EVALUATION OF THE BURREN PROGRAMME

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Department of Agriculture, Food and the Marine

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Quality information

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THE BURREN PROGRAMME

2005 BurrenLIFE

2010 Burren Farming for Conservation

2016 The Burren Programme

*The Burren Programme is a locally-led agri-environment scheme that aims to incentivise sustainable farming practices in the Burren. The Programme has helped to deliver a range of **environmental**, **social** and **economic** benefits for farmers, the local community and wider society.*

Incentivising sustainable grazing and feeding systems and removing encroaching scrub on **328 farms** over **23,000ha,** providing space for **rare flowers,** such as orchids and gentians, to flourish

Delivering **water quality** improvements by reducing **point-source pollution** from participants' farms

Repairing over **130,000 metres** of fallen dry-stone walls and installing **199** traditional Burren Gates

At least **€33 million** worth of landscape and biodiversity improvements since 2010

Preserving **ancient** farming practices and traditions, and encouraging their use on **modern** farms

Importance of strong **local leadership** and providing representation for **Burren farmers**

Respect for farming knowledge and traditions, alongside growing confidence in the role of **farmers as educators**

Knowledge sharing and creation of **networks** between farmers and agricultural, environmental, cultural and educational groups **in Ireland and internationally**

€9.4 million paid directly to local farmers since 2010, with an average direct results-based payment of **€2,613** in 2019

Ensuring the continued use and **viability** of Burren farms by funding **land access improvements**, **water infrastructure** and **scrub clearance**

€23 million generated in the local economy

Supporting an average of **20 local jobs** each year among Burren businesses, contractors and craftspeople

Promoting opportunities for **agri-tourism** and contributing to the Burren's appeal as a **visitor destination**

Executive Summary

The Burren Programme is an agri-environmental measure under Measure 10 'Agri-Environment Climate' of the Rural Development Programme 2014-2020 (RDP). The overall objectives of the RDP are enhanced competitiveness, sustainable management of the environment and balanced regional development. The Programme originally emerged in the 1990s in response to habitat decline and new environmental designations in the Burren. The current programme and was preceded by two earlier schemes: the BurrenLIFE project (2005-2010) and the Burren Farming for Conservation Programme (2010-2015).

The Burren Programme contributes to the RDP's focus area 4A of "restoring, preserving and enhancing biodiversity", and its objectives are to:

- ensure the sustainable agricultural management of high nature value farmland in the Burren;
- contribute to the positive management of the Burren's landscape and cultural heritage; and
- contribute to improvements in water quality and water usage efficiency in the Burren region.

To achieve these objectives, the Burren Programme promotes a set of sustainable farming practices based on ancient traditions that are associated with improved habitat quality and greater levels of biodiversity in the Burren's species-rich grasslands. Covering 23,000 hectares and 328 farms in the Burren, it supports farmers in adopting these practices through a hybrid model of 'results-based' interventions. Farmers receive payments as a reward for adopting practices and undertaking activities that deliver clear environmental results. It also financially supports 'action-based' interventions, where farmers are co-funded in carrying out specific tasks or site enhancement works that enable them to deliver these improvements. In addition to these core interventions, the Programme, through its locally-led team, provides assistance to farmers in seeking approval for farm works in designated areas (in terms of habitats/archaeology); delivers education and training; and organises a range of events relating to the Burren's landscape, environment, culture and farming and heritage.

This Evaluation examined evidence regarding the Burren Programme's environmental, economic, and social effects, including a literature review; a survey of its participants carried out in 2020; and a series of interviews with targeted stakeholders. Once identified, effects were classified according to the 'capitals' they impact upon; or the range of tangible and intangible assets from which farmers and society obtain value. These are natural, manufactured, human, intellectual, social and financial capital. The most significant effects identified are summarised in the table overleaf.

