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European Innovation Partnership Wales evaluation: Final Report

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European Innovation Partnership Wales evaluation: final report

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Glossary

Acronym/Initialism/Keyword	Definition
CCTs	Cross-Cutting Themes
DO	Development Officers
EAFRD	European Agricultural Fund for Rural Development
EIP	European Innovation Partnership
EIP-AGRI	European Innovation Partnership for Agricultural Productivity and Sustainability
EU	European Union
GHG	Greenhouse Gas
IBERS	Institute of Biological, Environmental and Rural Sciences
KE Hub	Knowledge Exchange Hub
MaB	Menter a Busnes
NGO	Non-Governmental Organisation
R&D	Research and Development
RDP	Welsh Government Rural Communities - Rural Development Programme (2014–2020)
RPW	Rural Payments Wales
RSPB	Royal Society for the Protection of Birds
SO	Standard Output
ToC	Theory of Change
UK	United Kingdom

1. Introduction

1.1 European Innovation Partnership (EIP) Wales was launched in January 2016 and funded under the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI), which itself was launched in 2012. Just under £2m has been made available from the Welsh Government Rural Communities - Rural Development Programme (2014–2020) to deliver this scheme. EIP Wales was delivered by Menter a Busnes (MaB) alongside support from Farming Connect, Innovation Brokers, and the Knowledge Exchange Hub (KE Hub). The role of EIP Wales was to facilitate innovative and new ideas for farming and forestry businesses. This was undertaken through funding 46 projects which were run by Operational Groups consisting of farming and forestry businesses alongside partners from other sectors.

1.2 This evaluation was commissioned by the Welsh Government to assess the implementation and impact of EIP Wales. Specifically, our evaluation had ten objectives.

1. To assess the level of engagement/services provided (including the composition of organisations that were engaged and the main routes that Operational Group members used to engage with the scheme).
2. To examine the effectiveness of the project's application and appraisal processes.
3. To assess the Innovation Broker's role in terms of quality, relevance, flexibility and value for money.
4. To assess the benefits of a farmer-led/group-working initiative.
5. To compare the initiative with EIP-AGRI in other regions and Member States and identify learning from the delivery elsewhere.
6. To assess the innovativeness of the EIP Wales projects which have been supported.
7. To assess and evaluate the overall impact of EIP Wales projects on the participating Operational Group members and the additionality of impacts.
8. To assess the dissemination of the group's findings to the wider public accessing Farming Connect.

9. To assess broader impacts related to the uptake of practices outside the EIP groups.
10. To provide recommendations and lessons learnt for future innovation partnership schemes.

1.3 The evaluation has been delivered over three phases, the first of which comprised scoping and Evaluation Framework development and was undertaken in 2021. The Framework outlined a series of evaluation questions, based on the aforementioned objectives, which have been used to steer the evaluation activity (the evaluation questions can be found in Appendix 1). We then produced a comprehensive Interim Report in late 2022 (Phase 2)[1] which addressed most of the objectives outlined above, including an assessment of the implementation process alongside consideration of impacts at that time. The current document acts as the final evaluation report and has built on the findings outlined in the Interim Phase. Much of the early sections, which describe the profile of businesses supported and an assessment of delivery performance, only seeks to update the findings presented in the Interim Report. The latter sections provide much more detail on outcomes and impacts than we were able to produce at the interim stage.

1.4 The remainder of this report is structured as follows:

- Chapter 2 outlines the methodology deployed to conduct the research.
- Chapter 3 provides the context for this evaluation by putting forth an overview of the scheme as well as the projects supported, and describing the type and suitability of businesses engaged and their drivers for participating.
- Chapter 4 assesses the delivery performance by exploring achievements against the delivery profile and the effectiveness of each component/part.
- Chapter 5 examines the impact on the Operational Group members as well as on the sector more broadly.
- Chapter 6 considers the work undertaken to disseminate the findings, the effectiveness of the approach, and examples of success.
- Chapter 7 sets out the contribution made to the CCT objectives.
- Chapter 8 concludes the report with a series of recommendations.

[1] Wavehill, '[European Innovation Partnership Wales Evaluation Phase 2: Interim Evaluation Report]', January 2023

2. Methodology

2.1 This evaluation combines quantitative and qualitative methodologies, utilising two types of evaluation which adopt a theory-based approach – theory-based process evaluation and theory-based impact evaluation. Our approach also aligns with HM Treasury Green, Magenta, and Aqua Book guidelines.

Phase 1: Evaluation framework

2.2 The first phase was delivered between March 2021 and January 2022. It principally used theory-based evaluation techniques to review, test and refine the assumed connection (i.e. the theory/intervention logic) between activities undertaken by EIP Wales and the anticipated outcomes and impacts. This process involved a comprehensive review of the core documentation and broader literature, six scoping interviews with key management and delivery staff, and a Theory of Change (ToC) workshop session. The research culminated in the establishment of a ToC logic model for EIP Wales (see Appendix 2), which performed a crucial function in capturing our understanding of the scheme and identifying performance indicators as well as the assumed causal links between activities, outputs, and outcomes. The model also pinpointed the potential barriers or blocks to success and helped to identify the key 'enablers' i.e. the potential facilitators to success.

2.3 The initial scoping phase also included a detailed desk-based review of the scheme's monitoring processes, allowing the evaluation team to understand the types of data being captured internally by Welsh Government and MaB officials delivering the EIP Wales scheme. This allowed us to identify what data were needed from the external evaluation research fieldwork, thus informing our research tool design process. This was all captured in an Evaluation Framework which, as informed by the ToC, outlined the key evaluation questions, the judgement criteria used to address those questions, and the indicators and data needed to answer the said questions.

2.4 Finally, the desk research included a broader literature review to provide a comparison revealing how the EIP-AGRI schemes have been delivered throughout the EU (this is summarised in Chapter 3 and the full review can be found in Appendix 3). This was intended to inform the assessment of the design decisions made in Wales, the other options available for delivering the scheme, and the lessons we can draw from this when designing future interventions.

Phase 2 and 3: Interim and final evaluation

2.5 The evaluation team designed the survey questionnaires to undertake the fieldwork with the relevant stakeholders, which principally involved capturing feedback from the Operational Group members.[2] We were supplied with a contact list of 239 farming and forestry Operational Group members during Phase 2 (the list did not contain any non-farming/forestry members for the interim stage). Each record on the list were contacted up to five times with 84 responses recorded as part of the first wave (a 35% response rate), which was conducted during the period spanning mid-November 2021 to the end of January 2022.

2.6 A second Operational Group survey 'wave' of interviews took place in November 2022 through to January 2023, targeting Operational Group members that had not completed the survey during the interim stage. In addition, we were given a list of 73 additional contacts for the non-farming/forestry contacts. The Wave 2 survey generated a further 48 responses, resulting in an overall sample of 132, which consisted of 108 farming businesses, four forestry businesses, and 20 other organisations. The 20 other organisations proved difficult to reach, with many not responding to the contact attempts and others indicating that they had no recollection of participating in the Operational Groups. In fact, nine of the 44 contacts we were able to reach (20%) opted out of the survey and suggested they had not been involved. Based on the 312 contacts supplied to us, the sample of 132 represents a 42% response rate.

[2] See Appendix 4 for survey of Operational Group members.

2.7 Whilst a census approach was deployed (with all contacts contacted up to five times each), we reviewed the response from each of the 46 projects after all businesses had been contacted. Having identified projects with no representation in our sample, further efforts were made to contact those specific Operational Group members, resulting in feedback being obtained from 42 of the 46 projects (91 %).

2.8 We typically received feedback from one or two Operational Group members per project. There were, however, a few projects in which several Operational Group members had responded to the survey, including one project where 15 survey responses were received. This may have affected the survey feedback included in this report, with greater weight given to the experience of those particular projects.

2.9 Some adjustments were made to the survey during Wave 2, with less emphasis placed on some of the process questions and more emphasis on the impact questions. For this reason, the 'base' (i.e. the number of respondents answering each question) varies in the data presented in the current report. Additionally, some of the survey questions were 'routed', i.e. some were only open to lead applicants, which also explains why the base responses vary in the report.

2.10 The Operational Group Member Survey was supplemented by a Follow-up Survey[3] where 38 of the 84 contacts who initially completed the survey during the interim stage (Wave 1) agreed to again take part, which is equivalent to a 45 % response rate. The purpose of this exercise was to capture longitudinal data, i.e. to understand whether the changes in practices had been sustained, and whether they had led to further outcomes a year after the first interview took place.

2.11 Alongside the Operational Group member survey, we conducted a survey of 'non-beneficiaries' at the interim phase, i.e. businesses that had applied for or enquired about a project but had not proceeded with it.[4] We were supplied with 81 contacts, and 30 responses were ultimately received – a 37 % response rate. These were split evenly between those who had made unsuccessful applications (15) and those who had withdrawn from the application process (15).

[3] See Appendix 7.
[4] See Appendix 5 for the questionnaire used.

2.12 Two rounds of qualitative interviews were undertaken with delivery team members from MaB and Farming Connect, whilst 10 Innovation Brokers[5] were also interviewed at the interim stage, alongside five external stakeholders. This served to triangulate the findings from Operational Group members. The interviews with external stakeholders generally consisted of discussions with other key sector stakeholders in Wales, although we also interviewed the lead bodies involved in delivering the EIP-AGRI in England so as to understand their experience and provide further context on the delivery performance in Wales, using the English experience as a benchmark.

2.13 Alongside the primary research, we conducted a review of the management information (MI), including an assessment of delivery against the Key Performance Indicators (KPIs) and financial spend, a review of individual projects' application and evaluation forms, and a review of feedback forms that were completed during the Farming Connect dissemination events. We also reviewed the evaluation of the EIP-AGRI scheme in England which was shared by the team; this step, alongside the stakeholder discussion with the team in England, informed a comparator review of EIP-England (see Appendix 8).

2.14 Finally, we placed much more emphasis on assessing the dissemination element in the final evaluation phase. As part of this, we undertook two observational visits at Farming Connect Open Day events which focused on EIP projects,[6] where we observed the sessions and undertook interviews with 19 of the attendees. The said attendees largely consisted of farmers not involved in the EIP operation, who had attended to learn about the project. It was an opportunity for us to explore attendees' satisfaction with the events, what they had learnt, and what impact the experience would have on them, if any at all, going forward. This provides us with qualitative data to supplement the quantitative data supplied through the event feedback forms.

3. Background and context

[5] See Appendix 6.
[6] The two projects were: 1. Building a Successful No-dig Market Garden; and 2. Controlling Cattle Worms on Dairy Farms

Overview of EIP-AGRI

3.1 EIP-AGRI was launched in 2012 to contribute to the EU's strategy Europe 2020 for smart, sustainable, and inclusive growth,[7] with 96 schemes delivered across the EU's member states. EIP-AGRI's overarching aim was to foster competitiveness and sustainability in the farming and forestry sectors by turning ideas from farmers and foresters into innovative action. The organisation provided farmers and foresters with access to funding which could be used to deliver projects that tested an innovative technology or idea within their businesses.

3.2 The funding was provided to facilitate Operational Groups involving farmers, advisers and researchers who came together in a targeted way to cooperate on joint research projects. Multi-actor Operational Groups provided an opportunity to build bridges between research and practice and facilitate the flow of ideas to farm and forest level. The core aim was to provide a mechanism with which to demonstrate these ideas, thereby creating the opportunity for the said ideas to become common practice so that the development of the industry could be fostered.

3.3 Member States were required to establish National Rural Networks (NRNs). These had a number of mandated tasks and, if used to their full extent, they could play a formal role in supporting the EIP-AGRI through four main areas of activity:

- Raising relevant stakeholders' awareness of, and involvement in, EIP-AGRI.
- Facilitating the search for Operational Group partners.
- Networking for advisers and innovation support services.
- Collecting and disseminating examples of Operational Group projects.

[7] EIP-AGRI (2020) EIP-AGRI: 7 years of innovation in agriculture and forestry. December 2020.

3.4 There was a high degree of flexibility in terms of how Managing Authorities implemented their EIP-AGRI schemes. The European Commission (EC) produced an implementation typology based on the following two variables[8]:

- average Operational Group budget (small (<€100,000); medium (€100,000–€300,000); large (>€300,000))
- prescriptiveness in the selection of Operational Groups (restrictive, i.e. Operational Groups must choose from pre-defined focus areas, top-down; and open, i.e. Operational Groups were free to choose their own themes, bottom-up).

3.5 Wales appears in the small and open group**,** which encompasses the smallest number of EIPs. Indeed, only three (including EIP Wales) of the 84 schemes that were categorised in the EC evaluation study fall into this group. Thus, the scheme design in Wales (i.e. providing a combination of small grants through an open approach) was relatively uncommon in comparison to the other EIP schemes across the EU. This is largely because only eight other schemes fell into the category of providing small grants, with the vast majority providing grants that averaged more than €100,000. There was a more equal split across the EU member states with regard to the prescriptiveness of schemes, with EIP Wales one of 41 schemes that could be described as being free to propose themes (open), whilst 48 were considered restrictive in that themes were pre-defined.

3.6 Guidance on programming for innovation in the context of the EIPs explains the important role that innovation brokering can play in discovering innovative ideas and facilitating the start-up of Operational Groups. It is suggested that the brokering obtains this important status mainly by acting as a go-between to connect farmers, researchers, advisers, and NGOs (Non-Governmental Organisations), etc. There were several options for funding innovation brokering. In some cases, the national/regional government acted as the IB; public bodies and NRNs undertook the role in other schemes, whilst external advisers (i.e. the same approach as that adopted in Wales) were used in several other schemes.

[8] European Commission (2016) Evaluation study of the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability. Final Report for DG AGRI. Coffey, AND, SQW, Edater and SPEED. November 2016.

3.7 External advisers also had involvement in the delivery of Operational Groups, e.g. as facilitators, although they could not be the lead applicant. Across the EU member states, there was no real pattern to the use of Innovation Brokers. The European Commission examined the use of Innovation Brokers in 84 RDPs, 80 of which provided information. The commission's analysis showed that Innovation Brokers were used in 51 of the regions (64 %). Where Innovation Brokers were not used, the rationale was usually that the existing infrastructure around innovation was adequate. Wales was the only UK country to have used external Innovation Brokers from the beginning of the programming period.

3.8 Wales was one of eight Managing Authorities choosing not to provide networking for the EIP-AGRI through their NRN, as the activity was undertaken through Farming Connect.

3.9 EIP-AGRI states that over 60 % of Operational Groups are working on innovative ways in which to overcome environmental and climate challenges. The Operational Groups cover a broad spectrum of subsectors and themes within agriculture and forestry, with the most prevalent being plant production and horticulture, which was the focus for 31 %.

Delivery model in Wales

3.10 In Wales, £1.8m was made available in the form of direct, 100 % grant funding to deliver 46 projects over seven years from 1st August 2016 to 30th June 2023.

3.11 The support includes not only the funding itself (maximum of £40,000 allocated per project), but also information and advice on project design through the KE Hub (a collaboration between Farming Connect and the Institute of Biological, Environmental and Rural Sciences (IBERS) at Aberystwyth University), support with knowledge transfer activities through Farming Connect, and dedicated staff (external Innovation Brokers and staff deployed at MaB) to facilitate Operational Groups through the application process and during the lifetime of the project.

3.12 To be eligible, projects had to demonstrate that they were innovative[9] and attempted to tackle on farm problems and align with at least one of the RDP's

[9] Innovation is often described as a new idea that proves successful in practice. Innovation may be technological, but also non-technological, organisational, or social. Innovation may be based on new but also on traditional practices in a new geographical or environmental context. The new idea can be a new product,

priority areas[10]. Additionally, applicants were also required to demonstrate how their project results would benefit the wider agricultural and forestry sector. The scheme was open to applications from a wide range of businesses and individuals involved in agriculture and / or forestry, such as: farmers, foresters, researchers involved in agriculture or food, agriculture / forestry advisers, agricultural, agri-food and forestry businesses involved in the supply chain, and non-governmental organisations. However, the lead applicant had to be a farmer or forester. Eligible activities and costs comprised the following:

- specialists' (e.g. consultants or scientists) time for setting up projects, taking measurements, collating data and writing reports
- hire of essential specialist equipment to assist with running the project
- co-ordination of projects
- communication and dissemination of project approaches, lessons and outcomes
- technical advice
- reporting on project milestones
- contractor costs for labour and use of equipment
- operating and running costs (e.g. hire of meeting rooms)
- direct costs to carry out any specific physical trials necessary as part of the project (e.g. specialist equipment)
- consumables for undertaking trial or project activity (e.g. specialist seeds)
- reasonable analysis and sampling costs (e.g. forage, soil, blood and tissues)
- reasonable travel and subsistence to enable specialists to visit project sites
- limited promotional costs where justified.

3.13 MaB was responsible for high-level management and delivery of the scheme, including regular monitoring of the projects and Innovation Broker activity, capturing results, and supporting dissemination planning. This involved a small team consisting of a Knowledge Exchange Manager and a Project Officer. The KE Hub provided supporting research to applicants on their project ideas, which was a crucial part of the appraisal process. Innovation Brokers supported applicants

practice, service, production process or a new way of organising things, etc. A new idea turns into an innovation only if it is widely adopted and proves its usefulness in practice. (Source: European Innovation Partnership: guidance)

[10] The RDP priority areas are listed in the 'Strategic objectives' section below in this chapter.

through the application process and would often lead on writing the applications, although the projects were meant to be based on lead farmers' ideas. Innovation Brokers often led on forming the Operational Groups and generally had an important facilitation role in the delivery of projects so as to ensure that they could be undertaken with sufficient scientific rigour. In total, 13 Innovation Brokers were commissioned to support EIP projects from some of the main business, agricultural, and environmental consultancies in Wales and across the UK, namely: KITE Consulting, Landsker Business Solutions, ADAS, and AgriPlan. Whilst all projects were encouraged to utilise the support of Innovation Brokers, six projects were delivered without their involvement.

3.14 The role of the Innovation Broker was key to the delivery of many projects, as we set out in Chapter 4, thereby demonstrating the importance of recruiting appropriate consultants to fulfil the role. Innovation Brokers were procured through the Farming Connect Advisory Programme, where interested parties were required to submit their curriculum vitae (CV) to MaB. In advertising the role, MaB called for:

> 'Individuals whose skills and experience are in line with the EIP programme, including evidence of working with groups and information on the sectors they specialise in. Working with groups is an important role of the Innovation Broker and they need to be able to demonstrate good networking skills and resourcefulness to access suitable group members for EIP projects. Examples of previous projects that have involved group working where the candidate has taken a strong facilitation role will be helpful to assess previous relevant experience'.[11]

3.15 Applicants were also required to provide a report undertaken within the last three years to demonstrate that they had a methodical and thorough approach to project design, delivery and reporting. The applications were then assessed by IBERS, and scored against the following criteria:

- readability and clarity (20 %)
- accuracy of technical information (40 %)
- apparent relevance and viability of advice (40 %).

[11] Source: a document shared by MaB, entitled 'The approval process for new Innovation Brokers'.

3.16 Whilst the purpose of the EIP Wales scheme was to look at innovative new ideas, (equally) the scheme did not support primary research. The intention was to build on existing research outcomes to be applied at a practical level. We understand that there is no other targeted support available which specifically encourages farmers and foresters to try out research outcomes at a practical level other than through the Farming Connect demonstration network (which is delivered on a one-to-one basis and on a much smaller scale). The above approach ensured that the applications and projects were based on the needs of farmers and foresters (as opposed to attracting applications from researchers who have access to other funding streams). This was a key principle of the EIP Wales scheme. Other design features were also introduced to ensure that the research delivered on the needs of farmers and foresters, including the small grant threshold.[12] The EIP scheme attempted to strike a balance, i.e. primarily focusing on practical projects that farmers could run themselves and based on their needs, whilst also ensuring sufficient scientific rigour to generate learning that could be applied throughout the sector.

3.17 Farming Connect had a crucial role utilising its network (particularly the Demonstration Network) to disseminate findings from the research projects and linking the projects with other knowledge transfer activity across the sectors in Wales. This was intended to ensure a broader sectoral impact by disseminating the learning from these projects associated with a select few farming and forestry businesses to the rest of the sectors so that new practices could be adopted more widely.

3.18 There were five main EIP project components, which are summarised below.

1. Facilitating the uptake of new ideas and technologies at the farm/woodland level to improve efficiency and productivity. The ideation could take different forms – participants may have known of a new technology that had been developed but was not widely available and could be used within their business; alternatively, they may have had an issue that they did not know how to solve and developed an EIP project to find a solution. We also understand that the Welsh Government

[12] It was assumed that farmers/foresters would be more comfortable with applying for the relatively small grants, whilst larger research groups would be disincentivised when it came to applying.

has instructed the scheme to explore certain projects based on specific strategic objectives.[13]

2. Bringing like-minded farmers, foresters, researchers, consultants, and agri-businesses together to work on common problems (i.e. the Operational Groups). Operational Groups had to be composed of at least two farmers/foresters from separate businesses, who were based in Wales and registered with Farming Connect, along with one other member from a related organisation, i.e. a researcher, consultant, or agri-business.
3. Providing information and advice to groups on their potential project ideas through the KE Hub. This involved undertaking a literature review on all project ideas to ensure their appropriateness and eligibility.
4. Facilitating research, i.e. support from the Innovation Broker to deliver the research project on site.
5. Communicating ideas and project results with the wider industry to improve the flow of information and the uptake of new technologies. This included a section on the Farming Connect website that is dedicated to hosting information on the groups and the progress of their projects along with updates linked to social media to increase the dissemination. The information was captured through various research outputs, including final reports, infographics, videos, and technical publications, all of which can be accessed on the website.[14] The Farming Connect Demonstration Network provided a platform through which to help disseminate findings from projects, with some participant farmers being approached to become focus sites, enabling dissemination to take place in the form of progression and open events as well as via the website and social media. Additionally, Farming Connect used the information from the reports to disseminate the findings to the wider industry through a variety of mechanisms, including the Farming Connect website, technical articles, and presentations at meetings and events.

3.19 A visual graphic of the scheme's ToC and logic model can be found in Appendix 2.

[13] Whilst EIP Wales has generally been open, there are a small number of cases where projects have been prescribed, such as the two projects focusing on the Internet of Things (see EIP27 and EIP40 in Appendix 8).
[14] Approved EIP Wales Projects | Business Wales (gov.wales)

Profile of Operational Group members

3.20 In total, 43 of the projects funded under EIP Wales were led by farmers, whilst the other three were led by forestry businesses. In total, 317 different organisations have been involved in the 46 Operational Groups responsible for delivering the projects, specifically:

- 237 farm holders
- 36 advisers
- 14 research institutes
- 11 NGOs
- 11 small and medium enterprises (SMEs)
- eight other public bodies.

3.21 The fact that just under 25,000 farm businesses were recorded in the latest Welsh Agricultural Survey suggests that around 1 % of the entire sector has been directly involved in EIP Wales by sitting on the Operational Groups. Many of these farmers have been involved in more than one project, with farmers involved in 385 participations in total. [15]

3.22 As farm businesses were by far the main type of organisation involved in the scheme, accounting for 75 % of all Operational Group members and 93 % of project leads, the remainder of this section considers the profile of farm businesses that was engaged (a more detailed profile is outlined in Appendix 9).

[15] Data supplied to Wavehill in October 2021.

Profile of farm businesses

3.23 According to the statistical analysis conducted by the Welsh Government,[16] the farm businesses taking part in EIP projects were generally much larger in size in terms of standard output (SO)[17] and land mass than average farms in Wales. The data shows that, in the period spanning 2015-16 (i.e. pre-EIP), lead farmers, on average, had a SO of €322,000, whilst other Operational Group member farmers had a SO of €399,000. By comparison, the remainder of the sector had an average SO of just €66,000.[18] With regard to land mass, lead farmers operated farms that contained 219ha of land on average, whilst other Operational Group farmers had 237ha of land; this can be compared with an average of just 66ha operated by other farming businesses. Together, the turnover data and the land mass data suggests that farming businesses participating in EIP Wales are several times larger than the industry average.

3.24 This is perhaps unsurprising, because the scheme has not been designed for smallholdings, which often do not have strong commercial interests (the types of organisations that make up a large part of the sector). The scheme is designed to help businesses make their operations more profitable. Thus, we would expect to see larger businesses accessing the support. However, the scale of the difference may suggest that the scheme has largely been accessed by farming businesses operating at the other end of the spectrum – the small group of progressive, profitable businesses that often look to innovate and may already be 'plugged into' support networks. Indeed, even when excluding all micro farms (which typically do not engage with support services) from the analysis, the data continues to reveal that EIP lead applicants and other Operational Group members were larger than average before accessing the support (they had an average SO of €333,000 and €434,000 respectively, compared with an average SO of just €158,000 when excluding micros).

[16] This analysis was based on data from the June survey of agriculture and horticulture (November 2022 data), where 32 lead farmers (from the 46 projects) and 201 other Operational Group farmers were identified (using Customer Referral Numbers) and compared with the overall population.
[17] Standard output is used as a proxy for turnover. It is the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock. The standard output is used to classify agricultural holdings by type of farming and by economic size.
[18] The statistical analysis conducted by the Welsh Government categorised farms in euros.

3.25 This is consistent with feedback from the delivery team, which acknowledged that many of the participants were ones that had applied for Welsh Government grants before, although the team also maintained that these farmers had brought in other farmers – via the Operational Group approach – who may not typically engage in such types of schemes or look to innovate. Equally, the main aim of these projects is to deliver coordinated trials and publish data that can provide meaningful results which change other farmers' practices. With that in mind, it is a sensible approach to engage the 'early adopters', i.e. farmers who are comfortable with the innovation process, so that robust trials can be conducted, and better information disseminated to the broader sector.

3.26 Other data from the Operational Group member survey reinforce this notion that most of the farmers engaged are often the same group who take part in other activities, with 70 % (76/108) reporting that they had received other grants or financial support from the Welsh Government or other public bodies in the last five years. This is not surprising given the role of Farming Connect in publicising the scheme. Businesses had typically received the Sustainable Production Grant (33 %; 36 responses), the Farm Business Grant (27 %; 29 responses), or Glastir (eight %; nine responses), whilst a range of other grants were also cited.

3.27 Alongside differences in business size, other notable differences in our analysis include the following[19]:

- Dairy constitutes the most prevalent subsector, with 41 % of EIP projects (19/46) incorporating a focus on the dairy sector despite dairy only accounting for six % of Welsh agriculture.
- The geographical distribution of the farms is fairly similar to what one might expect, being concentrated in the more rural authority areas in Wales and following a similar pattern to the distribution of all farms throughout the country.
- The scheme has engaged with more younger farmers than average within the industry. For instance, the 'Agriculture in the United Kingdom 2020' report showed that 36 % of UK farmers in 2016 were aged 65 or above, and the median age was 60.[20] By comparison, only seven % of EIP Wales farmers

[19] Note, the data were not available for EIP46. These data are based on an analysis of EIP projects 1–45.
[20] Department for Environment, Food and Rural Affairs, Agriculture in the United Kingdom 2020, 2021

(16/239) were aged 65 or above at the time of applying, and the median age was 48.[21]

3.28 In order to further understand the profile of farm businesses participating in the EIP Wales scheme, the research also drew on the Welsh Government's Farm Segmentation Model, which was designed to explore attitudes and perceptions across different groups of farmers so as to understand the profile of the sector.[22] In summary, a comparison of the EIP Wales participants with the overall farming business stock reveals that participants are more likely to:

- look to learn new skills and knowledge to apply in business
- access information/advice on the internet
- apply new technology on their farm
- seek advice and information from other farmers
- strive for environmental sustainability
- be more commercially minded.

3.29 The analysis further demonstrates that EIP Wales has been more likely to engage more profit-driven and progressive businesses with regard to their attitudes towards innovation. The full analysis is shown in Appendix 9.

Motivations for accessing support

3.30 Interestingly, the main driver for accessing support from EIP Wales appears to have been the expertise offered by the scheme, rather than the financial incentive, with 75 % of applicants (85/114) selecting this as a driver, compared with only 42 % (48 responses) selecting the need to remove the risk from testing a new idea. This suggests that businesses primarily wanted support in helping them to trial new practices, rather than simply accessing funding that would enable them to do so themselves; that support offer appears to have been key. Additionally, the opportunity to work with other organisations within the sector was also an important driver for 32 % (37 responses) of Operational Group members, whilst 16 % (18 responses) noted a desire to work with organisations from other sectors. We note that there was a substantial difference between the beneficiary and non-beneficiary

[21] Note, data for the age of farmers were in broader category bandings (e.g. 18–24, 25–40, 41–44 etc.). The average was calculated based on the midpoint of each farmer's age category.
[22] Lee-Woolf, C., Hughes, O., King, G., & Fell, D. (2014) Development of a segmentation model for the Welsh agricultural industry. A report by Brook Lyndhurst for the Welsh Government.

cohorts in that regard, although there is insufficient data to explain the reason for those differences.

Figure 3.1: 'Please can you describe why you wanted to develop a project through EIP Wales?'

Source: Operational Group member survey (n=84) & non-beneficiaries (n=30); n=114 overall

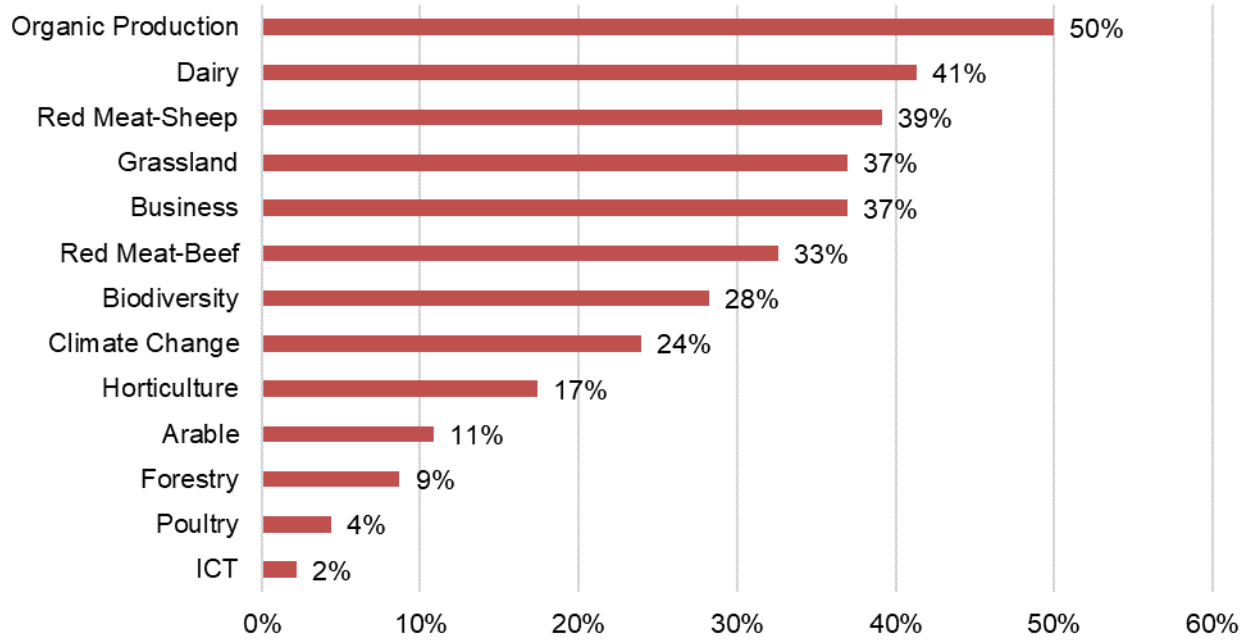
Overview of project delivery

3.31 A full outline of the 46 funded projects is presented in Appendix 10 of this report. It shows the substantial amount of variability in the projects supported, including crop production, animal health, nutrition, management practices including the use of new technologies (e.g. robotic weeders, photonics, GPS tracking, and genomic testing), slurry management, new market development, protection from theft, and much more.

3.32 The main themes contained within the projects were outlined in the scheme's monitoring information and are shown in Figure 3.2 below. The graphic illustrates that the range of projects cover almost all parts of the farming industry. As we might expect, given its dominance within agriculture in Wales, the red meat sector is a

theme within 48 % of projects (22/46)[23], whilst 41 % (19/46) of the projects include a focus on dairy. The chart also shows that 24 % (11/46) of projects contain an element that could help to tackle climate change such as through better yields, more efficient and sustainable production, or reducing slurry pollution. 37 % (17/46) include improvements to business practices, e.g. through generating efficiencies, increasing performance, supply chain opportunities, or assessing the economic viability of new market opportunities. 28 % (13 projects) include a focus on biodiversity.

Figure 3.2: Themes listed for each project in the EIP Wales monitoring data



Source: EIP Wales monitoring information (n=46)

3.33 There was not much variability with regard to the size of the projects. The data reveals that 11 of the 46 projects were awarded the maximum grant amount, whilst a further 31 were awarded within five % of the full amount (i.e. at least £38,000). Only four projects received less, with one receiving just over £25,000, another just over £30,000, and two from £36,000–£38,000.

[23] Projects typically focused on more than one theme and there was a particularly large crossover between sheep and beef. When combined, all projects focusing on beef and/or sheep only accounted for 48% of projects.

Strategic objectives

3.34 Lead applicants had to demonstrate in their application to which of the Welsh Government RDP 2014–2020 priorities their project contributed. They responded as follows.

- 45/46 (98 %) contributed to Priority 1: Fostering knowledge transfer and innovation in agriculture and rural areas.
- 44 (96 %) contributed to Priority 2: Enhancing the competitiveness of all types of agriculture and enhancing farm viability.
- 32 (70 %) contributed to Priority 3: Promoting food chain organisation and risk management in agriculture.
- 27 (59 %) contributed to Priority 4: Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry.
- 33 (72 %) contributed to Priority 5: Promoting resource efficiency and supporting the shift towards a low-carbon and climate-resilient economy in agriculture, food and forestry sectors.

3.35 This demonstrates how the projects delivered against the core aims of the scheme, i.e. making farming and forestry businesses more competitive and more profitable through innovation, whilst most applications also contained an element of generating environmental benefits.

3.36 Furthermore, the monitoring data contained information on synergies with the Well-being of Future Generations (Wales) Act 2015.

- 22 (48 %) of the projects aligned with the goal of creating ‘a prosperous Wales’.
- 11 (24 %) aligned with the goal of creating ‘a resilient Wales’.
- 9 (20 %) aligned with creating ‘a globally responsible Wales’.
- 7 (15 %) aligned with creating ‘a healthier Wales’.

Level of innovation and scalability

3.37 Operational Group members were asked a question in order to determine the level of innovation of their project. One-third of respondents (14/42) indicated that the project was based on a new practice within the sector, whilst the other two-thirds (28/42) stated that it was a new practice in Wales/the area. Thus, the projects have primarily been concerned with applying practices from elsewhere and testing how they work on Welsh farms and forestry sites. In some cases, whilst the technology itself was not innovative, the application of the technology in those circumstances was new and the scheme was used to test the cost-effectiveness of that application.

3.38 The delivery team, Innovation Brokers, and external stakeholders emphasised the importance of having clarity regarding what was meant by innovation, and favoured a broader definition, i.e. for it to be new to the businesses involved within the OG. This is, to some extent, dictated by the funding regulations, which did not allow for investment in primary research; thus, innovation in its purest sense could not be undertaken. However, the projects did have to demonstrate that the research had not been applied in Wales previously.

3.39 Generally, stakeholders and delivery team members did believe that an appropriate range of projects were selected. They sought to strike a balance by investing in ideas that were not only innovative, but also practical and scalable. The fact that they were primarily based on farmers' ideas appears to have ensured that they lean more towards the practical/scalable side of the spectrum, whilst there exists a smaller group of projects that are perhaps more 'left field'. For instance, if we consider the 'EIP4 - Reducing Antibiotics in Sheep' project, it is a strong example of a practical project that focuses on reducing the use of antibiotics and thereby lowering costs through exploring alternatives. The project has the potential to demonstrate clear benefits which can be scaled up and adopted farther afield by other sheep farmers. Conversely, the 'EIP42 - Exotic Plants' project explores the opportunity for Welsh growers to diversify by growing niche crops. This is potentially more innovative, although it has a higher risk of not working and is not as scalable.

4. Assessment of delivery performance

Achievements against delivery profile

4.1 At the most basic level, EIP Wales has been a success, with the scheme exceeding all three of the KPI targets. These KPIs are output indicators which were used to measure the scheme's success in delivering the activity that had been set. On that measure, the scheme has succeeded in delivering all 45 Operational Group-run projects alongside an additional one; moreover, it has far exceeded targets for the number of organisations engaged in Operational Groups and number of operations supported. This demonstrates the scale of activity undertaken and the scheme's success in delivering what it had set out to do.

Table 4.1: Achievement against KPI targets

	Target	Achieved	% achieved
Number of EIP operations supported	75	192	256%
Number of EIP groups supported	45	46	102%
Number and type of partners in EIP groups	220	317	144%

Source: Management information supplied by the Welsh Government in April 2023

4.2 The 46 grant awards add up to a total of £2,475,000 awarded, with £2,173,171.35 claimed up to April 2023[24] (equivalent to 88 % of the total awarded). To support project collaboration and activities, Innovation Brokers were allocated to each project at an additional cost of ca. £720,000. Accordingly, the scheme has therefore largely been able to administer the funding as intended.

