&D, best value from R&D and best use of R&D is defined in Section 6 of this strategy.



¹¹ High quality science 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.



Section 3

Strategic context

- 3.1. R&D is a key element of many high level science strategies globally, at EU and UK levels, in local and central government and within DAERA itself. This is why it is identified as a critical operational element of the DAERA Science Strategy Framework.
- 3.2. On Climate Change, Northern Ireland is adopting a Green Growth approach: bringing conversations about the economy, the environment, and climate crisis together to show the benefits of tackling it collectively. DAERA is leading the development of the NI Executive's holistic Green Growth Strategy, a multi-decade strategy which will set out the long-term vision and a solid framework for addressing climate change in the right way by balancing climate action with environmental and economic considerations. Green Growth is supported by the Environment Strategy¹² and actions to protect air, land, water and biodiversity.
- 3.3. The Future Agricultural Policy Framework Portfolio for Northern Ireland¹³ and The Northern Ireland Food Strategy Framework,¹⁴ are both part of the cross-departmental approach to Green Growth.
- 3.4. The Future Agricultural Policy Framework Portfolio for Northern Ireland aims to develop a framework that is better suited to local needs and one that will underpin long term sustainability within the industry. The framework's vision for future agricultural policy is defined around four desired outcomes:
 - Increased efficiency and productivity;
 - Improved resilience;
 - Environmental sustainability; and
 - A responsive supply chain.
- 3.5. The draft Northern Ireland Food Strategy Framework proposes a new strategic long term collaborative approach to food (a food systems approach). It proposes a long term vision, high level principles and areas for strategic focus, which will seek to optimise cross departmental working on food matters to deliver Programme for Government and departmental objectives.
- 3.6. Circular systems employ reuse, sharing, repair, refurbishment, remanufacturing and recycling to create a closed-loop system, minimising the use of resource inputs and the creation of waste, pollution and carbon emissions. The circular economy aims to keep products, equipment and infrastructure in use for longer, thus improving the productivity

¹² [Environment Strategy for Northern Ireland - Public Discussion Document | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](https://daera-ni.gov.uk)

¹³ [21.22.086 Future Agriculture Framework final V2.PDF \(daera-ni.gov.uk\)](https://daera-ni.gov.uk)

¹⁴ [21.22.076 NI Food Strategy Framework Consultation V3.PDF \(daera-ni.gov.uk\)](https://daera-ni.gov.uk)



of these resources. All “waste” should become “food” for another process: either a by-product, as a recovered resource for another industrial process or, as regenerative resources for nature (e.g., compost). This regenerative approach is in contrast to the traditional linear economy, which has a “take, make, dispose” model of production. NI will seek to take advantage of opportunities that will arise from our transition to a greener, more sustainable economy. This is a guiding principle set by the Department for the Economy in its, 10x Economy vision.¹⁵

- 3.7. The first draft of the UN Convention on Biological Diversity global biodiversity framework (CBD) guides necessary actions worldwide through 2030, to preserve and protect nature and its essential services to people¹⁶. The framework builds on the Strategic Plan for Biodiversity 2011-2020 and sets out an ambitious plan to implement broad-based action to bring about a transformation in society’s relationship with biodiversity, ensuring that by 2050 the shared vision of ‘living in harmony with nature’ is fulfilled.
- 3.8. The One Health concept recognises that the health of people is closely connected to the health of animals and our shared environment. An understanding of the changing interactions between people, animals, plants and our environment is becoming increasingly important in the context of growing and expanding world populations; climate change and land use; and the spread of endemic and zoonotic diseases.
- 3.9. The proposed Northern Ireland Animal Health and Welfare Strategic Framework aims to provide an overarching and integrated approach to animal health and welfare programmes and activities in NI. It is proposed that the Framework should have a 10 year lifespan and adopt the following five animal health and welfare outcomes;
 - We keep our animals healthy and treat them well;
 - We have a competitive, innovative livestock industry that contributes to our economic prosperity;
 - We protect public health and our food from animal related disease;
 - We take a sustainable approach to farming of animals that respects the environment; and
 - We have animal health and welfare safeguards that are widely recognised and trusted.
- 3.10. In the context of the UK’s departure from the EU, DAERA is developing a range of new policy frameworks focussing on NI needs. Timely and high quality science evidence to support this policy development and underpin statutory requirements is essential.

A summary of the R&D related strategic context is outlined in Appendix A.

The strategic fit of the R&D Strategy within existing DAERA policies is provided in Appendix B.