The evidence examined as part of this Evaluation suggests that the Programme has been successful overall, resulting in benefits for its participants, for the Burren and for wider society. It serves as a potential model for agri-environment schemes in Ireland and Europe; one that has been developed with the support of local stakeholders, that is tailored to suit local environmental and social conditions, and that targets specific and measurable environmental outcomes. More generally, the Programme highlights the role of farmers as 'custodians' of the landscape who, when given the appropriate structures, incentives and support, can deliver a range of eco-system services to the benefit of all. In the context of a need to find ways of diversifying farm incomes on the one hand; and to address widespread issues of climate change and ecological decline on the other, this model of 'environmental farming' - of ensuring farmers and rural communities are paid for the full range of eco-system services they deliver - is a way in which agriculture, environment and rural development can go hand-in-hand.

Summary of significant effects of the Burren Programme

Capital	Effect
Natural	• Improvements in landscape and habitat quality worth at least €32.8 million • Greater levels of biodiversity in the Burren • Reduced water pollution on participants' farms • Reduced scrub encroachment on Annex I habitats, leading to improved habitat quality and biodiversity
Manufactured	• Greater farm viability from improved farm infrastructure and access • Preservation and repair of at least 130,000 metres of traditional dry stone walls
Financial	• Increased farm income and improved financial viability of Burren farms • €23 million generated in local economic activity since 2010
Human	• Reduced day-to-day workload and time saved by 63% of participants from access, watering and feeding measures • Increased local employment, with an average of 20 FTE jobs per year supported since 2010. • Training and skills development for farmers, contractors and students. • Increased employment and revival in traditional skills • Greater confidence in farmers in their role as educators
Intellectual	• Increased knowledge and information sharing between participants of the Burren Programme • Preservation of traditional farming practices by facilitating their use on modern farms • Promotion of farming traditions/practices within the wider cultural heritage of the Burren • New innovations and technical solutions for Burren farms • Innovations relating to management and process for other agri-environment schemes • Increased knowledge/awareness among farmers of archaeological monuments
Social	• Bonding social capital between Burren farmers • Increased representation for Burren farmers, leading to bridging capital between farmers and agencies. • Bridging social capital as a result of strong local leadership • Bridging social capital between farmers and environmental agencies and organisations. • Linking social capital between the Burren Programme and other European agri-environment schemes.

Environmental Assessment

One of the main objectives of the Burren Programme is to preserve and enhance the ecological integrity of species-rich grassland habitats in the Burren, as well as the rare species that grow therein. Central to this is the traditional practice of 'Winterage', a form of transhumance where livestock are moved to upland fields over the winter months. This movement promotes the 'right' type of grazing among cattle; preventing overgrazing, while also reducing the encroachment of common rank grasses and scrub. These conditions facilitate the growth of rare species of flowers and orchids; contributing to the rich biodiversity for which the Burren has become famous.

The Programme developed a Field Scoring system, based on a range of management and environmental indicators, that is used to assess the environmental health of fields and to reward farmers who deliver environmental improvements. It also provides a rich source of monitoring data, and the increases in average field scores over time clearly show that the Programme has been

successful in incentivising farmers to improve the ecological integrity of their land. These environmental improvements are supported by I-2 actions that the Programme partially funds, such as scrub clearance, which is essential to reduce scrub encroachment on open grassland habitats; and other works like track construction, fencing or stone wall repair that make it easier for farmers to access, and keep livestock in, Winterage pastures.

By monetising the increases in field scores since 2010 across the 23,000 hectares of habitat in the Programme, the combined value of habitat and landscape improvements delivered by the Programme was estimated at €32.8 million in total over 10 years. This value is particularly notable when compared to the €12.3 million that was spent on the Programme to date, and suggests that the Programme is an efficient and effective model for delivering environmental improvements. Interestingly, stocking densities have largely not changed since 2000, indicating that the farming system promoted by the Programme is both environmentally and economically sustainable; resulting in improved habitat quality *without* significantly affecting farm output.

In valuing biodiversity, there are some potential trade-offs between different habitats which must be considered. Scrub removal is an essential part of preserving these open grassland habitats, and since 2010, approximately 385 hectares of immature hazel and blackthorn scrub were cleared in the Burren. Farmers are not permitted to remove mature scrub habitat. While this type of work has the potential for negative environmental impacts, such as the loss of habitat or disturbance of wildlife, robust mitigation measures employed by the Programme means that these negative impacts are negligible, and are greatly outweighed by corresponding improvements in species-rich grassland habitats.