4.3 Alongside the grant funds, there were costs associated with administering the scheme. These principally include the role of MaB (estimated to cost £600,000). Rural Payments Wales (RPW) did appraise a number of initial EIP proposals, which were all rejected, before using MaB to deliver the whole scheme. The scheme administration, from an RPW perspective, is estimated to have cost £46,000.

4.4 Taken together, the total costs for delivering the scheme amount to ca. £3.5m, with the grants accounting for 81 % (33 % RDP funding, 29 % Welsh Government match

[24] Note, the financial completion date for some projects was not until June 2023.

funding, and 20 % Innovation Broker project delivery support), and RPW and MaB administration accounting for 18 %. We note that this represents the best estimate and does not account for some of the other costs (e.g. the time provided by the KE Hub or the events organised by Farming Connect).

Table 4.2: Financial delivery

Expenditure category	Amount spent	Proportion of overall expenditure
RDP funding (53% EU)	£1,151,780.82	33%
Welsh Government match funding (47%)	£1,021,390.53	29%
Innovation Broker delivery costs (ex VAT)	£720,385.34[25]	20%
MaB administration costs	£600,000	17%
RPW administration costs	£46,000	1%
Total	£3,539,556.69	

Source: Management information supplied by the Welsh Government in April 2023

4.5 Generally, each stakeholder group that provided feedback as part of the evaluation (i.e. the delivery team, Operational Group members and external stakeholders) has been very happy with the way the scheme was delivered and the outcomes achieved. Delivery team members commented on their satisfaction with the variety of different pilots undertaken and their potential to bring about important changes for the sector:

> "What's marked it differently to other agricultural programmes was the variety and scope of the groups… We engaged with a lot of subsectors and some of the projects have the opportunity to truly transform the way we work in the sector in the future" (Delivery team member).

4.6 Other stakeholders stated that the projects supported have demonstrated their worth, with a very good team at MaB which delivered effectively and had a "profound appreciation of the issues and the purpose of EIP".

[25] The figures for April 2015 to March 2022 have been confirmed; however, the figure for April 2022 to March 2023 is a forecast, as the final financial year was yet to be claimed at the time of sharing the data.

4.7 The remainder of this chapter builds on the findings highlighted during the interim stage (many of which remain relevant) with regard to each delivery and design aspect. We begin by assessing the routes to engagement before assessing the effectiveness of the application and appraisal processes. We then assess the Innovation Broker role with regard to the quality, relevance, flexibility and value for money provided, and consider the underlying principles of delivering a farmer-led/group-working initiative. Finally, we provide a comparison of the scheme in Wales with the delivery of the EIP-AGRI in England and outline the key lessons learnt going forward.

Routes to engagement

4.8 Responsibility for promoting the scheme primarily lay with Farming Connect, which is reflected in the data, where the main way in which people became aware of the scheme was by means of discussion with their Farming Connect-employed Development Officers (DOs). This is consistent with comments from the delivery team, which explained that they utilised staff "out in the field" who talk to farmers regularly and were instructed to signpost to the scheme if relevant issues/ideas arose in conversation.

4.9 The importance of Farming Connect channels (a small number also heard about the scheme through Farming Connect publications) explains why the scheme has primarily engaged with businesses that are more innovation-focused and often participate in different schemes, as shown in the previous chapter. According to one of the stakeholders: "If farmers knew to go and ask somebody in Farming Connect about how [they] get [their] ideas funded, then they would get to EIP quite quickly". However, the stakeholder proceeded to state that farmers who were not as 'plugged in' will have been much less likely to know about, and able to access, the support. Thus, the proactive marketing approach was largely constrained to Farming Connect members.[26]

4.10 A large proportion of Operational Group members became aware of the support through word of mouth, potentially as a result of the interest generated from some of the earlier projects:

[26] It is important to note that a large proportion of farm businesses are members of Farming Connect, with 12,615 supported during this period. Source: Welsh Government website, 'Over £22m Farming Connect support for Welsh farmers', February 2023.

> “As the projects started to get established, it was a snowball effect. There were articles on the projects [...] people read them and would contact us – we had a lot of farmers contacting us directly after seeing the articles” (Delivery team member).

4.11 Thus, whilst the proactive marketing was largely targeted at businesses already engaged with Farming Connect, the scheme could also draw on other key stakeholders to raise awareness farther afield. The delivery team explained that Operational Group members would often invite neighbours or friends, who may have traditionally operated outside of the support ecosystem, to join them as fellow Operational Group members and that there were “new faces” participating in the scheme.

4.12 Innovation Brokers had an important role from the outset. They were given a licence to highlight opportunities from EIP Wales to their clients and to signpost where necessary. Two stakeholders suggested that this posed a risk in that the Innovation Brokers might “push through” projects for their own commercial benefit. However, one of the Innovation Brokers countered the aforementioned point by explaining how the comprehensive application and appraisal process provided the appropriate checks and balance. This is a valid comment, as we will demonstrate in the next section.

Figure 4.1: 'Can you please tell us how you became aware of the support?'

Source: Operational Group member survey (n=129) & non-beneficiaries (n=29); n=158 overall

4.13 In summary, the scheme largely engaged with Operational Group members via a combination of direct contact through Farming Connect channels alongside the interest generated organically. This was evidently an effective approach, with the scheme far exceeding its targets for the number of partners engaged in the Operational Groups. Whilst this led to supporting a group of farming businesses that were more progressive and plugged into the support network (i.e. those that typically engage in such schemes, as we outlined in the previous chapter), it also served its purpose in providing a suitable test bed to pilot the research areas. Additionally, the scheme also reached beyond the group of farmers / foresters that often show interest (perhaps thanks to the organic interest generated), as 30 % (32/108) of farming businesses reported that they had not received any financial support in the last five years.

Project application and appraisal process

4.14 Applying for support from the scheme was a lengthy process that provided effective scrutiny and a mechanism through which to ensure the research areas were appropriate (including through an expert-led literature review by the KE Hub of research already undertaken in the area). The application was described by one of the Innovation Brokers as a "very mature and transparent" process which allowed the projects to be assessed on scientific and technical grounds with an opportunity for comments and adjustments where needed.

4.15 Equally, the comprehensive nature of the process would have made it very difficult for farmers and forestry businesses to undertake the work without support. This is evident in the experience of EIP-England (see Appendix 8), where brokerage support was not provided, and the scheme was not able to secure the intended engagement from industry as a result. Indeed, there was an 80 % drop-off in England from the first to the second stage where the information requirements, combined with a lack of support, had the dual effect of curtailing interest in developing a full application (from farming and forestry businesses in particular) and skewing activity towards larger organisations.

4.16 For this reason, the role of Innovation Brokers has been crucial in helping or even leading the application bid writing, budgeting, and other aspects of the application process in Wales. The named lead applicants (farmers) who responded to our survey were broadly satisfied with the expression of interest and the application and appraisal processes, with 78 % (21/27) reporting that they were either 'very' or 'somewhat' satisfied; moreover, when they were explaining their reasons, the applicants' comments often referred to the support from the Innovation Brokers and how the latter had taken the burden off them.

4.17 Indeed, 80 % of respondents (33/41) declared that the Innovation Brokers provided 'very useful' support to refine project ideas and develop a project outline and application, whilst many specifically stated in their comments that their Innovation Brokers had been "in charge", as one put it, of that process.[27] Two respondents also stated that they would not have been able to undertake the process themselves because they did not have the time. According to one IB:

> "I don't think any of the projects that I've been working on would have done it without somebody supporting them. The application process was very EU-funding-orientated. It felt quite clunky. You had to say the right things in the right places" (Interview with IB).

4.18 The risk with such an IB-reliant approach is that the projects are shaped according to Innovation Brokers' vision and based on their ideas rather than those of the Operational Group members. Equally, there is a question of equity. Not all Innovation Brokers are as adept at application development as others; thus, the individuals with the more experienced or knowledgeable Innovation Brokers may have been at an advantage in terms of securing investment. Indeed, four of the non-beneficiaries responding to our survey highlighted how they felt let down/needed further expertise during the application stage:

> "The process is very difficult. It didn't feel like there was much support to apply for it. We did it ourselves and it was difficult and challenging to do so. I think the process could be simplified or there could be help available, as there was none" (Non-beneficiary survey).

[27] Only 13 responded to this follow-up question because it was determined by the specific support received by Innovation Brokers. In other words, only the respondents who recalled receiving support from an Innovation Broker to refine project ideas and develop a project outline and application answered this question.

4.19 The other concern is the lack of selectivity in the appraisal and selection approach. The team explained that, whilst they could have introduced funding windows and scored applicants against one another to make it more competitive, they felt this was not necessary, given that they were already securing an appropriate cross-section of projects, and that it would be easier to manage on a rolling basis. Nevertheless, a more competitive process and a large base of ideas from which to choose could have raised the potential quality and outcomes of projects even further. One delivery team member did suggest that they perhaps should have run three window opportunities during the process (rather than an open call), which "would have allowed for a better assessment of projects on a programme-wide basis and allowed for a better assessment of budget commitments etc.". This is something that should be considered for future delivery.

4.20 In summary, the application and appraisal process essentially comprised two main objectives: 1. to secure suitable projects (i.e. ones that were able to demonstrate the need/opportunity and ability to deliver with sufficient scientific rigour)
2. to ensure the projects were consistent with the underlying principles of the scheme (including a bottom-up/farmer-led approach). These were, to some extent, competing objectives, with the need to demonstrate scientific rigour and the suitability of investment, which necessitated support to navigate the detail required, potentially undermining the ambition of having a truly bottom-up approach. However, all stakeholder groups were generally very satisfied with the balance struck, and the evidence gathered regarding the delivery of the scheme in England suggests that this was the right approach.

Knowledge Exchange (KE) Hub

4.21 This aspect of the project was well received by applicants, with nine of the 18 lead applicants responding to the relevant question in our survey (50 %), indicating that the KE Hub had been 'very useful', whilst a further five (28 %) indicated that it had been 'useful' (the remaining four provided a neutral response). Several respondents explained how the literature review reports were informative and answered all the questions they had.

4.22 The KE Hub played an important role in informing the appraisal process and ensuring that the projects were based on existing research. Indeed, their fundamental role went beyond directly supporting the Operational Group members

and project delivery; they provided a crucial validation service and were valued by the core delivery team. Aside from the validation role, their influence on shaping projects and ongoing delivery appears to have been more mixed, with Innovation Brokers generally reporting that they had used some of the information in the application process but had not used it much thereafter.

Overall perceptions of support to deliver projects

4.23 Overall, Operational Group members were very satisfied with the support received in delivering the projects, with 84 % (110/131) stating that they were ‘very’ or ‘somewhat’ satisfied. Lead applicants were more satisfied than other Operational Group members, which is perhaps unsurprising when considering that the projects are trialled on the lead applicants’ sites and they are likely to receive the main engagement from the support team, although the above satisfaction levels may be indicative of other members not being as involved in the projects.

4.24 Explaining the reasons for the high scores, 39 of the 132 comments (30 %) referred to the ‘excellent’ communication and information provided by the support team and how they were very responsive to queries and gave recommendations. The Innovation Brokers’ role in structuring the trials and organising the projects was particularly appreciated. Operational Group members highlighted how their meetings as a group/with the Innovation Brokers were well organised, how the communication was clear throughout, how there was clarity regarding what was expected of them, and how the trials would be undertaken, e.g. with regard to sample collection or data sharing. Comments again referred to the manner in which the support staff had taken the burden off them by helping and leading on the paperwork. These comments demonstrate the importance of the facilitation role, wherein the support team had assumed much of the responsibility for coordinating and delivering the projects:

"Everything about the project was communicated clearly and efficiently. We were given the information we needed to know and not overloaded with technobabble. All aspects of the project were well organised (from the meetings to the testing to [...] getting the results)" (Operational Group member survey).

4.25 Whilst the comments mostly related to the value of the facilitation support, 20 respondents (15 %) spoke about the value of the expertise available to them. This covered a whole range of different areas, with examples of experts providing advice on sheep nutrition and preventative measures with which to reduce animal illness and infection, whilst many highlighted the useful advice received from vets, e.g. with regard to their cattle-scanning practices.

4.26 Businesses that had engaged with MaB and the KE Hub on an ongoing basis generally also found their support to be useful, with eight of the 16 (50 %) stating, in response to this question, that it was 'very useful', whilst a further three reported that it was 'somewhat useful'.

Assessment of the Innovation Broker role

4.27 Just 61 % of Operational Group members (17/28) reported that they had received support from an IB. Welsh Government monitoring data shows that 40 of the 46 projects (87 %) did include an IB. The discrepancy could be explained by either a less active role of Innovation Brokers in some projects (resulting in a lack of awareness amongst the Operational Group members) or a lack of engagement or awareness from the Operational Group members themselves. Alternatively, the Innovation Brokers may have liaised predominantly with the lead rather than other Operational Group members in some projects; this may also explain the discrepancy in certain instances.

4.28 The Innovation Brokers did have an important role in supporting or leading delivery in most cases. For instance, the majority of the Operational Groups were established by Innovation Brokers, with 81 % of survey respondents (30/37) reporting that the support they provided was 'very useful' in that regard (e.g. in one example the Innovation Broker was able to identify a vet in Devon specialising in sheep dairy to accommodate the very specific needs of the project). Moreover, and as we noted previously, the Operational Groups were also generally very satisfied with the support in completing their applications.

4.29 Furthermore, the Innovation Brokers played a crucial role in organising the delivery of the research projects, as noted in the previous subsection, with Operational Group members overwhelmingly positive about their role (79 % (33 respondents) reported it was 'very useful'). Reflecting on the role of the Innovation Broker in ensuring that the research projects were delivered with sufficient scientific rigour, one Operational Group member commented:

> "Because it was over two years, it needed the structure to be able to continue the project and ensure that everyone was at the same pace and we could compare with each other to see how different methods (lime treatment, for example) could be monitored and we could all learn and develop from the different operational methods being used across the different members of the group" (Operational Group member survey).

4.30 Operational Group members further reported that their Innovation Brokers possessed the relevant expertise with which to support their needs in delivering the project, whilst 70 % (31/44) 'strongly agreed' that it was important to have an Innovation Broker to help deliver their project.

4.31 Delivery team members agreed with this assessment and noted that the Innovation Brokers had been "very professional and delivered very effectively". Commenting on the value for money specifically, one delivery team member remarked that much was asked of the Innovation Brokers, who were often paid around £12,000 to deliver their project over a three-year period, which "was not a lot for what they delivered". On average, the Innovation Broker costed ca. £18,000 per project.

4.32 In summary, the Innovation Brokers have played a crucial role in supporting each aspect of delivery, from the initial work to establish Operational Groups and submit applications, to delivering the research trials. In most instances, Operational Group members have been overwhelmingly positive about their involvement. Equally, we note that Innovation Brokers were recruited for their high-level technical abilities, but in reality the nature of the role focused much more on facilitation and project management. Whilst the expertise and knowledge they provided were important in some projects, for the most part these elements were not a material part of their input, with a greater need for interpersonal skills and the ability to bring people together. The balance of evidence suggests that the Innovation Brokers have provided good value for money, although it is also possible that much of the

facilitation activity could have been delivered more cost-effectively at a more junior project officer level.

Delivering a farmer-led/group-working initiative

4.33 The scheme was designed to be delivered by, and based on, farmers' and foresters' ideas via a bottom-up approach. It is for this reason that the decision was made to limit the grant value to £40,000 – a decision supported by the vast majority of Operational Group members, with 79 % (97/123) reporting it was 'about right'. Very few other EIP schemes chose to have such a small maximum threshold. EIP-England, for example, welcomed grant applications of up to £200,000, and this saw several projects being led by large consultants and multinational food corporations. That has not been the case in Wales, where the decision to narrow the grant funding limit in this way appears to have been effective for supporting projects in which farmers and foresters were more interested.

4.34 Operational Group members highlighted the importance of having a farmer-led approach, noting that doing so helps to ensure that the aims are actionable, that it "makes it more applicable to the commercial reality on the ground", and that they are better placed to know what would work on their farm. Additionally, survey respondents explained how the approach helped to ensure a legacy impact, as farmers would be more likely to maintain the practices, as well as how it helped to secure buy-in from farmers.

4.35 For the most part, Operational Group members indicated that the projects were based on their idea, with 39 % (49/125) 'strongly' agreeing and 31 % (39) 'somewhat' agreeing with this statement (70 % in total), whilst just six % (seven responses) disagreed.

4.36 There were some exceptions to this. For instance, one Innovation Broker highlighted that two of their projects had been suggested by the Welsh Government and that it was their role to manage the projects and engage Operational Group members, encouraging those members to be part of the said projects. These projects had been suggested because they were strategic in nature and explored technologies that could help farmers to respond to changes in legislation. This is consistent with the findings from the Operational Group member survey, where a small minority reported that the projects were not based on their idea.

4.37 That said, the evidence shows that the scheme was largely delivered with a farmer-led and bottom-up approach with regard to ideation. The evidence is a little more mixed when it comes to the actual delivery of projects. For the most part, Operational Group members believed they had led delivery, as 65 % (80/124) agreed with the statement that 'the project was led by the foresters / farmers', whilst nine % (11 responses) disagreed. However, other survey evidence suggests that the Innovation Brokers played a leading role in many of the projects, as discussed in the previous section. Some Operational Group members highlighted this as a weakness:

> "I was much too naïve about it… we should have been far more insistent on the things that we really felt should have been done but gave way to the contractor… The downside of having someone organise this for you is you tend to let them get on with it and not see exactly what was going on. Overall, it's a good model but somehow or other the people who are doing the work and who the project is for need to be 100 % invested, not just to outsource it to the management team" (Operational Group member survey).

4.38 The delivery team noted that, whilst the bottom-up approach worked on most occasions, they "encountered some projects that offered exciting ideas, but did not have the capacity and oversight to take them forward", and thus a more top-down approach would have helped to move those projects forward. Additionally, another suggested that the scheme should perhaps have had an overarching strategy with maybe four or five key themes that projects had to align with. According to the interviewee, this would have allowed for a "better focus on the sector's needs rather than the sector's wants". These comments are also consistent with some comments

from external stakeholders who described the scheme as having a “scatter-gun approach” that was not always strategic.

4.39 We can draw lessons from the delivery elsewhere in Europe on this, where, although schemes were fairly evenly split with regard to having an open vs prescriptive approach, many of the schemes which were classed as having an open approach nonetheless identified particular needs and opportunities or sectors on which to focus. Some delivery team members felt that EIP Wales could have incorporated a similar approach: “Innovation from a bottom-up perspective, but with an overarching strategy” as one described it.

Operational Group member engagement and collaboration

4.40 The evidence is again mixed on the extent of collaborative activity taking place within the Operational Groups and the level of engagement from all Operational Group members, which appears to have varied from project to project.

4.41 Several examples of good cross-sectoral collaborations were highlighted by Innovation Brokers and the delivery team. There was a positive collaboration between the lead farmer and an academic from the Institute of Biological, Environmental and Rural Sciences (IBERS) in the upland grazing project (EIP21 – Upland leys). The Royal Society for the Protection of Birds (RSPB) was heavily involved in the Pasture for Pollinators project (EIP 3), and vets were closely involved in some of the animal health projects (wherein they had provided advice to farmers on the group). These are merely some of the examples that were highlighted to us; further examples can be seen in the list of projects outlined in Appendix 10.

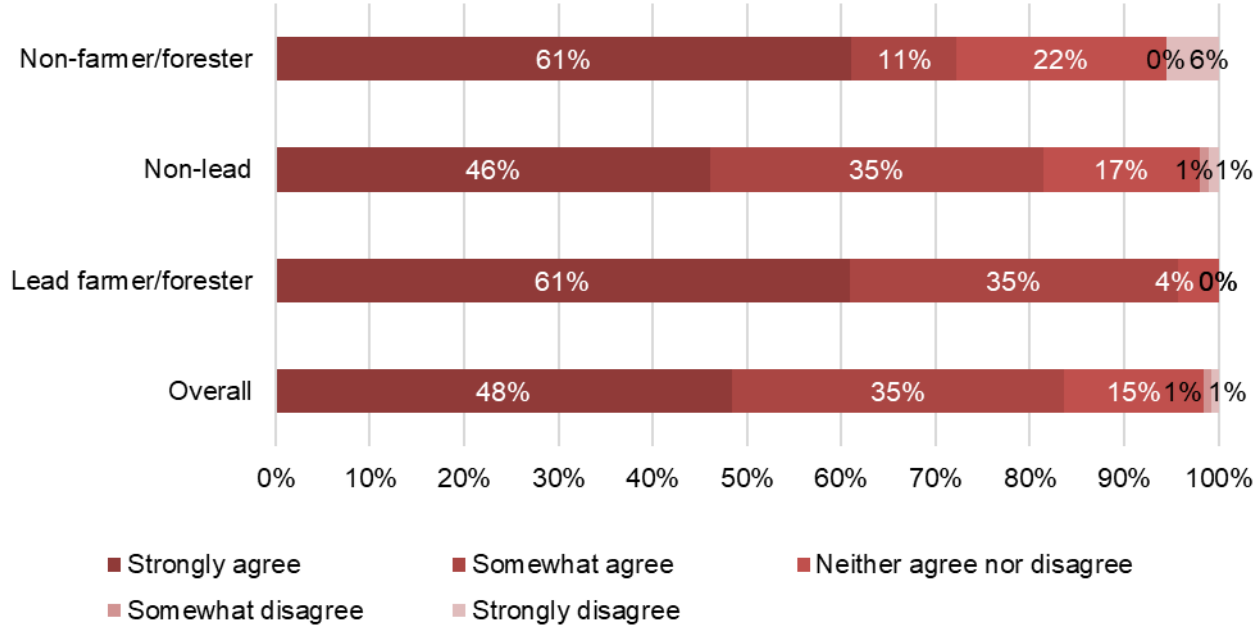
4.42 There were other examples in which there had not been as much collaboration or engagement from the Operational Group members. Indeed, delivery team members and Innovation Brokers described a highly variable picture:

"Hugely variable. Have good examples where non-farmer members [have] been proactive, e.g. really engaged in talking through results, [helping] to identify data, etc. With others, some non-farmer members wouldn't know what the project has done" (Interview with IB).

4.43 This was evident in our engagement with non-farmers and foresters. We note that there were only 73 non-farming/forestry contacts while 70 % of Operational Groups (32/46) only contained one non-farming/forestry organisation. When undertaking our survey work, 20 % of the non-farmers/foresters we were able to contact (9/44) could not recall their project or suggested they had not been involved. This is an important finding in itself, and one which demonstrates some level of non-engagement. Additionally, one of the delivery team members described their surprise when "I talked to a few participants who told me that they didn't realise they were part of the project". We further note, however, that the non-farmers/foresters who did take part in the survey were engaged in their project activity.

4.44 Additionally, responding to the main survey question, 84 % of Operational Group members (102/122) indicated a belief that they worked well with their fellow Operational Group members. This dropped slightly for the non-farmers/foresters, although remained high, since 72 % (13/18) agreed with the statement. Furthermore, 88 % (110/125) believed that their Operational Group represented an appropriate mix of expertise, with a similar proportion of non-farmers/foresters reporting the same.

Figure 4.2: 'To what extent do you agree with the following statements about the Operational Group? - The Operational Group worked well together'



Source: Operational Group member survey (n=129) & non-beneficiaries (n=29); n=158 overall

4.45 Other findings from the survey, however, provided further evidence of limited engagement and collaborative activity in some of the projects. For instance, 51 % of the non-leads (44/87) reported they were 'not at all' familiar with the level of project funding and how the funding had been used.

4.46 Several Operational Group members stated that the lack of compensation for farmers' time should be re-considered for future interventions:

> "I think that the basis on which we engage farmers needs to be looked at quite carefully. From the outset it's clear the farmers don't get paid for their time so the benefits for them are in the results and findings of the project and that needs to be made really clear to them at the outset. This problem needs to be a big enough problem and the benefits need to be big enough for them to put in a lot of time and commitment, they need to be quite engaged. The results of these are shared more widely, not just for the benefit of farmers involved, so is there a case for compensating farmers to some degree?" (Operational Group member survey).

4.47 Indeed, the adverse impact on Operational Group members' capacity was the second most commonly cited challenge when asked in the survey, only behind

adverse impacts associated with coronavirus (COVID-19). Two respondents explicitly cited the lack of compensation for their time as a frustration, whilst three highlighted a lack of engagement from other Operational Group members (including one who explained that other members would not engage, due to the time commitments, without being reimbursed):

"Having the farmers remaining committed to the project, as they started dropping out after one year of a three-year project (was the main challenge). Other farmers thought I was mad doing this project, as I wasn't paid for my time, or the land devoted to it, and that is why they started dropping out, as they did not want to invest their time and labour into it [...] without any payment for their services" (Operational Group member survey).

4.48 However, whilst the team and stakeholders thought that the lack of compensation for farmers' time might be an issue, only three of the 80 comments (four %) from Operational Group members were related to this when they were asked about the main challenges surrounding delivery. Additionally, when asked directly about improvements that they would want to see made, only four of the respondents' 80 comments (five %) highlighted the need to pay farmers for their time. This is likely because they were able to utilise the Innovation Brokers and other aspects of the support infrastructure to take much of the delivery pressure off themselves. It could be argued that, since the trials are taking place on their farms and that the scheme is typically investing in their ideas, it is not unfair to expect Operational Group members to invest some of their time without being compensated for it.

4.49 According to the delivery team, collaboration and coordination between the Operational Groups did not happen in any tangible sense, other than one diversification event arranged by Farming Connect. This is despite the EIP schemes being encouraged to facilitate such collaboration. One delivery team member noted that the projects were so varied and diverse that it was sometimes difficult to see the links between the Operational Groups. This again shows where having a more strategically focused set of projects based on common themes may have been beneficial.

4.50 In summary, the extent to which projects could be described as top-down or bottom-up varied from project to project, depending on how proactive the Operational Group members and Innovation Brokers were and how they came about. Generally,

however, most projects were conceived by farmers and foresters and based on their needs, albeit with extensive support from the Innovation Brokers in delivering them. It is also important to consider whether the scheme should seek a purely bottom-up, farmer-led and open approach, or whether there should be some degree of compromise to ensure that the projects do deliver on pressing strategic needs (which would bring the scheme more in line with the delivery approach elsewhere in Europe).

4.51 It was also noted that, although there has been one example of an EIP Wales project securing additional funding to continue their research, there was no clear mechanism or dedicated resource to scale up and mainstream the best projects. Delivery team members highlighted this as a weakness and supported the idea of having a dedicated resource, with the scheme almost used as “seed funding” to test a number of different projects at a relatively low cost with a ringfenced fund to upscale the best examples.

4.52 The level of engagement and collaboration amongst Operational Group members appears to have varied considerably, with some evidence of non-engagement, particularly amongst non-farmers and foresters. EIP England sought to secure engagement by mandating that all Operational Group members had to agree to terms of reference, thereby ensuring clarity with regard to their roles (which does not appear to have always been the case in Wales). This should be considered for future delivery in Wales. Additionally, future schemes ought to take into account whether the non-lead farming and forestry businesses should be compensated for their time.

Lessons learnt for future delivery model

4.53 With EIP Wales placing much more emphasis on the Innovation Broker role than many other EIP schemes in Europe, stakeholders were interested in understanding whether the investment in Innovation Brokers was appropriate. Indeed, some stakeholders questioned the appropriateness of paying a "consultant's fee" for what was largely a facilitation role, whilst others questioned the principle of spending so much of the funding on consultancies, noting that the funds would be better going directly to the farmers and forestry businesses engaged in the EIP projects.

4.54 The scheme was tasked with balancing aspirations for a farmer-led approach, a need to ensure scientific rigour, supporting the best and most suitable projects, and ensuring cost-effectiveness. There were broadly three available options.

- Option 1: the status quo whereby external consultants were commissioned as Innovation Brokers to provide facilitation support for the projects, with MaB responsible for coordinating activity at a scheme-level (through the Knowledge Exchange Manager and Project Officer).
- Option 2: no facilitation support, with the processes streamlined as much as possible (within the constraints of RDP funding) and organisations left to deliver the whole process themselves (such as in the EIP England model).
- Option 3: facilitation support provided by a central team which would likely have been less experienced and offered less expertise, although it would have also been less costly; this would essentially have involved establishing a team of Project Officers to deliver the facilitation support.

4.55 We note that the need for facilitation support has been well founded, with Operational Group members very unlikely to have engaged on the scale they did without the support. This is, to some extent, indicative of the nature of RDP funding, with the extensive administrative requirements entailed. In England, whilst their 'no facilitation support' approach required Operational Groups and their members to be much more committed in a 'sink or swim' environment, which may have led to more resilient groups (we note that some groups have been sustained well despite the scheme ending), it also led to a substantial underspend and lack of engagement amongst farming and forestry businesses, particularly with much of the activity undertaken by large organisations. Just £1.85m of the £5m budget in England was successfully allocated.

4.56 Further, the facilitation support provided by EIP Wales has been much more important than simply being a mechanism with which to engage members and alleviate the burden that would otherwise have occurred. The input from the Innovation Brokers has improved project delivery, with their expertise and experience utilised to deliver the trials in a structured manner, thereby ensuring the scientific rigour needed to affirm the credibility of the research findings. Accordingly, even if some of the administrative burden associated with RDP funding is removed from future interventions, a strong case can still be made for maintaining some form of facilitation support.

4.57 Operational Group members were largely in favour of this. When asked for their preferred option with regard to how schemes such as the EIP should be delivered in future, 74 % (35/47) selected the option of retaining a similar structure (i.e. a comprehensive application process but with substantial support from an IB), whilst just 26 % (12 responses) selected a streamlined, light-touch process with minimal support from a central team (and therefore greater responsibility placed on the lead applicant/Operational Group members to deliver the work). As well as describing the need for practical support (to alleviate the administrative burden, which could also be addressed, in theory, by a more streamlined process), respondents also highlighted the importance of having professional support to manage the complexity and ensure that the projects are delivered as intended, as well as with scientific credibility.

> “I think it works quite well. It was very easy for me to commit to it and all the necessary complicated stuff was taken care of. My concern would be if farmers had to do it we wouldn't get the ball over the line, so to speak” (Operational Group member survey).

> “Definitely need an innovation broker to lead and organise and bring in people from different backgrounds and specialities but also feedback the practical concerns of the farmers. The innovation broker ensures that the project has the scientific credibility needed whilst also ensuring that the farmers get a practical benefit from the project and remove the admin burden” (Operational Group member survey).
>
> “The innovation broker played a key role in the success of this project. They provided the admin support which helps the rest of the operational group focus on the main objectives of the project. A lot of the people involved had very little experience of this type of project and the innovation broker provided valuable guidance and structure” (Operational Group member survey).

4.58 Others highlighted that the type of support needed varies according to the nature of the project, with some more simple to deliver than others, and with some Operational Group members and leads more experienced in engaging with R&D projects than others.

4.59 Together, whilst these data demonstrate the importance of retaining facilitation support in future delivery, the variability in the complexity of projects may suggest a case for a blended model that runs across two or all three of the options described above. For instance, a future scheme could firstly identify whether there is a need for facilitation support at all and, where that need is confirmed, assess whether the level of complexity can be managed by a more junior Project Officer or requires an external specialist. This would perhaps provide the best balance between securing value for money, scientific rigour, retaining a thorough application process to help identify the best projects, and having a bottom-up approach.

5. Outcomes for Operational Group members

Delivering successful projects

5.1 In total, 59 % (77/130) of Operational Group members reported that their projects had been completed at the time of being surveyed.[28] In cases where they had completed their projects, we asked a number of follow-up questions about the results and outcomes. The vast majority of Operational Group members with completed projects either 'strongly agreed' (58 %, 40/69) or 'somewhat agreed' (23 %, 16 responses) that their project had been a success (81 % in total, excluding those reporting it was too early to say).

5.2 Alongside this analysis, we also explored perceived success on a project-level basis in order to identify how many of the projects were perceived to have been a success. Of the 42 projects covered in the survey (i.e. where at least one Operational Group member provided feedback), there were 33 (79 %) that appear to have been completed at the time.[29] All Operational Group members agreed that their project had been a success in 65 % (20/31[30]) of the completed projects and a further 26 % of projects (8/31) contained a mixed response i.e. where some agreed their project had been a success and others disagreed. Just 10 % of projects (3/31) contained a unanimous view among Operational Group members that their projects had not been a success. Overall, these findings show that the vast majority of projects were considered a success.

5.3 Generally, Operational Group members reported their projects had been a success because they had achieved positive results and accomplished what they had set out to do, e.g. "The objective was to reduce the antibiotics and we did that and have got the data to prove it". Indeed, when asked, 78 % of respondents (74/95) agreed, at least to some extent, that they had received the benefits that they hoped the projects would generate (when excluding those reporting it was too early to say). We note that 27 % of respondents answering this question (35/130) reported that it

[28] By the end of the first survey wave in January 2022, half the projects had been completed. This had increased to 91% by the end of the second survey wave in January 2023, with the results in this section therefore providing a mix of those two timelines.
[29] This is on the basis that at least one Operational Group member reported that their project had been completed. Note that 15 projects had Operational Group members providing contrasting responses on whether their projects had been completed. This may reflect the lack of engagement and awareness among some members of the status of the project they were involved in.
[30] Note, respondents from two projects did not provide a response to this question.

was too early to say, mostly because their projects had not been completed at the time of being surveyed. However, there was a small number of comments from respondents with completed projects, perhaps from Operational Group members who were not as heavily engaged, which suggested they had not been made aware of the results; thus, the scheme should ensure that all Operational Group members are alerted.

5.4 Alongside the respondents reporting success because of the positive results achieved, the projects which conclusively show that an idea does not work can also be described as successes. For example, one delivery team member highlighted the 'EIP6 – Squill Production' project, which trialled the growing of squill on North Wales farms, found that this did not work because the availability of seed bulbs was an issue for any commercial exploitation. These findings are equally important to those of the 'successful' projects and are just as vital with regard to the dissemination side of the scheme to prevent other farmers from investing in things that have already been shown to be unviable. The only instance where pilot projects such as these should be considered a 'failure' is if they fail to conclusively demonstrate that the idea being piloted does or does not work (or where that information does not reach the wider sector and thus does not add to the knowledge base).

Changes to practices

5.5 Just over half of participants (56 %, 62/110) reported that they had changed practices within their business as a result of the project, whilst a further 23 % replied with 'Not yet' (25 responses), thus suggesting that they could do so in the future. Given that many of the projects were not completed at the time of the survey and numerous other Operational Group members were still waiting for results from their projects, we can safely assume that the figure of 56 % will increase further. Indeed, around a third of the responses from organisations that selected 'No' in response to the question indicated they had either not yet received the results or had gained valuable information and were still considering how to use it: "Not changed any yet but it's given me an idea of what to do".

5.6 Operational Group members who had completed their projects were also asked this question in their 'EIP Wales end of project evaluation form'; amongst the 35 responses, 24 (69 %) reported that they had made changes as a result of the

project. These primarily concerned improving farming techniques (25 responses), animal health improvements (12 responses), and using testing to inform decisions (seven responses). The specific changes made varied considerably according to the theme of the project in which they were engaged, with some examples provided below.

> "More regular foot trimming, rubber mats, new water tanks, more focus on milk emotion scoring and care comfort" (Operational Group member survey).
>
> "We now regularly genomic test all the calves" (Operational Group member survey).
>
> "Reduced chemical and pesticide use which improves the attractiveness of the product to consumers and saves the farm a lot of money as we no longer need to buy expensive chemicals" (Operational Group member survey).
>
> "We have developed a more cost and time effective method for preparing Welsh Birch for processing" (Operational Group member survey).

5.7 This is a key finding revealing that most of the farmers and foresters engaged in the scheme have made tangible changes.

Benefits of changes

5.8 The benefits of the changes made to farming and forestry practices also varied considerably in line with the specific activities of the projects undertaken. Examples of such activities include reducing the use of antibiotics, lowering illness and infection through testing, and demonstrating the financial benefit of genetic testing, e.g.:

> "[The project] provided clear evidence of how udder health was important and that we were overmilking which was leading to more infections and then reduced quality of milk yields. This showed that simple testing identified the problem early and it could be treated easily and not require large scale use of anti-biotics" (Operational Group member survey).
>
> "Scab as a disease can only be eliminated if all farmers in an area take action. The group have shown that a simple blood test and dipping where positive results are found does cut levels of scab in a flock but it will need to be adopted

across all farmers in the region to get rid of the problem completely" (Operational Group member survey).