¹⁵ A 10x Economy (economy-ni.gov.uk)

¹⁶ [First Detailed Draft of the new Post-2020 Global Biodiversity Framework \(cbd.int\)](https://www.cbd.int/doc/default/cbd-int-2020-02-01-01-en.pdf)





Section 4

Key drivers for change

Where we are now

- 4.1. To inform the development of this strategy, a high-level SWOT (Strengths, Weaknesses, Opportunities and Threats) assessment was undertaken for R&D in areas for which DAERA has responsibility (Appendix C). The key drivers for change arising from the SWOT are outlined in this section.
- 4.2. DAERA and its predecessor departments, had a range of approaches to R&D in terms of how needs were identified and prioritised; how 'in-house', arms-length¹⁷ and external science providers were engaged; how work was commissioned; and how projects were monitored and evaluated. To get the best R&D at best value, we need a coherent new approach which is understood across the whole of DAERA, and which enables more effectively 'join-up' between NI government Departments.
- 4.3. DAERA currently has a number of well-established and successful R&D programmes, namely:
 - The DAERA-directed AFBI Research Work Programme (AFBI);
 - The DAERA Postgraduate Studentship Scheme; and
 - The industry-led DAERA Research Challenge Fund;

Until 2014, the Northern Ireland Environment Agency (NIEA) funded the Natural Heritage Research partnership at QUB, which is one of a number of stand-alone arrangements NIEA had to support R&D prior to the formation of DAERA. There were similar arrangements with Scottish Environmental Protection Agency through the Scotland and Northern Ireland Forum for Environmental Research¹⁸, which has evolved into the five agencies Shared Agencies Regulatory Evidence Programme (SHARE)¹⁹. We will achieve the best R&D at best value by building on existing R&D programmes and by strengthening cohesion through centralised co-ordination. This will help ensure that all parts of DAERA can access the R&D they need.

- 4.4. The Evidence and Innovation Strategy (EIS) updated for 2015-17 (EIS 2015-17)²⁰, set out a high level framework for DARD research, as well as commissioning processes and governance structures to manage R&D during the transition to a new Department (DAERA). That framework continues to guide our current approach to DAERA R&D. To get the best R&D at best value, new approaches to identifying and prioritising research

¹⁷ DAERA sponsors a non-departmental public body, the Agri-Food Biosciences Institute to undertake a range of science services in the areas outlined in the Agriculture (NI) order 2004, including research and development.

¹⁸ SNIFFER - <https://www.sniffer.org.uk/>

¹⁹ Shared Agencies Regulatory Evidence Programme - <https://www.sepa.org.uk/about-us/how-we-work/our-research/five-agencies-share-programme/>

²⁰ <https://www.daera-ni.gov.uk/sites/default/files/publications/dard/evidence-and-innovation-strategy-2015-17final.pdf>



needs are required, as well as appropriate governance structures and commissioning arrangements to ensure that all parts of DAERA can access the R&D they need.

4.5. Significant benefit is currently being achieved through the collaborative research programme co-funding partnerships with:

- The Department of Agriculture, Food and the Marine (DAFM);
- The US Department for Agriculture;
- Science Foundation Ireland (SFI); and
- Biotechnology and Biological Sciences Research Council (BBSRC).

These partnerships allow DAERA to access the best relevant science through the development of innovative, collaborative science capability and capacity in NI. DAERA's responsibilities are technically diverse and increasing complex, so building and adding to DAERA collaborative funding partnerships will be essential to achieving access to the best R&D at best value going forward.

4.6. A significant proportion of the research commissioned to deliver the EIS 2015-17 has been through the DAERA-Directed Evidence and Innovation Programme undertaken by the AFBI.²¹ To get the best R&D at best value from AFBI, we need to ensure that we have the most appropriate commissioning arrangements in place, operating efficiently and effectively.

4.7. DAERA's R&D programmes produce significant numbers of scientific outputs, in terms of academic papers, technical guidance and knowledge transfer outputs. To achieve best use of DAERA R&D, we must optimise use of science outputs and data through dissemination, education and innovation.



²¹ AFBI is a Non-Departmental Public Body (NDPB) established by the Agriculture (Northern Ireland) Order 2004. Article 4(1) of that Order requires AFBI to carry out such scientific work as may be assigned to it by DARDNI (now DAERA), which includes the Evidence and Innovation Programme. Each financial year DAERA and AFBI agree the Institute's proposed activities in an Assigned Work Programme.



Section 5

Principles for a new R&D science system.

Where we want to get to

- 5.1. The vision from the Science Strategy Framework (SSF) is that DAERA science will be innovative, collaborative and transformative. It seeks to bring a coherent approach to DAERA's science, which is essential to support effective DAERA policy development and implementation. It provides a vision for DAERA science and includes high level principles to be adopted and challenging goals to be achieved.
- 5.2. The Mission of this Strategy is to get the best R&D (*informed, influential science from high quality impartial scientists*); *at the best value; and make the best use of it to support the achievement of the DAERA purpose.*

What?

- 5.3. DAERA will optimise the value of the investment it makes in science to inform policy development; meet statutory obligations; measure outcomes; promote innovation; and manage risks to society and the environment in Northern Ireland. R&D funded by DAERA will support the development and implementation of strategies and policies across the DAERA remit, and help maintain and build scientific capacity in disciplines vital to achievement of the DAERA purpose.

Why?