The Programme also aims to contribute to improvements in water quality in the Burren by reducing the potential for point-source pollution to the Burren's surface water bodies and vast underground water network. These measures include discouraging silage feeding, which can act as a significant source of point-source pollution around feeding rings; the provision of water troughs, pumps and fencing to keep livestock away from vulnerable streams and springs; and encouraging the out-wintering of cattle to reduce the need for slatted sheds. These measures have had a positive impact in terms of reducing the risk of pollution from participants' farms, although the overall impact of this on water quality in the Burren is not quantifiable due to the range of other factors affecting water quality in the region.

The Programme put in place measures to ensure the protection of archaeological monuments and built heritage on farmland in the Burren. Dry stone walls, which were built to manage and provide shelter to livestock, are an enduring feature of the Burren's landscape and a testament to the significance of farming to the Burren's history and identity. Since 2010, the Programme has funded the repair of approximately 130,000 metres of damaged dry stone wall. Dry stone walling is a traditional skill in the Burren, and the Programme celebrates and promotes this heritage. The promotion of heritage is also seen in the way the Programme provides higher rates of co-funding to farmers who install traditional, locally-made Burren gates. In addition to these physical improvements, the Programme provides support to farmers in identifying monuments on their farms; helping to ensure that they are protected when carrying out farm works.

Economic Assessment

The Burren Programme makes two types of payments to farmers: 'Intervention 1' (I-1) payments, which reward farmers for delivering environmental improvements; and 'Intervention 2' (I-2) payments, which partially reimburse farmers for carrying out targeted farm works which, in turn, should help to increase their I-1 payment. Overall, the Programme and its predecessor, the Burren Farming for Conservation Programme, resulted in direct payments of €9.4 million to farmers since 2010, with an additional €2.9 million spent on implementing the programmes over that period. There was a boost to the local economy due to these payments, and €30.3 million in economic activity was generated, including €23.2 million within the local economy. This helped to support employment, with approximately 26 jobs (including 20 within the local region) supported directly and indirectly each year by the Programme. The local economic impact of the Programme is particularly high as farmers are strongly encouraged to use local contractors, businesses and craftspeople when carrying out farm works.

A total of €5.8 million was paid directly to farmers in the form of I-1 payments since 2010. While I-1 payments generally represent a positive increase in the purchasing power of farmers and their households, this overall impact is likely to be low. The average annual I-1 payment of €2,613 in 2019 accounted for a sizeable proportion of average family farm income (28%), indicating that the Programme plays a greater role in supporting the financial viability of family farms, rather than increasing household purchasing power. Overall however, income received was not the primary motivation for participating in the Programme, and most farmers reported reinvesting this money into their farms rather than using it solely for household expenditure.

Instead, the support the Programme gives for physical farm improvements and infrastructure – that is, providing funding and a framework in which they can easily secure approval for certain farm works - was ranked by farmers in the 2020 Farm Survey as the most important benefit from the Programme. €3.6 million was paid to farmers to partially reimburse them for carrying out I-2 works on their farms, such as scrub clearance, the construction of access tracks, water supply measures, and the repair of stone walls; with an additional €2.3 million contributed by farmers towards these works. Farmers agreed that these improvements enabled them to adopt sustainable farming practices like Winterage by improving access to upland fields, providing secure food and water supplies, and generally allowing them to herd and handle livestock more easily. This is particularly important for part-time farmers: time savings that enable farmers to farm alongside other paid employment. The Programme also provided a framework through which farmers could seek approval to carry out site enhancement works in designated areas, which has greatly reduced the paperwork and bureaucracy that had previously been a barrier to farmers seeking to do so. For some, these improvements have allowed them to farm certain tracts of land that had become badly neglected, thereby demonstrating how the Burren Programme has helped to ensure the long-term financial and economic viability of their farms.

In general, farmers agreed that the payment structure of the Programme fairly reflected the work that they put in. However, the evaluation found that there is potentially not as great an incentive for Burren farmers with smaller holdings to join the Programme, and that they might find it more financially attractive to participate in GLAS (another agri-environment scheme) rather than the Burren Programme. As GLAS is not a results-based programme, farmers participating in the Low Input Permanent Pasture and Traditional Hay Meadow options in GLAS can receive the equivalent maximum payment for their field (€315 per hectare), without necessarily having to demonstrate the same magnitude of environmental results and improvements that are required in the Burren Programme.