5.9 Certain themes were revealed by a review of the comments (129) made by Operational Group members regarding the benefits which their organisation received as a result of implementing the changes. Ideally, we would report identified benefits as a percentage of the relevant project goal, rather than a percentage of total comments (i.e. to identify what percentage of those projects aiming to reduce antibiotics, for example, were successful). However, this was not possible from the available data as it would have required a clear set of objectives and corresponding outcomes for each project in the form of categorical data. The data captured on this has generally been in narrative form and has been coded as part of the analysis. This was not sufficiently robust to analyse achievement of specific goals on a project basis. Thus, the focus here is on the general outcome themes reported by Operational Group members. The project goals varied considerably and, as such, these outcomes will only have been applicable to a subset of respondents. These themes are as follows:

- 21 (16 %) reported that they have been able to reduce the use of antibiotics and other medicines, whilst also reducing illness and infection, through preventative action (e.g., testing, vaccine development, and changes to rearing practices which lead to improvements in aspects such as nutrition and hygiene) in the 'EIP4 - Reducing Antibiotics in Sheep', 'EIP35 - Udder Health', 'EIP17 - Tackling Scab', 'EIP32 - MCF in Bison/Buffalo', 'EIP41 - Lameness' projects, as well as the 'EIP34 - Herbal Leys' and 'EIP23 - Cattle FEC' projects.
- 19 (15 %) reported they were able to improve the quality of their livestock (e.g. weight gain, fertility, calving rates etc.) or other produce (e.g. higher yields/lower crop wastage) through general testing, genetic testing, improvements to rearing practices (leading to improvements in soil quality/nutrition/hygiene etc.), and crop production (e.g. using natural pesticides). These improvements were achieved through the 'EIP15 - Foliar Feed for Grassland', 'EIP3 - Pasture for Pollinator', 'EIP37 - Pregnancy Diagnosis', 'EIP34 - Herbal Leys', 'EIP8 - Genomic Testing in Dairy', 'EIP16 - Trace Elements', 'EIP29 - IDPM Soft Fruit ', 'EIP46 - Biochar', 'EIP27 - Lot Slurry', 'EIP19 - Goat Meat Production', and 'EIP33 - Cucurbits' projects.

- 16 (12 %) reported benefits for conservation and the environment through the ‘EIP3 - Pasture for Pollinator’ (i.e. increasing bee stocks), ‘EIP34 - Herbal Leys’ (also by having a positive effect on pollinators), ‘EIP39 - Carbon Neutral’ (by identifying ways to reduce farmers’ carbon footprint e.g. by reducing hedge trimming), ‘EIP5 - Low Impact Forestry’ (by using lower-impact machinery), ‘EIP18 - GPS Tracking of Livestock’ (by identifying the habitat the cattle focus on and using the information to inform conservation management), ‘EIP29 - IDPM Soft Fruit‘ (by reducing the use of pesticides), ‘EIP1 - Potato Blight Control’ (by reducing the used of nitrogen-based fertilisers), ‘EIP30 - Cryptosporidium’ (by informing the prevention of contamination of streams and rivers), and ‘EIP27 - Lot Slurry’ (by identifying best practice to reduce slurry-related pollution) projects.
- Three (two %) reported that they have been better able to market their product through the ‘EIP2 - Cambrian Mountains Beef Group’ and ‘EIP3 - Pasture for Pollinators’ projects.
- Two (two %) reported that they have been able to develop and/or sell new products as a result of the ‘EIP38 - Birch Sap’ and ‘EIP1 - Potato Blight Control’ projects.
- One (one %) reported that they were able to develop their local supply chain and cut costs through the ‘EIP2 - Cambrian Mountains Beef Group’ project.

5.10 Accordingly, the three main outcomes for businesses as a result of participating in EIP are, by far, improvements to animal health on their farms and a reduction of health-related costs (cited by 21 survey respondents across seven projects); improvements to businesses’ produce (cited by 19 respondents across 11 projects); and environmental outcomes (cited by 16 respondents across nine projects).

5.11 In total, 40 of the comments (31 %) were from respondents explaining that it was too early to have had any outcomes. Excluding those, 56 % of the comments (49/88) provided detail on tangible outcomes for their businesses.

5.12 Some of these projects appear more frequently than others, thus suggesting that they have been particularly successful. For example, the ‘EIP3 - Pasture for Pollinator’ project was very evident in the survey responses, comprising conservation benefits through increasing the local bee population alongside

improvements in the nutrition of dairy herds, and the development was used by farm businesses as part of their marketing:

> “The project achieved all the project aims. We found the best wild flower mix of seeds that not only attracted and helped bees but also improved the nutrition of our dairy herd. We were also able to highlight that just leaving strips of pasture uncut could still increase bee populations. We have used the data from the report in our marketing to retailers, as we have proof that our method is bee-friendly” (Operational Group member survey).

5.13 Another example of a project that featured prominently in reported outcomes is the ‘EIP4 - Reducing Antibiotics in Sheep’ project. According to one of the Operational Group members we surveyed:

> “The project provided clear evidence that nutritional supplements and simple hygiene measures reduce antibiotic use during the lambing season. I used lime to disinfect lambing areas, and this was very cost effective. Antibiotic use was reduced, which saves money in terms of paying for less medicine and also not having to pay as many vet bills for treatment and visits” (Operational Group member survey).

5.14 Yet another successful project was 'EIP8 - Genomic Testing in Dairy', with one Operational Group member remarking as follows:

> “Doing the genomic testing and following it up and seeing the animals who are genomically superior, and their improved performance compared to the rest opened our eyes to the possibility of improving the genetics of the herd and the financial benefit of that” (Operational Group member survey).

5.15 Finally, ‘EIP15: Foliar Feed for Grassland’ is another good example, with one respondent commenting that it had been a ‘revelation’ because they were able to use substantially less fertiliser whilst simultaneously achieving the same amount of growth.

5.16 Our analysis also included the responses from the non-farming/forestry Operational Group members. They were much less likely to cite tangible impacts for their organisation. This is to be expected, given that their role was more to provide input to projects that were aimed at benefitting and changing practices in farming and forestry businesses. For this reason, only 26 % (5/19) ‘strongly agreed’ that the

project generated benefits for their organisation, with a further 26 % (five responses) ‘somewhat agreeing’; this (52 % combined) can be compared with 78 % of the sample overall agreeing, at least to some extent, that there had been tangible benefits for their organisation. Where benefits were cited by the non-farming/forestry members, the said benefits typically concerned supporting their organisation in delivering its mission, i.e. raising awareness about issues such as good health planning practices, e.g.:

> “It has been a successful project especially in terms of raising the profile and importance of hoof health in dairy cattle and giving farmers information about the best way to prevent lameness in dairy cattle” (Operational Group member survey).

> “I think we have done a good job in raising the awareness of Cryptosporidium and combatted some of the myths. It has also shown that there are no tools available that can stop contamination of streams and rivers, so early detection, testing and treatment are the best approaches” (Operational Group member survey).

5.17 Finally, it is important to note that COVID-19 will have limited some of the impacts generated by the projects. Five Operational Group members reported that the pandemic had prevented them from achieving the intended benefits, or at least slowed down the process, e.g.:

> “Whilst the project did allow farmers to use photo selective film for the first time to see if it increased leaf yields, COVID-19 caused problems in terms of disrupting the planting and harvesting schedules, which meant there wasn't as complete a set of data as the project initially set out to collect” (Operational Group member survey).

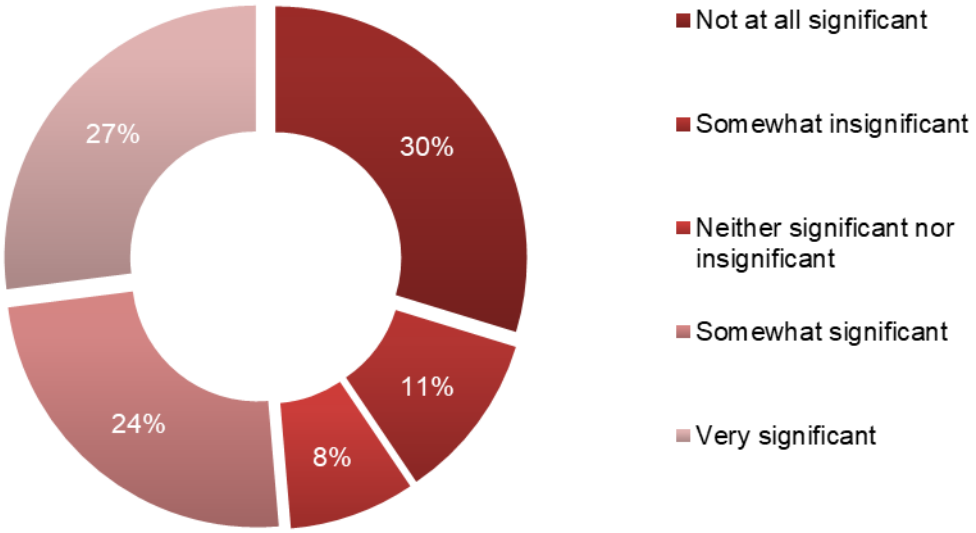
Impact, sustainability, and additionality

5.18 We explored the level of these changes’ impact on the businesses and the sustainability of the above-mentioned outcomes for Operational Group members in greater detail during the follow-up survey, which was conducted around a year after they were first interviewed. Positively, 93 % (13/14) of follow-up survey respondents reported that changes to their practices had been sustained after the end of the project, at least to some extent.[31] We note, however, that this was based on just 14 responses, where projects were complete at the time of the initial survey. As such, the results from this question should be treated with caution due to the small sample size.

5.19 A more mixed response was received when respondents were asked about the level of impact on their businesses, with just over half (51 %, 19/37) reporting that the impacts were very or somewhat significant (see Figure 5.1). Describing the reasons for this, respondents typically referenced the impact on their productivity, reduction in costs, and the impact from the knowledge gained. Such variability is not surprising when considering that the projects were trialling new ideas with some, inevitably, not working, whilst others will have only been designed to explore marginal improvements, and some of the Operational Group members responding to the question will have also been less engaged and thus less likely to reap the benefits. Accordingly, the operation was always likely to generate more meaningful impacts for some organisations compared to others.

[31] The following responses were provided: six selected ‘5 – To a great extent’, five selected ‘4 – To a large extent’, two selected ‘3 – Somewhat’, none selected ‘2 – Little’, and one selected ‘1 – Not at all’.

Figure 5.1: 'On a scale of 1–5, where 1 is 'Not at all significant' and 5 is 'Very significant', how significant have these impacts been for your business?'



Source: Operational Group member follow-up survey (n=37)

5.20 Finally, the evidence (both self-reported Operational Group member data and feedback from non-beneficiaries) suggests a high level of additionality. When asked about what would have happened in a counterfactual scenario (i.e. had they not received support), only seven % (4/60) of the respondents 'strongly agreed' that they would have changed these practices anyway, whilst a further 17 % (10/60) 'somewhat agreed'. Most (53 %, 32/60) disagreed with the statement that they would have changed these practices anyway, without the support. A similar response was found at the end of project evaluation forms, wherein only one of 32 respondents noted that they would have implemented the changes without the support; the remaining participants either categorically stated that they would not have (16) or were unsure (15). Drawing on evidence from the group of businesses which applied or initially showed interest but did not proceed with a project through EIP Wales (i.e. the non-beneficiaries), the vast majority of respondents (23/26) reported that their project did not go ahead without EIP support[32], which further suggests a high level of additionality for this type of scheme.

[32] This is based on those reporting 'No' to the following question – 'Did your project go ahead without EIP support?'

Assessment of economic returns

5.21 Below, we provide our assessment of the impact generated for Operational Group members in economic terms, based on their response to that line of enquiry in the Operational Group member survey. It is important to emphasise that this is a tentative assessment which is based on broad estimates of the economic returns for respondents and broad assumptions regarding those returns' generalisability to the entire cohort of farm businesses supported. Nevertheless, such estimates provide some indicative findings regarding the direct economic impact exerted by the activity.

5.22 In total, 53 % of respondents (33/62)[33] reported that they had been able to generate new income or reduce costs as a result of the project.

5.23 We then asked Operational Group members to speculate on an annualised economic impact (through increased annual income or cost savings) generated from implementing the new practices and applied a zero value for businesses reporting there had been no impact. This provided 29 records for an assessment of the economic returns, amounting to £217,810 overall. Individual returns varied from as little as £400 to as high as £50,000, although the majority were in the hundreds to low thousands with a median average of £2,500. The rationales for providing these estimates were well reasoned, often focusing on the savings generated by reducing antibiotic bills or other medication, or the productivity gains from improvements to Operational Group members' produce. Some of the examples are shown below.

> "Lessened antibiotic cost and the costs related to huge reduction of lameness by having a more targeted approach" (Operational Group member survey).
>
> "I would say lameness has already been cut by 10 %, which probably saves us about £10,000 over a year in treatment, vets bills etc." (Operational Group member survey).
>
> "I saw a 15 % drop in crop wastage during the trial period" (Operational Group member survey).

[33] Note, this question was only asked where Operational Group members confirmed they had changed some of their practices as a result of their project.

"Has reduced some costs as we test for more things before treatment. We save around £8 a head over winter, so around £3,000–£4,000 annually" (Operational Group member survey).

"I think when taking into account the cost of genetic testing we would save £19 per cow as the offspring would be healthier, produce more milk and have higher fertility" (Operational Group member survey).

5.24 If we assume that the median average figure is representative of the wider group of farmers supported by the operation (i.e. all 237), grossed up this would be equivalent to an economic return of £582,500. With the changes likely to continue providing return for businesses for years to come, and with more value likely from projects that had not been completed at the time of survey, the scheme may generate a positive return on investment from the benefits to direct beneficiaries alone. We can assume that the benefits will have also gone beyond this group of direct beneficiaries, with much activity focusing on disseminating the learning to the wider sector, as we will discuss in the next chapter.

5.25 The Welsh Government conducted analysis of the Welsh Agricultural Survey to look at changes in Standard Output (SO) (i.e. the proxy for farm business turnover) from the year before the EIP operation was launched (2015) up to the latest available data (2021). The figures for Operational Group members are shown in Table 5.1 (including a separate set of figures for lead applicants), benchmarked against the rest of the sector. The graphic illustrates a much higher increase in SO amongst those involved in the EIP operation. Indeed, the percentage share of Operational Group member farmers increased from accounting for 5.3 % of the entire sector's SO before the operation, to 6.9 % in the latest data. Some of the difference may simply reflect that EIP has engaged more progressive businesses which were potentially always more likely to grow at a faster rate. Equally, such a difference does provide more weight to the evidence that EIP has supported the growth of the farm businesses taking part, supplementing the self-reported growth attribution shown above.

Table 5.1: Growth in the Standard Output (SO) of lead farmers, other Operational Group members, and non- Operational Group members from 2015 to 2021

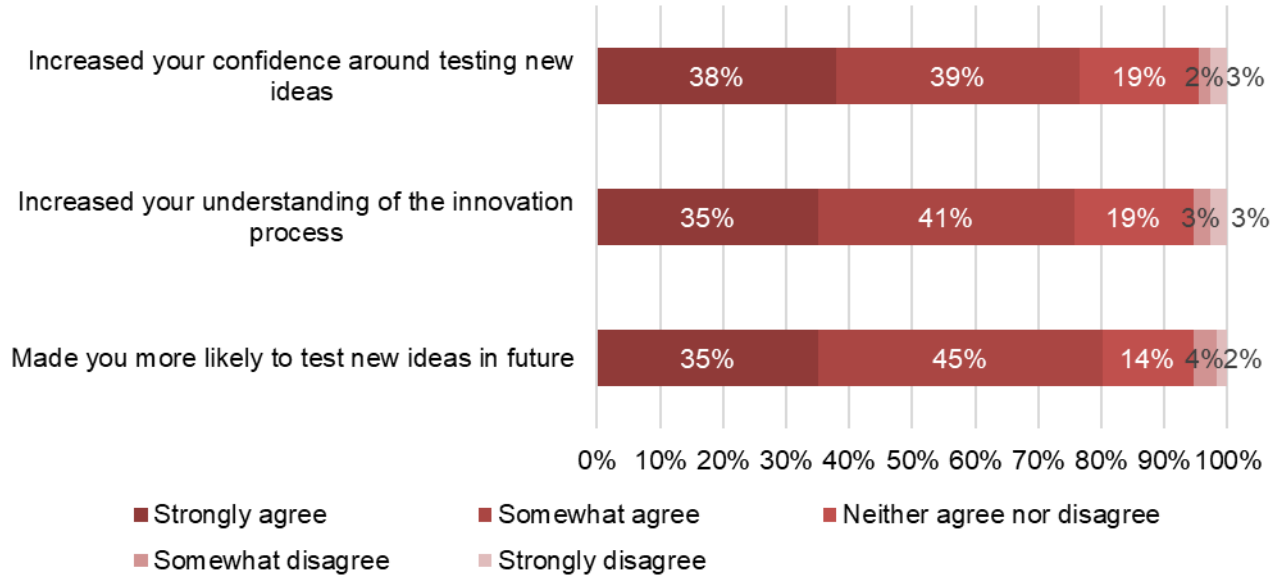
	Average SO (000)			Share of Wales total		
	Lead applicant	Other Operational Group member	Non-Operational Group members	Lead applicant	Other Operational Group member	Non-Operational Group members
2015	322	399	66	0.6%	4.7%	94.7%
2021	409	555	74	0.7%	6.2%	93.1%
% growth	27%	39%	12%	12%	34%	-2%

Source: Welsh Government analysis of Welsh Agricultural Survey data

Fostering innovation

5.26 Operational Group members were asked a range of questions in order to gauge the outcomes associated with fostering innovation, as shown in Figure 5.2 below, which was a core objective of the scheme. Most agreed that the support had made them more confident about trialling new ideas (77 %, 85/111), increased their understanding of the innovation process (76 %, 84 responses), and made them more likely to test new ideas in the future (80 %, 89 responses).

Figure 5.2: Outcomes associated with fostering innovation: 'To what extent do you agree that being involved in EIP Wales has ...?'



Source: Operational Group member survey (n=111)

5.27 The above are key indicators of success with regard to the scheme's main objective of fostering innovation within the sector. Indeed, seven respondents reported that they had already engaged in follow-up research after completing their project. This was also highlighted in the delivery team interviews, where it was reported that the 'EIP7 - Robotic Weeder' project had been successful in securing funding from the Horizon Europe programme to undertake further development of the project alongside ADAS. One delivery team member stated that the scheme had proved to people in the sector that the concept of innovation need not be "scary".

5.28 We introduced a direct question in the follow-up survey, asking Operational Group members to what extent taking part in EIP had fostered innovation within their business. In response, 76 % (29/38) reported that it had done so at least to some extent,[34] with respondents explaining how it had encouraged and inspired them, whilst also giving them the confidence and understanding to undertake further innovation:

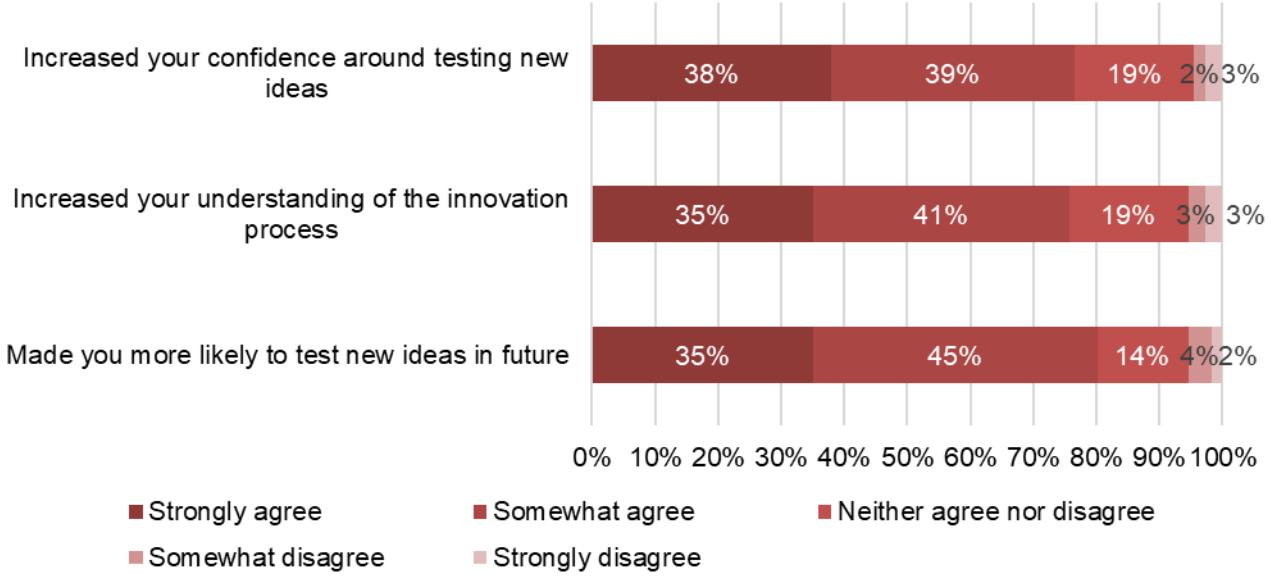
> "Finding out that this liver testing is available has been very innovative and if there were other projects relating to me in the future I would certainly consider being part of them" (Operational Group member follow-up survey).

[34] A five-point scale was used with the following responses received: 12 selected '5 – To a great extent', 11 selected '4 – To a large extent', six selected '3 – Somewhat', one selected '2 – Little', and eight selected '1 – Not at all'.

Collaboration

5.29 Figure 5.3 shows that most Operational Group members do believe that the scheme has enabled them to develop new relationships with other farmers and foresters and, to a slightly lesser extent, with individuals from other sectors.

Figure 5.3: Outcomes associated with collaboration: 'To what extent do you agree that being involved in EIP Wales has ...?'



Source: Operational Group member survey (n=131)

5.30 Furthermore, 91 % of respondents (116/128) reported that they intend to continue collaborating with other Operational Group members in future. Several comments highlighted the impact of these collaborations and the learning undertaken:

> "I think it's excellent – you get different attitudes and different personalities in the group, and we can all learn from each other" (Operational Group member survey).

> "The whole structure of the programme and availability of experts to go through things were excellent. The group meetings were extremely beneficial and opened my eyes [a] lot more than I thought [they] would do, and see what other streams of expertise are available to get full and minimum flock counts by looking at things I had not previously thought about, such as evaluating minimum feeds on the farm in response to blood testing – the EIP project was definitely a worthwhile thing to do" (Operational Group member survey).

5.31 The above topic was explored further in the follow-up survey, with 63 % of respondents (24/38) reporting that they had engaged in formal or informal

collaboration through the scheme. This typically involved informal conversations with other members of the Operational Groups during meetings, sharing ideas, discussing results, and collaboration around data collection etc. Operational Group members described how the main benefit of collaboration was that it instigated the discussion groups and some highlighted how they had continued these relationships years after their project had come to an end. There were also some examples of more formalised collaborative ventures:

> "We've created a little co-op because you need loads and loads of birch sap to make a little bit of birch syrup, so it made economical and production sense to pull together other people who are interested. … we've learnt the process together so that's really nice to see what other people are doing in other areas" (Operational Group member survey).

5.32 In total, 46 % of respondents (18/39) indicated some impact from the collaboration element, noting how it had opened dialogue and raised awareness of good practices. In addition, 73 % of respondents (27/37) reported that it had made them more likely to collaborate in future, whilst 70 % (26/37) stated it had made them value collaborative activity more.

5.33 One of the delivery team members told of how the networking and collaboration extended beyond the projects. In a recent Operational Group meeting which they had attended, for example, farmers were discussing other things affecting their business beyond the scope of the project, such as fertiliser costs. It was highlighted how they would use one another as a sounding board during these meetings and offer peer support.

5.34 Finally, Figure 5.3 also reveals the benefit for non-farming/forestry Operational Group members, with 60 % (12/20) indicating that the project had raised their profile and helped to demonstrate their expertise, at least to some extent. As previously noted, they generally cited the increased awareness around environmental and progressive health planning measures as the main benefits. Additionally, 55 % of that cohort (11/20) also agreed, to some extent, that they benefitted from developing new relationships with farmers/foresters and organisations from other sectors.

6. Dissemination of findings and broader impacts

Introduction

6.1 The dissemination of findings was a critical component of the scheme because, without it, any impacts generated are limited to the group of farmers and foresters directly participating. It was hoped that, through effective dissemination, other businesses would learn about these new practices and their results and may decide to adopt them, thus generating a broader sector-wide impact.

6.2 Dissemination was largely based on various Farming Connect channels, as described previously in the report. Findings were promoted through final EIP project reports hosted on the website, posts and short videos on social media, and technical articles in the bimonthly Farming Connect magazine, with each issue having included an in-depth outline of a particular EIP project. Additionally, a quarterly EIP newsletter has also been issued to all Farming Connect-registered businesses, featuring EIP projects. Furthermore, projects have been promoted through open days utilising the Farming Connect Demonstration Network approach, which was the most intensive mechanism deployed to encourage broader uptake.

Review of open day event data

6.3 The data shared with the evaluators reveal that 26 such events took place up to the end of 2022, with two undertaken in 2018, three in 2019 and in 2020, 12 in 2021, and six in 2022.[35] The COVID-19 pandemic, naturally, had a substantial impact on this, with several events being hosted online, which may have affected engagement. The data suggest that the online delivery might have secured a higher number of attendees, with 30, on average, attending the online events in comparison to an average of 22 people attending other events.[36] However, the quality of engagement seems to have been higher in physical events, which were scored 4.8/5 on average in comparison to 4.5/5 for the online events.[37]

[35] Different types of data have been received for these events. The first 20, conducted up to the end of 2021, contained headline figures and basic information regarding topic, date, number of attendees and average score on engagement. Data for three of those events, and a further four delivered in 2022, contained evaluation form data as set out in Table 6.1 (although the four conducted in 2022 did not contain headline data on number of attendees). Data for the final two events undertaken in 2022 were obtained through primary research, i.e. collected directly by Wavehill researchers who attended the events.
[36] Note, this excludes figures for the events undertaken in 2022; see above.
[37] Note, this excludes figures for the events undertaken in 2022; see above.

6.4 In total, 486 individuals had attended these events, or 24 per event on average. They ranged from small events, wherein only six participants attended a technical event relating to the 'EIP22 – Fat-tailed Sheep' project, and 95 participants attended an event for the 'EIP15 - Foliar Feed for Grassland' project.[38]

6.5 Evaluation form data were shared for 53 attendees across seven events conducted during late 2021 and through to 2022.[39] This included pertinent information about attendees' satisfaction with the dissemination activity, what they had learned (if anything), and how the said learning would affect their practices. The results are presented in Table 6.1 below and demonstrate broad satisfaction with the events (averaging 4.9 out of 6 for overall experience and 5.6 for the knowledge of the speaker).

[38] Note, this excludes figures for the events undertaken in 2022; see above.
[39] Evaluation feedback forms were only used by Farming Connect in a selection of events due to the practical difficulties of obtaining such data. Additionally, not all participants completed the forms. Accordingly, these data provide an incomplete view of the events.

Table 6.1: Feedback on Farming Connect dissemination events, based on 53 forms completed by individuals attending seven events from late 2021 to 2022 (all scores are averages, based on a scale of 1 – least positive to 6 – most positive)

The EIP Project	Overall rating	Speaker knowledge of subject	Improved awareness of topic	Learnt anything new about the topic?		Intend to change practices?		
				Yes	No	Yes	Possibly	No
Overall	4.9	5.6	4.7	98%	2%	27%	54%	19%
EIP38 - Birch Sap	4.6	6.0	4.8	100%	0%	20%	60%	20%
EIP24 - Trees in Bracken	5.4	5.1	4.9	100%	0%	14%	71%	14%
EIP20 - Dairy Ewes	5.6	5.8	5	100%	0%	20%	60%	20%
EIP33 - Cucurbits	6.0	6.0	6.0	100%	0%	75%	25%	0%
EIP31 - Ammonia from Broilers	5.2	5.8	5	100%	0%	40%	40%	20%
EIP25 - Selective Dry Cow Therapy	5.5	5.6	5.6	100%	0%	20%	60%	20%
EIP29 - IDPM Soft Fruit	4.0	5.3	3.8	94%	6%	19%	56%	25%

Source: Management information supplied by the Welsh Government in April 2022

6.6 Two of these events were facilitated online: 'EIP38 - Birch Sap' and 'EIP29 - IDPM Soft Fruit'; indeed, the aforementioned were the two lowest scoring events. After applying statistical tests[40] to the population mean score, the difference in averages was found to be statistically significant, demonstrating that the method of delivery had an impact on participants' satisfaction. Additionally, the online events had the smallest proportion of participants/attendees reporting they would change practices, thereby providing further evidence of better outcomes associated with in-person delivery.

6.7 Crucially, the data demonstrates that the events improved attendees' awareness and knowledge of the topic. Whilst there was some variability across the events, almost every attendee in every event reported that they had learnt something new.

6.8 Most importantly, 27 % of attendees (14/52) reported that they intend to change their practices as a result of this learning, whilst a further 54 % (28 responses) indicated that they potentially would. The fact that up to 81 % of businesses

[40] T-tests were used at a 95% significance level to assess the differences between the scores for each event.

attending these events were considering changing their practices suggests that the scheme has succeeded in generating broader uptake of good practice outside the participants directly involved in the projects. This, in turn, indicates that the dissemination approach has been effective in achieving what was intended. Though we cannot quantify the exact scale of this impact, we know that hundreds of farming and forestry businesses attended these events.

6.9 Specific examples of knowledge transfer and changes being considered are listed below.

- Attendees of 'EIP38 - Birch Sap' reported that they learnt about the opportunities associated with birch sap harvesting and the process involved, with four of the five stating that they would potentially change their practices as a result by introducing birch tree sap tapping:

  "Learnt enough to want to make a start at birch sap harvesting" (Event Evaluation Form Data).

  "The process itself of tapping and equipment used along with useful information about the species of tree and the environment's impact on the product" (Event Evaluation Form Data).

- Attendees of 'EIP24 - Trees in Bracken' learnt about bracken management best practice and alternative approaches, including the effectiveness of mechanical interventions and the results of different treatments for bracken clearance before tree planting. They also learnt about the respective merits of different tree species for planting. Six of the seven attendees indicated that they would potentially change their practices, e.g. by planting broad leaf trees or developing a plan for thinning.
- Attendees of 'EIP20 - Dairy Ewes' learnt about ways to improve sheep's milk production, flock monitoring, how to choose the right breed, and how to improve management. Four of the five indicated that they would potentially use this information to inform their decisions, e.g. around choosing the right breed or introducing flock monitoring.
- Attendees of 'EIP33 – Cucurbits' were perhaps the most positive, reporting that the event was very useful for first-time growers, with information about accessing the wholesale market for pumpkins and growing techniques. Three of

the four attendees confirmed that they would change their practices, whilst the fourth indicated they potentially would.

- Attendees of ‘EIP31 - Ammonia from Broilers’ primarily learnt about ways to monitor and reduce electricity usage and costs by employing alternative options such as solar batteries and panels, whilst some also cited new information on reducing ammonia emissions. Eight of the ten were at least considering implementing changes, including installing solar panels, batteries, or improving their monitoring of electricity usage.
- Attendees of ‘EIP25 - Selective Dry Cow Therapy’ highlighted useful information regarding the benefits of mobility scoring, incorporating technology as part of a more holistic approach to managing mastitis cases, whilst it was also stated that not all cases require antibiotics. Four of the five respondents reported that they were considering changes, with one even indicating that they would start collecting mastitis samples.
- Attendees of ‘EIP29 - IDPM Soft Fruit’ learnt about broader weed control options available to them, including using electronic methods instead of herbicides, whilst others learnt about the need to target weed species at the correct time and broader good management practices. Many reported that they knew very little about electronic weed control before the event, and they therefore found the presentation about the trial results very interesting. In total, 12 of the 16 were considering changing their practices as a result, e.g. developing a control strategy, spraying herbicide at the correct time, and exploring using pasture management to reduce weeds.

Observational visits

6.10 Wavehill researchers visited two of the open day events at the end of 2022 – one focusing on findings from 'EIP46 – Biochar' and the other on 'EIP23 - Cattle FEC'. Below, we provide our observations of the sessions before presenting the feedback from attendees.

6.11 The first event (EIP46) involved 10 farmers, four presenters (including two of the farmers involved in the project alongside an ADAS colleague and a biochar consultant), and three event organisers (including an EIP representative). The session was delivered outdoors in a no-dig market garden farm and included a discussion on the benefits of biochar in improving soil for growing (which was the focus of EIP46). Overall, participants seemed relatively engaged in the event and asked pertinent questions regarding marketing, selling directly to buyers, tools used in the no-dig market garden, and the scalability of biochar.

6.12 The second event (EIP23) was much larger, with 35 farmers present (many were directly involved in the EIP research), alongside five presenters. The session was split into a presentation followed by demonstrations. The presentation was delivered in a barn complete with seating and a projector. Attendees seemed engaged at the beginning, although some lost interest over time, likely because of how difficult it was for people at the back to hear and see the presentation[41] (however, the paper sheet with the results of the experiment ensured that they still received the key information). Attendees seemed more engaged in the demonstrations where farmers were split into two groups and given a demonstration on how to administer medicine to calves and on improving grass quality for dung beetles. Participants were given a paper sheet containing the main results of the Faecal Egg Counting (FEC) experiment. Participants were generally engaged with the main messages regarding which worming medicines to use and how often they should be undertaking FEC. They seemed less engaged in the particularly technical parts of the presentation.

6.13 Attendees were then interviewed by the Wavehill researchers at the end of the sessions to collect further data on the dissemination activity. All provided positive

[41] This statement is based on some of the comments made by attendees in interviews with Wavehill researchers, as well as the general observations made by our researchers at the event.

feedback, stating that the events had been run well and contained useful and practical information alongside a good level of detail:

> “The session exceeded my expectation; it went into a lot more depth than I expected. I think it was delivered effectively; these sorts of events can sometimes last too long, and everyone gets bored, but I think they hit the right amount of time. It's been useful for my work because I've been able to see what other farmers are working on, so I have a better understanding of my clients” (Interview with event attendee).

> “Enjoyed the session and learned more useful information about biochar and I have learned more about EIP” (Interview with event attendee).

> “There were lots of opportunities to ask questions. I received all the information I needed” (Interview with event attendee).

> “I want to explore using biochar when growing my willow trees and maybe explore creating biochar myself. I also want to explore the use of cardboard during the growing process” (Interview with event attendee).

6.14 As with the previous findings from the review of evaluation forms, many farmers indicated, during the interview consultation, that they planned to follow up on and utilise the information they had received. Seven of the 19 attendees (37 %) planned to explore the topic further and it had given them ideas, e.g. one attendee stated, “my main takeaway from the session is to explore more into the use of biochar”. Seven attendees went a step further, reporting that they would utilise or consider utilising some of those (new) practices in their own businesses:

> “My main takeaway is to invest in a FECPAK kit to identify when the cows have worms” (Interview with event attendee).

> “My main takeaway is around which medicines to give the cattle; I was unaware worms had started developing a resistance to Ivermectin” (Interview with event attendee).

6.15 Finally, some attendees highlighted how the events had enabled them to learn about the EIP scheme more broadly; 11 of the 19 respondents interviewed (58 %) had not heard about the scheme previously and three reported that they had learnt more about the scheme. Additionally, four indicated that they were now more interested in Farming Connect events as a result of their experience.

Operational Group member initial and follow-up survey

6.16 Alongside the formal Farming Connect communication, peer-to-peer learning is likely to be a critical component of dissemination, with research showing that farmers typically place most trust in other farmers to learn about new practices.[42] Around half of Operational Group members responding to our survey reported that they had discussed their project with other organisations, including 43 % (56/131) who had discussed it with other farmers and foresters and 18 % (24 responses) who had discussed it with other organisations. Elaborating on this, half of those reporting they had discussed with others had done so through informal discussions with neighbouring farms and other farmers to promote the benefits. Indeed, 23 % (15/64) stated that they had discussed their project in more formalised networks, e.g. cooperatives, Farming Connect Discussion Groups, Young Farmer Clubs, and farming unions, whilst 11 % (seven responses) had taken part in open days to share their findings. Similarly, 53 % (18/34) of Operational Group members who had submitted an end-of-project evaluation form to MaB reported that they had shared practical advice arising from the project with other people from outside of the OG, whilst a further 35 % (12 responses) responded with 'Not yet', suggesting that there is scope for this to increase further.

6.17 Some of the comments made throughout the survey demonstrate how Operational Group members have actively been sharing information with others, e.g.:

> "It's focused on awareness of the problem and how to reduce infection with good practices, and this in turn has been spread out through the farming community with those not involved in the project" (Operational Group member survey).

6.18 Together, these data suggest that the scheme has been able to reach businesses and sectors beyond the participant groups. Indeed, some of the respondents claimed that they knew that other farmers had introduced the new practices to their farms following the dissemination activity:

> "Provided open days with other dairy farmers in the area to explain the project and the benefits. Around 25–26 other dairy farmers are introducing the practice after seeing the results" (Operational Group member survey).

[42] Rust, N.A., Stankovics, P., Jarvis, R.M. et al. 'Have farmers had enough of experts?' Environmental Management 69, 31–44 (2022).

"Mostly by talking to other farmers and telling them about how this testing reduces infections and medicine costs and saves money overall" (Operational Group member survey).

"I've discussed it with other farmers who have not been involved in the project who are in the same situation on their farms, with the same problem as my farm. They've all been quite keen to get involved" (Operational Group member survey).

6.19 We asked directly about this in the follow-up survey, where 18 % of respondents (7/38) reported that they were aware of examples whereby other farmers/foresters outside of EIP have explored or developed new practices as a result of their project.[43] Several examples were given, often where the Operational Group members were part of larger networks (e.g. societies, cooperatives etc.) outside of EIP and the information had been disseminated through those groups. In some cases, the new practices had been formally rolled out rather than just encouraged.