- 5.4. Research provides transparent, robust and impartial evidence. Scientists provide expertise and capability to inform decision-making.
- 5.5. Research provides new knowledge and novel insights (supporting an innovation ecosystem through high quality R&D) and enables the development, measurement of effectiveness, and evaluation of, evidence based strategies and policies (developing a strong evidence base); assurance of compliance with statutory requirements; the development of innovative applications; and the management of risk.
- 5.6. It enables DAERA to develop national scientific capacity and capability in areas required to fulfil the DAERA purpose through funding early-career researchers (e.g. PhD studentships and post-doctoral positions), and supporting industry-led collaborative research.

How?

- 5.7. DAERA will seek to optimise the value of its investment in R&D science, and ensure it is of the best quality (*informed, influential science from high quality impartial scientists²²*) through always:

²² High quality science 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.



- Commissioning R&D transparently, and wherever appropriate on a competitive basis²³;
- Engaging with stakeholders to inform a comprehensive and accurate understanding of its evidence needs and opportunities for innovation;
- Evaluating R&D investment through assessing the impact of science outcomes on the environment; society; human capacity and skills; green economy; public policy; and health and wellbeing of people, and animal welfare.
- Prioritising 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.
- Commissioning R&D on the basis that data and findings will be accessible and usable, with results made available as early and as widely as possible.



²³ In implementing this strategy, a policy will be developed to guide which R&D DAERA requires its Arms-Length Bodies to deliver to maintain core Departmental functions and therefore would not be appropriate for commissioning on a competitive basis (e.g. R&D to maintain Emergency Response Capability).



Section 6

DAERA R&D Strategy - an operational strategy of the DAERA Science Strategy Framework

To address the issues outlined above, DAERA will adopt the following:

The R&D Strategy Mission

- 6.1. To get the best R&D (*informed, influential science from high quality impartial scientists²⁴*); at the best value; and make the best use of it to support the achievement of the DAERA purpose.

R&D Strategy Scope

Best R&D

- 6.2. DAERA needs to have the best R&D, informed by need, from high quality impartial scientists, and influential in delivering impact. To achieve this, DAERA needs to develop a more intelligence-led approach to determining which R&D projects it funds. In simple terms, this means new targeted approaches to identifying and prioritising evidence needs, while being open to the opportunities innovation can offer.
- 6.3. Becoming a more intelligent customer of R&D means DAERA needs to have better engagement with its key stakeholders. Better engagement will help overcome some of the barriers identified in the DAERA innovation strategy,²⁵ (which include *insufficient market intelligence; poor communications infrastructure; and failure to identify opportunities*).
- 6.4. DAERA will secure the best R&D through better forward-planning its investments, and through clear articulation of its strategic science priorities. To help achieve the right balance between ‘policy-led’ and ‘discovery-led’ R&D, DAERA will develop, maintain and publish Areas of Research Interest (ARIs) documents and Evidence Plans.²⁶
- 6.5. ARIs will be developed using best practice recommended UK Government Office for Science guidance²⁷, and be led by the DAERA Chief Scientific Adviser and Heads of Professions with support from a new DAERA High Level Science Advisory Group to secure the correct breadth and depth of investment. ARIs will help bring focus to our approach to ‘discovery-led’ R&D and be the basis of a future DAERA R&D Innovation programme. That programme will also be guided by the Priority Overarching Themes set

²⁴ High quality science 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.

²⁵ [DAERA Innovation Strategy launched | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

²⁶ Addressing Recommendation 5 of [Tailored Review of AFBI Tailored review of AFBI review report | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

²⁷ [Chief Scientific Advisers and their officials: an introduction \(publishing.service.gov.uk\)](#)



out in the DAERA Innovation Strategy 2021-2025, namely: *Big Data, Artificial Intelligence (AI) and Transformative Bioeconomy*²⁸.

- 6.6. Good evidence plans will be those which carry the support of relevant scientific, industry and sector stakeholders who have been meaningfully engaged in their development. These plans will enable a clearer line of sight between the science evidence DAERA is investing in, and the policies and other work which benefit from it. Policy and thematic areas covered by new evidence planning processes will align with, but not be limited to, DAERA Strategic Objectives and draft Programme for Government objectives. They will be suitably flexible to include potential future needs identified through horizon scanning.
- 6.7. These evidence plans will be the basis for a future DAERA R&D Evidence programme²⁹ and complimentary Monitoring & Surveillance science commissioning; and will support business cases for the maintenance of strategic evidence and data sets (including biological recording and environmental data sets).
- 6.8. DAERA will prioritise evidence needs and opportunities for innovation in both its future Evidence and Innovation R&D programmes. Prioritisation will be based on importance, urgency and potential cost³⁰, and will include an assessment of the most appropriate way to obtain the science services required to address identified needs