The potential economic impact of agri-tourism linked to the Programme was also considered. The interviews and surveys revealed a perception among some farmers of an inequity between the ecosystem services that they, as custodians of the landscape, deliver for tourism in the region; and the benefits and income that they directly receive in return. Agri-tourism was therefore mooted as a potential solution to this issue. The Programme has hosted 3,400 visitors from outside the Burren since 2010, which has created opportunities for farmers to earn additional income by leading farm tours or providing food, accommodation or transport to visiting groups. Although a low proportion of farmers reported earning agri-tourism income as a result of the Programme, a growing interest and awareness in/of the Burren's farming heritage from visitors suggests that there are potential future opportunities for interested farmers to benefit directly from increased tourism in the Burren.

Social Assessment

The Burren Programme resulted in significant social impacts, and has been successful in strengthening ties among farmers in the Burren and between other stakeholders and organisations outside the region. Four explicit different networks or communities of association were identified: agricultural, environmental, cultural and educational networks. The level of social capital and social capital formation was identified and assessed within these four networks.

While social ties between the farmers themselves were considered strong in many cases prior to the Programme as a result of existing geographic and community ties, the Programme has strengthened these relationships by fostering a shared Burren farming identity. The predecessors to the Burren Programme emerged from a period where trust between locals and 'outsiders' had reached a low-point due to a series of controversies regarding land designations and visitor access in the Burren during the 1990s. At the time, these changes were implemented by state agencies without significant consultation, and resulted in feelings of anger, disillusionment and distrust among farmers and the

local community. In contrast, the early leaders involved in the Programme took a 'bottom-up approach' to its development; engaging with and listening to farmers, respecting their innate knowledge of the Burren's farming practices and landscape, and incorporating their views and knowledge into the design of the Programme. This approach continues today by its local team, which has helped to secure greater buy-in among farmers not only for the Programme itself, but for its objectives in terms of sustainable management of the Burren's High Nature Value Farmland.

The impact of this 'bottom-up approach' on farmers is significant. Participant farmers feel respected. Farmers are treated as educators, which increases their confidence and pride. The full autonomy that farmers are given over their farm plans and their choice of works to undertake gives them control of activities on their farm, while the design of the results-based payment mechanism makes it clear what they can get paid for. The Farm Survey showed clear evidence of participants commitment to improving their land and the environment. Income received from the Programme, while important, was not the key motivation to join the Programme.

Networks with environmental and cultural groups and organisations were facilitated and strengthened by outreach and communication, particularly to agri-environmental networks in Ireland, but increasingly through international engagement and connections with communities of interest outside of Ireland. The connection and development of Burren festivals, and collaboration with the Burrenbeo Trust, facilitated the strengthening of these networks. There are regular talks and frequent outreach, including a move to digital platforms in response to restrictions brought about by the COVID-19 Pandemic.

One of the most remarkable outcomes of the Programme is the strengthening of educational networks and knowledge sharing. This takes the form of continued upskilling and training. It also extends into what can be called a Burren pedagogy; an approach to learning in and learning about the landscape, which places farmers and farming knowledge in a central role. This approach recognises and celebrates and builds on local knowledge, rather than adopting a top-down perspective of telling farmers what to do. Indigenous and traditional knowledge is brought into the Programme, with an emphasis on communicating and sharing all knowledge.

Numerous innovations can be identified from activities undertaken in the Programme, both in terms of products such as the 'Burren Ration' and processes such as paying for environmental services. This innovation is a form of intellectual capital. The maintenance and preservation of traditional farming practices is another form of intellectual capital that has resulted from the Programme. Although Winterage is the practice most noted as unique to the Burren, other traditional practices such as drystone walling and gate making are also supported by the Programme.