"We have, as a society (Welsh Sheep Society), informed other farmers to introduce good practices and made them aware of (steps to reduce scab)" (Operational Group member follow-up survey).

"I know several people who have had a problem with scour, and I've advised them on what we do now to prevent it" (Operational Group member follow-up survey).

"The group of six farmers who took part in this project are part of the milk co-op. The buyer found out about the project and now wants it rolled out across the whole of the co-op, which is 25 farmers across Wales" (Operational Group member follow-up survey).

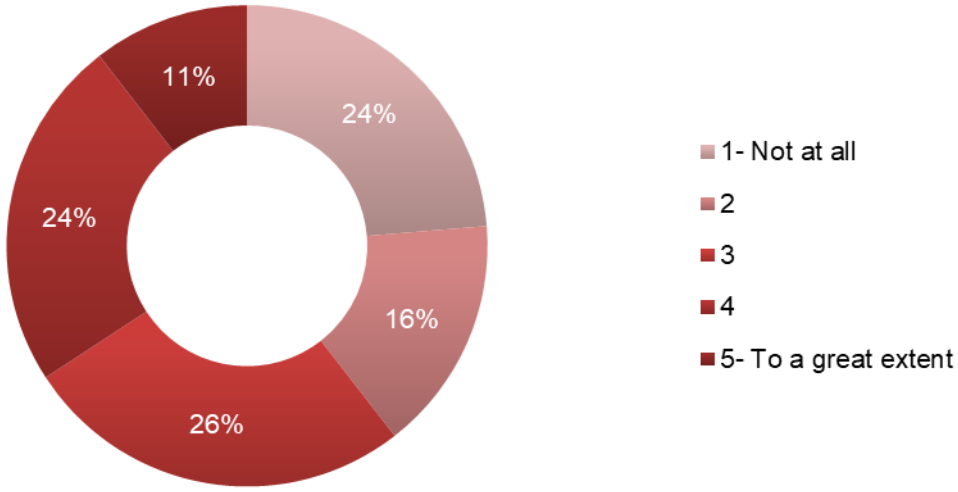
"It's being run out now with all the members of the (bee group). There are 25 in the group, and we are working with the Bumble Bee Conservation to spread the word on how it's to be done" (Operational Group member follow-up survey).

"We shared with lots of farmers the project details at our open day; I can only guess they are adopting too. Information will also be shared at the big grasslands meet next May 2024 to spread the word further" (Operational Group member follow-up survey).

[43] A further 24 % (nine respondents) reported 'Not sure', whilst 58 % (22) reported 'No'.

6.20 We also asked respondents to the follow-up survey about their perceptions of the level of awareness concerning their projects throughout the sector. The response was mixed, with 35 % (13/38) providing a high score of four or five out of five, whilst 39 % (15 responses) gave a low score of one or two out of five. Evidently, these data are limited to what Operational Group members are aware of, although they nevertheless provide a useful indication of awareness.

Figure 6.1: 'To what extent do you believe your project is well-known within the agricultural/forestry sectors in Wales?'



Source: Operational Group member follow-up survey (n=38)

Stakeholder feedback

6.21 The key stakeholders, Innovation Brokers, and delivery team members participating in this evaluation were generally content with the dissemination approach, noting that Farming Connect was best placed to deliver because of its reach (which is unparalleled in Wales). It was highlighted how there is a constant 'drip feed' of dissemination regarding EIP Wales projects in every Farming Connect publication and at the end of Farming Connect meetings, workshops, and events (whether they are directly related to the scheme or not). Equally, stakeholders did highlight the risk of messages about EIP Wales getting lost or being diluted by the sheer volume of other information that is disseminated through the Farming Connect channels. Thus, the delivery team are seeking to maximise outreach by using other industry publications, such as publishing articles in Farmers Weekly or the Guardian.

6.22 When asked about the best way of disseminating project findings, Operational Group members typically referred to the current methods in place, utilising the Farming Connect magazine, the website, and open days, whilst nine suggested distributing through the farming press and other related publications. Four respondents highlighted the importance of supplying farmers with hard copies of reports and suggested posting relevant reports out to them directly. Two wanted to see the scheme working closely with farming unions and suggested that the team should promote findings at their meetings. Overall, their responses indicate that Operational Group members generally feel as though the scheme disseminated findings through the appropriate channels.

6.23 The delivery team felt that the approach was working in some instances and were able to cite examples in which they knew that other businesses within the sector had shown interest in the EIP projects. For example, the scheme has received many queries from farmers with regard to the 'EIP15 - Foliar Feed for Grassland' project since the demonstration event, which was attended by 95 individuals.

6.24 In another example, the 'EIP20 - Dairy Ewes' project was said to have attracted much interest. A young farmer heard about the project and decided to create a joint venture with an older peer, in which the main operation was that of dairy farming using ewes: "the whole attention [towards] milking sheep sparked the young person to do that" (source: interview with delivery team member). In another example, a delivery team member highlighted how the 'EIP27 - Lot Slurry' project had the potential to provide important solutions that could help farmers to rise to the challenge of The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021. This was a strategic project which the Welsh Government had encouraged, given the challenges that these new regulations would bring. It demonstrates the importance that these types of projects can have at a strategic level.

Conclusions

6.25 The main objective was for this scheme to have an impact that reached beyond the group of farmers, foresters, and other Operational Group members directly involved in the funded projects. It was hoped that, through effective dissemination, the scheme would have an impact across the sector. The findings presented here suggest that the scheme has succeeded in achieving those aims to a large extent.

There will always be an ‘unknown’ factor regarding the level of awareness and uptake throughout the sector; indeed, this is one of the research limitations, and could only be fully resolved through a sector-wide survey. However, we do know that project findings have been widely circulated to the sector through various publications and hundreds of people have attended open day events to learn about those findings. We have also been provided with a plethora of examples, directly from farmers/foresters not involved in EIP, and indirectly from Operational Group members, regarding how there has been uptake more broadly within the sector. Accordingly, we can state, with some confidence, that the scheme, through its dissemination activity, has been able to inform other businesses of these new practices, leading to broader uptake.

7. Delivery against cross-cutting themes and cross-cutting objectives

7.1 The 'Programme Application for Funding'[44] details how EIP Wales would address the three cross-cutting themes (CCTs) of 1) Equal Opportunities, Gender Mainstreaming and the Welsh Language, 2) Sustainable Development, and 3) Tackling Poverty and Social Exclusion through a combination of internal policies and practices on the one hand, and the projects' activity, outputs, and priority areas on the other hand.

7.2 A review of the application documents reveals that 45 of the 46 projects (98 %) claimed to address CCT1 through having a gender balance in the Operational Groups, or that simply no one would be excluded on the basis of their gender or social group. Many also spoke about involving the 'next generation' and how the projects sought to provide better opportunities for young people, e.g. by working with agricultural colleges. Only one applicant (two %) discussed the contribution that they made to the Welsh language, which outlined how the Operational Group operations would be conducted in Welsh and how the final report would be available in Welsh. Given the importance of agriculture as an economic sector to the Welsh language, where a much higher proportion of farmers speak Welsh than the national average, we can assume that support in helping the sector to grow has an indirect, positive benefit for the Welsh language.

7.3 With regard to CCT2, 43 of the 46 (93 %) application documents claimed to deliver against sustainable development. They alluded to the direct impacts on the environment if the new practices were successfully implemented, including in relation to waste management, developing shorter supply chains, efficiencies, and reducing greenhouse gas (GHG) emissions. We highlighted, in Chapter 5, how 16 respondents from our Operational Group member survey (12 %), across nine different projects, cited positive environmental outcomes. These included measures designed to positively affect pollinators, reducing carbon footprint on farms, reducing intensive forestry machinery, identifying ways to reduce pollution, and much more. The 'EIP39 - Carbon Neutral' project is one of the best examples of this, with an Operational Group member explaining:

[44] 'Application Form – Part Two' document shared by the Welsh Government. The document was submitted by MaB on 22nd of June 2017.

> “All of the farmers involved in the project have had their carbon footprint calculated and identified areas that could be improved and how to do this. Each farmer has been given a plan on how to reduce their carbon footprint” (Operational Group member survey).

7.4 Additionally, and as we noted previously in this report (see Chapter 3), 24 % of projects (11/46) had a specific focus on climate change.

7.5 Moreover, 43 of the application documents (93 %) also claimed to address CCT3, including 29 projects (63 %) that were recorded as ‘improving skills of young people and families’, 13 (28 %) as ‘tackling worklessness and raising household income’, and six (13 %) as ‘improving the health and educational outcomes of people living in Wales’. The applications spoke about creating increased and improved employment opportunities, raising financial profitability, and allowing farmers, who may face social isolation, to solve problems together. Our tentative assessment of economic returns (see Chapter 5) suggests that many of the changes made to practices have resulted in positive returns for farming and forestry businesses and made them more profitable. This has a clear link with the ambition of tackling poverty, particularly when considering the rural deprivations in which many of the Operational Group members are situated.

7.6 As well as the CCTs, the Rural Development Regulation (1303/2013) stipulates that programmes and, therefore, schemes under the Rural Development Programme, should contribute to the three CCOs of 1) innovation, 2) environment and 3) climate change mitigation and adaptation.

7.7 There is, of course, an intrinsic link to innovation, as the scheme is fundamentally concerned with supporting farmers and foresters in innovating. Chapter 5 demonstrates that the vast majority of Operational Group members have become more confident, knowledgeable, and likely to conduct further innovation as a result of their engagement in an EIP project. Indeed, some had already engaged in follow-up research after completing their project, including farmers involved in one project that had secured funding from the Horizon Europe programme to undertake further development. Accordingly, the operation has certainly delivered against CCO1.

7.8 There is a clear link with the environment (CCO2), as evidenced in the application forms, where the vast majority (43/46, 93 %) cited the environmental benefits of

their projects (such as improving waste management practices, developing shorter supply chains and more efficient production processes). Environmental benefits constituted one of the most commonly cited themes in the Operational Group member survey when respondents were asked for the main benefits which the EIP-inspired changes had given their business (see above). Additionally, respondents to the survey were given an opportunity to cite other benefits resulting from their project towards the end of the survey. Four of the 75 responses (53 %) concerned benefits to do with the environment, e.g.:

> “Food miles have been cut by buying supplies locally and also by selling more locally” (Operational Group member follow-up survey).
>
> “By moving away from simple grass to a mixed wild meadow pasture we have increased biodiversity” (Operational Group member follow-up survey).
>
> “Raised awareness of the environmental and ecological impact of parasites and the environmental and economic benefits of the more efficient use of medicines and early diagnosis and treatment of parasites in cattle” (Operational Group member follow-up survey).

7.9 Similarly, there is also a clear link with measures designed to address climate change (CCO3). Many of the provided examples of the environmental benefits, such as reducing food miles, creating more efficient processes and reducing GHG, also directly contribute towards efforts to mitigate climate change. Thus, whilst the alignment with this CCO will have varied across the projects (e.g. from the ‘EIP39 - Carbon Neutral’ project, which was principally concerned with efforts to tackle climate change, to other projects that contributed towards the objective indirectly or not at all), overall, the operation has made a positive contribution towards this objective.

7.10 In summary, the projects do contribute towards the CCTs and the CCOs, particularly with regard to sustainable development, the environment, and climate change, with many Operational Group members reporting that they had managed to successfully adopt more efficient practices which will reduce their GHG emissions.

8. Conclusions and recommendations

Assessment of performance

8.1 The evidence presented in this report demonstrates that the EIP Wales operation has been successful, delivering its objectives and generating important outcomes through effective management.

8.2 The scheme has successfully delivered the number of projects intended and far exceeded the target for the number of organisations engaged in Operational Groups. Beyond that, there was broad satisfaction with the delivery amongst each stakeholder group. The vast majority of Operational Group members believed that their projects were a success and that they had reaped the intended benefits.

8.3 The impact for Operational Group members was considerable, with most farmers/foresters reporting that they had made changes to their practices as a result of the research. The evaluation also found tangible benefits associated with those changes, notably improvements to animal health and reduction in health-related costs; improvements to businesses' produce; and environmental outcomes. These changes and benefits were found to largely have been sustained a year after they were first reported, and some represented substantial improvements in businesses' performance. Our evaluation also discovered that there is a possibility that a good return on investment has already been achieved for the scheme, where many of the changes can be attributed to reduced costs and increased income generation (although these estimates were highly speculative).

8.4 There was a small number of comments from respondents with completed projects, perhaps from Operational Group members who were not as heavily engaged, which suggested they had not been made aware of the results[45]; thus, the scheme should ensure that all Operational Group members are alerted.

8.5 **Recommendation 1:** MaB should work alongside Innovation Brokers to ensure that all Operational Group members have received their project results where relevant.

[45] See paragraph 5.1.

8.6 The team in Wales have certainly delivered on EIP-AGRI's overarching aim, which was to foster competitiveness and sustainability in the farming and forestry sectors through turning ideas from farmers and foresters into innovative action. In fact, EIP Wales appears to compare favourably with other EIP schemes when it comes to the impacts achieved.

8.7 The core aim of EIP was to provide a mechanism which farmers and foresters can use to pilot their ideas, and for this to be demonstrated to the wider sector, resulting in a broader uptake and thus a more transformative change. Whilst we cannot definitively identify the scale of change created by the scheme throughout the sector, there is an abundance of evidence presented in this report demonstrating examples of knowledge transfer to farmers and foresters not involved in EIP, as well as examples where this has led to improved practices outside the direct beneficiary group. Thus, we can say, with some confidence, that the scheme has delivered on its core remit.

8.8 Equally, a wealth of information has been amassed and captured effectively in reports and other publications which can be used to generate further knowledge transfer. Whilst there has been some activity to disseminate findings, the level of awareness throughout the sector is not known. The potential impact of this research would likely be enhanced, and generate a greater legacy, if the dissemination of findings was embedded and sustained. Without this, the risk is that the learning will be lost after these initial impacts.

8.9 **Recommendation 2:** There should be consideration of how best to deploy the knowledge generated from this research activity going forward, e.g. by embedding in Farming Connect literature or training for development officers, and engaging with other agricultural consultants, services, and colleges to ensure that the knowledge is embedded in their operations and then passed on to the individuals and businesses they support.

Recommendations and lessons learnt for future innovation partnership schemes

8.10 Firstly, we note that the scheme has demonstrated its value when considering the impacts outlined above. There is a strong case for maintaining this type of activity given the impact on improving practices and the continuing need for the sector to innovate and become more profitable.

8.11 **Recommendation 3:** An innovation partnership scheme that allows the farming and forestry sectors to test new technologies and ideas should be maintained.

8.12 With regard to what a future scheme should look like, there are many lessons that can be drawn from EIP Wales to help inform future delivery.

8.13 We note that, whilst the initial promotional activity was effective in engaging farmers, it has been swayed more towards progressive farm businesses that were already innovating and plugged into the support network. Whilst there is evidence to suggest that the support has increased the appreciation for innovation and confidence and ability to innovate, this may have been limited slightly given that they were already quite innovative. It is entirely legitimate to support these businesses because, as we have already noted, the main intention was to use the projects to demonstrate ideas so that they become common practice. That said, future schemes may wish to engage with more businesses which have greater needs around increasing their profitability and propensity to innovate. It is important to note that the scheme did manage to engage some farming businesses that have not been involved in previous interventions to the same extent (e.g. 30 % reported they had not received any financial support in the last five years). However, a better balance could potentially be struck between the proportion of farming businesses supported that are already heavily engaged in the support infrastructure and those that are less so.

8.14 **Recommendation 4:** Schemes in the future should consider ways of engaging the ‘hard-to-reach’ farmers who are not part of the support infrastructure. The main way in which those businesses found out about EIP Wales was through peers. Future schemes could consider encouraging members to invite peers, who do not typically engage in support provisions, more explicitly.

8.15 The application and appraisal processes were robust, which allowed projects to be assessed on their scientific merit. Whilst the process was comprehensive and likely

too time-consuming and difficult for most farmers to complete, this was mitigated by the fact that Innovation Brokers were given a licence to lead the process. The farmers and foresters were generally satisfied with this compromise. However, there may be an opportunity in post-RDP interventions to streamline some elements of the process to make it more accessible and potentially reduce the level of input required from consultants.

8.16 **Recommendation 5:** Before launching any future scheme, the application process should be reviewed and streamlined where possible.

8.17 There was a lack of selectivity in the processes, with the grants being awarded almost on a first come, first served basis (provided they met the eligibility criteria). Securing a broader group of projects from which to choose could have potentially led to a different or perhaps better selection of projects.

8.18 **Recommendation 6:** Schemes in the future should consider deploying a more competitive application process to ensure the most appropriate projects are funded. This could include adopting a robust scoring matrix set against key criteria which all applications regardless of application windows would need to be scored against.

8.19 The expertise offered by the scheme was a more important motivation for businesses' engagement than the financial support given to deliver the projects. This is an important point to consider when thinking about what future schemes should look like and whether there should be a facilitation component.

8.20 The Innovation Brokers have played a crucial role in supporting each aspect of delivery, from the initial work to establish Operational Groups and submit applications, to delivering the research trials. This has been important in ensuring that the projects were professionally managed with an appropriate structure, thereby ensuring sufficient scientific rigour to give credibility to the results. In most instances, Operational Group members have been overwhelmingly positive about their involvement. The balance of evidence suggests that the Innovation Brokers have provided good value for money, although it is also possible that much of the facilitation activity could have been delivered more cost-effectively at a more junior project officer level. We note that, whilst the expertise provided by Innovation Brokers has been valuable in some situations, for the most part it was not a material part of Innovation Brokers' input, with a greater need for interpersonal skills and the

ability to bring people together. Thus, beyond anything else, the scheme has shown the importance of having facilitation support to deliver the projects.

8.21 **Recommendation 7:** The Welsh Government should consider placing more emphasis on the provision of expertise and facilitation support in future schemes that are focused on trialling innovative approaches within the farming and forestry sectors.

8.22 Whilst the importance of retaining facilitation support is evident, the variability in the complexity of projects may suggest a case for a blended model whereby the more straightforward projects could be supported at a more junior level. This would perhaps provide the best balance with regard to securing value for money, ensuring scientific rigour, retaining a thorough application process to help identify the best projects, and having a ground-up approach.

8.23 **Recommendation 8:** Future schemes should consider adopting a blended model approach with a larger team of core staff (project officers) employed to provide facilitation support and the more costly external consultants only commissioned where the complexity of the proposed project requires their input.

8.24 Regarding other design considerations for future delivery, there was broad agreement that the value of grants provided under this scheme worked well and was particularly effective when it came to supporting projects that farmers and foresters were more interested in, and when it came to making sure the funding could go as wide as possible.

8.25 **Recommendation 9:** Future schemes should continue to provide small grants that prioritise farmers and foresters' ideas.

8.26 Generally, most projects were conceived by farmers and foresters and based on their needs, albeit with extensive support from the Innovation Brokers in delivering them. However, it is important to consider whether this is the best approach. Some stakeholders felt that there was not always a clear strategic focus, likely linked to having such an open approach. Most other EIP schemes around Europe that are classed as having an open approach nonetheless identified particular needs and opportunities, or sectors on which to focus. Stakeholders favoured having an open approach but underneath an overarching strategy with perhaps four or five key themes on which to focus. This would help ensure that the projects deliver on the

Welsh Government's strategic objectives as well as the farmers and foresters' needs or wants. This would also have the benefit of simplifying the articulation and dissemination of findings at a scheme level, i.e. by referring to groups of similar projects rather than 46 completely different projects.

8.27 **Recommendation 10:** Future schemes should consider adjusting the open nature of the approach by setting out strategic themes and guidelines.

8.28 A further weakness highlighted by stakeholders was the lack of dedicated funding to scale up EIP projects. Some saw the scheme as providing 'seed funding' to test numerous ideas at a relatively low cost and then backing those which showed the most potential, although there was no formal mechanism with which to undertake the latter.

8.29 **Recommendation 11:** Future schemes should consider incorporating a separate, follow-up fund which could be ringfenced for the most successful and most scalable projects, allowing those projects to scale activity by drawing in more farmers.

8.30 The level of engagement and collaboration amongst Operational Group members appears to have varied considerably, with some evidence of non-engagement, particularly amongst non-farmers and foresters. Due to the small size of the team, there appears to have been a lack of oversight from MaB regarding individuals' engagement on the ground and Innovation Brokers' role in securing that engagement. This further suggests that a larger team of core staff would be a worthwhile addition to future schemes. EIP-England sought to secure engagement by mandating that all Operational Group members had to agree to terms of reference, thereby ensuring clarity on their roles (which does not appear to have always been the case in Wales).

8.31 **Recommendation 12:** Operational Groups should be instructed to establish terms of reference with clear roles and responsibilities.

8.32 There may be a case for awarding some form of compensation to Operational Group members for their time spent on the project. This was suggested by some members and stakeholders and would likely increase engagement, although other measures should be tested first, as the monetary aspect was not highlighted as an issue by the vast majority and there could be concerns around the impact which such a measure would have on the ethos of the scheme.

8.33 Overall, EIP Wales has been a highly successful scheme that has delivered good outcomes for the participants and for the agriculture and forestry sectors more broadly. It has shown the value gained from investing in this type of scheme and there is a strong case for continuing to do so in future. Should that be the case, there are valuable lessons in this report which can be used to inform future delivery.

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Appendix 1: Evaluation questions

The following evaluation questions were identified in the Evaluation Framework to help guide the focus of this interim evaluation report.

1. Assess the level of engagement/services provided through Farming Connect:
    a. What is the sectoral composition of farms/foresters that have engaged with EIP Wales?
    b. What are the routes that Operational Group members have used to engage with the scheme?
    c. Have the Operational Group members been involved in any other RDP schemes?
    d. To what extent are the services provided by Farming Connect encouraging to potential Operational Groups?
2. Examine the effectiveness of the project application and decision and appraisal processes:
    a. How effectively were the expression of interest and the application and appraisal processes implemented?
    b. Were there any barriers/challenges faced during the application process?
    c. To what extent do the services provided by Farming Connect support Operational Groups in completing applications?
3. Assess the Innovation Broker role in terms of quality, relevance, flexibility, and value for money:
    a. To what extent is the Innovation Broker role relevant and flexible with regard to the needs of Operational Groups?
    b. What is the added value of the Innovation Broker, especially for the Operational Group?

4. Assess the particular design aspects of the EIP scheme:
    a. Has the size of the grants been appropriate in relation to delivering the main objectives?
    b. Does the Innovation Broker role provide good value for money?
    c. What role did the KE Hub play in improving and changing projects?
    d. What are the benefits of a farmer-led/group-working initiative?
5. Assess and evaluate the dissemination of the group findings to the wider public accessing Farming Connect:
    a. To what extent have the findings of the EIP Wales project had an impact on the wider agricultural or forestry industry?
    b. To what extent are the activities/solutions adopted during projects sustained after the end of the project?
    c. How effective has the dissemination process been at sharing the findings of the EIP Wales projects?
6. Assess the innovativeness of projects:
7. Assess and evaluate the overall impact of EIP Wales projects for the participating Operational Group members:
    a. What are the impacts of the individual EIP Wales projects for the participants of the Operational Group?
    b. To what extent has being involved in an EIP Wales project fostered innovation?
    c. To what extent has involvement in an EIP Wales project had a different impact for different types of actors?
    d. To what extent are the innovations additional to what would have taken place without the support?
8. To what extent has EIP Wales successfully addressed the Welsh Government's three cross-cutting themes and the RDP cross-cutting objectives?

Appendix 2: A theory of change for EIP Wales

Rationale/ Need for EIP Wales				
• There is a clear need for the agricultural and forestry sectors to innovate, particularly in the current context of substantial external economic and environmental pressures. However, a combination of risk aversion, a lack of confidence and knowhow, and traditional attitudes contributes to preventing such innovation from taking place. • This support is needed to remove the risk and provide the knowhow and confidence with which to trial new innovations, whilst changing traditional attitudes by demonstrating the benefit of these innovations through effective dissemination activity. • This support is also needed to bridge the gap between industry and the research community, with much of the research related to these sectors never being applied.				
Inputs and Resources				
• £1.8m grant funding. • Expertise provided by the Innovation Brokers and members of the Review Panel. • Existing infrastructure and services within the sector, including the KE Hub, Farming Connect's networks, and publications.				
Activities	**Outputs**	**Intermediate Outcomes One**	**Intermediate Outcomes Two**	**Overall Impacts**
• Recruitment/awareness-raising through Farming Connect channels. • Developing Operational Groups. • Conducting literature reviews. • Support to develop project outline and application. • Ongoing support to deliver projects. • Monitoring of progress and project management. • Dissemination of research findings.	• 45 Operational Groups encompassing 210 members. • 45 projects successfully undertaken, including at least three forestry projects, demonstrating what does and does not work. • 45 literature review documents and 45 final reports alongside other technical outputs. • No. of projects showcased through the Farming Connect Demonstration Network. • No. of articles and social media posts published. • Reach of dissemination activity • No. of events/meetings attended.	• Implementing innovations within participants' systems. • Developing new products. • Participants overcoming barriers to innovation (confidence/ knowledge/ attitudes). • Valued working as a group. • Awareness of and interest in research findings throughout the sector. • Participants securing additional funds for follow-up research phases.	• Tangible benefits for participants as a result of implementing the innovations (e.g. new income/reduced costs). • Participants improving/adapting practices. • Non-participants deciding to implement innovations. • Participants developing new relationships with peers/other sectors. • Non-farmers/foresters raising their profile/demonstrating expertise. • Increased confidence/willingness to experiment with new practices. • Follow-up research being conducted where appropriate.	• Agriculture/ forestry becoming more engaged with the research community. • Developing resilience/efficiencies within the sectors.

Assumptions	Barriers	Enablers
• There is sufficient demand (particularly from non-farmers/foresters). • Topic areas have broad appeal to the sectors. • Appropriate range of expertise offered.	• Projects being too niche for broader uptake. • Communicating technical research findings. • Operational Group members not collaborating, disengaging, or lacking capacity. • Failure to engage most suitable projects due to FPTP system. • External: COVID-19, policy/trade changes, EIP-AGRI limitations.	• Farmers/foresters taking ownership of work, encouraged by the scheme's design. • Prioritising projects that have broad relevance. • Securing an appropriate blend of Innovation Brokers. • Utilising Farming Connect networks.

Appendix 3: EIP-AGRI delivery in Europe

Introduction

EIP-AGRI was launched in 2012 to contribute to the EU's strategy Europe 2020 for smart, sustainable and inclusive growth.[46] There are five different types of EIP schemes, of which EIP-AGRI is one. The other types include Active and Healthy Ageing (EIP-AHA), Smart Cities and Communities (EIP-SCC), Water (EIP Water), and Raw Materials (EIP Raw Materials).

EIP-AGRI's overarching aim is to foster competitiveness and sustainability in the farming and forestry sectors through turning ideas from farmers and foresters into innovative action. It provides farmers and foresters with access to funding which can be used to deliver projects that test an innovative technology or idea within their businesses. By doing so, it is designed to develop innovations within the sector that contribute to (i) ensuring a steady supply of food, feed and biomaterials; and (ii) the sustainable management of the essential natural resources on which farming and forestry depend by working in harmony with the environment.[47]

EIP-AGRI is implemented through Regulation (EU) No 1305/2013, under which co-funding is provided to Member States for the innovative projects of Operational Groups involving farmers, advisers and researchers who come together in a targeted way to cooperate on joint research projects. Multi-actor Operational Groups provide an opportunity to build bridges between research and practice and facilitate the flow of ideas to farm and forest level. Once these ideas have been demonstrated, they have the opportunity to become common practice, and so the development of the industry is fostered.

The way in which Member States must make the EIP-AGRI operational is set out in Article 56 of the Regulation. The Article makes clear that Member States need to decide the extent to which they will support the Operational Groups within the framework of their Rural Development Plans (RDPs). Article 57 sets out the permitted tasks of the Operational Groups.

[46] EIP-AGRI (2020) EIP-AGRI: 7 years of innovation in agriculture and forestry. December 2020
[47] European Commission (2015) Synthesis of ex ante evaluations of Rural Development Programmes 2014–2020. Final Report for DG AGRI. Kantor Management Consultants. November 2015.

Support for setting up Operational Groups under EIP-AGRI is given via the Co-operation measure (Article 35(1)(c) of the Regulation), whilst support for Operational Group projects is provided under Articles 35(2)(a) to (k), which set out specific activities that can be funded.

Article 53 of the Regulation puts in place an EIP network at the EU level which is designed to link together national EIP-AGRIs through a network, facilitate the exchange of expertise and good practice, and establish a dialogue between farmers and the research community whilst including all stakeholders involved in the knowledge exchange process.

The use of EIP-AGRI and the number of Operational Groups

Under Regulation (EU) No 1305/2013, Member States have the option to set up EIP-AGRIs under their RDPs, but are under no obligation to do so. RDPs are supposed to be designed to reflect priorities at the regional, Member State and EU level, as expressed via SWOT analysis, and with the assistance of ex-ante evaluations which are intended to probe the rationale for the selection of measures adopted.

Although innovation is a horizontal priority under the 2014–2020 RDPs, the European Commission[48] reported, in 2016, that out of the total of 118 regional and national RDPs,[49] EIP-AGRI has been selected in 96 (Van Oost updated this to 98 In 2017).[50] Two Member States, namely Estonia and Luxembourg, did not programme EIP-AGRIs in their national RDPs, whilst EIP-AGRIs were also not selected in some regional RDPs in Belgium, Finland, France, Germany, Italy and Spain. Where EIP-AGRI has not been programmed, regions and Member States must pursue innovation under other measures.

Member States are required to establish NRN. These have a number of mandated tasks and, if used to their full extent, as they are in France, Germany and Italy, they can play a formal role in supporting EIP-AGRI. National/Regional Rural Networks were established in the 2007–2013 programming period and therefore predate the EIP-AGRI. One of the four aims of the NRNs expressed in Regulation (EU) No 1305/2013 is to "foster innovation in

[48] European Commission (2016) Evaluation study of the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability. Final Report for DG AGRI. Coffey, AND, SQW, Edater and SPEED. November 2016.
[49] Eight RDPs are national framework programmes (with regional RDPs under this framework) and therefore do not programme for EIP-AGRI.
[50] Van Oost, I. (2017) Concept and importance of macro-regional & multi-actor cooperation. Budapest – 20 September 2017. DG Agriculture and Rural Development.

agriculture, food production, forestry and rural areas". The European Commission (2016) elaborates on four main areas of activity via which this is achieved[51]:

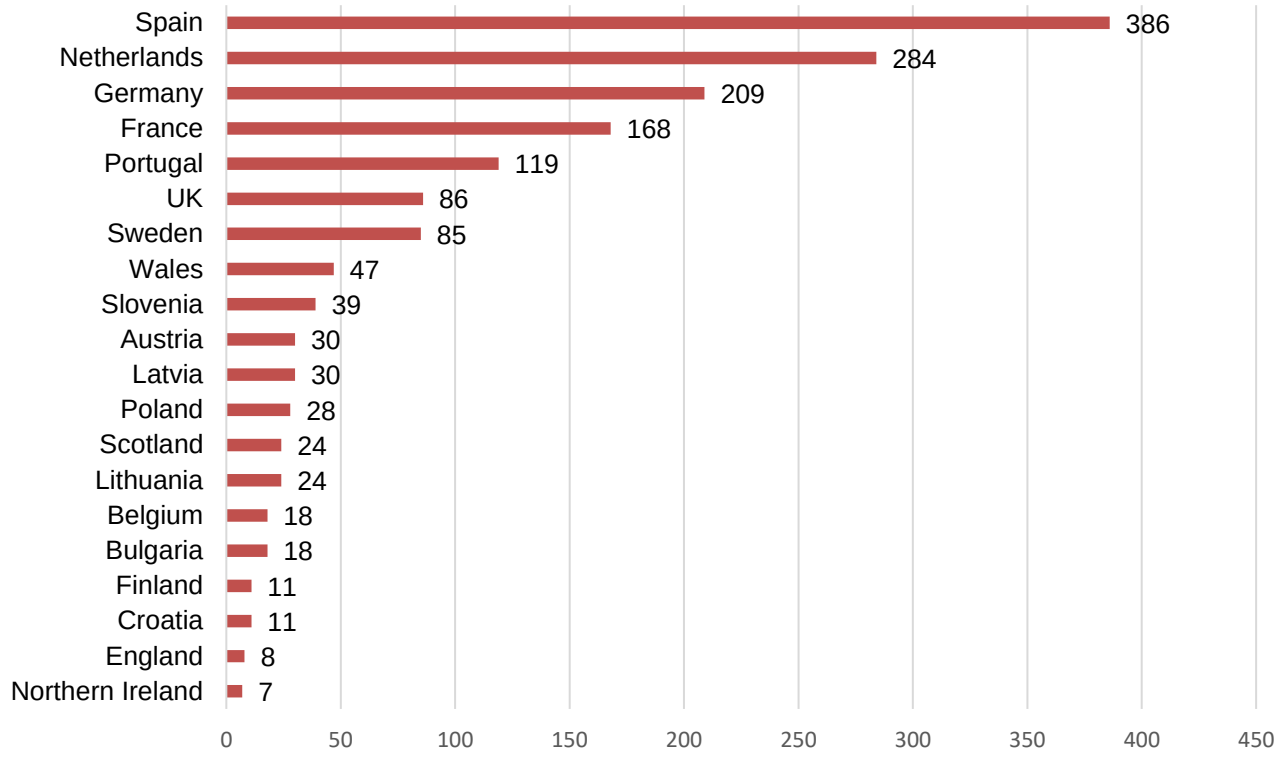
- raising relevant stakeholders' awareness of and involvement in EIP-AGRI
- facilitating the search for Operational Group partners
- networking for advisers and innovation support services
- collecting and disseminating examples of Operational Group projects.

Once established, EIP-AGRIs are funded through support for Operational Groups which run innovative projects. The number of Operational Groups depends on the implementation choices of RDP Managing Authorities.

The EIP-AGRI database of Operational Groups records a total of 1,546 (26 July 2021), slightly less than the 1,617 reported in EIP-AGRI in 2020[52] and substantially less than the 3,200 envisaged early in the 2014–2020 programming period.[53] A quarter (25 %) are in Spain, where there are 17 RDPs, and a further 18.4 % are in the Netherlands, where there is only one RDP. Germany and France, both with a regional approach, account for 13.5 % and 10.9 % of total Operational Groups, respectively. Together, these four Member States account for 1,047 Operational Groups – two-thirds (67.7 %) of the total. Whilst there are substantially fewer Operational Groups listed in the UK (86, 6 % of total), it is important to note that more than half of UK-based Operational Groups (46) are in Wales. Figure A1 over page shows how each nation within the UK contributes to the overall UK figure.

[51] European Commission (2016) Evaluation study of the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability. Final Report for DG AGRI. Coffey, AND, SQW, Edater and SPEED. November 2016.
[52] EIP-AGRI (2020) EIP-AGRI: 7 years of innovation in agriculture and forestry. December 2020.
[53] Van Oost, I. (2017) Concept and importance of macro-regional & multi-actor cooperation. Budapest – 20 September 2017. DG Agriculture and Rural Development.

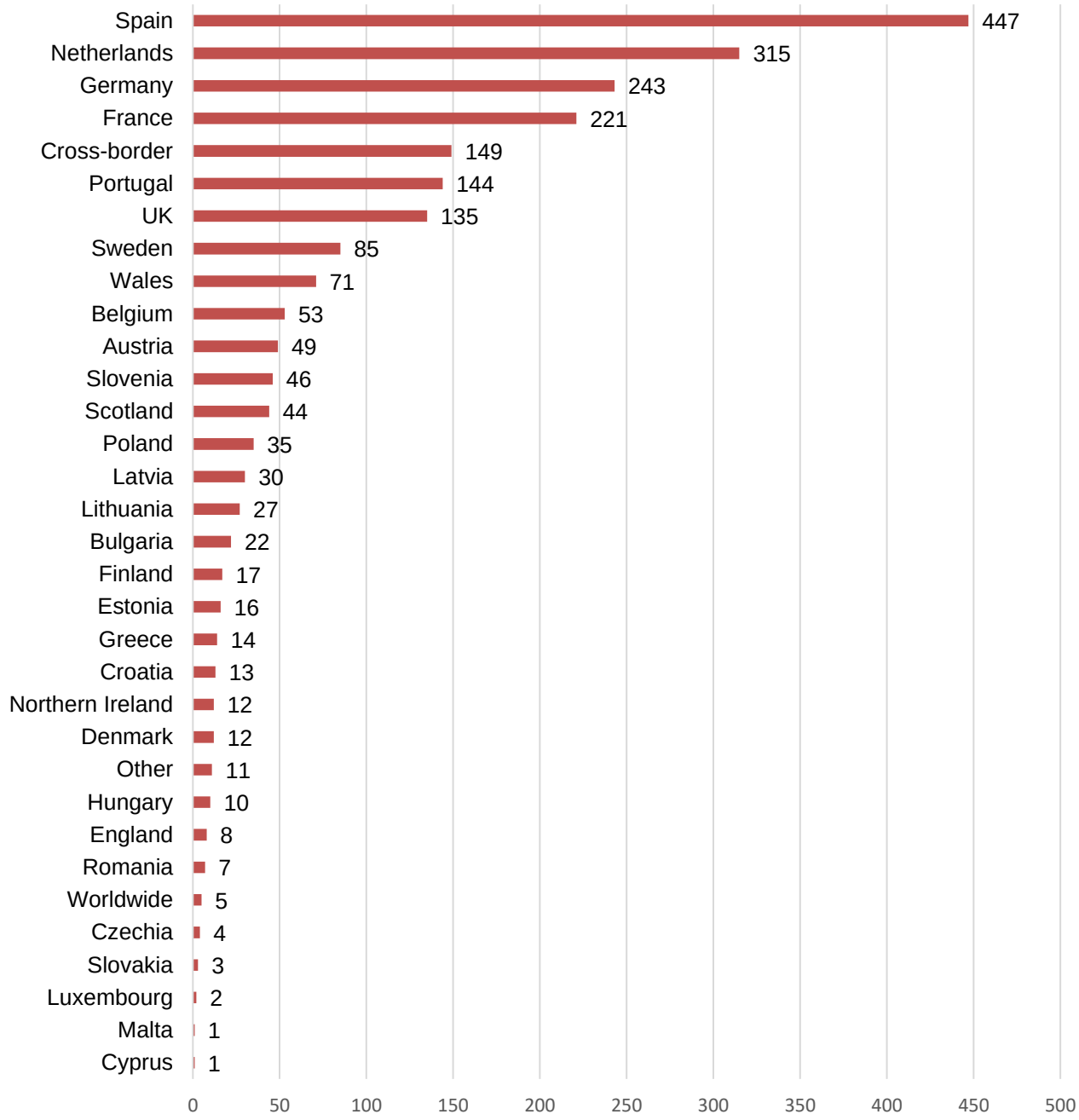
Figure A1: Number of Operational Groups listed in the EIP-AGRI database as of 26 July 2021



Source: EIP-AGRI.