Best value

- 6.9. DAERA will achieve best value by commissioning its R&D from the most appropriate providers through greater use of competitive commissioning processes wherever appropriate³¹, and seek to leverage its investments with other funders where possible. This will create new opportunities for a range of research organisations to bid for funding either separately or collaboratively.
- 6.10. Commissioning processes will recognise that the nature and type of research required to address innovation is often quite different from that required to provide evidence to achieve the DAERA purpose. DAERA will consider if 'policy-led' or 'discovery-led' R&D is likely to achieve the required impacts; and tailor its approach to commissioning accordingly. When planning its investments, DAERA will use 'ring-fenced' R&D budgets where necessary.
- 6.11. Going forward, DAERA will derive additional assurance of best value through the use of independent peer-review panels in commissioning processes. These panels will rank proposals by merit and impact potential and will be integral to processes for selecting the best R&D to address DAERA priorities. Peer-review will help ensure DAERA has accountability and impartiality around how funding decisions are made.

²⁸ [DAERA Innovation Strategy launched | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

²⁹ Addressing Recommendations 8 and 13 of Tailored Review of AFBI [Tailored review of AFBI review report | Department of Agriculture, Environment and Rural Affairs \(daera-ni.gov.uk\)](#)

³⁰ DAERA is developing new policies on how science needs are identified, and on commissioning R&D science.

³¹ In implementing this strategy, a policy will be developed to guide which R&D DAERA requires its Arms-Length Bodies to deliver to maintain core Departmental functions and therefore would not be appropriate for commissioning on a competitive basis (e.g. R&D to maintain Emergency Response Capability).



- 6.12. A new fit-for-purpose digital-platform based commissioning, monitoring, management and reporting processes will be implemented to track expenditure and ensure that all DAERA science (including R&D) is delivered effectively, efficiently and demonstrates value for money.

Best use

- 6.13. DAERA will ensure best use of its R&D by ensuring through its commissioning and management of its research portfolio that the data and written outputs are of a high quality and are accessible both within the DAERA family, and with any interested stakeholders.
- 6.14. DAERA will ensure best use of its R&D through a more explicit focus on measuring and monitoring impact. A new Impact Evaluation Framework will be developed and embedded into the R&D project lifecycle from the beginning so that impact can be more clearly forecast and measured. (Appendix D). It will develop new fit-for-purpose metrics and measures to ensure its R&D programmes deliver impact
- 6.15. DAERA will optimise the use of research through active engagement in dissemination, and communicating key messages, results and data through CAFRE education programmes and innovation networks. It will publish data sets in line with the DAERA Data Strategy and the effective dissemination of high quality scientific outputs.





Section 7

Goals

- 7.1. The R&D Strategy outlines three main goals related to getting the best R&D, at the best value and make the best use of it to support the achievement of the DAERA purpose.
1. DAERA gets the best R&D.
 2. DAERA gets the best value from its R&D.
 3. DAERA gets the best use from its R&D.

Goal 1 - Best R&D

- i) We get the best quality R&D, informed by need, from high quality impartial scientists, and influential in delivering impact.
- ii) We engage better with our key stakeholders and become more intelligent customers of R&D.
- iii) We forward plan our investments in R&D, and use 'ring-fenced' budgets to achieve the right balance between 'policy-led' and 'discovery-led' R&D.
- iv) We publish Areas of Research Interest and Evidence Plans, and use these to guide our commissioning of future R&D Evidence and Innovation programmes.
- v) We use our investments in R&D to develop innovative, collaborative science capability in NI.

Goal 2 - Best value from R&D

- i) Wherever appropriate, we seek to leverage additional funding when commissioning R&D.
- ii) We continue to commission R&D transparently, and wherever appropriate on a competitive basis, encourage research organisations to bid for funding either separately or collaboratively.
- iii) We develop an end-to-end commissioning, monitoring and evaluation system and utilise independent peer-review panels to make us a more intelligent customer.

Goal 3 - Best use of R&D

- i) We make the outputs of R&D science more accessible within the DAERA family, and with wider stakeholders including the general public.
- ii) By default, we make science data available in line with the DAERA Data Strategy.
- iii) We get best value and impact from R&D science by measuring performance and impact more regularly, and more systematically.
- iv) We optimise the use of research through dissemination, education and innovation.



Section 8

Milestones

8.1. Milestones associated with Goal 1 - Best R&D:

- By December 2022 DAERA will develop a new evidence planning process and publish evidence plans related to key DAERA strategic objectives, and use these to guide our future Evidence R&D programme.
- By March 2023 DAERA will develop and publish annual Areas of Research Interest; and will use these to guide our future Innovation R&D Programme.

8.2. Milestones associated with Goal 2 - Best value from R&D are:

- By December 2022 we will establish and utilise independent peer-review panels as part of all of our commissioning processes.

8.3. Milestones associated with Goal 3 - Best use of R&D:

- By November 2021 we will launch a DAERA Knowledge Hub which will allow stakeholders to be better informed by a good understanding of past and current DAERA science investments.
- By June 2022 all data from DAERA funded R&D will be published in line with the DAERA Science Data policy.
- By September 2022 we will develop and implement a new R&D impact evaluation framework; and it will be employed by CSA Office.