Glossary of Acronyms

AES	Agri-Environment Scheme
AEOS	Agri-Environment Options Scheme
BurrenLIFE	Predecessor to the BFCP and Burren Programme (2005-2010)
BFCP	Burren Farming for Conservation Programme (2010-2015)
BLG	Burren Lowland Grassland
CAP	Common Agricultural Policy
CCC	Clare County Council
DAFM	Department of Agriculture, Food and the Marine
EIA	Ecological Impact Assessment
EPA	Environmental Protection Agency
FTE	Full-time equivalent
GLAS	Green, Low-Carbon, Agri-Environment Scheme
HNV	High Nature Value
I-1	Intervention 1 (results-based intervention paying farmers for achieving specific environmental goals)
I-2	Intervention 2 (action-based intervention, partially reimbursing farmers for carrying out certain site enhancement works)
IFA	Irish Farmers Association
LIPP	Low Input Permanent Pasture *(action in GLAS)*
LU/ha	Livestock Units per hectare
NMS	National Monuments Service
NPWS	National Parks and Wildlife Service
RDP	Rural Development Programme
REPS	Rural Environment Protection Scheme
RoNE	Risk of Nutrient Export (model)
SAC	Special Area of Conservation
THM	Traditional Hay Meadow *(action in GLAS)*
WTP	Willingness-to-Pay

1. Introduction

The Burren Programme is an agri-environmental measure under Measure 10 'Agri-Environment Climate' of the Rural Development Programme 2014-2020 (RDP); the overall objectives of which are enhanced competitiveness, sustainable management and balanced regional development. The Burren Programme contributes to the RDP's focus area 4A of "restoring, preserving and enhancing biodiversity", and its objectives are to:

- ensure the sustainable agricultural management of high nature value farmland in the Burren;
- contribute to the positive management of the Burren's landscape and cultural heritage; and
- contribute to improvements in water quality and water usage efficiency in the Burren region.

To achieve these objectives, the Burren Programme promotes a set of sustainable farming practices based on ancient traditions that are associated with improved habitat quality and greater levels of biodiversity in the Burren's species-rich grasslands. It supports farmers in adopting these practices through a hybrid model of 'results-based' interventions, where farmers receive payments as a reward for adopting these practices and for delivering clear environmental results; and 'action-based' interventions, where farmers are given support in carrying out specific tasks or site enhancement works that enable them to deliver these improvements. In addition to these core interventions, the Programme provides assistance to farmers in seeking approval for farm works in designated areas, education and training, and organises a range of educational and cultural events relating to the Burren's landscape, environment and farming heritage.

Figure 1.1: Landscape of the Burren

Source: AECOM, 2020.

This Evaluation report addresses the social, economic and environmental impacts of the Burren Programme, which has been in operation since 2016, as well as its predecessor the 'Burren Farming for Conservation Programme' (BFCP) which ran between 2010 and 2015. While the report does not explicitly assess the impacts of the 'BurrenLIFE' project (a trial period for these later programmes in operation between 2005 and 2010), many are implicit in the impacts of the Burren Programme and the BFCP. This report collates evidence of the Programme's activities in recent years, including a Farm Survey of its participants and in-depth interviews with internal and external stakeholders.

While its primary objectives are related to the Burren's environment and to the promotion of these sustainable farming practices, the evaluation of the impact of the Burren Programme, particularly its

socio-economic impacts on farmers and on the local community, required a more nuanced and holistic approach. This evaluation uses the 'integrated capitals' approach to assess and measure the impacts of the Burren Programme, which is explained in greater detail in Section 2. This approach considers the effects of the Programme on six different capitals from which farmers and society obtain benefits; acknowledging the potentially wide-reaching impacts of a programme like the Burren Programme on its participants and on rural communities. These capitals consist of:

1. **Social –** Relationships and networks between farmers, wider community and other agencies
2. **Human –** Employment, training and skills
3. **Intellectual –** Technical and cultural knowledge, innovation and a conscious change in practices
4. **Natural –** Natural assets, such as land, water, habitats and ecosystems. Ecosystem services are the benefits that people and society receive from natural capital
5. **Financial –** Monetary stock and flows associated with the Programme
6. **Manufactured –** Physical assets such as buildings and infrastructure which were constructed for a particular use (e.g. fencing, water troughs)

There are many lessons to be learnt from the Burren Programme. Overall the programme is considered a resoundingly innovative step-change in how agri-environment programmes are managed, and this evaluation critically assesses the reasons for this success. Some unresolved issues and scope for improvement were also identified.