There is also an EIP-AGRI database of projects, which includes innovation projects run outside of Operational Groups and categorised as “research projects” and “innovative actions”. This recorded 2,120 projects as of 26 July 2021. Whilst the distribution of projects broadly matches the distribution of Operational Groups, Member States where there are no recorded Operational Groups record a total of 70 other innovative projects that run outside this framework. In addition, 149 projects are listed as being cross-border, and five are listed as being worldwide.

Figure A2: Number of projects listed in the EIP-AGRI projects database as of 26 July 2021



Source: EIP-AGRI.

EIP-AGRI provides a breakdown of Operational Groups by theme (Table A1).[54] At the time (November 2020) there were just over 1,600 Operational Groups in the Commission database. Almost a third of Operational Groups (31 %) were concerned with plant production and horticulture. At the other end of the spectrum, 5 % of Operational Groups were concerned with genetic resources, 5 % with forestry, and 5 % with energy management.

Table A1: Breakdown of Operational Groups by theme

Theme	Operational Groups dealing with the theme	
	%	Number
Plant production and horticulture	31%	477
Farming/forestry competitiveness and diversification	27%	430
Animal husbandry and welfare	24%	388
Food quality/processing and nutrition	22%	363
Supply chain, marketing and consumption	21%	334
Pest/disease control	19%	300
Fertilisation and nutrients management	17%	275
Soil management/functionality	16%	252
Biodiversity and nature management	14%	222
Farming equipment and machinery	13%	204
Climate and climate change	13%	203
Water management	12%	198
Landscape/land management	10%	161
Waste, by-products and residues management	9%	154
Genetic resources	5%	88
Forestry	5%	88
Energy management	5%	79

Source: European Commission, November 2020 in EIP-AGRI (2020). Note: Operational Group projects can be counted under several themes.

[54] EIP-AGRI (2020) EIP-AGRI: 7 years of innovation in agriculture and forestry. December 2020.

EIP-AGRI states that over 60 % of Operational Groups are working on innovative ways to overcome environmental and climate challenges, and that the EIPs therefore offer continuing relevance in the context of the EU Green Deal and specifically the Farm to Fork Strategy.[55]

Implementation at national and regional level

There is a high degree of flexibility in terms of how Managing Authorities implement their RDPs and, as a result, there is considerable difference in how EIP-AGRIs are implemented. The European Commission produced an implementation typology based on the following two variables[56]:

- Average Operational Group budget (small (<€100,000); medium (€100,000–€300,000); large (>€300,000)).
- Prescriptiveness in the selection of Operational Groups (restrictive, i.e. Operational Groups must choose from pre-defined focus areas, top-down; open, i.e. Operational Groups were free to choose their own themes, bottom-up).

The above approach produced six types of EIP-AGRI, although it was not possible to place all the EIPs within this framework, as not all provided the necessary information to the authors; the typology contains 84 of the 96 EIPs. It should be noted that changes to approach over the course of the 2014–2020 programming period might result in a reclassification if the exercise were to be repeated. However, as the financial data were gathered through a survey of Managing Authorities, a reclassification is not practicable.

Wales appears in the small and open group (top left of Table A2), along with Flanders (BE) and Asturias (ES). This group encompasses the smallest number of EIPs. The other UK EIPs appear in the medium and open group (England and Northern Ireland) and the large and open group (Scotland).

There are nine small EIPs in total, 36 medium EIPs, and 39 large EIPs. Some 41 EIPs are categorised as being free to propose themes (open), whilst 48 are considered restrictive in that themes are pre-defined.

[55] Ibid.
[56] European Commission (2016) Evaluation study of the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability. Final Report for DG AGRI. Coffey, AND, SQW, Edater and SPEED. November 2016.

Table A2: Typology of Managing Authority approaches to EIP-AGRI

		Average funding per Operational Group		
		Small (up to €100,000)	**Medium (€100,000 to €300,000)**	**Large (more than €300,000)**
Prescriptiveness of approach to selecting Operational Groups	**Open (Operational Groups free to propose themes)**	**Type 1: small & open (3)**	**Type 2: medium & open (16)**	**Type 3: large & open (17)**
		Flanders (BE)	Finland	Guyane (FR)
		Asturias (ES)	Martinique (FR)	Haute-Normandie (FR)
		Wales (UK)	Picardie (FR)	Niedersachsen and Bremen (DE)
	No budget information for the following RDPs, which adopt an open approach:		Baden-Württemberg (DE)	North-Rhine Westphalia (DE)
			Hessen (DE)	Schleswig-Holstein (DE)
			Saxony (DE)	Ireland
	Bolzano (IT)		Greece	Basilicata (IT)
	Mecklenburg-Vorpommern (DE)		Hungary	Campania (IT)
			Abruzzo (IT)	Piedmont (IT)
	Saxony Anhalt (DE)		Andalucía (ES)	Sardinia (IT)
			Galicia (ES)	Sicily (IT)
	Malta		La Rioja (ES)	Veneto (IT)
			Murcia (ES)	Poland
	Madrid (ES)		National RDP (ES)	Portugal (mainland)
			England (UK)	Romania
			Northern Ireland (UK)	Sweden
				Scotland (UK)

		Average funding per Operational Group		
		Small (up to €100,000)	**Medium (€100,000 to €300,000)**	**Large (more than €300,000)**
Prescriptiveness of approach to selecting Operational Groups	**Restrictive (Operational Groups must choose from pre-defined focus areas)**	**Type 4: small & restrictive (6)** Cyprus Limousin (FR) Réunion (FR) Liguria (IT) Basque Country (ES) Slovakia	**Type 5: medium & restrictive (20)** Austria Croatia Aquitaine (FR) Corsica (FR) Lorraine (FR) Midi-Pyrénées (FR) Pays de la Loire (FR) Rhône-Alpes (FR) Rhineland-Palatinate (DE) Bavaria (DE) Emilia Romagna (IT) Lombardy (IT) Lazio (IT) Netherlands Slovenia Aragon (ES) Canary Islands (ES) Castilla y Leon (ES) Catalonia (ES) Extremadura (ES)	**Type 6: large & restrictive (22)** Bulgaria Czech Republic Auvergne (FR) Basse Normandie (FR) Burgundy (FR) Brittany (FR) Centre-Val de Loire (FR) Champagne-Ardennes (FR) Guadeloupe (FR) Ile de France (FR) Languedoc Roussillon (FR) Mayotte (FR) PACA (FR) Poitou-Charentes (FR) Berlin and Brandenburg (DE) Friuli-Venezia-Giulia (IT) Marche (IT) Molise (IT) Puglia (IT) Tuscany (IT) Umbria (IT) Lithuania

Source: European Commission (2016).

Member States are able to fund innovation brokering activities designed to help generate innovative ideas, facilitate the start-up of Operational Groups, and provide support in finding partners and funding. Member States can also make use of facilitators whose role is to help bridge discussions between the research and practice ends of the knowledge exchange chain. The European Commission notes that the distinction between the two roles was often

confused by Member States, at least in the early stages of implementation.[57] However, it is clear that Innovation Brokers can go on to become facilitators once Operational Groups have been successfully set up; it is just that this is not automatically the case.

Comparison between EIP-AGRI design in Wales and other RDPs

The comparison provided here follows the analysis in the European Commission,[58] where 37 specific RDPs were examined in detail, including Wales. This is the only complete and comparable source of information.

Measures used to programme EIP Operational Groups

Competent Authorities have a high degree of flexibility when it comes to the selection of measures under which to programme EIPs, although the main funding source is Measure 16: Co-operation, and specifically sub-measure 16.1: support for the establishment of an operation of Operational Groups of the EIP-AGRI. In total, 18 of the 37 RDPs examined supported EIPs under this sub-measure alone, including Wales (and Scotland and England).

Some 17 RDPs also provided support under sub-measure 16.2: support for pilot projects and for the development of new products, practices, processes and technologies, including Northern Ireland. Seven RDPs used sub-measure 16.4: support for horizontal and vertical cooperation amongst supply chain actors for the establishment and development of short supply chains and local markets and for promotion activities in a local context relating to the development of short supply chains and local markets; this was in addition to sub-measure 16.1. Moreover, three RDPs used sub-measure 16.1 in conjunction with sub-measure 16.5: support for joint action undertaken with a view to mitigating or adapting to climate change and for joint approaches to environmental projects and ongoing environmental practices.

Wales also provided support under Measure 1: Knowledge transfer and information actions, as did five other RDPs, as well as under Measure 2: Advisory services, farm management and farm relief services, along with four other RDPs. Furthermore, four RDPs provided support under Measure 4: Investments in physical assets.

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[57] Ibid.

[58] European Commission (2016) Evaluation study of the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability. Final Report for DG AGRI. Coffey, AND, SQW, Edater and SPEED. November 2016.

Financial resources and envisaged spending

The EIP grants provided in Wales are much smaller than those typically seen across Europe (as noted earlier). Wales is one of just nine regions or Member States out of 84 which provide grants of less than €100,000; indeed, the maximum grant amount provided in Wales is less than half that. Total spending in Wales on EIP is low compared to other RDPs, at €2.1m, although larger than the €0.36m in Flanders (BE) – the only other RDP in the 'Small' typology group for which spending data were available.

The European Commission (2016) compiled data on the EIP budget as a percentage of the total Measure 16: Co-operation budget where information was available to make the calculation.[59] Of course, this is partly also a function of the budget attached to Measure 16, which could be substantial, but is still dwarfed by spending in other areas. The figure for Wales was 1.7 % (the second lowest amongst the examined RDPs), whereas in Flanders (BE) it was 5.1 %, even though the overall budget was much lower (see above). The proportion of the Measure 16: Co-operation budget allocated to the EIP ranged from 1.3 % in Finland to 70.9 % in Slovenia. It is important to note that, whilst the proportion spent on EIP-AGRI in Wales appears to be low, we understand that Wales has generally invested more heavily in Measure 16 than have other countries have, and thus an analysis of each country's proportional contribution may be misleading.

Comparisons between the financial resources devoted to the EIP under different RDPs need to be considered in the context of regional/national needs and priorities; it does not follow that the same spending in different areas will produce the same outcomes or address the needs to the same extent. Below a more detailed outline is provided of how the proportion of the Measure 16 budget spent on EIPs varies within each typology group, although the important caveat is that this masks the overall spend on EIP:

- Type 2 EIPs: 1.3 % (Mainland, FI) to 38.9 % (Greece)
- Type 3 EIPs: 9.2 % (Basilicata, IT) to 25.9 % (Poland)
- Type 4 EIPs: 4.9 % (Limousin, FR) to 43.3 % (Basque Country, ES)
- Type 5 EIPs: 5.4 % (Rhone-Alpes, FR) to 70.9 % (Slovenia)
- Type 6 EIPs: 2.7 % (Umbria, IT) to 36.6 % (Bretagne, FR).

[59] Ibid.

Average spending ranged from €21,800 in Reunion (FR) to €2,600,000 in Andalusia (ES). Wales sits at the lower end, with an average funding allocation to each Operational Group of €48,000. Of course, average spending per Operational Group will, to some extent, be a consequence of strategy, with a focus on a few, large Operational Groups leading to high average spending.

Priority themes and sectors

Table A2 also outlines the prescriptiveness in the selection of each Operational Group. In its 2016 report, the European Commission found that, as expected, open approaches to the selection of Operational Groups resulted in a more flexible approach to priority themes and sectors. Three main approaches to prioritisation were identified.

- Mix of open and fairly broad thematic priorities, often reflected in the RDP strategy.
- Targeted priorities and subsectors are left open to allow applicants to focus on the most pressing needs.
- A prescriptive approach under which applicants must follow established regional priorities in order to receive support.

The approach in Wales is very open, in common with RDPs in Abruzzo (IT), England and Scotland (UK), Galicia (ES), Hungary and Picardie (FR). Other regions which are classed as having an open approach nonetheless identify particular needs and opportunities, or sectors on which to focus. These regions include Andalucía and Asturias (ES), Guyana and Hate-Normandie (FR), Hesse, Niedersachsen and Bremen, North Rhine-Westphalia, Saxony, Saxony-Anhalt, Schleswig-Holstein (DE).

By definition, RDPs where there is a restrictive approach specify priorities, themes and sectors to varying degrees.

Approach to innovation brokerage services

Guidance on programming for innovation in the context of the EIPs[60] explains the important role which innovation brokering can play in discovering innovative ideas and facilitating the start-up of Operational Groups. It is suggested that this is achieved mainly by acting as a

[60] European Commission (2014) Guidelines on programming for innovation and the implementation of the EIP for agricultural productivity and sustainability. Programming period 2014–2020. Updated version December 2014. DG AGRI, Directorate H. Sustainability and Quality of Agriculture and Rural Development. H.5. Research and innovation.

go-between to connect farmers, researchers, advisers, and NGOs, etc. There are several options for funding innovation brokering.

In some cases, such as Czech Republic and Baden-Württemberg and Saxony (DE), the national/regional government acts as the IB; the European Commission (2015) draws attention to the dedicated EIP unit within the Baden-Württemberg (DE) Managing Authority. Public bodies also adopt this role in other regions, including Murcia and Andalucía (ES). NRNs, rather than Innovation Brokers, for example in Bavaria (DE), Greece and Slovenia. External advisers, i.e. the same approach as that adopted in Wales, are used in several other regions, including Berlin-Brandenburg, Hessen and Schleswig-Holstein (DE). Some Managing Authorities use a mix of provision, e.g. Veneto (IT).

External advisers acting as Innovation Brokers are important features of the delivery of EIP AGRI in Wales, with 27 highly experienced farm-level advisers working in this capacity; these are also able to have involvement in the delivery of Operational Groups, e.g. as facilitators, although they cannot be the lead applicant. There is no real pattern to the use of Innovation Brokers in terms of scale of Operational Group budget or whether there is an open or restrictive approach to selecting Operational Groups. The European Commission[61] examined the use of Innovation Brokers in 84 RDPs, 80 of which provided information. Their analysis shows that Innovation Brokers are used in 51 of the regions (64 %). Whilst all the Managing Authorities in Spain reported using Innovation Brokers, as do the vast majority of those in France and Germany, the vast majority of those in Italy did not report doing so.

Where Innovation Brokers were not used, the rationale is usually that the existing infrastructure around innovation is adequate, as, for example, in Flanders (BE) in the small and open group of EIPs.

Wales is the only UK country to have used external Innovation Brokers from the beginning of the programming period. In England, there is no specific innovation brokerage service, and salaried Innovation Brokers are not funded.[62] However, the NRN provides information and forums to help potential Operational Group participants to meet and develop ideas. The

[61] European Commission (2016) Evaluation study of the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability. Final Report for DG AGRI. Coffey, AND, SQW, Edater and SPEED. November 2016.
[62] Defra (2019) United Kingdom - Rural Development Programme (Regional) – England. Programming period 2014–2020. Version 15.0. 08/06/2022.

NRN also has a role in helping Operational Groups to form, and it facilitates the sharing of project results.

The Scottish Rural Network (SRN) launched the Rural Innovation Support Service (RISS) in February 2018.[63] The RISS is funded from the SRN budget and is a service available to farmers, foresters or crofters which facilitates innovation by giving access to subject specialists and managing working groups, which develop options until a viable project plan is produced. Scottish Government officials feel that this approach is unique in the EU but was probably the sort of service that the European Commission had envisaged. As is the case in Wales, the role of facilitator is also provided by the IB.

The Rural Network acts to bring together interested actors in Northern Ireland.[64] Existing stakeholder groups and research and development networks are also expected to be utilised. However, the Northern Ireland RDP also states that the functions of the Innovation Brokers will be to develop potential projects and bring together the relevant actors to establish Operational Groups, and that a payment can be made for this activity.

The role of National/Regional Rural Networks (NRNs)

The European Commission report in 2016 examined the role of NRNs with respect to the five areas of activity listed previously (i.e. raising awareness of EIP-AGRI, facilitating the search for Operational Group partners, providing networking for advisers/innovation support services, facilitation of research, and collecting and disseminating examples of Operational Group projects) in 37 RDPs.[65] In the said report, Wales indicated that its NRN would be active in three of these – raising awareness, facilitating the search for Operational Group partners, and collecting and disseminating examples of Operational Group projects – but would not provide networking.

Some 33 Managing Authorities reported that their NRNs would be active in *raising awareness*; 27 stated that their NRNs would *facilitate the search for Operational Group partners*; 27 said their NRNs would *provide networking*; and 31 said their NRNs would

[63] Agra CEAS Consulting (2019) 2018 Enhanced Annual Implementation Report on the 2014–2020 Scottish Rural Development Plan. National Report for the Scottish Government. Job No3027/BDB/11th October 2019.
[64] DAERA (2021) United Kingdom - Rural Development Programme (Regional) – Northern Ireland. Programming period 2014–2020. Version 9.0. 06/04/2021.
[65] European Commission (2016) Evaluation study of the implementation of the European Innovation Partnership for Agricultural Productivity and Sustainability. Final Report for DG AGRI. Coffey, AND, SQW, Edater and SPEED. November 2016.

collect and disseminate examples of Operational Group projects. Additionally, 16 Managing Authorities reported that their NRN would have a role in all four areas, whilst only two did not anticipate a role for the NRN at all.

Wales is one of eight Managing Authorities choosing not to provide networking for the EIP-AGRI through their NRN, along with Andalucía (ES), Brittany (FR), Bulgaria, Croatia, England (UK), Flanders (BE), Midi-Pyrénées (FR), Murcia (ES) and Slovakia. Four Managing Authorities chose not to disseminate examples of Operational Groups through their NRNs, eight chose not to have their NRNs facilitate the search for Operational Group partners, and two chose not to use their NRNs to raise awareness of the EIP. In 2015, the European Commission cited, as an example of good practice, the way in which the NRN acts as a bridge between the EIP network and Operational Groups in Austria and Sweden.[66]

Participants supported

There is little difference in the type of participant supported, with most Managing Authorities adopting a broad approach to include farmers, foresters, advisers, researchers, associations and public bodies. In a small number of cases, there is little guidance on participants; for example, Andalucía (ES) and Saxony (DE) only mention natural or legal persons or partnerships. This does not, however, preclude any specific groups. Very few Managing Authorities appear to preclude farmers, e.g. Ile-de-France (FR), where participants are listed as collective organisations, clusters, interest groups for economics and the environment, and Sweden, where participants are listed as authorities, municipalities, counties, regions, associations, organisations and companies. However, farmers could presumably fall under some of these groupings.

Internal coherence of EIP-AGRI within RDPs

The European Commission, in 2016, examined the internal coherence of EIP-AGRIs with the RDP needs assessment. Coherence was usually high, including in Wales, where the needs assessment refers extensively to competitiveness, natural resources and innovation which are addressed in the wide range of strategic priorities set out.

[66] European Commission (2015) Synthesis of ex ante evaluations of Rural Development Programmes 2014–2020. Final Report for DG AGRI. Kantor Management Consultants. November 2015.

Only in very few cases was coherence judged to be intermediate (England (UK), Midi-Pyrénées (FR), Rhineland-Palatinate (DE) and Sweden). In the case of England (UK), whilst the needs assessment refers to insufficient collaboration and the limited dissemination of innovation, strategic priorities only partially address these elements. In the case of Sweden, the needs assessment refers to a lack of innovation capacity, but the stated priorities for Measure 16 focus on farm modernisation. In Rhineland-Palatinate (DE), the needs assessment refers to the relationship between researchers and practitioners, which is not addressed in the Measure 16 priorities; there is a similar disjunction in Midi-Pyrénées (FR). In no cases was coherence judged to be low.

Appendix 4: Operational group member survey

Introduction

Os hoffech ateb y cwestiynau yn Gymraeg, dewiswch 'Cymraeg' o'r blwch uchod

The Welsh Government have commissioned Wavehill, an independent research consultancy based in Ceredigion, to undertake an evaluation of the European Innovation Partnership (EIP) in Wales. Its purpose is to assess how effectively the operation has been delivered and to identify any benefits for participants and the sector more broadly. It will also be an opportunity to identify whether any changes are needed to improve the operation over the remaining period or in future interventions. As participants, your feedback is crucial in order to help us to understand these matters.

This survey explores a range of issues, including the application process, your experience and satisfaction with different aspects of the support, information about your project, and the benefits received.

Your involvement in this research is completely voluntary, and any information that you provide will be treated confidentially. For information about how we obtained your details and how we will handle the information that you provide to us, please visit the following link: link to PN.

If you have any further questions regarding this research, please contact either XXX@wavehill.com or XXX@gov.wales

Thank you in advance for your time.

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
The European Agricultural Fund for Rural Development: Europe Investing in Rural Areas

Llywodraeth Cymru
Welsh Government

Section 1 – Profile

1. Can you please confirm that the following information is correct?
    a. Participant name
    b. Name of business/organisation
    c. Project name
2. (Lead applicants only) Our records show that you were the lead applicant for this project. Is that correct?
    a. Yes
    b. No
3. Can you confirm the type of organisation that you represent?
    a. Farming business
    b. Forestry business
    c. NGO (non-governmental organisation)
    d. Research institute
    e. Advisor
    f. Other SME
    g. Other organisation
4. Please can you describe why you wanted to develop a project through EIP Wales (Open question – research team to provide the following options as prompts and back-code responses)?
    a. To remove risk from testing a new idea
    b. To access expertise to test a new idea
    c. To work with other organisations within the sector
    d. To work with organisations in other sectors
    e. To provide our expertise
    f. To develop our reputation
    g. Other

If having selected 'Farming business' in Q3

Why do we need this information? This will help us to understand the views and experiences of different farmers who have participated in EIP Wales.

5. What is the main sector on your farm?
    a. Cereals
    b. General cropping
    c. Horticulture
    d. Specialist pig
    e. Specialist poultry
    f. Dairy
    g. Upland grazing livestock
    h. Lowland grazing livestock
    i. Mixed
    j. Sheep
    k. Beef
    l. Other (please specify)
6. What size is the total area of your farm? Would you prefer to give your answer in hectares or acres?
7. What is the tenure status of your farm?
    a. All owned
    b. Mostly owned
    c. Mostly rented
    d. All rented
8. Approximately what was the total turnover of the farm in the last financial year (2020–21)? Please enter a numerical figure only (no pound signs, commas, etc.).
9. If you do not have the actual figure at hand, please provide an approximate number.
    a. None
    b. <£10,000
    c. £10,000 to £49,999
    d. £50,000 to £99,999
    e. £100,000 to £199,999
    f. £200,000 to £499,999
    g. £500,000 to £999,999
    h. £1,000,000 to £1,999,999
    i. £2,000,000 to £4,999,999
    j. £5,000,000 to £9,999,999
    k. £10,000,000 to £19,999,999
    l. £20,000,000 to £49,999,999
    m. £50,000,000 or above

10. Have you received any other grants or financial support from the Welsh Government or other public bodies in the last five years?
    a. Yes
    b. No
11. (If ‘Yes’) Which schemes have you received financial support from?
    a. Sustainable Production Grant
    b. Farm Business Grant
    c. Timber Business Investment Scheme
    d. Other (please specify)
12. On a scale of 1–5 (where 1 is ‘not at all important’ and 5 is ‘very important’), how important is talking to other farmers as a source of information and advice for you personally?
13. On a scale of 1–5 (where 1 is ‘not at all interested’ and 5 is ‘extremely interested’), how interested are you in accessing information or advice about farming on the Internet?
14. To what extent do you agree or disagree with the following statements?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Achieving a good quality of life is more important to me than maximising income from my holding					
All farms should strive to be as environmentally sustainable as possible					
Collaborating with other farmers improves the running of a farm					
I always make time to socialise with other farmers					

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am always looking to learn new skills and knowledge that I can apply to my business					
I am keen to apply new technology on my farm as it becomes available					
I am happy to take advice about managing the natural environment on my farm					

Section 2 – Experience/satisfaction with support

15. Can you please tell us how you became aware of the EIP programme support?
    a. Through Farming Connect Local Development Officers
    b. Online, i.e. through the website or social media
    c. At a Farming Connect event
    d. At another event
    e. Farming Connect magazine
    f. Other publications
    g. Word of mouth – through other farmers/foresters
    h. Word of mouth – other (please specify)
    i. From an Innovation Broker
16. Generally, how satisfied have you been with the support to deliver your EIP project?
    a. Very dissatisfied
    b. Somewhat dissatisfied
    c. Neither satisfied nor dissatisfied
    d. Somewhat satisfied
    e. Very satisfied

17. Can you please explain your answer?

(Non-lead applicant only)

18. As a non-lead member of the Operational Group, how familiar are you with the funding given to your project and how that funding has been spent?

	Not at all familiar	Somewhat familiar	Very familiar
Level of project funding			
Information about how the funding has been spent			

(All)

19. Grants were offered of up to £40,000. Do you think that this was too high, too low, or about right?
    a. Too high
    b. About right
    c. Too low
20. What are the reasons for your answer?

(Lead applicant only) Application process & project development

21. Generally, how satisfied were you with the expression of interest and the application and appraisal processes?
    a. Very dissatisfied
    b. Somewhat dissatisfied
    c. Neither satisfied nor dissatisfied
    d. Somewhat satisfied
    e. Very satisfied
22. Were there any barriers/challenges faced during the application process?
23. Did you receive support from an Innovation Broker (i.e. an expert or facilitator commissioned to support participants through the application process and project development and implementation)?
    a. Yes
    b. No
24. (If 'No') Please explain why you chose (not) to receive this support.

25. How useful were the following support services in helping you during the application process and project development and implementation?

	Not at all useful	Not very useful	Neutral	Somewhat useful	Very useful
Support provided by the Knowledge Exchange Hub (i.e. literature review/supporting research for project ideas) in helping you to shape the project					
(If applicable) Support from Innovation Brokers to refine project ideas and develop a project outline and application					
(If applicable) Support from Innovation Brokers to form the Operational Group by identifying and bringing in other parties					
(If applicable) Ongoing support from Innovation Brokers to deliver the projects					
(If applicable) Ongoing support from KE Hub or Menter a Busnes staff to deliver the projects					
Support to disseminate the findings					

26. Please explain your answers.

Support provided by the Knowledge Exchange Hub	
(If applicable) Support from Innovation Brokers to refine project ideas and develop a project outline and application	
(If applicable) Support from Innovation Brokers to form the Operational Group by identifying and bringing in other parties	
(If applicable) Ongoing support from Innovation Brokers to deliver the projects	
(If applicable) Ongoing support from KE Hub or Menter a Busnes staff to deliver the projects	
Support to disseminate the findings	

(If applicable) Innovation Broker (all respondents)

27. **(Non-lead applicants)** Did you receive support from an Innovation Broker (i.e. an expert or facilitator commissioned to support participants through the application process and project development and implementation)?
    a. Yes
    b. No
28. Do you believe that the Innovation Broker had the relevant expertise to support your needs in delivering this project?
    a. Yes
    b. No
29. To what extent do you agree or disagree that it was important to have an Innovation Broker to help deliver your project?
    a. Strongly disagree
    b. Somewhat disagree
    c. Neither agree nor disagree
    d. Somewhat agree
    e. Strongly agree
30. Please explain your answer.

Information about your project and Operational Group

31. **(Lead applicant only)** As far as you are aware, is your project based on:
    a. A new practice to the sector
    b. A new practice to Wales/the area
32. **(All farmers/foresters)** To what extent do you agree or disagree that the Innovation Broker/EIP Wales provided effective advice and support to implement the new practices in your system?
    a. Strongly disagree
    b. Somewhat disagree
    c. Neither agree nor disagree
    d. Somewhat agree
    e. Strongly agree
33. Please explain your answer.

(All respondents)

34. To what extent do you agree with the following statements about the Operational Group?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The Operational Group worked well together					
The Operational Group represented an appropriate mix of expertise					
The project was based on the farmers'/foresters' idea					
The project was led by the foresters/farmers					

35. What are the benefits of having a farmer-led/group-working initiative?
36. What have been the main challenges in delivering your EIP Wales project?
37. What, if anything, could the EIP Wales team have done to help overcome these challenges?

Section 3 – Benefits for participants

38. To what extent do you agree that being involved in EIP Wales has:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
(All farmers/foresters) Increased your confidence around testing new ideas					
(All farmers/foresters) Increased your understanding of the innovation process					
(All farmers/foresters) Made you more likely to test new ideas in the future					
(All respondents) Helped you to develop new relationships with (other) farmers/foresters					

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
(All respondents) Helped you to develop new relationships with organisations from other sectors					
(Non-farmers/foresters) Raised your profile/helped to demonstrate your expertise					

39. Do you intend to continue collaborating with other Operational Group members in the future?
    a. Yes
    b. No
40. Have you discussed the project with other organisations?
    a. Yes – farmers/foresters
    b. Yes – other organisations
    c. No
41. (If 'Yes') Please provide details.

42. To what extent do you agree or disagree that you have been able to achieve what you set out to do (to date) with regard to the benefits for your organisation?
    a. Strongly disagree
    b. Somewhat disagree
    c. Neither agree nor disagree
    d. Somewhat agree
    e. Strongly agree
    f. Too early to say
43. Please explain your answer.

If having completed the project

44. Our records show that your EIP Wales project has been completed. Is that correct?
    a. Yes
    b. No

If 'Yes'

45. To what extent do you agree or disagree that your project has been a success?
    a. Strongly disagree
    b. Somewhat disagree
    c. Neither agree nor disagree
    d. Somewhat agree
    e. Strongly agree
    f. Too early to say
46. Please explain your answer.
47. **(All farmers/foresters)** As a result of this project, have you changed any practices within your business?
    a. Yes
    b. No
    c. Not yet
48. (If 'No') Can you please explain why you have not changed any practices within your business as a result of this project?
49. (If 'Yes') To what extent do you agree or disagree that you would have changed these practices anyway without the support?
    a. Strongly disagree
    b. Somewhat disagree
    c. Neither agree nor disagree
    d. Somewhat agree
    e. Strongly agree
    f. Too early to say
50. (If 'Yes') Can you please describe any benefits from these changes?

51. (If ‘Yes’) Have you been able to generate new income or reduce costs as a result of this?
    a. Yes
    b. No
    c. Not yet
52. (If ‘Yes’) Can you provide an estimate of the annual income/cost savings generated from implementing these practices?
53. **(All respondents)** Have you engaged in any follow-up research since completing the project?
    a. Yes – please explain
    b. No
54. Have there been any other benefits as a result of this project?

Section 4 – Reflections

55. What changes, if any, would you like to see made to EIP Wales over the remaining period or in future interventions?
56. What type of support would best address your needs going forward?
57. Do you have ideas around how the project findings should be disseminated?
58. Do you have any other comments that you would like to add?

59. Would you be happy for Wavehill to give you another call during our final evaluation at the end of 2022 to ask a few questions about any outcomes from your project?
    a. Yes
    b. No

Thank you very much for your time.

Appendix 5: Survey of unsuccessful applicants

Introduction

Os hoffech ateb y cwestiynau yn Gymraeg, dewiswch 'Cymraeg' o'r blwch uchod

The Welsh Government have commissioned Wavehill, an independent research consultancy based in Ceredigion, to undertake an evaluation of the European Innovation Partnership (EIP) in Wales. Its purpose is to assess how effectively the operation has been delivered and to identify any benefits for participants and the sector more broadly. As part of this process, we want to hear from individuals who applied to take part in EIP Wales but were unsuccessful or withdrew from the process. The purpose of this exercise is to help us to understand why potential participants did not take part and what happened with their project ideas. It is also an opportunity to obtain your feedback on the application process and the need for EIP Wales.

Your feedback will help us to understand the value of and need for EIP Wales and whether any improvements are needed.

The survey should take no more than 5–10 minutes of your time. Your involvement in this research is completely voluntary, and any information that you provide will be treated confidentially. For information about how we obtained your details and how we will handle the information that you provide to us, please visit the following link: link to PN.

If you have any further questions regarding this research, please contact either XXX@wavehill.com or XXX@gov.wales

Thank you in advance for your time.

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
The European Agricultural Fund for Rural Development: Europe Investing in Rural Areas

Llywodraeth Cymru
Welsh Government

Section 1 – Profile

1. Can you please provide the following information?
    a. Your name
    b. Name of business/organisation
2. Can you confirm the type of organisation that you represent?
    a. Farming business
    b. Forestry business
    c. NGO (non-governmental organisation)
    d. Research institute
    e. Advisor
    f. Other SME
    g. Other organisation
3. Please can you describe why you wanted to develop a project through EIP Wales?
    a. To remove risk from testing a new idea by accessing grant funding
    b. To access expertise to test a new idea
    c. To work with other organisations within the sector
    d. To work with organisations in other sectors
    e. To provide our expertise
    f. To develop our reputation
    g. Other

Section 2 – Experience of engaging with EIP Wales

4. Can you please tell us how you became aware of the EIP support?
    a. Through Farming Connect Local Development Officers
    b. Online, i.e. through the website or social media
    c. At a Farming Connect event
    d. At another event
    e. Farming Connect magazine
    f. Other publications
    g. Word of mouth – through other farmers/foresters
    h. Word of mouth – other (please specify)

    i. From an Innovation Broker

5. Why did you not proceed with the EIP Wales support?
    a. My/our application was unsuccessful
    b. I/we decided that the support was not needed to deliver the project
    c. I/we identified a more suitable source of funding
    d. Partners/others in the group withdrew or lacked commitment
    e. We proceeded with a better project idea
    f. Other (please explain)
6. (If ‘A’) Why was the application unsuccessful?
7. (If ‘B’) Please explain why the support was not needed.
8. (If ‘C’) What was this funding?
9. (If ‘D’) Would you have wanted to proceed?
    a. Yes
    b. No
10. (If ‘E’) Was this funded through EIP Wales?
    a. Yes
    b. No
11. (If ‘No’) Why not?
12. Do you have any further comments about the reasons why your EIP project did not go ahead?
13. Generally, how satisfied were you with the expression of interest and the application and appraisal processes?
    a. Very dissatisfied
    b. Somewhat dissatisfied
    c. Neither satisfied nor dissatisfied
    d. Somewhat satisfied
    e. Very satisfied
14. Were there any barriers/challenges faced during the application process?

15. How useful was the support that you received to:

	Not at all useful	Not very useful	Neutral	Somewhat useful	Very useful	N/A
Help you shape the project and refine your project idea						
Develop a project outline and application						
Form the Operational Group by identifying and bringing in other parties						

Section 3 – About your project

16. What were you hoping to achieve with your proposed project?
    a. Diversify my business
    b. Respond to new policy area
    c. Other (please specify)
17. As far as you are aware, was your project based on:
    a. A new practice (i.e. to trial a new way of working, developing a new product, etc.) to the sector
    b. A new practice to Wales/the area
18. Grants were offered of up to £40,000. Do you think that this was too high, too low, or about right?
    a. Too high
    b. About right
    c. Too low
19. (If ‘C’) Was the funding limit restrictive for your project?
    a. Yes
    b. No
20. (All) What are the reasons for your answer?

21. Did your project go ahead without EIP support?
    a. Yes
    b. No

If 'Yes'

22. Have you received any support to deliver the project?
    a. Yes
    b. No
23. (If 'Yes') Please describe the nature of this support.
24. Have you completed your project?
    a. Yes
    b. No

If 'Yes'

25. To what extent do you agree or disagree that your project has been a success?
    a. Strongly disagree
    b. Somewhat disagree
    c. Neither agree nor disagree
    d. Somewhat agree
    e. Strongly agree
    f. Too early to say
26. Please explain your answer.
27. **(All farmers/foresters)** As a result of this project, have you changed any practices within your business?
    a. Yes b. No c. Not yet
28. (If 'Yes') Can you please describe any benefits from these changes?
29. (If 'Yes') Have you been able to generate new income or reduce costs as a result of this?
    a. Yes b. No c. Not yet

Section 4 – Reflections

30. Do you have any comments or would you like to suggest any changes that should be made to EIP Wales?
31. What type of support would best address your needs going forward?
32. (If ‘Yes’ to Q21) Would you be happy for Wavehill to give you a call during our final evaluation at the end of 2022 to ask a few questions about any outcomes from your project?
    a. Yes
    b. No

Thank you very much for your time.