Section 9

Benefits

9.1. The benefits of implementation of this R&D Strategy by DAERA are detailed in Table 3:

Table 1: Benefits of implementation of this R&D Strategy by DAERA.

Benefit	Examples of impact
Benefit 1: Improved customer service (DAERA)	<p><i>benefits to customers, such as;</i></p> <ul style="list-style-type: none"> - Improved policy development and advice. - Improved transparency and availability of data and evidence.
Benefit 2: Improved staff experience	<p><i>benefits to staff such as;</i></p> <ul style="list-style-type: none"> - Increased productivity, better integration, improved staff awareness, better working environment and ways of working, improved investment in training, making DAERA Science a great place to work.
Benefit 3: Improved value for money (Monetary benefit)	<p><i>benefits in use of public money, such as:</i></p> <ul style="list-style-type: none"> - Increased investment and better budget utilisation. - Improved effectiveness (outcomes - tracking benefits, return on investment, reach and impact of investment). - Increased draw-down of external, competitive funding by R&D providers; and - Increased impact from investment in R&D by relevant sectors.
Benefit 4: Improved science performance and management	<p><i>benefits in internal management, such as;</i></p> <ul style="list-style-type: none"> - Improved strategic alignment. - Better internal management. - Improved commissioning, focus on science excellence and delivery against needs, greater assurance, better decision making. - Better IT and systems.
Benefit 5: Improved collaboration and strategic alliances	<p><i>benefits in use of networks such as;</i></p> <ul style="list-style-type: none"> - Improved collaboration both internally and externally, building brand as a trusted partner in NI and across UK/Europe/Globally (soft power assets), improved skills transfer and development.



- 9.2. Baselines to facilitate measurement of benefits of this R&D will be established at an early stage of strategy implementation. Qualitative and quantitative measures will be included within the subsequent monitoring and evaluation of strategy.
- 9.3. The R&D strategy runs from 2022 to 2026. A DAERA R&D Report will be produced at the mid and end points of strategy implementation and will include:
- an evaluation of progress against goals and milestones to ensure the strategy is on track for delivery and that necessary adjustments can be made in a timely manner; and
 - Recommendations for future actions and policy direction.
- 9.4. A systematic evaluation will also be carried out on this strategy at the end of its term (2026) to inform future needs.



Section 10

Key actions to achieve goals

10.1 The essential components needed to improve R&D and achieve the goals outlined in Section 7 have been considered. These are shown in:

Figure 3 - Key actions to achieve Best R&D, Best value and Best use Goals





Section 11

Rural needs considerations

- 11.1 DAERA has a statutory duty to screen decisions to consider the likely impacts of the proposed decisions on rural areas. A rural needs assessment has been completed.
- 11.2 While potential impacts of the strategy on rural areas have been identified, the Rural Needs Assessment template is a living document and will be reviewed regularly.

Section 12

Equality considerations

- 12.1 A High Level Impact Assessment has been completed for this R&D Strategy, 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. This is in line with the DAERA Equality Scheme.





Section 13

Abbreviations

AFBI	Agri-Food and Biosciences Institute
AI	Artificial Intelligence
ARI	Area of Research Interest
BBSRC	Biotechnology and Biological Sciences Research Council
CAFRE	College of Agriculture, Food and Rural Enterprise
CBD	UN Convention on Biological Diversity
CSA	Chief Scientific Advisor
CSAO	Chief Scientific Advisor's Office
DAERA	Department of Agriculture, Environment and Rural Affairs
DAFM	Department of Agriculture, Food and the Marine
DARD	Department of Agriculture and Rural Development
DDARWP	DAERA Directed AFBI Research Work Programme
DOE	Department of the Environment
E&I	Evidence and Innovation
EIS	Evidence and Innovation Strategy
EU	European Union
M&S	Monitoring and Surveillance
NDNA	New Decade New Approach
NDPD	Non Departmental Public Body
NI	Northern Ireland
NIEA	Northern Ireland Environment Agency
OECD	Organisation for Economic Co-operation and Development
PfG	Programme for Government
PhD	Doctor of Philosophy
R&D	Research and Development
SEPA	Scottish Environmental Protection Agency
SFI	Science Foundation Ireland
SHARE	Shared Agencies Regulatory Evidence Programme
SSF	Science Strategy Framework



STP	Science Transformation Programme
SWOT	Strengths, Weaknesses, Opportunities and Threats
UK	United Kingdom
UKRI	United Kingdom Research and Innovation
US	United States
VfM	Value for Money



Appendix A

Summary of the strategic context for the DAERA R&D Strategy.

Strategy/Policy	Description and strategic fit with wider national, EU and world strategies
Programme for Government 2016-2021)³²	<p>The Northern Ireland Executive's draft Programme for Government (PfG) 2016 - 2021 outlines priorities to be delivered in Northern Ireland for the purpose of <i>'improving wellbeing for all - by tackling disadvantage and driving economic growth'</i>. This includes a range of priorities relevant to DAERA, including those focused on 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, work, visit and invest (Outcome 10).</p>
Innovate NI, Innovation Strategy for Northern Ireland 2014 - 2025)³³	<p>The Innovate NI strategy takes forward the <i>'Stimulating innovation research and development and creativity'</i> theme identified in the Northern Ireland Economic Strategy 2012. Innovate NI aims to stimulate a step change in innovation across the economy. This strategy also highlights the fact that skills, design and collaboration between sectors locally, nationally and internationally are essential for innovation.</p>

³² Northern Ireland Executive (2016), Draft Programme for Government 2016-2021.

³³ Northern Ireland Executive (2014), Innovate NI: Innovation Strategy for Northern Ireland 2014 -2025.



Appendix B

Summary of the strategic fit of the R&D Strategy within existing DAERA policies.

Strategy/Policy	Description and strategic fit within DAERA policies
DAERA's Vision	<i>Sustainability at the heart of a living, working, active landscape valued by everyone. Research and development is a key enabler for the achievement of this vision. DAERA will put a significant focus on encouraging and supporting research and development across the breadth of its remit.</i>
DAERA Science Strategy Framework³⁴	DAERA's Science Strategy Framework (SSF) envisages the science secured and used by DAERA will be innovative, collaborative and transformative, supporting a healthy and sustainable economy, environment and rural community, helping deliver the Programme for Government outcomes and contributing to a sustainable, living, working active landscape valued by everyone. A goal of the SSF is that DAERA optimises its investment in science. R&D is identified as a critical operational element of the SSF and therefore the implementation of a research and Development Strategy to encourage and support R&D commissioning, will benefit knowledge generation, exchange and exploitation.
DAERA Knowledge Framework³⁵	This aims to ensure that individuals, organisations and businesses within the agri-food industry have access to high quality, relevant and accessible education, training and technology exchange provision to improve productivity, resilience, environmental performance and sustainability. It makes a commitment that the enhancement of knowledge and skills will be an integral component of any of DAERA's policy interventions, and acknowledges that investment in science and support of research and development can only generate a return if its outcomes are communicated through education and lifelong learning and adopted by industry.
Sustainability for the future - DAERA's Plan to 2050³⁶	This strategy aims to reform the farming and agri-food sectors supporting them to become more productive, sustainable and profitable through funding and promoting resource efficiency through working collaboratively with industry to grow using science, research and development , innovation and education to increase responsiveness, stimulate efficiencies and minimise waste throughout the food chain leading to increased resilience and ensuring a continued supply of food.

³⁴ DAERA (2020), Science Strategy Framework.

³⁵ DAERA (2019), Knowledge Framework.

³⁶ DAERA (2021), Sustainability for the future- DAERAs plan to 2050.



Strategy/Policy	Description and strategic fit within DAERA policies
DAERA Innovation Strategy 2021-2025³⁷	DAERA is a science based, data driven department, which invests around a quarter of its annual budget on science services. These services involve monitoring and surveillance testing and research and development (R&D). Science outputs from research and development are used to inform policy development, meet statutory obligations, measure outcomes, provide advice and information, manage risks to society and the environment, support rural development and promote innovation.
Environment Strategy for Northern Ireland (Draft)³⁸	Research and development , radical approaches and solutions to environmental issues, are identified as key drivers to support the development of a strong, competitive, sustainable economy and the sustainable use of resources.
Northern Ireland Future Agricultural Policy Framework (Draft)³⁹	A Productivity Grand Challenge approach towards science and research and development is an important driver of long term productivity growth, aiming to secure more value from existing and additional resources, including use of a multi-factor approach of science, R&D, knowledge transfer, education, policy and industry.
NI Food Strategy Framework	Research and Development is necessary to ensure the realisation of the vision of to a transformed food system that protects natural resources for future generations, is economically and environmentally sustainable and provides safe, nourishing, accessible food to people, who make informed healthy choices.
NI Executive Green Growth Strategy and Climate Action Plan (In Production)	This framework will provide the strategic context for research and development , innovation, capital support, investment and competition that can give rise to new sources of economic growth, while using science for solutions in building resilient ecosystems and aims to transform society towards net zero by 2050.
Rural development framework 2014-2020⁴⁰	Science and research and development play a key role in informing the knowledge and evidence base required to improve and promote the development and regeneration of rural communities.
Animal health and Welfare Framework⁴¹	This strategy outlines the importance of multidisciplinary approach to research and development that will inform policy and practice and strengthen the role of commissioners and regulators to drive improvements in both animal and human health.