Appendix 6: Delivery team discussion guide

Evaluation of EIP Wales

Background

Wavehill have been commissioned to assess the implementation and impact of EIP Wales, which is a requirement of the funding. As part of an interim and final evaluation, it is critical that the findings and lessons learnt be fed into delivery, inform future innovation partnership schemes in Wales following Brexit, and improve their impact on the sector in Wales.

The evaluation is being delivered over three stages:

1. **Scoping Stage: *Interviews and desk-based review and logic model development*:** to ensure a robust understanding of the programme logic model and develop an Evaluation Framework (including indicators and data requirements) to measure both implementation (process) and impact.
2. **Interim Stage*: Provide an interim evaluation of the programme*:** At this stage we will focus on evaluating the implementation process and the impact for completed projects.
3. **Final Stage: *Provide a final evaluation at the end of the programme*:** The final evaluation will assess the impact of the EIP projects and of the operation as a whole in terms of the overall aims, performance indicators, and outcomes.

We recently completed the scoping stage and are now conducting the interim evaluation. As part of it, we wish to speak to team members involved in delivering EIP Wales in order to gain their perspectives on the effectiveness of delivery and on the difference that the operation has made.

We would expect this interview to take about 45 minutes of your time. Your participation in this research is completely voluntary. However, your views and experiences are important in order to help inform Welsh Government policies. For information about how we will manage feedback data, please see our privacy notice by clicking the following link: https://www.wavehill.com/eipexternalstakeholders

Questions for discussion

Background

1. Can you please introduce yourself and explain your role in delivering EIP Wales?

Recruitment and application process

2. How effectively was EIP Wales promoted as part of the recruitment campaign?
    a. Was it sufficiently promoted?
    b. Were appropriate channels used to reach the target audience?
3. Are you satisfied that you have been able to recruit an appropriate cross section of farmers and foresters and engage with different agricultural and forestry sectors?
    a. To what extent has EIP Wales supported the most suitable group of participants/projects?
    i. How broad is the group of participants supported (i.e. to what extent does it go beyond the 'usual suspects')?
4. Did the application process work well/as intended?
    a. Was there sufficient 'selectivity' within the process?
    b. Were the selection criteria appropriate?
    c. Have there been any issues with projects failing to progress from EOI through to full application and successful delivery?

Design and delivery

5. Do you believe that EIP Wales has been designed appropriately?
    a. Has the size of grants (max. £40k) been appropriate?
    b. What is the added value of the Innovation Broker, especially for the Operational Group?
    c. What have been the advantages/disadvantages of using Farming Connect and Innovation Brokers to perform the facilitation and dissemination aspects over

the Wales Rural Network (the national rural networks in some other areas have performed this role)?

6. How effective have Innovation Brokers been in conducting the following activities:

	Very good	Good	Acceptable	Poor	Very poor	Comments
Refining project ideas and helping to develop project outline/application						
Supporting forming the Operational Groups						
Supporting delivering the projects on site						

7. Do you believe that there has been an appropriate mix of expertise among the Innovation Brokers?
8. How important is the support from the Knowledge Exchange Hub (i.e. literature review/supporting research for project ideas) in helping to shape projects?
9. Has the dissemination of findings to the wider public worked well/as intended?
    a. Do the projects have sufficient appeal for broader uptake?
    b. What have been the most effective approaches to dissemination?
    c. To what extent has the dissemination activity reached the target audience?
    d. Are you aware of this dissemination activity leading to other farmers/foresters trialling ideas on their site?

Project delivery and early outcomes

10. In your opinion, how innovative have the projects been?

11. From your understanding, how effectively did Operational Group members engage with the project and work together?
    a. To what extent did farmers/foresters take ownership of the work undertaken through the projects?
    b. How important have non-farmers/foresters been in supporting delivery and what have they gained from their participation?
12. In your opinion, to what extent are the projects that have come through likely to meet the needs of the operation?
    a. What do you believe to be the best examples of projects delivered to date?
13. What have been the main outcomes for farmers/foresters to date?
14. To what extent do you believe that farmers/foresters would have tested/made the changes without the support?
    a. Could they have accessed support from another scheme to deliver their EIP Wales projects?

General reflections

15. Are there any gaps/areas that need to be improved in the delivery model?
    a. If so, what are they?
16. What, if any, have been the main internal and external challenges to delivery (e.g. COVID-19, policy/trade changes, operational limitations)?
17. What have been the main strengths within delivery to date and that should potentially be retained in future provisions?

Alignment

18. Is the approach that the programme is taking to integrating the cross-cutting themes (CCTs) into its delivery appropriate or could it be doing more? (four CCTs include Equality of Opportunity and Gender Mainstreaming; Sustainable Development; Tackling Poverty and Social Exclusion; and Welsh Language)

19. How effectively has EIP Wales aligned with other rural grant schemes that have been designed to foster competitiveness and sustainability in the farming and forestry sectors?
20. Is there anything else that you would like to add at this stage?

Appendix 7: Operational Group Member Follow-up Survey

Introduction

As you may recall, Wavehill are undertaking an evaluation of the European Innovation Partnership (EIP) on behalf of Welsh Government. We spoke to you in late 2021 / early 2022 about your experience of receiving support from the project. Your feedback, alongside that from other businesses participating in the project, was used to inform an Interim Evaluation Report which is due to be published by Welsh Government this winter. We are now undertaking our final evaluation of the project, which is due to come to an end in 2023.

During our first discussion, you kindly said that you would be happy for us to give you another call to follow up on some of your responses and check on the progress you have made since our first call. The discussion should not take more than around 20 minutes of your time. Are you still happy to have that conversation?

- Yes
- No

If you struggle to hear over the phone or require an accessible format, alternative versions can also be made available. Interviews can be undertaken in Welsh or in English. Please feel free to ask me to explain or repeat any question if it is unclear. I am happy to answer any questions that you may have as we go along.

Confidentiality

Participation in this interview is voluntary. You can decide to not take part before or during the interview and can choose to not answer certain questions if you prefer. If you have any questions, please contact X at XXX@wavehill.com or on 02921 202 826. Alternatively, you can contact X (Welsh Government) at XXX@gov.wales

For further information about how we will manage your data, you can visit our privacy notice at:

https://www.wavehill.com/single-post/eipcymrugrantapplicants

1. Researcher to note:
    a. Business name
    b. Survey ID
2. What has been the impact for your business from taking part in the EIP? (Prompt on economic/environmental impacts and changes to their approach towards running their business)
    a. On a scale of 1-5 where 1 is ‘Not at all significant’, and 5 is ‘Very significant’, how significant have these impacts been for your business?
    b. Please explain your answer
3. To what extent has taking part in EIP fostered innovation within your business i.e. increased your understanding of the innovation process and/or made you more likely to conduct innovation going forward?
    a. 1- Not at all
    b. 2 - Little
    c. 3 – Somewhat
    d. 4 – To a large extent
    e. 5 - To a great extent
4. Comments:
5. Can you tell us more about the nature of your collaboration with other farmers/foresters and organisations from other sectors through the EIP?
    a. Have these been formal or informal collaborations?
6. What impact, if any, has it had on your collaboration with other farmers/foresters and organisations from other sectors going forward?
7. To what extent has it… (scale: 1 – Not at all; 2 – Little; 3 – Somewhat; 4 – To a large extent; 5 – To a great extent
    a. Made you value collaborative activity more?
    b. Made you more likely to collaborate in future?
8. (If selected 4 or 5 to option b) Is this likely to be with other farmers/foresters or organisations from other sectors?
    a. Other farmers/foresters
    b. Organisations from other sectors
    c. Both

9. To what extent do you agree or disagree that your project has been a success?
    g. Strongly disagree
    h. Somewhat disagree
    i. Neither agree nor disagree
    j. Somewhat agree
    k. Strongly agree
    l. Too early to say
10. Please explain your answer.

If had not completed an EIP project at time of initial survey (RT to check)

11. **(All farmers/foresters)** As a result of this project, have you changed any practices within your business?
    d. Yes
    e. No
    f. Not yet
12. (If No) Can you please explain why you have not changed any practices within your business as a result of this project?
13. (If Yes) Please describe what these changes have been
14. (If Yes) To what extent do you agree or disagree that you would have changed these practices anyway, without the support?
    a. Strongly disagree
    b. Somewhat disagree
    c. Neither agree nor disagree
    d. Somewhat agree
    e. Strongly agree
    f. Too early to say
15. (If select somewhat or strongly agree) Would you have made the changes at the same scale?
    a. Yes
    b. No – would have been smaller changes
    c. No – would have been larger changes
    d. Not sure

16. (If select somewhat or strongly agree) Would you have made the changes as quickly?
    a. Yes
    b. No
    c. Not sure
17. (If Yes to Q11) Can you please describe any benefits from these changes?
18. (If Yes to Q11) Have you been able to generate new income or reduce costs as a result of this?
    a. Yes
    b. No
    c. Not yet
19. (If Yes to Q11) Can you provide an estimate for the annual income / cost savings generated from implementing these practices?
    a. Estimate of additional income generated
    b. Estimate of cost savings
20. other benefits as a result of this project?

If had completed an EIP project at time of initial survey (RT to check)

21. Please describe any changes you have made to your business practices, if at all, as a result of this project.
22. (if changed practices) To what extent have the activities / solutions adopted during your project been sustained after the end of the project?
    a. 1- Not at all
    b. 2 - Little
    c. 3 – Somewhat
    d. 4 – To a large extent
    e. 5 - To a great extent
23. (if changed practices) Can you provide further information about the specific economic or environmental benefits for your business?
    a. Economic
    b. Environmental

24. (if changed practices) Can you provide an estimate for the annual income / cost savings generated from implementing these practices, if at all?
    a. Estimate of additional income generated
    b. Estimate of cost savings
    c. Which specific changes or activities have generated that economic impact for your business?

All respondents

25. On a scale of 1-5 where 1 is 'Not at all' and 5 is 'To a great extent', to what extent do you believe your project is well-known within the agricultural / forestry sectors in Wales?
    a. 1- Not at all
    b. 2 - Little
    c. 3 – Somewhat
    d. 4 – To a large extent
    e. 5 - To a great extent
26. Do you know of any examples whereby other farmers / foresters (i.e. outside of EIP) have explored or developed new practices as a result of your project?
    a. Yes
    b. No
    c. Not sure
27. (If Yes) Can you please provide further information about this.
28. Have there been any unexpected outcomes from your project or participation in the EIP?
29. Has your project led to any further research (e.g. applying for new funding to build on the research)?
    a. Yes
    b. No
30. (If Yes) Please describe

Delivery model

31. On a scale of 1-5 (where 1 is ‘not at all important' and 5 is ‘very important’), how important were each of the following in delivering the project (e.g. conducting the trial work, data collection, managing timescales, coordinating activity etc.)?
    a. Lead applicant
    b. Wider Operational Group members
    c. Innovation Broker
32. Which of the following would be your preferred option with regards to how programmes such as the EIP are delivered in future?
    a. Retain a similar structure i.e. a comprehensive application process but with substantial support from an Innovation Broker
    b. A streamlined, light-touch process with minimal support from a central team (and therefore greater responsibility on the lead applicant / Operational Group members to deliver the work)
33. Do you have any further comments on what you would like the delivery model for future programmes to look like, including the need for an Innovation Broker role?
34. Would you be happy for Wavehill to develop a case study based on your project to be included in our final evaluation report? We would like to include your business name and potentially your name as part of that case study, if agreeable. You would get an opportunity to review the case study to amend and correct any inaccuracies before it is shared with Welsh Government.
    a. Yes
    b. No
35. (If Yes) Would you be happy for us to include your name and your business name as a part of that case study?
    a. Yes – my name
    b. Yes – business name
    c. No – anonymised only
36. Do you have anything else to add?

Appendix 8: Comparator review of EIP-AGRI delivery in England

Introduction

Some 37 applications were made to EIP-AGRI in England, 18 of which were ultimately successful. Total expenditure amounted to £1.85m, meaning an average project size of £102,778.

The scheme was evaluated in-house by Defra between March and November 2021. The evaluation was carried out to form part of the evidence base for the planned ex-post evaluation of the 2014–2020 England RPD in 2024 and also to inform future innovation policy teams within the Future Farming and Countryside Programme and Agri-Food directorates.

The following seven evaluation questions were addressed:

1. To what extent was the application process a successful mechanism to encourage quality applications?
    a. Were there any barriers to application?
    b. What were the most asked questions by applicants?
    c. Were there areas of high/poor quality within applications?
2. How were projects appraised to ensure they were relevant to industry needs?
    a. Was the definition of 'innovative' appropriate to industry needs?
    b. What was done to assess industry needs, and was this effective?
    c. Could the appraisal process have been improved?
3. Were good project ideas pitched (which did not get funded) that would have benefitted from a different type of support? Were there patterns in rejected applications that were 'close' to success?
4. Did applicants find the project milestones clear and relevant? What were the most common areas for questions/concerns from project owners?
5. What support/facilitation was available to project managers? Did project managers take up these offers, and in what ways? Did they ask for any support that was not available?

6. What were the barriers to dissemination and how were these overcome? How does Defra keep projects in the fold when they start sensing there is value in their research?
7. What were the mechanisms of knowledge exchange? Based on final reports, were any more successful than others? Were any barriers met?

Not all of these questions are likely to have relevance for the Welsh Government in considering the performance of EIP Wales. This summary therefore focuses on elements of evaluation questions 1, 2, 5, 6 and 7, where it is felt that the approaches taken and lessons learned could be of interest. This summary largely draws on the evaluation report, alongside comments made by key delivery partners as part of the evaluation of EIP Wales.

The application mechanism

A pre-application phase involved the submission of a Notification of Interest (NOI) comprising an outline of the project idea in up to 300 words. The scheme was promoted by the RDP team in England primarily through a series of workshops around the country's agricultural colleges. Defra and the Rural Payments Agency (RPA) considered this approach a success in that it allowed for the targeting of workshops on sectors which had shown interest in EIP-AGRI. It also allowed early feedback which prevented unsuitable applications from being made; in some cases, potential applicants were redirected to more suitable funding opportunities. Ultimately, around 20 % of NOIs progressed to the formal application.

The application form itself consisted of five parts, each with several sections and multiple questions. A lesson learned by the English authorities was that this was over-lengthy, and a much-reduced application process would be more suitable for future schemes.

Uptake of EIP-AGRI in England was considerably lower than expected, with a commitment of £1.85m against a budget of £5m. The three main barriers identified in the evaluation report which explain this were:

- Political uncertainty resulting from two general elections and the UK referendum on leaving the EU. The uncertainty reduced the number of applications and the

changing relationship with the EU impacted project ideas linked to European regulations.

- The requirement that each project had to apply via a legal entity and on behalf of the operating group impacted on how project participants were financially reimbursed. This prevented some initial ideas from developing into a full application.
- The fact that research funding under EIP-AGRI has to be published and disseminated widely was off-putting to interested parties that wanted to retain intellectual property rights to their research.

None of the identified barriers can be addressed by scheme implementation; in fact, the second and third form an essential part of EIP-AGRI.

Delivery team members provided further insights during the discussion with Wavehill. Commenting that there had been good initial interest but a disappointing drop-off from NOI to full application; they cited the level of information required, including auditing requirements, as the main reason for this. They further commented that the scheme in England was generally not permitted to provide brokerage support due to the principle of diverting as much of the finance as possible directly to beneficiaries (rather than advisers).[67] Applicants were required to organise themselves with regard to engaging other partners and forming their Operational Group, as well as developing their application. Accordingly, the combination of detailed information requirements and a lack of support to help applicants through the process had the effect of curtailing interest in developing a full application.

There are few insights into what made a successful application in England in the evaluation report; successful applications were those that met the scheme requirements. One point of difference was around applicant business size, with larger businesses seeing a higher approval rate, possibly because they have more resources to make applications. The conclusion drawn from this was that a simplified procedure or tailored support to smaller businesses might improve their success rate.

[67] The only exception was a small number of examples whereby some proposals that were based on similar ideas were encouraged to combine their efforts.

Only 18 of the 37 applications were successful, but no patterns were identified in the projects rejected, which covered a wide range of themes. However, applications made by farmers were more likely to be rejected than those made by research and publicly funded bodies. It might be the case that this also explains the lower success rate for smaller businesses and may be linked to the resources available to make the application. A lesson to learn from this is that farmers might benefit from specific support in the application process.

The two main reasons for rejecting applications were (i) lack of an academic partner; and (ii) failure to offer good value for money – both points demonstrate the need for brokerage support. Interestingly, a lesson learned was that matching projects with application-writing mentors to help create successful applications could be useful for future innovation projects. The point was made that this was the approach adopted in Wales, as well as several other Member States.

Project appraisal

Project appraisal appears to be a separate exercise to project approval. Defra undertook a "light-touch" appraisal of 40 % of applications received (i.e. not projects approved).[68] The projects appraised were assessed for scientific quality, which was considered a function of robustness of design and likelihood of success. Three key areas were examined.

- Does the project represent true innovation? Almost 30 % were not considered to be innovative and a further 20 % showed little evidence of innovation. This suggested that there may be a problem with how innovation is understood by the industry, or that applicants needed more guidance on developing suitable project ideas.
- Is the project technically achievable? Whilst all applications were considered achievable, further information and clarification was requested in 30 % of cases.
- Is the experimental plan sufficient to demonstrate success? Almost 90 % of applications were considered to be of reasonable quality or better.

[68] Although it is not explicitly clear from the evaluation, based on the use of numbers and percentages, it appears as though the appraisal was of full applications, not Notifications of Interest.

The evaluation could not examine whether the approval process could have been improved due to the long time lag before the evaluation was conducted. However, it is not clear from the evaluation report how useful an appraisal process can be if it is not applied to all applications. Those applications that were appraised received feedback which, presumably, was not available to those that were not. For example, in some cases, applicants were asked to provide further information on innovation. It may be the case that this feedback resulted in a successful application. Those applications not appraised may therefore have been at a disadvantage, although it should be noted that other forms of support were available to all (see below).

Alongside differences in the brokerage support, the other notable difference with EIP Wales was the size of grants allocated, with EIP England providing a much higher threshold of up to £200,000. EIP England had a range of projects come through, from small projects of £10,000–£20,000 up to others that were given £150,000. Some of the projects involved very large consultants or multinational food companies which were able to establish an Operational Group with 200–300 members. We note that this was an aspect that the EIP Wales team wanted to avoid, with grants limited to £40,000 in order to disincentivise larger organisations from dominating the scheme. Nevertheless, the EIP England team noted that it was difficult to draw lessons on which approach worked better, commenting that there were examples of small and large projects that worked well, and some less well.

Support/facilitation available to project managers

The support and facilitation offered in England amounted to:

- an initial individual face-to-face meeting after the Notification of Interest stage before the application
- one-to-one direct email and telephone contact throughout the duration of the project with one key person
- case study applications and reports shared to show project managers what a successful project looked like and the level of detail required
- provision of guidance documents (EIP-AGRI Handbook)
- workshops.

Not all applicants took advantage of the support offered, although not all appeared to be aware that it was available. For example, only some of those interviewed had taken up the pre-application face-to-face meeting. However, this was considered the most effective support, particularly in ensuing that the application met the requirements for innovation. Contact with one key person was also widely appreciated because this ensured that the project was fully understood. The level of detail required in the application was considered to be a concern, and one interviewee explained that a short training course on completing the application form would have been helpful. In particular, this could have focused on the level of detail required and how answers should be phrased.

In contrast, the workshops were not especially well received, mainly because their content was considered to be too broad to accommodate the wide range of backgrounds held by the applicants.

All Operational Groups were required to establish terms of reference to formalise the process and ensure each member could understand their role. This may have helped to secure engagement from Operational Group members and aided in ensuring a greater legacy, with some groups still operational long after the scheme came to an end.

Barriers to dissemination and how these were overcome

It is a requirement of EIP-AGRI funding that operational groups disseminate the results of their projects via the submission of a final report for upload onto the European Commission's EIP-AGRI website, as well as via a bespoke dissemination plan which forms part of the application. It was a requirement of projects that they achieve the goals laid out in their stated dissemination plans in order to receive funding.

Five types of barriers to dissemination were identified via interviews with project beneficiaries.

1. **COVID-19 lockdown restrictions:** Clearly physical attendance at planned dissemination events such as workshops was not possible in some cases. Although physical events were replaced by virtual ones, these were considered

inferior to meeting in person and beneficiaries felt that they would result in a lower take-up of innovation. It is difficult to see how this barrier could have been addressed, other than postponing planned physical events. However, at the time, there was no certainty as to when lockdowns might finish, and it is understandable that alternatives were sought at the time to ensure that at least some form of dissemination could take place.

2. **Product names:** The specific (brand) names of products used in two projects were not used in dissemination material because, in one case, the specific product used was not successful and, in the other, the product was not authorised for use in the sector under research. This barrier was overcome through the use of generic product details. The aforementioned approach seems to be reasonable where there are good reasons not to be more specific.
3. **Quality of results:** In one case, project results were sufficient to progress scientific thinking in the field but were not sufficiently rigorous to be accepted as an academically published paper. The solution in this case was to continue the research in order to develop more robust results. It is important that project results are robust and are seen to be credible if innovation is to be taken up.
4. **Lack of experience:** One project was unable to complete a detailed technical report (a requirement of their funding) due to a lack of access to statistical software. In this case, as a requirement of funding, steps should perhaps have been taken on the part of the project to ensure that they had access to relevant software. On the part of the funding agency, it should have been noticed that elements required as a condition of funding were not actually in place.
5. **Commercial value of intellectual property:** Four projects identified issues with sharing intellectual property when there was a commercial impact, although they recognised that, in accepting public money, it is reasonable that there is a public benefit. In the case of one project, this issue was dealt with by the return of funds, which meant that there remained no obligation to disseminate results. However, the beneficiary in this case would still have developed private benefit from public funding, which they may not otherwise have been able to do. An appropriate approach would perhaps be to ensure that successful applicants are fully aware that results developed using public funds must be disseminated. It does not seem

reasonable that public money, awarded with the express intention of developing innovation, can result in purely private benefit.

Clearly, projects run by organisations which are used to disseminating results are much less likely to face barriers in this area. A lesson that could be learned is to provide sufficient support on dissemination to projects run by farmers or other individuals less likely to have experience of organising dissemination. The onus here falls on the funding body to ensure that dissemination plans, which are a condition of support, have been adequately assessed and are considered plausible. When it comes to the development of intellectual property, it should be made clear to applicants that, if this is done with public money, then the results should be disseminated so that there is some public benefit.

The mechanisms of knowledge exchange and barriers met

The evaluation found that, despite the requirement to upload final reports onto the European Commission's EIP-AGRI website, only eight of the 18 EIP-AGRI projects had been registered on the website by November 2021. The implication from the evaluation report is that not all of these eight registered projects contained links to the final report; incorrect links were also identified. It is not clear from the evaluation report whether reports from all 18 projects should have been available on the website by November 2021. As Defra was in receipt of 12 reports (and was waiting for more), it would be relatively straightforward for the funding body to take responsibility for their upload to the Commission website; this would ensure that project reports are available to interested parties.

In terms of knowledge exchange plans written into projects, the most popular method was presentations/workshops, which were used by all 12 of the projects for which final reports were available to Defra at the time of the evaluation. Whilst some of these could take place in person as planned, others had to be carried out virtually due to COVID-19 restrictions (see above). Other dissemination methods used included writing industry-specific articles; websites; wider-reaching articles; videos; poster presentations/trade stands; brochures and flyers; and social media.

Impacts

The evaluation report (understandable given the methodology) focuses on output indicators such as the number of dissemination events and website hits, etc., rather than on outcome indicators. As a result, the impact (success) of dissemination events cannot be determined. Evidently, in order to understand the diffusion of innovation it is necessary to know how results were taken up by others. Although a monitoring and evaluation framework is suggested in the evaluation, this does not really address the issue of understanding uptake; the closest the evaluation comes is suggesting that the number of people who engage with the research during industry events be monitored.

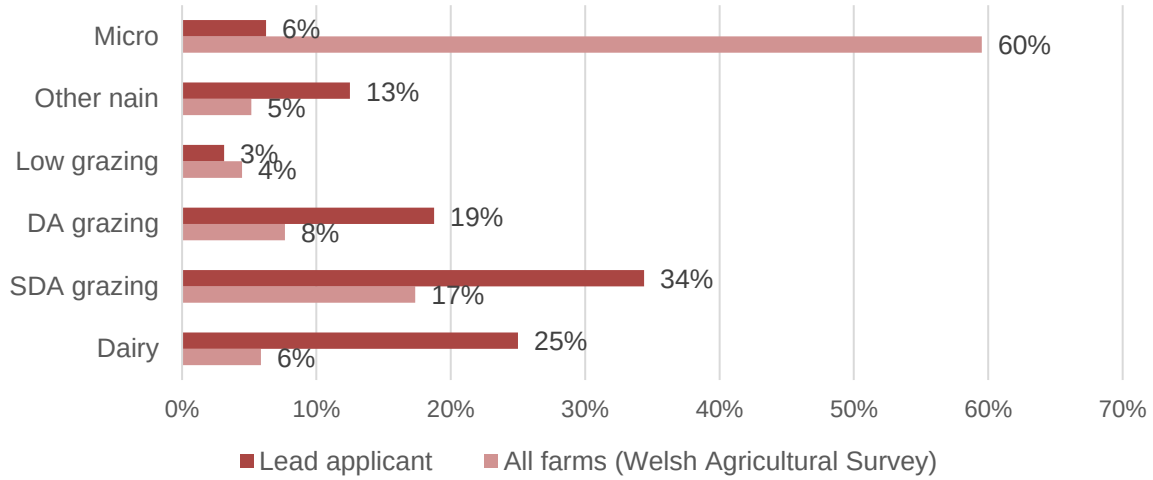
The stakeholder discussion with the delivery team did provide some insights into achievements. It was noted that “to my knowledge one or two of the groups still exist”, where they are still collaborating and undertaking innovation together. It was suggested that this is perhaps where the decision not to use Innovation Brokers is beneficial, whereby the greater demands placed on the groups (i.e. to establish and organise themselves without support) perhaps led to greater commitment, resilience, and sustainability within the groups that were able to make a success of their projects. Further, the team were able to provide some examples of outcomes generated by the projects. For instance, in one project an electric weeding product was successfully trialled and eventually commercialised; another had developed an app for use in viticulture to identify the ideal conditions to grow their crops. Additionally, there were other examples whereby the projects had demonstrated useful learning on things that either did work or established things that did not work, thereby avoiding the wasting of energy and resources on further research.

Appendix 9: Detailed profile of Operational Group members

According to the statistical analysis conducted by the Welsh Government,[69] the farm businesses taking part in EIP projects were generally much larger in size than average farms in Wales. The data shows that, in 2015–16 (i.e. pre-EIP), lead farmers, on average, had a standard output (SO)[70] of €322,00, whilst other Operational Group member farmers had an SO of €399,000. By comparison, the remainder of the sector had an average SO of just €66,000.[71] With regard to land mass, lead farmers operated farms that contained 219ha of land on average, whilst other Operational Group farmers had 237ha of land; this can be compared with an average of just 66ha operated by other farming businesses. Together, the turnover and land mass data suggest that farming businesses participating in EIP Wales are several times larger than the industry average.

Dairy accounts for the most prevalent subsector, with 25 % of EIP projects led by dairy farmers, which is much higher than the six % represented by the subsector throughout Welsh agriculture.

Figure A3: Subsector of EIP Wales lead applicants and all farms in Wales

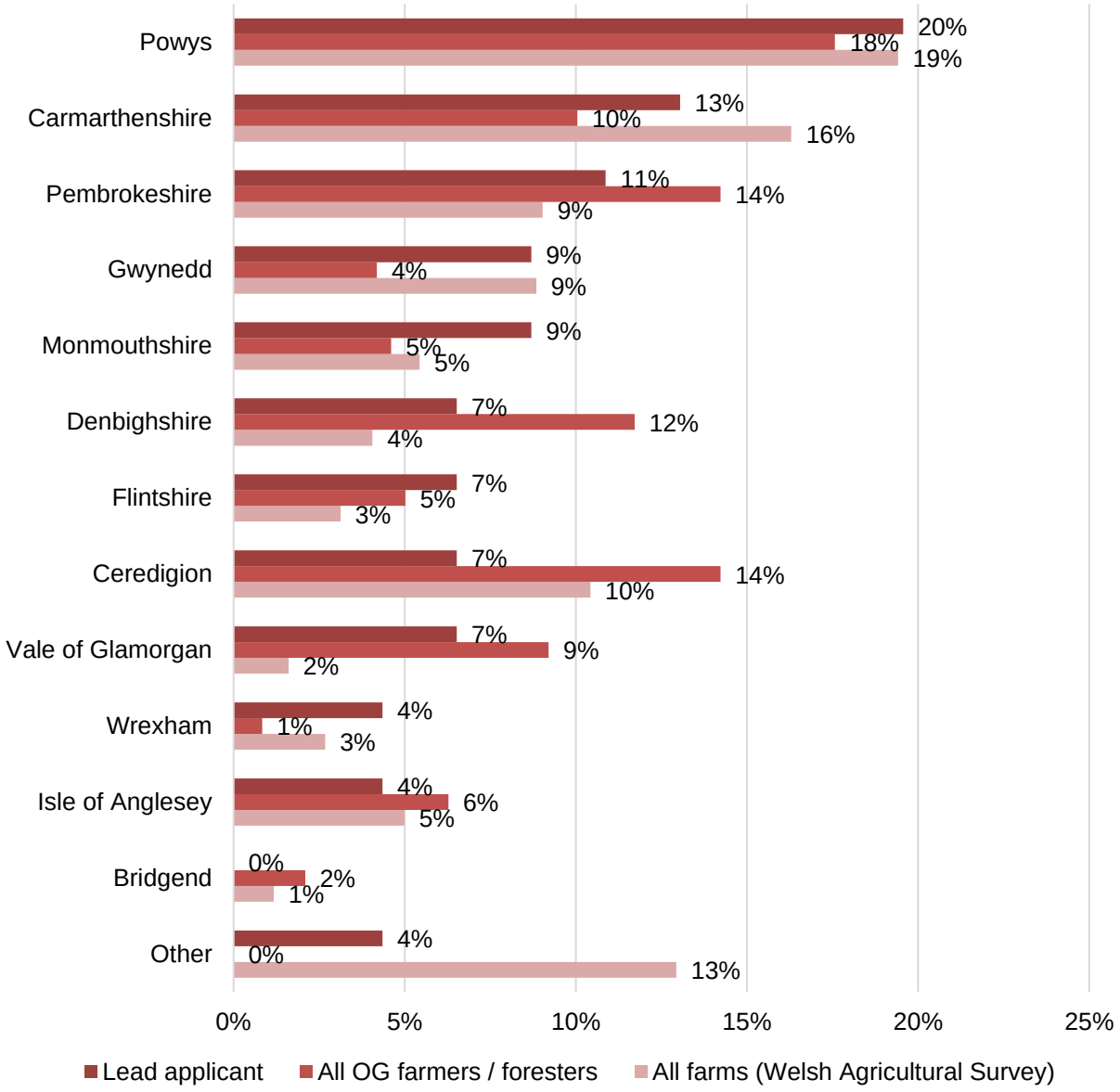


[69] This analysis was based on data from the 2021 June survey of agriculture and horticulture, where 32 lead farmers (from the 46 projects) and 201 other Operational Group farmers were identified (using Customer Referral Numbers) and compared with the overall population.
[70] Standard output is used as a proxy for turnover. It is the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock. The standard output is used to classify agricultural holdings by type of farming and by economic size.
[71] The statistical analysis conducted by the Welsh Government categorised farms in euros.

Source: Welsh Government analysis of Welsh Agricultural Survey data

The geographical distribution of the farms is fairly similar to what one might expect, being concentrated in the more rural authority areas in Wales and following a similar pattern to the distribution of all farms throughout the country (see Figure A4 below).

Figure A4: Geographical location of EIP Wales lead applicants, all Operational Group farmers/foresters, and all farms in Wales



Source: EIP Wales monitoring information & Welsh Agricultural Survey 2017

Powys accounts for most of the Operational Group members and lead applicants, reflecting the county's position of containing most farms in Wales. The notable exception, however, is in the north-east, wherein there is more EIP Wales activity than might be expected (given that it is not an area known for farming). Indeed, the three counties of Denbighshire, Flintshire, and Wrexham account for 18 % (42/239) of all EIP Wales members, despite being home to only 10 % of farms in Wales. Similarly, the Vale of Glamorgan contains more activity than might be expected, whilst Pembrokeshire is also well served by the scheme. Conversely, some areas in the west, such as Carmarthenshire, Ceredigion, and Gwynedd, whilst amongst the main areas of activity, have fewer members than might be expected (given the importance of agriculture within those areas). Additionally, 10 of the counties in Wales[72] that are less known for agriculture have no involvement in the scheme at all, despite accounting for 13 % of all farms in Wales.

Other demographic data within the scheme's monitoring information show that 88 % (210/239) of the Operational Group farmers/foresters are men (the remaining 12 % are women), and the age distribution is fairly evenly split between the younger cohort (59 % (140/239) are up to the age of 50, including four % (9/239) up to the age of 24) and the older cohort (41 % (99/239) are aged 50+). This seems to show that the scheme has engaged with more younger farmers than average within the industry. For instance, the 'Agriculture in the United Kingdom 2020' report illustrated that 36 % of UK farmers in 2016 were aged 65 years or above and the median age was 60.[73] By comparison, only seven % (16/239) of EIP Wales farmers were aged 65 years or above at the time of applying and most were below the age of 50.

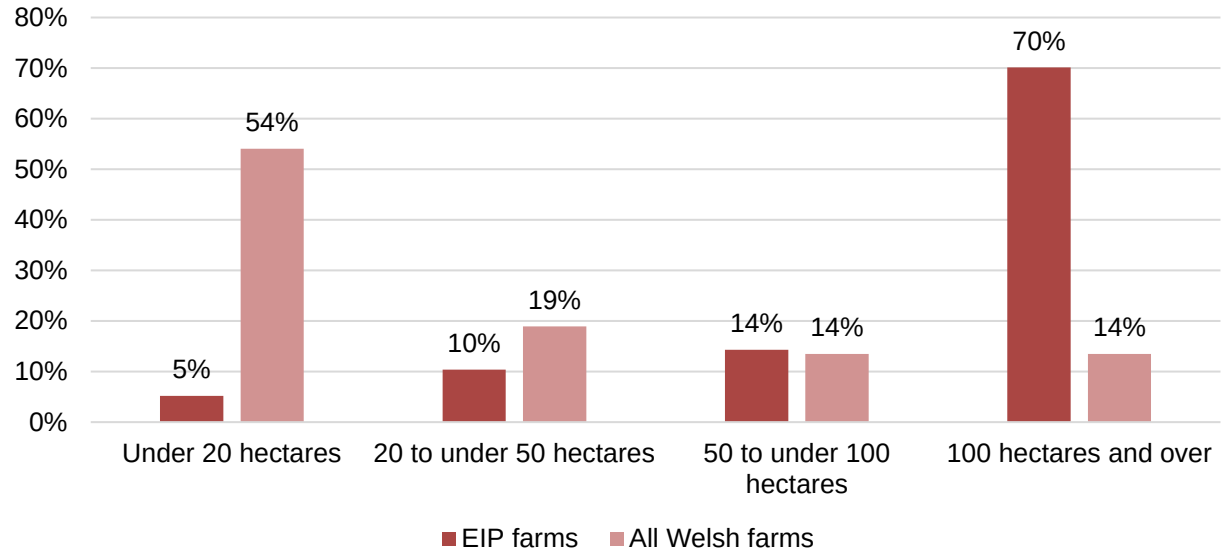
We asked some additional questions in the Operational Group member survey to gain further insights into the types of businesses supported. Whilst we cannot be sure that these responses are reflective of the entire EIP Wales population, they do give us a useful indication.

Firstly, the survey further reveals that EIP Wales has engaged with larger-than-typical farming businesses. On average, farming businesses engaged in the scheme

[72] These counties are: Blaenau Gwent, Caerphilly, Cardiff, Conwy, Merthyr Tydfil, Neath Port Talbot, Newport, Rhondda Cynon Taf, Swansea, and Torfaen.
[73] Department for Environment, Food and Rural Affairs, Agriculture in the United Kingdom 2020, 2021

operated on 259ha of land, compared to the national average of only 48ha (according to the Agriculture in the United Kingdom 2020 report).[74]

Figure A5: Size of farm (ha) – comparison between Operational Group members and national average



Source: Operational Group member survey (n=105) and Agriculture in the United Kingdom 2020[75]

The Operational Group Member Survey includes turnover data for 84 of the farming businesses (a broader group than the analysis for the Operational Group leads described above, which was based on just 32 records). This shows that the broader group of farming businesses (i.e. not just the leads) are generally much larger than typical, with 35 % generating more than €500,000 compared with just three % of the overall farming business stock. Indeed, the average turnover reported by the survey respondents was around £713,000, which is much higher than the Welsh average for all cash income (£44,000).