37 DAERA (2021), Innovation Strategy.

38 DAERA (2019), Environment Strategy for Northern Ireland - Public Discussion document.

39 DAERA (2018), Northern Ireland Future Agricultural Policy Framework.

40 DAERA (2014), Rural Development Programme 2014-2020.

41 DAERA (2019), Animal Health and welfare framework (draft).



Strategy/Policy	Description and strategic fit within DAERA policies
NI Forestry - A Strategy for Sustainability and Growth⁴²	The Forest Service is committed to continuing in its role as the major source of advice on forestry and promoting the use of forests and forest products. Research and development focuses on how more forests can be created and informs the knowledge and evidence base required for the sustainable management of existing forests.
Biodiversity Strategy⁴³	This strategy sets out how Northern Ireland plans to meet its international obligations and local targets to protect biodiversity and ensure that the environment can continue to support our people and economy. Research and development is key to addressing gaps in knowledge about where habitats and ecosystems are and how they are changing.
Peatlands Strategy 2021-2040 (Issued for Consultation)	Ecosystem services provided by healthy peatlands, include climate regulation and adaptation, specialised biodiversity, good water quality, flood alleviation and a historical archive. Peatlands also provide a unique landscape for recreation and education. Research and development is essential to compile evidence to inform the development of peatland restoration and management plans and identify evidence gaps that require further research.
Sustainable Agricultural Land Management Strategy⁴⁴	The implementation of this strategy provides a robust, scientifically sound evidence from research and development to address agricultural land sustainability.
Future Clean Air Strategy⁴⁵	This strategy aims to improve air quality in NI, reducing atmospheric pollution from all sources, including emissions from agriculture, industry, transport and in the home. Evidence provided from research and development will inform and expand our knowledge base.
Ammonia Strategy (In Preparation)	Continuing research and development is necessary to mitigate the challenging and detrimental effects of ammonia emissions, this strategy will highlight the approaches required by to alleviate this complex issue.

⁴² DARD (2006), A strategy for sustainability and growth.

⁴³ DOE (2015), A Biodiversity Strategy for Northern Ireland to 2020.

⁴⁴ DAERA (2016), Delivering Our Future, Valuing Our Soils: A Sustainable Agricultural Land Management Strategy for Northern Ireland.

⁴⁵ DAERA (2020), Clean Air Strategy for Northern Ireland- A Public Discussion Document.



Strategy/Policy	Description and strategic fit within DAERA policies
Northern Ireland Third Cycle River Basin Management plan 2022-2027 (Issued for Consultation)	Research and development is required to provide a robust evidence base on which to assess effectiveness of future mitigation measures, and their social/economic consequences on the aquatic environment. It is also required to model and predict the impacts of changing climate, natural recovery, and timescales for outcomes of interventions. Finally it will assist in the development of new technologies such as remote sensing as part of innovative monitoring strategies.
Marine Strategy⁴⁶	This strategy aims to achieve the UK wide vision for clean, healthy, safe, productive and biologically diverse seas. Gathering information through research and development will help us bridge knowledge gaps in order to ensure the healthiest state possible for the seas around NI.
NI Marine Litter Strategy⁴⁷	This strategy seeks to deliver appropriate and reliable evidence through research and development which will inform policy development and help monitor progress towards realising the vision of “clean, healthy, safe, productive and biologically diverse oceans and seas”.
NI Inshore Fisheries Strategy⁴⁸	In order to make better informed management and investment decisions, existing gaps in inshore fisheries data need addressed by research and development to provide more accurate, complete and relevant data to enable stakeholders.
NI Climate Change Adaptation programme⁴⁹	Climate change will have far-reaching impacts on our society and communities, our way of life, our businesses and services, our economy and our natural environment. This strategy outlines the importance of research and development in providing evidence to determine future actions.
Circular Economy Strategy⁵⁰	This policy framework identifies steps for the reduction of waste and establishing an ambitious and credible long-term path for waste management and recycling. Robust evidence from research and development is key to achieving this.

46 DEFRA (2012), UK Marine Strategy Part 1.

47 DOE (2016), Northern Ireland Marine Litter Strategy.

48 DARD (2014), Northern Ireland Inshore Fisheries: Delivering a sustainable future.

49 DAERA (2019), Northern Ireland Climate Change Adaptation Programme 2019-2024.

50 DAERA (2020), Circular Economy policy statement.



Appendix C

DAERA Science Policy for R&D SWOT

DAERA R&D

People/Resources

Strengths:

- DAERA has well-established research programmes and funding arrangements to build on, including established collaborative R&D funding partnerships.
- A well-established DAERA PhD studentship programme.
- In most areas, strong linkages between policy makers and academia, and intra-departmental science working relationships.
- Breadth of expertise available locally which can meet the majority of DAERA research and innovation needs.
- Having a science non-departmental public body (AFBI) which allows DAERA to flexibly direct resources between R&D and M&S work quickly when necessary to meet emerging departmental priorities.