[74] Ibid.
[75] Ibid.

Figure A6: Operational Group members' (farmers only) turnover bandings

Source: Operational Group member survey (n=84)

Other data from the Operational Group member survey reinforce this notion that most of the farmers engaged are the usual suspects, with 74 % (59/80) reporting that they had received other grants or financial support from the Welsh Government or other public bodies in the last five years. This is not surprising, given the role of Farming Connect in publicising the scheme. Businesses had typically received the Sustainable Production Grant (35 %, 28/80), the Farm Business Grant (31 %, 25/80), or Glastir (11 %, 9/80), whilst a range of other grants were also cited.

Welsh Government Farm Segmentation Model

In order to further understand the profile of farm businesses participating in the EIP Wales scheme, the research also drew on the Welsh Government Farm Segmentation Model.[76] The model segments Welsh farm holdings based on the values and beliefs of those managing them. It is intended to support the design and implementation of policies and programming by understanding the differences in attitudes and perceptions across different groups of farmers. The questions explore a range of themes, including adaptability and innovation and the networks and broader support on which farmers draw. Furthermore, they explore attitudes towards

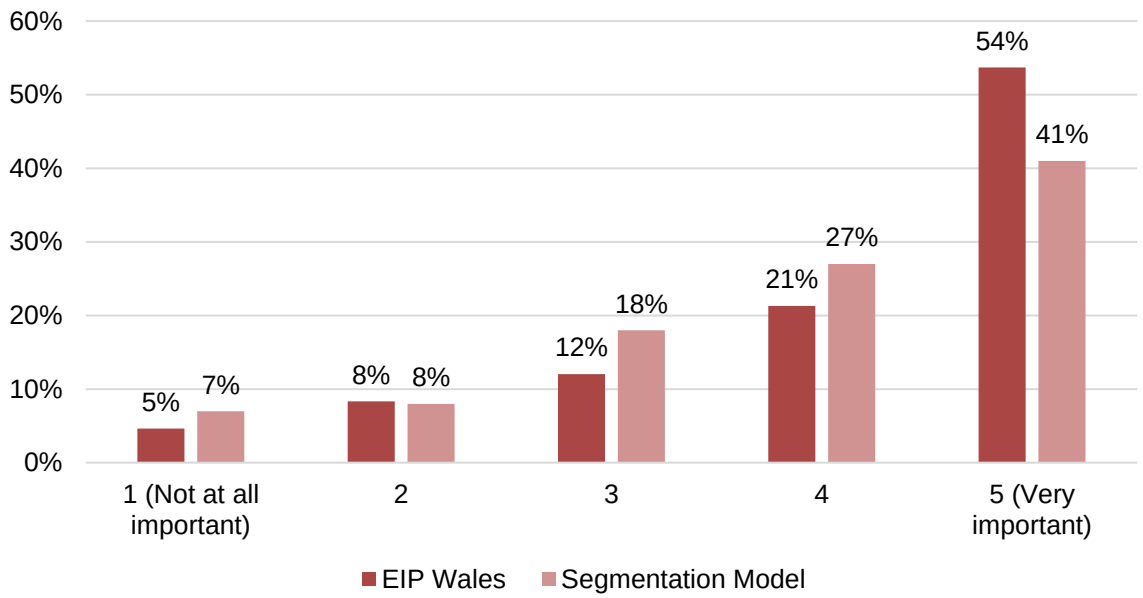
[76] Lee-Woolf, C., Hughes, O., King, G., & Fell, D. (2014) Development of a segmentation model for the Welsh agricultural industry. A report by Brook Lyndhurst for the Welsh Government.

environmental sustainability, the importance of connectedness with other farmers, and the role of new skills and knowledge in running a farm effectively. The segmentation model then maps these characteristics against five segments or clusters.

Figure A7: A segmentation model for the Welsh agricultural industry

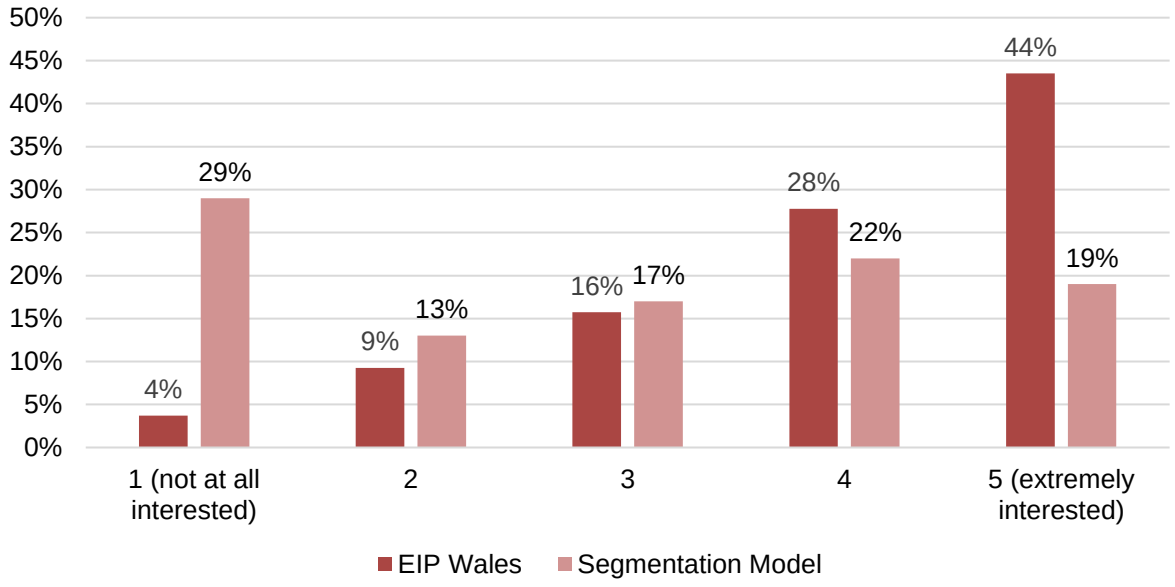
Source: Lee-Woolf, C., Hughes, O., King, G., & Fell, D. (2014) Development of a segmentation model for the Welsh agricultural industry. A report by Brook Lyndhurst for the Welsh Government.

Figure A8: 'How important is talking to other farmers as a source of information and advice for you personally?'



Source: Operational Group member survey (n=108) & Farm Business Segmentation Model 2014 (n=1,814)

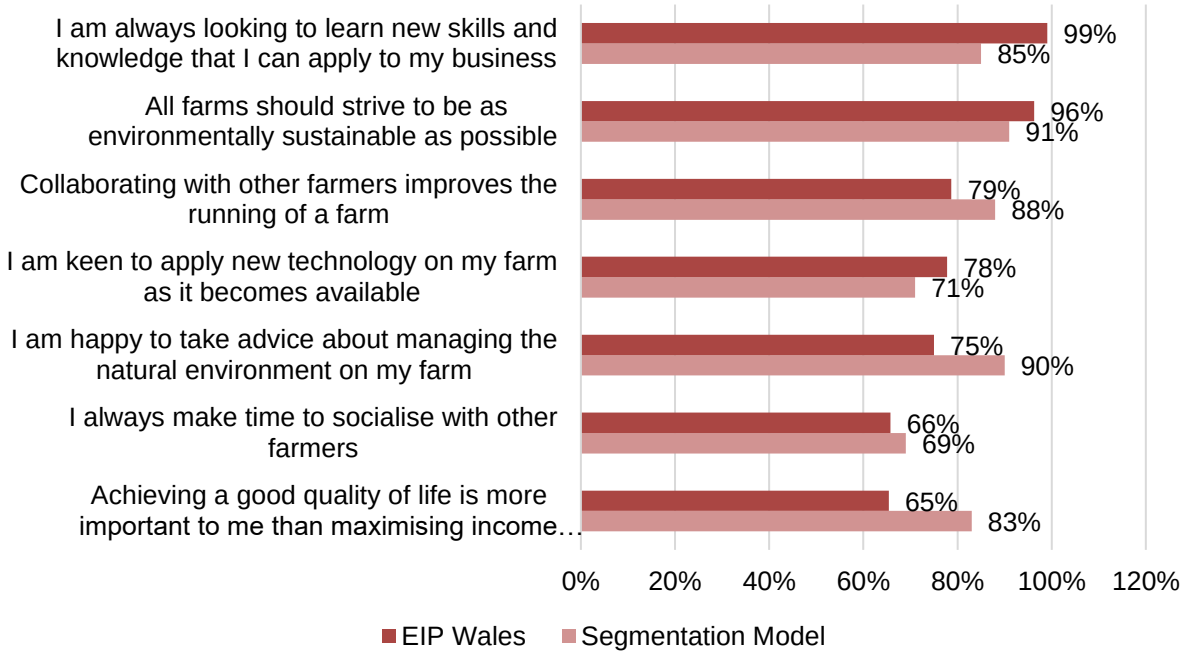
Figure A9: 'How interested are you in accessing information or advice about farming on the Internet?'



Source: Operational Group member survey (n=108) & Farm Business Segmentation Model 2014 (n=1,814)

Figure A10 over page presents the final set of indicators used to test the characteristics of Operational Group members. It reinforces some of the comments made previously in the section, revealing that Operational Group farming businesses are more likely to be commercially orientated (e.g. they are more likely to deprioritise a good quality of life in favour of maximising the income from their farm, as shown by the final statement in Figure A10). Perhaps surprisingly, given the nature of the scheme, Operational Group members do not appear to be particularly prone to collaborating with other farmers to improve the running of their farms; only 76 % (61/80) felt that collaborating with other farmers improves the running of a farm – less than the 88 % reporting this nationally. They do embrace new skills, information and technology more than is typical (99 % (79/80) vs. 85 % reporting this nationally) and are more likely to want to apply new technologies on their farm (74 % (59/80) vs. 71 % reporting this nationally). Together, these data suggest that the group do value and recognise the need to upskill and improve their knowledge, although they are also independently minded.

Figure A10: 'To what extent do you agree or disagree with the following statements?'



Source: Operational Group member survey (n=80) & Farm Business Segmentation Model 2014 (n=1,814)

If we consider the pattern of the data as a whole, we can broadly state that the farming businesses taking part in EIP Wales most closely resemble Cluster U (see Figure A7 above), which, in fact, accounts for the smallest segment in Wales (11 % of farms). This is, of course, a very broad generalisation, and each business will have its own, different values and beliefs; indeed, some will be closer to the other cluster segments. However, this does provide a useful insight with which to understand whether the scheme has attracted a particular group of businesses, and the data does suggest that businesses with particular characteristics have been drawn to the scheme, although these characteristics are generally not reflective of the sector as a whole. They are larger-than-average businesses, which are typically already ‘plugged into’ support networks; they are more business-minded, eager to learn new skills and adopt new technologies.

Appendix 10: Overview of projects

Project	End date	Project summary
EIP1 - Potato blight control using components of indigenous non-food waste plants	March 2019	This EIP Wales project investigated a natural biopesticide made from a chemical compound (saponin) sourced from common ivy. "This project could result in a brand-new market opportunity, to grow common ivy commercially, and to use its natural saponin to help organic growers reduce blight infestation". The project was led by representatives from Sarvari Research Trust and Emerald Crop Science and Naturiol Ltd, whilst trial plots were located on two farms, Ty'n yr Helyg near Llanrhystyd and Henfaes farm at Bangor University. They tested two new blight control options: Hederin, which is made from ivy leaves, and OptiYield Diamond, which is a growth stimulant. Project outcomes: • The Hederin treatment slowed the progression of blight but overall was less effective than the standard fungicide. • When Hederin was combined with OptiYield Diamond the impact was more effective, and this showed potential as a blight control. This combination may be useful in an integrated pest management control programme, particularly for organic growers.
EIP2 - Developing the Cambrian Mountains Beef group to manage and expand their short supply chain	March 2020	In this EIP Wales project, a group of farmers from the Cambrian Mountains Beef Group wanted to develop their skills to build on a short supply chain they had established with a catering butcher supplying high-end restaurants. Managing a short supply chain requires multiple skills, including marketing, product processing and product development. Project outcomes: • The group developed a marketing strategy for their beef brand that involved understanding and adopting social media as well as more traditional communication methods. • Involvement of the next generation was essential to the long-term security of the business. Younger members of the group took on roles such as managing social media accounts as well as developing butchery skills. • Understanding the consumer was essential in securing long-term contracts. The group developed their knowledge of legislation and regulations to ensure business compliance.
EIP3 - Pasture for pollinators	December 2020	Six dairy farmers who are members of the Calon Wen Milk Co-operative undertook a three-year project to see if some simple interventions could boost pollinator numbers on their farms. Their organic farms already provided suitable habitats for bumblebees and other pollinators, but they still wanted to see if more could be done.

Project	End date	Project summary
		Project outcomes: • Higher numbers of bumblebees and other pollinators, as well as greater numbers of pollinator species were recorded in uncut/ungrazed agricultural ley margins compared to cut/grazed ley margins when surveyed within two weeks of silage being cut/grazing. • The results indicate that leaving uncut/ungrazed margins in agricultural ley fields could help support bumblebee and other pollinator populations, especially in terms of 'bridging gaps' in forage (nectar and pollen) during the season when a continuous supply of forage is required by these species from around March through to October. • A greater number of species and abundance of individual pollinators may be supported by the more species-rich herbal fertility building ley (or fields which have been seeded with an agricultural ley but also retain a variety of wildflower species), compared to less species-rich agricultural leys. • The project has successfully shown that simple changes to grassland management, without sacrificing farm productivity and profitability, can go hand in hand with pollinator conservation.
EIP4 - Reducing antibiotic use on sheep farms at lambing time through best practice management, by improving nutrition and hygiene	July 2019	The aims of the project aligned with the Welsh Government's five-year Implementation Plan for Wales, which aims to reduce antimicrobial resistance in animals and the environment. By focusing on flock health, nutrition and cleanliness in the lambing shed, the group made significant progress on reducing the amount of antibiotics required. Project outcomes: • Silage analysis encouraged the group to look at where improvements in silage making could be made to improve quality. Additionally, the analysis allowed accurate rationing to tailor the supplementation to the ewes' requirements. • Metabolic profiling by blood sampling ewes pre-lambing highlighted any issues with the health and nutrition of the flocks and enabled corrective action to be taken. • Colostrum quality is quick and simple to measure on farms using a refractometer and provides a useful indicator of whether the lambs are receiving that important early life protection. • Cleanliness in the lambing shed is paramount and was successfully achieved through cleaning out and disinfecting pens, disinfecting feeding tubes and wearing gloves when assisting at births. On average, the farmers in the group reduced their antibiotic usage at lambing by 60%.
EIP5 - A comparison of the relative environmental	October 2019	This EIP Wales project investigated low-impact machinery options for providing access to woodlands with emphasis on the effects on soil structure and water runoff during the operations. The woodland areas on two farms were divided into four areas: a control area where no activity took place; clearing using conventional machinery (County tractor); clearing using an Alpine tractor; and clearing using a tracked

Project	End date	Project summary
benefits of low impact machinery in small-scale woodlands		Bobcat vehicle. The volumes of water runoff during the operations were monitored, as was the loss of nutrients and sediments and hence the impact on soil structure. The project showed that all machinery types successfully gained access to the woodland areas and none of them created lasting issues with soil compaction. The project highlighted the issues of measuring soil water runoff, as there is huge variation depending on topography, vegetation cover and severe weather events.
EIP6 - Feasibility study on Squill Production in North Wales	March 2020	White squill (Drima maritima) is a perennial herb that is native to the Mediterranean region. The bulbous portion of the base contains several steroid glycosides (Bufadienolides), which are key compounds in many anti-cough syrups. In recent years, the plant has been subject to severe uprooting and collection in its native country of origin, for pharmaceutical companies, and the demand for bufadienolide is increasing. Recent small-scale research has shown that this specific variety of squill can be grown in Gwynedd and has been proven to contain twice the number of active constituents contained within the varieties produced overseas. Five farmers took part in this 18-month project and investigated the potential to grow squill at various locations across North Wales. The aim was to understand the optimum growing conditions as well as harvesting and extraction techniques. Project outcomes: • Squill can grow at various locations across North Wales. • It does contain the high value compounds that are of interest to the pharmaceutical industry. • Existing machinery can be adapted to plant and harvest squill on farms. • Availability of seed bulbs is an issue. More information is required on the agronomy of squill to maximise its potential in a Welsh setting.
EIP7 - An analysis of the use of a computerised robotic weeder on a small scale	June 2022	This project sought to analyse the impact of computerised robotic multi-row weeders on two small-scale horticultural systems compared with the current methods of hand hoeing. One of the farms in the project was organic, whilst the other was keen to look at alternatives to a conventional pesticide programme, and so a system which is not reliant on the use of chemicals is essential to the long-term success of both operations. Project outcomes: • Hand weeding took 16 minutes on average for a 30m length of one bed width of leeks, compared to only 21 seconds for the same plot size with the robotic weeder. Hand weeding can cost as much as £16 per hour. • Robotic weeding using vision-guided systems normally used in broadacre crops proved extremely effective.

Project	End date	Project summary
		• The robotic weeders tested in this project (Steketee EC-weeder with inter-row attachment) would be beneficial for small-scale horticultural growers to aid their weed control requirements, but the initial purchase cost needs to be considered carefully. • On one of the sites the grower was confident that the use of the Steketee mechanical weeder would reduce the need for one of the post-emergence herbicide applications and increase overall efficacy of weed control. An adaptable spreadsheet was produced which outlines the annual cost of vision-guided weeders at three different price points.
EIP8 - Assessing the potential of genomic testing dairy heifers to increase genetic gains and financial returns	October 2020	Through EIP Wales, nine farmers from North Wales investigated the potential for using genomic testing of their dairy heifers to identify the best animals to breed from at an early age. The reliability of traits being inherited from the traditional pedigree index is 35%. Using genomic testing to measure DNA for production, type, fertility and health traits can increase the reliability to 70%. But genomic testing is more expensive, and so the group wanted to see if this extra cost is worth the improvement in reliability of the information generated. Project outcomes: • A hypothetical breeding scenario illustrated how 23% of the heifers would have been incorrectly bred if information was based on the traditional £PLI figures. This equated to lost £PLI potential of £6,914 for the next generation. • The benefit of genomic testing lies in the increased progression of genetic gain. The total economic benefit generated from genomic testing totalled £46.89, minus the cost of genomic testing at £27.50, which creates a cost benefit of £19.39 per heifer. However, this does not account for the additive and compound interest that investing in herd genetics creates.
EIP9 - Alternative forage systems	December 2020	This project worked with three upland farms in the South Wales Valleys which were all interested in what multi-species leys could bring to their farming systems but were unsure of how they would perform on their marginal, upland farms. In 2018 the three farms established plots of multi-species leys and conventional ryegrass with white clover leys. Each plot was approximately 3ha. Establishment was monitored, following which production over three seasons was assessed. Project outcomes: • The multi-species leys performed as well as the ryegrass with white clover leys in a variety of situations and under different management regimes. • Livestock performed equally well on both leys in this project. • The composition of the multi-species leys did change over time on every farm due to varying management and ground conditions.

Project	End date	Project summary
		• The project demonstrated the benefits to be had from reseeding pastures with respectable yields achieved on both types of ley, as seen in the graph.
EIP10 - Night milk - assessing the reliability and economic benefit	September 2019	Two dairy farmers in Bridgend wanted to see whether their cows have higher levels of melatonin in the milk that is produced during the night. They milk their cows three times a day and one of these milkings occurs during the night. This made it simple to sample the milk produced during the night to ascertain whether the 'night milk' contains sufficiently high levels of melatonin to brand the milk for its sleep-promoting properties. The project demonstrated that, in a commercial farm setting, the production of melatonin-rich milk may be more complicated than other studies have suggested. During the project, the samples of night milk contained levels of melatonin that were higher than those which naturally occur in humans, but they did not meet the required 1mg threshold required to market the milk as melatonin-rich. The farmers also found that neither the season nor the cows' diets impacted melatonin levels. But on a more positive note, pasteurisation did not affect melatonin levels, and so if a way is ever found to manipulate melatonin levels in milk, it will not be negatively affected by the pasteurisation process.
EIP11 - Electrophysical dock control	November 2021	Electrophysical destruction offers the potential benefits of controlling docks whilst reducing the need for herbicides. This project looked at the effectiveness of using an electric weeding machine to control docks on two dairy farms near Raglan, South Wales. The machine uses high-energy electrons to run an electric current through the leaves of the docks, causing the death of all the tissues. This project used a hand-held electric weeder made by the company Rootwave. The hand-held lance is powered by a generator with a long (20m) cable. Each dock plant in a plot was touched with the charged lance for 5–10 seconds before moving on to the next plant. The technology is scalable and other machines are also available, such as a larger tractor-mounted, PTO-driven machine. A machine was hired over a period of two years to trial control of docks by electrophysical destruction. Project outcomes: • The electrical treatment of dock plants on three treatment timings was very effective in this project, and the results can be seen as equivalent to a herbicide application alone. • There is potential for the electrical control of docks to serve as a promising means of dock management in grassland, especially for organic farmers or those requiring lower herbicide inputs. Electrophysical dock control also proved to have the potential to help retain clover in a sward if targeted treatments were applied.

Project	End date	Project summary
EIP -12 An examination of the practical and financial potential for growing small-scale asparagus organically at two locations in South Wales	July 2021	Asparagus has good potential in Wales, as it is a high-value crop which is a good draw for farm gate sales. The crop falls into the hungry gap period from the end of April to the end of June when few other crops are available in the UK. The crop benefits from freshness and short supply chain markets that supermarkets are generally unable to compete with. Whilst there is a great demand for asparagus, the high establishment costs and long period before first harvest can make growing the crop unattractive to small-scale growers. The aim of this project was to monitor outputs and benchmark organic asparagus growing from establishment through to first harvest on two farms in Monmouthshire on a field scale. The hope was to gain an understanding of the practical and financial requirements of growing the crop, and to provide useful information for the wider sector. Project outcomes: • Asparagus can be grown successfully under organic management. • Asparagus is marketed easily and can command a good premium if sold direct and locally. • Having sufficient skilled labour can be an issue at peak times and should be considered a major cost to the enterprise. Apart from labour, other costs were negligible post planting, and it is the low input costs which have resulted in the apparent good margins for the farms.
EIP - 13 Organic ancient cereal supply chains	March 2022	Although the demand for these ancient cereal species has increased, it can be difficult to produce them in an economically viable manner, given the generally low yields. There is little to no up-to-date agronomic information relating to ancient cereal varieties, and the ability to carry out research into the effects of different seed rates and undersowing on farms will allow the farmer group to gain a better understanding of the agronomy and economics of growing the crops. As part of this project, trials were set up in spring 2019 across four farms in Pembrokeshire to investigate the agronomy of an ancient and a heritage wheat compared to a modern variety. Certain management factors of interest were included, namely varying seed rates and undersowing, decided through the farmer-led research approach. By addressing some key agronomic questions, the aims were to improve the efficiency of production, with the baking, taste and nutritional test used to help test the claims made for products based on ancient cereals. Project outcomes: • There is the potential for ancient and heritage wheats to become an opportunity for crop system diversification for suitable farms. • The ancient and heritage wheats show promising results from the trial in terms of grain yields, grain quality and beneficial crop traits such as weed suppression.

Project	End date	Project summary
		Key issues and barriers have been identified for the growing and establishment of ancient and heritage wheat varieties, which can be potentially considered for future purposes.
EIP14 - Investigation of the effect of contrasting dairy production systems in West Wales on the profile of milk fatty acids (especially omega-3 and omega-6)	October 2022	A group of 20 dairy farmers in West Wales came together for an innovative project to investigate which pasture-based management practices produce the highest levels of the fatty acid omega-3 in cows' milk. The farmers involved in the project all have diverse cattle grazing systems, including conventional housed winter and a grazing summer, herds housed all year round, organic herds, and herds which undertake block calving in the spring. They supply their milk to different milk buyers and processors, including commodity liquid milk, premium organic liquid milk, cheese manufacturers, and high-value food ingredient manufacturers. During the two-year project, milk and forage samples from all 20 farms were submitted monthly to the Institute of Biological and Environmental Research (IBERS) at Aberystwyth University, together with a questionnaire on feeding practices at the time of sampling. Project outcomes: • Results showed that omega-3 varied across the season and between different farming systems. In broad terms, the summer months exhibited more variation in omega-3 content of the milk, with the organic units' average being highest overall. Conventional and spring calved herd averages were generally higher than housed herds early and later in the grazing season, likely reflecting grass omega-3 content; however, these averages showed less difference mid-summer, and during the winter where silage predominated. • Omega-6 levels were higher in housed herds than conventional and spring-calving systems during the grazing period, likely reflecting maize feeding in housed systems. Organic farms were a little higher than conventional and spring calving systems across the grazing season, perhaps reflecting different forage species, or possibly the oil profile in the common organic supplementary feeds. • Ratios of omega-6 to omega-3 fatty acids in the milk all lay within what is thought to be the 'healthy' range for a human diet, with the exception of a small number of months for housed systems. The relationship between the forage levels of the fatty acids showed a correlation with milk levels, which confirms that forage is a key area to focus on when it comes to increasing milk levels. • Farms in West Wales are particularly well placed to produce milk which is higher in omega-3 given that fresh grass is naturally high in these fatty acids. Farms where grazing is not possible still have options to increase the omega-3 content of their milk through techniques such as zero grazing, or the use of feeds that are naturally high in omega-3, such as extruded linseed. Potential opportunities exist to promote the brand of West Wales dairy farming, particularly linked to the quality and fatty acid profile of fresh grass.

Project	End date	Project summary
EIP15 - Foliar feed for grassland	September 2021	Foliar feeding is a technique used to feed plants by applying liquid fertiliser directly to the leaves and is in contrast with the more traditional method of applying it in solid or prill form with a spreader. Four dairy farms in mid and south west Wales took part in the EIP Wales-funded project to assess the extent to which using a foliar feed that is based on urea and humic acid can reduce the application of conventional N fertiliser to grass. Project outcomes: • It is possible to achieve yields comparable to the conventional plots using foliar feed systems. • At lower rates of N application, yields were lower in the foliar feed systems. However, the Nutrient Use Efficiency (NUE) was between 2 and 3 times higher in foliar feed systems. • On average, the cost of N per litre of milk produced was 39% lower when using foliar feed compared to conventional fertiliser. • Foliar feed systems achieved higher yields in adverse conditions, e.g. cool and/or dry conditions. This could be because absorption through the leaves was less affected by adverse soil conditions compared to uptake through the roots. • The levels of sugar in the grass plant were also consistently higher in the foliar feed plots over the two years. • The data were unable to show any relationship between the method of N application and nitrate levels in leaf tissue. Peaks were observed in the plots with no fertiliser, which are likely to be linked to the higher clover levels in these plots. • Grass quality was only measured on one site over two years, and so the results need to be treated with appropriate caution. • Digestibility (D) values and metabolizable energy (ME) were similar between foliar feed and conventional fertiliser regimes. • Crude protein appeared to be higher in conventional plots, which is likely to be related to the high total amounts of N applied.
EIP16 - Implementing advanced nutritional management in the Welsh sheep industry	December 2020	Live animal liver biopsies provide different information on blood in that they offer a much longer-term historical estimation of trace element status. The technique is proven to be quick, safe and reliable. Blood analysis is still useful in conjunction with such biopsies, as it can provide short-term information indicative of current supply and response, as well as information regarding element competition. The blood and liver samples taken in parallel provide the most comprehensive indication of historic and current trace element status and the best information with which to formulate management advice for future dietary adjustments. In this project, 12 farms from across North Wales used the aforementioned dual sample approach in the Welsh sheep context, together with an analysis of the available forage. The project aimed to utilise an intelligent and progressive approach to nutritional planning in breeding ewes.

Project	End date	Project summary
		Project outcomes: • There are big improvements to be made in managing nutrition on sheep farms and a key intervention would be for farmers to adopt regular body condition scoring, adjusting grazing to enable sheep to meet pre-established targets at key times of the year. • Parasitism is still an important feature of flock management and regular monitoring of control programmes is necessary to ensure that the said programmes remain effective. • Infectious diseases are common causes of production problems; proactive investigation can ensure that appropriate action is taken in the future. • Trace elements a. Trace elements constitute an important component in proactive and optimal nutritional planning but are far less important when compared to the overall availability of forage and the body condition of the ewes. b. The techniques used in this project were extremely useful in determining the trace element needs of the ewes and in monitoring the response to supplementation. The old adages of 'if you can't measure it, you can't manage it' and 'things are not always as they seem' were frequently borne out throughout this project. As farms become larger and there is a move to focus on optimising production, close working relationships will need to continue to be developed between farmers and veterinary and consultancy services to enable farmers to achieve these goals.
EIP17 - Tackling scab - a farmer led approach	June 2022	Sheep scab causes serious economic and welfare losses and costs the Welsh sheep industry an estimated £5.86m a year between costs of treatment and loss of production. A key issue when it comes to tackling scab within and across sheep flocks is the ease of infection from flock to flock, due to the challenges of biosecurity, which is of particular concern in extensive/upland grazing systems, and communally grazed areas. The best long-term solution to scab is to eradicate the disease from Wales and the rest of Britain. The best chance we have of achieving this is if farmers adopt a collaborative approach to tackling the disease. In this three-year project, a group of farmers within the Ceulanmaesmawr parish, Talybont, North Ceredigion, investigated how working together, rather than a single farm effort, can improve the successfulness of scab treatment. The project was able to: • Increase the level of management and knowledge of scab within the Ceulanmaesmawr area. • Improve the communication and liaison between the farmers, as well as between farmers and their vets on the topic of scab identification and management. • Show the benefits of using ELISA blood testing to detect early outbreaks of scab before clinical signs are present, allowing farmers to coordinate treatment of flocks with neighbours to ensure scab control on those farms.

Project	End date	Project summary
		• Increase the farmers' understanding of flock-specific infection routes, diagnosis methods, treatment options, and the importance of monitoring for infection, even when there have been no clinical signs.
EIP18 - Where have ewe moo-ved to? Trialling the use of tracking technology in extensive grazing systems	June 2022	Grazing livestock on large extensive grasslands can pose many problems, such as difficulties in gathering, grazing management and an increased chance of theft. With the aim of farming smarter and not harder, a group of six farmers across Wales investigated how using tracking technology could help prevent these problems. Four of the farmers are sheep producers on the Brecon Beacons and share common summer grazing up on the mountain. One farmer grazes the Kenfig coastal reserve near Margam, Port Talbot with cattle. The final farmer undertakes conservation grazing on land in North Wales. Livestock tracking technology is a concept which is new to extensive grazing animal systems in the UK, and this project was the first of its kind here in Wales. Project outcomes: • The technology allowed the farmers to know where their animals were in 'real-time', what they were doing, and where their animals grazed over a period of time. This can reduce gathering time and costs, minimise the risk of theft, help identify ill animals, and gain a better understanding of grazing habits. • The technology showed potential for livestock tracking to help both environmental bodies and land managers/graziers manage land for environmental benefits. The cost of the equipment remains the biggest barrier to adoption. At the time of this project, the tracking collars from Digitanimal were priced at £120 each.
EIP19 - To improve the sustainability of goat meat production in Wales by investigating the efficacy of recommended wormer dose rates for meat goats	January 2022	Anthelmintic resistance has been a growing issue for several years and has a significant impact on the sustainability of both goat and sheep meat production. Sheep and goats are both hosts to the same gastrointestinal (GI) parasites. At present, there exists no published dose rate for anthelmintic treatment of goats, and it is instead assumed to be similar to that used for cattle and sheep. However, the ability of the goat species to metabolise toxins quicker than sheep, and possibly cows, could potentially promote anthelmintic resistance within goat herds, leading to a reduced effectiveness of the wormer drugs across the species. Four goat farmers located across mid and south Wales came together in this two-year project to establish a technical solution to the lack of clarity around the correct dose rate suitable for goats. This was measured using FEC (Faecal Egg Count) testing before the wormers were administered at different times of the year, and should the wormer be required, FEC testing post drench after the advised interval. The purpose of this study was to provide an indication as to a 'best practice' worming routine and establish a more effective dose rate and regime for worming meat goats which can be shared with the industry. A more effective dosing regime could improve the daily live weight gain of the animal and therefore reduce the time to slaughter. If goat meat consumption becomes more of a mainstream trend, then it is possible that further livestock health care schemes may evolve.

Project	End date	Project summary
		Project outcomes: • Body condition scoring proved to be a highly effective tool as an early warning system to investigate FEC in goats. • Grazing sward lengths had a dramatic impact on worm burden within the group/herd, with goats having less exposure to larvae with longer sward lengths. • It was proved that anthelmintic treatment needs to be monitored by using FEC to ensure that treatment is effective.
EIP20 - Managing dairy ewes to produce a better outcome for cheese production	February 2022	The high solid content of sheep's milk (typically 5.4% protein and 7% fat) makes it an ideal ingredient for products such as cheese, yoghurt, and ice cream. Due to this, there is a rapidly increasing demand for sheep's milk, not only in Wales but throughout the UK. When compared to the conventional dairy cow sector in Wales, there is poor understanding when it comes to what factors control the bacteriological profile of sheep's milk. This project aimed to investigate how the following three controllable factors influence the bacteriological profile of the milk. 1. Breed of sheep Milk samples were taken from a group of Friesland, Lleyn and Friesland x Lleyn ewes to investigate whether genetic differences between breeds have any effect on the bacteriological profile of the milk. 2. Stage of lactation The ewes were milked from February to June over three lambing blocks. Regular milk testing assessed whether there was a pattern in the bacteriological profile of the ewes' milk during their lactation cycle. 3. Selenium diet supplementation One group of milking ewes was used to investigate whether selenium supplementation can lead to reduced cases of clinical and sub-clinical mastitis. Ahead of this potential growth in milking ewes to mass production level, it was important that as much information about the ewes' milk itself was collected prior to mass production. The group's vision was to be at the forefront of this emerging sector in Wales and to put a strong foundation in place where the production system is based on high-quality milk for the consumer. Project outcomes: • There is great potential for the Lleyn sheep breed to be well suited to being a productive native breed for Welsh producers for both meat and high-quality milk for human consumption. • A "low input-low output" system, as practised on the project farm, is well suited to the Lleyn breed and to dairy sheep farming in Wales.

Project	End date	Project summary
		Closely monitoring somatic cell count and bacterial plate counts has the potential to help with selection criteria for future flock breeding by eliminating, from the flock, ewes that are chronically infected with sub-clinical mastitis to help improve and further the level of production and milk quality.
EIP21 - Sustainable intensification in upland grazing production systems	April 2022	Timothy is the main grass species grown in Finland, where it is normal to have ice and snow in April, just weeks ahead of the first cut in June. It can grow when the soil temperature is 0°C and the air temperature is +5°C. The project trialled the use of Timothy on wet, deep-peat soil to ascertain how much Timothy should be incorporated into the seed mix to allow good establishment, performance, and persistence. Project outcomes: • There was no difference in the protein and energy values of Timothy and ryegrass, despite an expectation that the quality of ryegrass would be higher. • The trial had suggested that the highest percentage of Timothy which could be achieved in any of the plots was 25%, whatever the sowing rate of the seed. • Seed mixture composition did not seem to play a huge role in this outcome; even with huge numbers of Timothy seed going into mixtures, swards were still likely to be dominated by more aggressive grasses (e.g. ryegrass and Festulolium). • With a lack of any real cold spells during the project lifespan, there was no genuine test of the winter hardiness of Timothy compared to ryegrass. The Timothy plots produced dry matter yields very similar to those of the ryegrass control, although analysis did show that Timothy had lower energy levels compared to ryegrass. • There is a strong argument that a higher level of Timothy in the seed mix will be needed to produce consistent effects on forage quality, and indeed on animal performance. The project has highlighted the benefits of reseeding to increase productivity and extend the grazing season, with a 300% higher productivity compared with the older swards.
EIP22 - Introducing fat-tailed sheep to Wales to satisfy UK market demand	April 2022	Fat-tailed sheep are a domestic breed known for their large ‘fatty’ tails and hindquarters. These breeds of sheep are commonly found in arid, desert-like areas such as the Middle East, Northern Africa, Northern India and Central Asia. They are renowned for being able to thrive in harsh environments due to their ability to gain weight despite a diet that is nutritionally poor. The unique tasting meat and fat from these sheep are used in traditional Arabic cooking and are in high demand amongst ethnic groups here in the UK. The meat from fat-tailed sheep is said to be more tender, leaner and juicier than that from their thin-tailed cousins. It is also found that their meat has a higher omega-3 to omega-6 fatty acid ratio and is lower in saturated fat, which are favourable qualities for human health. This project was the first of its kind to introduce the Damara, which is a breed of fat-tailed sheep, to the UK marketplace, and the aim was for Wales to be pioneering in the development of the aforementioned sheep breed. This three-year project, involving two farmers from North

Project	End date	Project summary
		Wales, investigated the feasibility of rearing both pure Damara and crossbreeding them with Romney, Texel cross, and Lleyn cross ewes and monitoring how well they adapt to the milder and wetter Welsh climatic conditions. Project outcomes: Frozen embryos and semen of pure-bred Damara were successfully imported from Australia and the overall. • In 2020, six healthy pure-bred lambs were born alongside 75 cross-bred lambs, having artificially inseminated Texel, Lleyn, and Romney cross ewes. • In 2021, a further nine pure-bred lambs were born, as well as 74 cross-bred lambs, all with non-assisted births. • The pure Damara adapted well to the milder and wetter Welsh conditions, although grew more slowly compared to what the Texel cross lambs similarly managed, grazing the same pasture. • After the successful breeding programme, the two farmers sought feedback on the lamb from several prominent Welsh chefs – one of whom was Gareth Ward of two Michelin star restaurant Ynyshir, Powys – who praised the quality and flavour of the meat. This led to the launch of the 'Damara Môn' brand, which sold its first meat box in September 2022 online.
EIP23 - Improving the diagnosis and treatment of gastrointestinal round worms in cattle	June 2022	This project involved three dairy farmers in Ceredigion who noticed that roundworm burdens in their youngstock were affecting growth rates and performance. Concerns were raised over the efficacy of the wormers being used and whether certain species of parasites were developing resistance to treatments. Through this EIP Wales project, the three farmers were able to work closely with experts to adopt a more targeted approach to their roundworm control programmes. The use of Faecal Egg Count (FEC) sampling is much less common in cattle-based systems compared to sheep and is vital for the effective management of the roundworm problem. This project aimed to assess how using a combination of FEC testing, FECPAKG2 technology, resistance testing, speciation testing, and predictive models, can improve the management of roundworms in dairy youngstock. Project outcomes: • Regular monitoring of FEC and growth rates enabled the better targeting of wormer treatments on each farm, meaning wormers were administered when required rather than on a regular set treatment regime. • The number of wormer treatments for R2 Cattle (2nd season grazers/yearlings) was significantly reduced on each farm. • One of the three farmers also reduced treatments of R1 cattle (1st season grazers/calves), and changes to timing of treatments were seen on the other two farms. • Treatment failures were detected on multiple occasions when the Group 3ML (clear) wormers were used. Both Group 1BZ (benzimidazole/White) and 2LV (levamisole/Yellow) were fully effective. • The results of efficacy testing showed that each farmer changed from relying solely on 3ML wormers to alternating between the three wormer classes.

Project	End date	Project summary
		• The changes to treatment strategy did not result in a negative impact on performance (growth and condition). • Changing farmer behaviour is challenging, but this project has demonstrated that, with the correct support, significant changes can be achieved.
EIP24 - Establishing trees in dense bracken	October 2022	Bracken can be controlled by cultivation (and or ploughing). This method is rarely used on farms because of the difficulties of working on steep ground and the costs involved. However, there is specialised machinery that could be used for this purpose. Because trees are planted 2m to 3m apart, it should be possible to prepare in strips rather than ploughing the whole slope. This project trialled techniques to cultivate strips of varying widths using different types of machinery suitable for working on steep ground. The treated strips were then planted with trees and their subsequent growth monitored. The project, which ran on two sites over two and a half years, included ground preparation using a mini digger cutting shallow benches, a mini digger with a cultivator attachment, a crawler tractor with a cultivator, and a forestry scarifier and a robocut machine with a cultivator. Alternative techniques for post planting weeding were also tested for comparison, such as strimming and manual bashing. Projects outcomes: • Notwithstanding the reduced amount of experimental data due to COVID-19, this study suggests that cultivation of bracken is not likely to be a promising option. A slope above 50% is probably the safe limit for working. The majority of bracken-covered land is likely to be too steep for most equipment. The cultivated strips would have to be wide in order to avoid the impact of vigorous growth of adjacent bracken. Complete ploughing or rotavation of the site would be the most practicable option and this could lead to erosion and other environmental problems. • Planting in dense bracken (using canes and spirals) in the absence of cutting or trampling leads has a poor rate of establishment. Significant cumulative losses continue for at least three years after planting. • The most resilient of the four species chosen was rowan, whilst birch was also fairly resilient. These species should be favoured when planting difficult bracken sites. • The pushing over and smothering effect of the bracken appears to be a greater problem than the direct shading. Trees planted in bracken without any support are not likely to survive. Any support that helps prevent the tree from being pushed over should help reduce mortality. Any canes used should be extra sturdy. The impact of the timing of strimming and/or trampling on tree survival is a topic of research that would be worth looking at in the future.
EIP25 - Targeted approach for selective dry cow	January 2022	In this project, three farmers in north east Wales, milking a total of 1,700 Holstein Friesian cows, investigated the use of milk leukocyte differential (MLD) testing using Q Scout Farm Lab. Q Scout is a new and scientifically proven portable diagnostic machine that scans milk samples microscopically. It allows for the sampling and testing of each milking quarter prior to drying off to determine whether individual quarters require antibiotic therapy to combat an intra-mammary infection, or whether they could be dried off using an internal teat sealant in

Project	End date	Project summary
management decision making		isolation. The test results are available in a very quick turnaround, meaning that dairy managers have access to current udder health data, allowing them to be confident in their decision making for every cow and every individual milking quarter. Project outcomes: • This new technology, with its very quick turnaround of results, gave confidence to the farms that they were drying off their cows correctly. • Some of the cows tested would not have been treated with antibiotics if farmers were relying on milk record cell count data alone, meaning that they would have calved down with mastitis. • MLD testing has the potential to aid the reduction of spectrum antibiotic therapy through targeting only the cows with an intra-mammary infection with antibiotics and those with a healthy udder with sealant only. • As a result of reducing antibiotic usage, the three farms were able to save a total of £7,133.80 during the lifetime of the project based on an average antibiotic tube cost of £2.49. MLD is not risk-free and correct training for clean administration, record keeping, and using new technology is required to ensure that these risks can be reduced.
EIP26 - Developing a novel way of rapidly measuring agronomic treatment effects on grass growth	June 2022	Measuring grass yield is time-consuming and laborious because it either involves multiple measurements with a rising plate meter or counting and weighing silage trailers. Recent studies have demonstrated that spectral reflectance of grass crops measured by satellite could be used to accurately measure grass yield. This technique offers a much simpler and quicker method of measuring grass yield that would enable farmers to test the effect of different agronomic treatments in order to optimise their grass husbandry approach. Spectral reflectance imagery captured by drones can now also be used to measure grass growth, which can produce finer resolution images, although this relies on manual operation. Three dairy farmers in Monmouthshire came together to investigate whether these new methods of measuring grass enabled them to measure grass yields reliably and quickly. Their hope was that the technology would allow them to measure the effects of different agronomic treatments (fertiliser treatments, grass varieties and the use of herbicide etc.) remotely on their own fields. Project outcomes: • Analysis of the information from the drone and satellite technology showed it could detect significant differences in agronomic treatments applied on the farms as well as data that could not be picked up by plate meters. • The project also illustrated that the drone was able to detect the smallest treatment differences at a level two or three times smaller than the satellite used.

Project	End date	Project summary
		• This project identified advantages and disadvantages of each grass measurement technique, thus allowing farmers who wish to utilise this new technology to decide which technique would best suit their system. These new approaches could potentially provide a non-labour intensive method of accurately measuring grass which can improve farm viability and competitiveness.
EIP27 - Using 'Internet of Things' (IoT) technology to improve slurry management on farms	March 2022	The aim of this project was to better understand what role IoT technology plays when trying to help farmers with their slurry management. Soil condition, water table level, rainfall levels and air temperature all influence the likelihood of water runoff from fields. When such runoff occurs after slurry application, it can waste a valuable source of nutrients and risks polluting natural water courses. This project tested a range of sensors at Glynllifon College and two other dairy farms in North West Wales, namely Hen Dŷ near Caernarfon and Erw Fawr near Holyhead. The farmers hoped that gaining real-time information on the conditions of the land would allow them to quickly and safely make decisions on slurry management. Various IoT sensors were positioned on each of the three farms: 1. Water table sensors – aimed at testing whether accurately monitoring the water table level would provide farmers with useful knowledge regarding when it is suitable to apply slurry to a field. 2. Soil moisture sensors – to test the quality of the data generated against the number of sensors per field and layout pattern. 3. Rain Gauge – to enable farmers to monitor the amount of rainfall in the area. This would factor into the overall decision regarding whether or not conditions are correct to apply slurry. 4. Slurry Pit Level Sensor – Good slurry management includes ensuring adequate safe storage on the farm. This data would provide the farmer with accurate information on storage capacity. Project outcomes: • This project was the first of its kind in Wales to evaluate the use of IoT technology in slurry management. • The technology trialled does work for collecting data on farm conditions, and this project has laid the foundations for IoT technology to provide better information when managing a nutrient-rich source so as to improve farming and reduce water pollution. • The data provided by the sensors fed into the ‘Pethau’ dashboard (which was developed separately to the project), which has shown potential to aid farmers in their decisions on which fields are suitable for slurry application. • The project also evaluated the opportunity for IoT to be used for self-auditing purposes by logging environmental conditions and weather forecasts for farms. This project supports better decision making beyond slurry application. For example, a soil temperature sensor could assist a farmer in deciding when best to apply nitrogen fertiliser at the start of a new season when using the T-SUM 200 model.

Project	End date	Project summary
EIP28 - Targeting anthelmintic use in sheep	June 2022	Farmers are becoming increasingly better at targeting anthelmintic treatments for lambs to achieve good growth rates without compromising the efficacy of the wormers. However, treatments for ewes are often given routinely around lambing because of the risk posed by ewes in terms of contaminating grazing pastures with worm burdens that they may carry. This project investigated the patterns of infections in the ewes around lambing time, known as the peri-parturient rise (PPR), so as to ensure that treatments are targeted at the optimum time and with the most appropriate product. Six sheep farmers based in mid and south west Wales worked together on the project to develop roundworm treatment plans for their ewes in the lead up to, and shortly after, lambing. Their objectives for this project were to minimise the risk of ewe and lamb parasitic infections, improve lamb growth rates, and reduce their dependency on anthelmintics. Project outcomes: • The PPR varied between farms in both extent, timing and duration. Sheep farmers therefore need to monitor their flock to ascertain what the pattern is on their farm in order to choose the most effective time to administer any treatments to ewes. • Mob and sentinel FEC results were generally in good agreement, which supports the use of a mob FEC as a monitoring tool (providing the samples are taken according to best practice). • In this project, it was the change (reduction) in BCS that was the indicator of an increased FEC. • Selecting the ewes most likely to be responsible for a high proportion of the pasture contamination (those with a high egg output) relies on being able to find those that lose BCS at the time when the flock is under nutritional pressure. Simply using litter size and a set time (e.g. at lambing) as a guide as to which ewes to treat and when is not accurate enough; farmers should be advised to monitor FEC levels in ewes in the run up to, and after, lambing, in addition to following BCS changes so that they are able to decide when the right time to treat is.
EIP29 - Improving knowledge and experience of integrated pest control of soft fruit in Wales to reduce pesticide application and wastage	December 2021	Biological control is the use of natural predators, parasites, bacteria, and sometimes plants to control pests and weeds as part of an integrated pest management programme, mainly in greenhouses and polytunnels. It has become standard practice for many larger horticulture farms supplying supermarkets, but it is not yet common practice for many smaller fruit growers in Wales. Numerous small-scale fruit growers are interested in utilising this method to reduce their use of conventional pesticides and lower the chances of pests developing resistance to these pesticides. The main hurdle for the small-scale growers is the lack of knowledge and understanding on how to recognise pests, what biological controls are available, how best to use them, and how to integrate them into an existing pest and disease control programme. This project trialled the establishment of different biological pest control strategies within polytunnels on two commercial fruit farms in south west Wales.

Project	End date	Project summary
		Project outcomes: • Working closely with the experts, the growers developed a programme that suited their own growing systems and received training on pest identification, monitoring methods, and biological control options on an ongoing basis. • Biological controls have the advantageous bonus of being applied quicker, meaning that treatment can start earlier. • Both growers were impressed with the biological controls and will continue using them in the future to reduce their pesticide usage. As part of the project, factsheets and guides were produced to help other growers utilise an integrated pest management (IPM) approach.
EIP30 - Is there something in the water? Identifying and addressing Cryptosporidium in sheep	June 2022	Cryptosporidium refers to a group of parasites which infect the gastrointestinal tracts of numerous species, including cattle, sheep, goats, pigs, chickens, horses and deer, but can also have an impact on human health. Reducing the incidence of Cryptosporidium in livestock can therefore have a twofold advantage: improving animal health and productivity and reducing contamination of the environment, leading to a reduction in human health risks. There is a low level of understanding regarding the persistence, transmission routes, and management options of Cryptosporidium in sheep. A group of seven farmers in Powys had identified Cryptosporidium in calves and lambs on their farms and came together to work with their vets, Moredun and Dŵr Cymru/Welsh Water in this project to increase their understanding of the pathways by which Cryptosporidium is transmitted amongst sheep and to also identify measures they could adopt to control the disease in their flocks. Project outcomes: • Cryptosporidium was found in most waterbodies entering and leaving all seven farms; it was also found in water from two of the three boreholes tested. • Cryptosporidium was detected in lambs on all but one farm. Lambs become less susceptible to disease the older they are, but animals with previous exposure are not protected from re-infection. • The project increased farmers' awareness and knowledge of Cryptosporidium issues on farms, potential sources of infections, and preventive measures that can be used to reduce pathogen spread, incidence and production impacts. These measures included: a. Steam cleaning buildings to kill oocysts. b. Frequent cleaning and disinfection of livestock sheds; research has found that 3% hydrogen peroxide and hydrogen peroxide-based disinfectants are the most effective at reducing the viability of Cryptosporidium oocysts. Disinfectants are less effective in tackling oocysts, which are in faeces, and so thorough cleaning of sheds is advised before disinfection. c. Frequent bedding down with straw. d. Quarantining of scouring animals. e. Ensuring lambs and calves quickly receive adequate quantities of good-quality colostrum.

Project	End date	Project summary
EIP31 - Reducing ammonia emissions from broiler chicken production	December 2021	Two established commercial broiler producers, with modern buildings and many years' experiences of producing poultry for the UK market, were involved in this one-year project which investigated whether these additives could reduce their ammonia emissions. Three different commercially available ammonia-reducing additives were tested on each farm. On both farms, one house was used for the trial and the other as a control. Each product was tested for one complete broiler flock cycle (2 months), and the following variables were recorded: 1. ammonia levels within the houses 2. in-house temperature 3. foot pad condition, hock and gait scoring 4. feather condition 5. litter condition 6. mean bird liveweight 7. flock mortality 8. feed intake. Project outcomes: • Ammonia emissions were actually slightly lower in the control houses than in those with products added. Again, the differences were very small, at around only 3%. Due to the small sample size, it is impossible to know for sure whether the differences observed were due to chance or represented true effects from the additives. • The average liveweight in the houses with product was slightly lower than in the control houses, even though the average age at processing was very slightly higher. However, the differences are again marginal. • The use of additives has the potential to result in a higher litter dry matter in poultry houses compared to those receiving no additives. If this difference is real, then the use of products would be consistent with the aim of keeping litter as dry as possible. The project highlighted some potential difficulties in calculating ammonia emission factors in commercial settings, and further studies may be needed to resolve methodology issues for future projects.

Project	End date	Project summary
EIP32 - Developing a blueprint for controlling malignant catarrhal fever (MCF) in bison, buffalo, and cattle in Wales	February 2023	In Wales and the wider UK, some producers have found a market ready for bison meat, as it is a healthier red meat alternative to traditional beef products, being lower in fat, cholesterol, and sodium. Deadweight prices for bison are also approximately twice as high as those for beef cattle. However, bison are challenging, not only due to their temperament and sensitivity to stress, but also their increased susceptibility to malignant catarrhal fever (MCF), which is considered a disease that limits the chances of successful production. In the UK, MCF is caused by the virus OvHV-2, and can affect many species including cattle, bison, water buffalo, deer and yak. Sheep are considered the main reservoir host, but in bison the infection can lead to sudden death due to a rapid onset of infection. This project involved two farms, namely Rhug Estate in Corwen, which has a herd of bison, and the Buffalo Dairy in Llanon, which investigated possible steps that farmers can take to control MCF – something that is currently lacking within this niche sector. Project outcomes: • Blood samples were taken from the bison/buffalo/cattle/sheep on each farm to test whether, at the time, they had been exposed to OvHV-2; the aim here was to increase the understanding of the risk which OvHV-2 posed to in-contact bison, buffalo, and cattle. • The disease profile for each herd was analysed based on all the available data, and a control strategy – tailored to each farm – was developed as a result. • For Rhug Estate, overall, the general health of the bison appeared to be improved, as evidenced by the visual improvements and the measurable improvements in body condition. • For Buffalo Dairy, no significant health events occurred during the monitoring period, and production was also reported to be good. • Stress to the animals due to handling remains a difficult factor to manage regarding their susceptibility to diseases such as MCF. Combining necessary events, e.g. parasite control, trace element supplementation and statutory testing to minimise further handling, is essential when it comes to minimising the number of stress events experienced by the bison. The MCF vaccine used at Rhug Estate in this study was experimental and is unavailable for use on other farms at this stage. No vaccine-associated adverse events were detected and the bison appeared to be clinically well as a result of the vaccine. However, it is not possible to say from the results of this project whether the vaccine prevented infection or disease in the bison.

Project	End date	Project summary
EIP33 - Improving knowledge and experience of micronutrient management in cucurbit production in Wales	January 2022	Cucurbits include a number of important crops, such as courgette, marrow, pumpkin and squash. These crops are robust and can be grown in a variety of field conditions, as well as being able to offer increased variety to farm-shop-style businesses. As field crops, cucurbits can also be integrated into a mixed cropping system or offer an accessible diversification crop for arable farms. Pumpkins can potentially offer high-value returns for pick-your-own local Halloween markets, although there has been continued growth of pumpkin as an edible crop with a number of prominent eating varieties now available to growers. A common problem within this crop group is the development of rots such as blossom end rot (BER), which can render the fruit unmarketable. BER can lead to significant crop losses and is one of the primary sources of wastage in this sector. A limited range of fungal plant protection products are available, but as these are generic fungicides, their use in an open field setting may be unsuitable. Two relatively small scale horticultural units based in Brecon, which are members of the Tyfu Cymru network, worked together during this two-year project to gain more knowledge on whether foliar feeding calcium and boron can reduce the incidence of BER in their pumpkin crops. Project outcomes: • The variable onset of BER symptoms, and difficulties achieving effective inoculation in the lab, impacted the ability of this project to draw clear conclusions. • The results suggest that the use of calcium foliar feeds can be beneficial in reducing the incidence of rots in the field, as well as the progression of rots once they become established. • Growers should not assume that all foliar calcium products are equivalent to each other, and they ought to base their choice of feed product on all available information rather than on pure calcium content alone. Foliar nutrient sprays are effective when it comes to directly addressing specific deficiencies with the crop but remain secondary, in effect, to soil nutrient management.
EIP34 - The impact of herbal leys on the health and performance of grazing lambs	March 2023	Herbal leys, also known as multi-species pastures, are characterised by a combination of grasses, legumes and herbs. In grazing systems, increasing the biodiversity of the sward is one possible strategy that could reduce the reliance on chemical anthelmintics, with legumes and herbs being rich in compounds with potential anthelmintic properties. It is believed that herbal leys could help to: a. Reduce worm burdens in grazing lambs b. Maintain/improve liveweight gain c. Reduce the need for fertiliser input.

Project	End date	Project summary
		This project, involving three farmers from Ceredigion and Carmarthenshire, aimed to assess the effect of using a herbal ley in comparison to a more conventional ryegrass and clover ley; indeed, its effect on both daily liveweight gain and worm burdens of growing lambs were investigated. Project outcomes: • On average, there was a 35% reduction in worm burden within the lambs on the herbal pasture in comparison to the conventional plots. • The pasture grown by the herbal leys was comparative to the conventional pasture in terms of overall dry matter yield, with herbal leys responding better in dry conditions. • Daily liveweight gains of the lambs on both the herbal and conventional plots were similar. The lambs on the herbal pasture had higher growth rates in 2022, probably due to the herbal leys dealing with the drought conditions better than the conventional leys. • On average, the herbal pasture had a higher sugar content than the conventional pasture. • The herbal pasture did not deplete the soils of calcium as much as did the conventional pasture. It would be beneficial when using herbal pasture to have a 30+ day grazing rotation, as the 27/28-day rotation which the project was working on seemed to affect the plant population by year 3, as far as having a reduced herbal population.
EIP35 - Maximising udder health for improved herd performance through dynamic testing	January 2022	Dynamic testing of the milking plant is a form of time and motion study, where all elements of the milking process (from the milking plant to the milking routine and any effect on the cow's teats) are considered. The difference between dynamic testing and normal maintenance undertaken by manufacturers/farmers is that the former tests the parlour when it is under stress of being used. Dynamic testing can also incorporate both mechanical issues and husbandry issues, all of which contribute to improving udder health. Four dairy farmers in Carmarthenshire, with an average herd size of 260, took part in this project to ascertain whether dynamic testing could improve udder health in terms of reducing somatic cell counts, clinical mastitis and bactoscan levels. Project outcomes: • Overmilking was found to be one of the primary mechanisms of damage to the teat end, which in turn is one of the many defence barriers of the udder to mammary infection. • After the issue had been identified, changes were able to be made on the farms to rectify this, and overmilking reduced, on average, across all four farms by 21%. • Following dynamic testing, the average bulk tank somatic cell counts (BTSCC) fell by 3.86 x1,000/ml. Milk parlour dynamic testing can lead to changes in the milking machine and in the milking routine, which in turn gives rise to positive change around udder health performance.

Project	End date	Project summary
EIP36 - Using photo selective films to enhance the profitability of leafy salad production in Wales	June 2022	There is limited uptake of photo selective films within the small-scale grower community, which can be explained by the lack of knowledge regarding the said films; they could, however, have great potential. In this project, two small-scale horticulture units in Anglesey and Flintshire tried out different varieties of light-modifying plastics under normal growing conditions. Project outcomes: • The project demonstrated that there was a benefit of protected cultivation compared with bare ground cultivation. At the start of the 2022 trial, plastic treatments had increased crop yields compared with bare ground cultivation, which produced fewer yields. • Light-modifying plastics in this trial demonstrated that manipulating the light exposure, specifically when using UV-blocking plastic, increased the head weight of the Lollo Rosso whilst also increasing overall yield. • The ability to improve growing conditions around crops, and potentially reduce pest and disease proliferation, could offer growers a low-energy, chemical-free way to improve crop performance. It could also ameliorate water management and reduce the need for irrigation by controlling water loss from plants and soil during hot, dry periods. Plastics may be particularly beneficial for propagation and early plant raising, specifically for field crops such as pumpkin, which can be sown early under plastic before planting out.
EIP37 - Improving fertility and also calving rates of dairy herds in South West Wales through a method of early pregnancy diagnosis using pregnancy-specific protein B (PSPB)	November 2021	In this project, four dairy farmers in Carmarthenshire, with a total of approximately 1,700 cows, investigated whether PSPB can be used as an early indicator of pregnancy in dairy cows, within 30 and 120 days post service. Project outcomes: • There are advantages and disadvantages to both methods of pregnancy diagnosis. PSPB allows for a trained farmer to collect the samples at any time that suits their schedule, and that of their cows. It can be implemented as part of the weekly management task, similar to foot trimming, thus minimising the disruption to the animals' routine. After the PSPB results return from the laboratory, those that tested negative can be presented to the vet. The vet can then ascertain why they are unable to conceive and administer appropriate treatments. As for the disadvantages, the collection of a blood sample falls under the remit of the Veterinary Surgeons Act. Therefore, the person who harvests those samples must be trained in the procedure by their own vet. Secondly, although PSPB predicts a pregnancy result relatively accurately, it cannot ascertain the length of the pregnancy (and therefore works best with a known service date), twinning rate, or be used for gender determination.

Project	End date	Project summary
EIP38 - Birch sap	June 2022	Forestry Statistics for 2019 indicate that birch is the third most common broadleaf tree species in Wales, covering an estimated 2,000ha of the Welsh Government Forest Estate (NRW) and 11,000ha of private land. As many birch trees found on farms are not intended for timber, they are potentially available as a source of other non-wooden products, such as birch sap. Birch syrup is mostly produced in North America and can sell at up to five times the price of maple syrup. A key barrier for commercial birch sap harvesting has been its short shelf life: just 24 hours at 5ºC. The freshly collected sap needs to be immediately preserved and stored on the farm before being transported to a commercial kitchen where it is made into syrup. Taking place across four sites in Wales, the two-year project focused on three different preservation methods, analysing which is most effective at turning birch sap into a concentrate at different scales of production. In total, 70 birch trees were tapped over two seasons, producing a total of 2,000 litres of sap. The preservation methods: • Outdoor wood stove – The sap is boiled down in evaporation pans over a homemade stove constructed from breeze blocks and flue pipe. • Reverse osmosis – The sap is pushed through vacuum pumps and micro-porous osmosis filters, which brings the sap down to a sugar concentration of around 6 Brix. • Urn – An electric thermostatically-controlled urn can be used to boil or simmer the sap. Project outcomes: • All three systems work, each with its own costs and benefits. The optimal system involved passing fresh sap through reverse osmosis and then evaporating in either a wood stove or urn to a sugar concentration of no more than 38 Brix. The concentrate should then be transferred to a commercial kitchen for finishing and bottling. Alongside trials of sap preservation, the project also investigated appropriate tapping procedures to ensure that harvesting of birch sap is sustainable. Wound healing following tapping was good, with external wound closure after 18 months. Unsurprisingly, larger, healthy, fast-growing trees gave the best yield and quickest healing of the tap wound.
EIP39 - Carbon Neutral Farming: Assessing opportunities and challenges	December 2022	The focus of this project was to assess the opportunities and challenges for the agricultural sector in reaching the net zero carbon target. Net zero will be achieved on farms when on-farm greenhouse gas (GHG) emissions are matched with on-farm carbon sequestration. Working closely with Bangor University and Forest Research, six farms from the Brecon area, representing a variety of systems, including dairy, beef and lamb, aimed to address the following: 1. understanding what net zero means for farmers in Wales.

Project	End date	Project summary
		2. assessing the baseline carbon emissions for participating farms, according to which action can be taken and measured. 3. improving evidence to demonstrate how actions taken on farms can help the industry move towards net zero. 4. farm outputs: milk, beef, lamb, crops etc. Project outcomes: • This project highlights the importance of carbon footprinting to help identify what has a positive or negative impact on a farm's carbon balance whilst also enabling farmers to monitor changes to their footprint over time. • The majority of GHG emissions from the farms came from livestock (methane) and nitrous oxide from soils, whilst emissions from inputs (e.g. fuel, feed, and fertiliser) were relatively low. These emissions are difficult to reduce, and so achieving net zero will not be possible through efficiency gains alone. • Sequestration generally made a meaningful contribution to reducing the net emissions position, equating to, on average, 28% of total GHG emissions. Increasing tree cover on farms will play an important role in increasing sequestration and moving towards net zero. There is a unique opportunity in agriculture because land as a resource can remove atmospheric carbon dioxide through sequestration into woody biomass and into soils under crops and grass. It is important to be realistic on what that potential is and understand how sequestration practices can be adopted and maintained in farm systems.
EIP40 - Early adoption of on-farm 'Internet of Things' (IoT) sensor networks to alert and notify farmers to improve farm security	June 2022	Five farms took part in this project to evaluate the capabilities of a range of LoRaWAN (long range area wide network) sensors to alert and notify farmers with the aim of improving farm security. During the project, a range of LoRaWAN sensors were used to monitor the location of valuable farm assets, which are a common target for thieves. In the future, 5G technology could replace LoRaWAN. The real-time information gathered by the sensors was able to alert farmers to an incident involving key assets, allowing them to inform the police sooner, with higher-quality information. Monitoring systems provided logged evidence to show when the sensor was triggered, which is intended to help police focus their resources on a specific time period and help trace stolen assets quickly. The areas of priority identified by project partners North Wales Police were: • Quadbike theft • Monitoring the open/close status of various kinds of on-farm infrastructure • Tracking valuable farm equipment.

Project	End date	Project summary
		Project outcomes: • The project encouraged further cooperation between the farming community, North Wales Police, and technology experts to come up with solutions to common problems and bring about smarter ways of working. • The knowledge gathered during this project will help develop a farming industry in Wales that is fit for purpose for the future world. This could also potentially increase the number of jobs available within agricultural technology sectors and encourage those with an entrepreneurial flair to venture into this market to create further solutions for current agricultural problems.
EIP41 - Lameness in Dairy Cattle: Exploring the effects of different methods of knowledge transfer on behaviour change in dairy producers and subsequent impact on lameness prevalence in their herds	February 2023	Lameness is one of the most common diseases in the dairy cattle industry, with huge impacts on animal productivity, welfare, and economics. This EIP Wales-funded, two-year project aimed to explore different methods of engaging with farmers in lameness management. In total, 24 dairy farmers from across south east Wales took part in this two-year project, which aimed to discover the best method of engaging with farmers in lameness management. The farmers were split into four groups: 1. Control. No planned intervention unless there was a need due to welfare concern resulting from lameness levels. 2. One-to-one advice from vet. Farmers received direct, targeted advice through implementation of the AHDB Healthy Feet Lite Programme (HFLite) with their own trained vet (Mobility Mentor). 3. Peer learning. Farmers received no specialist advice but shared knowledge and ideas through a facilitated Farmer Led Action Group (FLAG), with each farm hosting two meetings over the course of the project. 4. Combination of one-to-one advice and peer learning. Farmers received both the HFLite with their own vet and peer support through a FLAG. Project outcomes: • Overall, farmers in the Intervention Groups (2, 3 and 4) saw a reduction in lameness prevalence of, on average, 9% in comparison to 1% for the Control Group. • On average, farms in the Intervention Groups implemented more changes in relation to lameness, whilst they also saw a larger decrease in lameness and a larger reduction in costs associated with lameness in comparison to farms in the Control Group. • In terms of how much value farmers placed on the advice received, farmers placed a higher value on the FLAG in comparison to the HFLite. Reasons for this included the value of learning practical solutions from other farmers, being able to visit other farms to learn from their success, and the frequency of meetings, which meant there was a continued focus on lameness.

Project	End date	Project summary
		Although a wide range of changes were implemented across farms, the majority of farmers said that the biggest single positive influence on their ability to improve lameness was changing to a more highly skilled foot trimmer.
EIP42 - Opportunities for market diversification and increased farm resilience with exotic vegetables and edible flower production in Wales.	June 2022	The growing of micro salads, unusual vegetables and edible flowers has been a sensation in the top restaurant trade for a number of years. Demand for new and exotic foods from across the globe is now more prevalent than ever before. This represents a strong opportunity for Welsh growers seeking to diversify their offerings and increase productivity. Although these niche crops have been grown successfully in different countries, there is no agronomic advice available which is specific to the climate of Wales. This two-year project ran on two commercial horticulture units in North Wales and aimed: 1. To gain practical experience of growing edible flowers and exotic vegetables, supported by technical evidence for best practice cultivation in Wales to maximise production potential. 2. To develop an evidence base to support growers seeking to implement new crop types on their holdings, including toolkits for new products support with agronomic and marketing advice. Project outcomes: • Key findings of the project indicated that these crops could be adapted for production in Wales, with the niche nature of crops potentially being offset by the additional value which can be provided by pioneering crops. • This project demonstrated that these novel exotic crops can be adapted for production in Wales, enabling growers to provide novel exotic crops to their customers, whilst diversifying their offerings. Additional conclusions stressed the importance of developing a marketing space for the exotic plants, as some growers may need to support their customers in achieving the best use of the products due to the current novelty of the crops. This could include recipe cards, social media posts, or promotion through marketing channels.
EIP43 - The Welsh Farmland Bird Initiative: Overwinter feeding of farmland birds to reverse biodiversity decline on productive pasture-based farms	March 2023	The project was run in conjunction with the Game and Wildlife Conservation Trust (GWCT) on two farms, with the aim being to investigate whether providing an over-winter habitat and over-winter supplementary feeding can help boost farmland bird numbers. The two farms involved in the project – Tŷ Newydd Farm, an organic dairy farm in Trefnant, Denbighshire, and Gilar Farm, a hill sheep and beef farm near Pentrefoelas – were chosen as representatives of the types of farms found across Wales. Project outcomes: • A combined total of 5.5ha of wild bird seed mix cover crops were grown across the two holdings and supplementary feeding buckets filled with seed placed near the crops to provide sufficient food during the so-called ‘hungry gap’ from December to April, when the seed in the cover crop has been eaten.

Project	End date	Project summary
		• Chaffinches, reed buntings, green finches, and linnets – a species on the red list of Birds of Conservation Concern – flocked to the farms after seed-bearing cover crops were grown, along with feeding stations providing supplementary seed. • The combination of the conservation measures increased the density of birds on both farms; by 4.4-fold on the lowland farm and 6.3-fold on the upland farm in the winter, and by 1.4-fold on the lowland farm and 1.7-fold on the upland farm during the breeding season. Additionally, the project also demonstrated a 3-fold increase in butterflies as indicators for pollinators in the cover cropped areas, and a 1.3-fold increase in invertebrate diversity alongside a 1.4-fold increase in invertebrate abundance, which helps provide feed for the birds and their chicks in the spring and summer.
EIP44 - Fluke mapping using eDNA to inform development of sustainable control measures	June 2022	The aim of the project was to investigate the use of infection risk maps in helping control fluke – a parasite which seriously impacts animal health and welfare and costs the UK cattle industry an estimated £23m annually and around £3 to £5 per infected sheep. A group of six beef and/or sheep farmers from around Aberystwyth who have all experienced similar fluke issues took part in this two-year project. They worked with IBERS and Ystwyth Veterinary Practice to investigate whether fluke mapping using environmental DNA (eDNA) can aid them in reducing fluke levels on their farms. This technology can identify the presence of mud snails infected with fluke by detecting their DNA in water, which has the greatest potential to infect livestock with parasites. As not all wet areas contain infected mud snails, by knowing which areas of fields pose risk, it will be possible to reduce contact between livestock and those areas by fencing them off, or by improving the drainage. Project outcomes: • The project confirmed the complex nature of liver and rumen fluke infection of livestock. In addition, the project confirmed that eDNA sampling could be used as a tool with which to identify high fluke risk areas on farms. This should be used alongside other strategies, such as FEC and blood testing, implementing veterinary advice, and treating livestock shortly after housing, before turnout and in early autumn in order to facilitate sustainable fluke management. • Farmers are advised to develop a tailored fluke control plan in consultation with a vet. This ensures that fluke infections are detected and treated when necessary, with appropriate anthelmintics. Fluke risk will vary from year to year, and from farm to farm, whilst regular adjustments to treatment schedules may be needed. Following a vet-guided fluke control plan can limit resistance development by ensuring that triclabendazole is not overused in a flock by tailoring the use of other anthelmintics at appropriate times, and by guiding appropriate quarantine treatment of bought-in animals.

Project	End date	Project summary
EIP45 - Improving suckler herd management through nutrition and hygiene around calving time to enhance productivity and reduce antibiotic use	June 2022	Beef farmers from Ceredigion and Carmarthenshire were involved in this two-year project, as they were keen to improve the nutrition and management of their suckler herds around calving to thus ameliorate animal health and reduce the use of antibiotics. The project involved: a. ration formulation based on metabolic profiles as well as feed and forage analysis b. the implementation of strategies to increase colostrum quality and absorption c. creating strategies for the preventative management of diseases, including cleaning and hygiene protocols, which were based on the results of bedding analysis, faecal sampling, and post-mortem reports d. designing a framework for decision making on antibiotic treatments. Project outcomes: • The project highlighted how critical the first few hours immediately after calving are to the health and survival of both the cow and calf, with management strategies at calving focused upon reducing the impacts of dystocia, ensuring adequate colostrum consumption, and managing housing and environmental conditions. • Regular observation of the cow and regular observation of the calf in the first week of life are equally important when it comes to ensuring that the cow has recovered from parturition and is exhibiting good maternal behaviour, whilst also ensuring that the calf is receiving enough milk, is vigorous, and is not vulnerable to poor weather conditions. Additionally, regular monitoring also enables subtle clinical symptoms of disease to be detected early, whilst a close working relationship with the farm's vet is also crucial in ensuring that the best prevention and treatment measures can be put in place.

Project	End date	Project summary
EIP46 - Improving horticultural yields with Molinia biochar and sheep manure/wool based soil amendments	September 2022	In this two-year project running from October 2020 to June 2022, four experienced farmers/horticultural growers from across mid and south Wales trialled different soil amendments to establish their effects on yield and quality of several vegetable crops. 1. Molinia biochar 2. Animal bedding co-composted with sheep's wool 3. Animal bedding compost with Molinia biochar (20% wool, 80% manure) The trials involved crops of radish, basil, courgettes, maize and cabbage and 14 experiments were conducted with each of the applications at three different rates, to compare them to control plots. Project outcomes: • Biochar alone, applied at 10t/ha, increased crop performance by 8.2%. • Biochar and wool compost, applied at 30t/ha, increased crop performance by 14.8%. • Wool compost, applied at 30t/ha, reduced crop performance by 7%. The results in both years showed that adding either biochar or compost improved yields significantly compared to the control. In the second year, the highest application of biochar, at 40t/ha, produced a yield difference of 91%. The different soil amendments demonstrated great potential and could possibly serve as a great source of input if and when they are readily available and affordable.