Weaknesses:

- Some gaps in expertise and/or limited capacity in NI to address DAERA evidence and innovation needs.
- In some areas, DAERA has research needs but insufficient R&D funding is being applied to address those needs.
- In some areas, scope to improve linkages between policy makers and academia, and intra-departmental science working relationships.
- Limited external peer review of DAERA-directed AFBI research proposals (science and policy evaluations are currently undertaken by DAERA officials).
- Narrow perspective on research impact in current assessment and evaluation of R&D proposals (primary focused on VfM.).
- Budgetary and administrative processes can mean significant lead-time into the development of new research funding initiatives.



DAERA R&D

People/Resources

Opportunities:

- Scope to encourage more collaborative approaches to R&D through stronger linkages with other government and research council funders.
- Potential to build on and further develop science networking and stakeholder engagement.
- Potential to build on and improve evidence planning processes to help DAERA better identify and articulate its needs.
- Potential to capture and express opportunities for innovation in ways which encourage collaboration.
- Scope to increase R&D capacity available to DAERA through competitive funding.
- Potential to build deeper and broader NI research capability, and to attract, develop and retain key scientific expertise
- Measureable and quantifiable impact analysis will better drive research outcomes.
- Potential to support the development of new scientific capabilities and capacity building in in NI research community.

Threats:

- Gaps in scientific capacity and capability in areas required to fulfil the DAERA purpose.
- In some areas, inflexibility exists in NI R&D systems which makes adaptation to changing policy demands challenging.
- Institutional barriers and missed opportunities for collaboration (e.g. between NI Government Departments).
- Lack of longer-term funding mechanisms to maintain long term monitoring to serve as baseline for research into environmental change.



Appendix D

Impact Evaluation Framework

Impact has many perspectives, however in the in the context of the CSAO commissioning process impact may be considered as the effects, influence or benefits to an individual, community, or society as a whole resulting from a research project or programme.

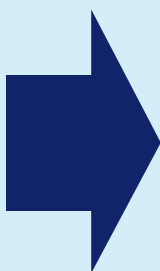
In order to enable a clear evaluation of the impact it is essential that impact beneficiaries and impact areas relevant to the agri-food; environment, forestry; fisheries; and bio-based sectors, are defined.

DAERAs interests include the effects on, and benefits to our environment, economy, and health and wellbeing as directed by The ‘New Decade New Approach’ (NDNA) document which set out the process and approach for developing the Executive’s Programme for Government (PfG).

The Programme for Government Draft Outcomes Framework Consultation Document⁵¹ outlines key priority areas and which departments are relevant to each priority area. It is proposed that DAERA will have responsibility for one outcome **‘We live and work sustainably - protecting the environment’**, in addition to having input into other the Key priority areas below. We have used these key priority areas to define impact themes.

Key priority areas that have been identified as relevant to DAERA are:

- Capability and Resilience
- Skills and Attainment
- Natural Environment
- Green Economy
- Waste Management
- Water and Wastewater Management
- Inclusion and Tracking Disadvantage
- Rights and Equality
- Mental Health and Wellbeing
- Physical Health and Wellbeing



Impact Themes

- Impacts on the Environment
- Impacts on Human Capacity and Skills
- Impacts on Green Economy
- Impacts on Society
- Impacts on Health and Wellbeing of people and animal welfare
- Impacts on Public Policy

For impact to be fully realised it needs to be identified and assessed at the pre-award, monitoring and respective stages of the commissioning process. Combining the merit of scientific excellence and impact at the award selection stage will allow measurable baseline outcomes to be established. In addition, an in depth pathways to impact plan detailing expected impacts and outlining activities and deliverables will allow progression to be measured.

⁵¹ <https://www.northernireland.gov.uk/sites/default/files/consultations/newnigov/pfg-draft-outcomes-framework-consultation.pdf>



Impacts on the Environment

Impacts derived from research that affect the natural, historical and built environment and its ecosystems, in order to improve benefits for plants, animals and society.

Impacts on Human Capacity and Skills

Impacts involving enhanced scientific and technical capabilities of the population (including the agri-food, environment, forestry, fisheries and bio-based sector workforce, and those in education and training e.g. CAFRE), future-proofing and enabling the current workforce, and enabling informed public discussions on complex issues involving science.

Impacts on Green Economy

Impacts that benefit the establishment of a sustainable economy that enhances energy and uses natural resources efficiently. An inclusive green economy is low carbon, conserves resources, and is diverse and circular.

Impacts on Society

Impacts that are associated with positive aspects derived from research that may directly affect the quality of life, knowledge, behaviours, and creative practices of individuals, groups of individuals, organisations or communities.

Impacts on Health and Wellbeing and Animal Welfare

Impacts correlated with improved health outcomes or enhanced quality of life (or potential harm mitigated) for people, animals and plants. The wellbeing of people may also be affected by impacts related to food security, the food chain or nature, and the welfare of animals.

Impacts on Public Policy

Impacts where the beneficiaries are usually government, public sector and charity organisations and societies, either as a whole or groups of individuals in society through the implementation (or non-implementation) of policies, systems or reforms.

Images on pages on 9, 29 and 33 courtesy of Cliff Mason, AFBINI.



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