The Social Assessment primarily corresponds to social, intellectual and human capital, and evaluates the programme with a focus on the wider impacts on the local community and beyond. The networks that have formed and solidified due to the Programme, as well as their role in sharing knowledge and innovations from the Programme to groups inside and outside of the Burren, are discussed. The effect of the Burren Programme on education, knowledge and skills are also highlighted, as well as the emergence of a particular pedagogy in the Burren based on place-based and landscape learning.

The Economic Assessment corresponds to financial capital, which are the material flows of money between the Programme and farmers, businesses and the local community. The costs of the programme and expenditure by the programme are explored, with input-output analysis used to measure the direct, indirect and induced effects of this spending on the wider local economy. Impacts of the Programme on local employment (human capital) and on farm infrastructure (manufactured capital) are also assessed.

The Environmental Assessment focuses on the Burren's natural capital. While this is not a formal Environmental Impact Assessment, it aims to incorporate the main environmental effects of the Programme into the integrated capitals reporting framework developed for this evaluation. Using habitat monitoring data collected by the Burren Programme Team at a field level, the monetary value of the improvements resulting from activities undertaken in the programme is calculated, using a willingness to pay study undertaken for the Burren in 2009[1]. Other natural capital impacts on water quality and biodiversity are also considered, as well its impacts on the Burren's built heritage.

The report is structured as follows:

- Section 2 outlines the approach taken and the methodology used for this Evaluation;
- Section 3 provides the background to the Burren Programme, including its historical context and an overview of its structure;
- Section 4 contains the Social Assessment;
- Section 5 contains the Economic Assessment;
- Section 6 contains the Environmental Assessment; and
- Section 7 summarises the main conclusions of this Evaluation.

Additional background information is contained in the Appendices at the end of this report.

[1] Van Rensburg *et. al.,* 2009

2. Evaluation Approach and Methodology

A significant amount of funding was invested in the Burren region for the conservation of the unique farming landscape, including the €15 million total allocation for the Burren Programme (2016-2021), €6 million for the Burren Farming for Conservation Programme (2010-2015), and €2.23 million for the BurrenLIFE Project (2005-2010). The terms of reference for this Evaluation are that it should consider the economic, social, and environmental impact of the Burren Programme, with a particular focus on quantifying the economic and social impacts. It should also incorporate the impact of the Burren Farming for Conservation Programme (2010-2015) and the BurrenLIFE Project (2005-2010).

"Social-ecological systems" is a term that is increasingly being used in assessments of humans-in-nature[2]. It describes the interdependencies between people and their environment; replacing the previous treatment of the environment as an 'externality' with a view of environment as a precondition for sustainable development. Although this distinction may appear trivial, it has a significant impact on how an assessment is undertaken. By recognising a social-ecological system, silos are avoided. For example, the environment and ecosystems are not considered in isolation, under the pretence that humans do not exist; and/or economists are compelled to recognise that nature exists, and their analysis cannot be viewed above or outside the environment. This leads to more integrated approaches to evaluation, and influenced the choice of methodology used for this assessment.

The Burren Programme objectives are integrative; ensuring the sustainable agricultural management of high nature value farmland in the Burren and contributing to the positive management of the Burren's landscape and cultural heritage; and contributing to improvements in water quality and water usage. If these objectives are met, it is a significant achievement of the Programme to integrate such outcomes. Relaying these messages implicitly to farmers, getting 'buy-in' and participation to the Programme and general acceptance from farmers as to why an integrative approach is necessary to support their desires and ambitions to continue farming in a sustainable and policy-compliant manner would be a fundamental achievement. To explore the extent of this integration, a methodology centred on integrated reporting was adopted for this evaluation, which is part of an emerging evaluation approach that emphasises integrated thinking, connectivity of information and interdependencies. This builds on an approach developed by academics, accountants and consultants within organisational analysis, whereupon multiple or integrated capitals that represent stores of value for a particular organisation are clearly identified.[3]

2.1 Methodology

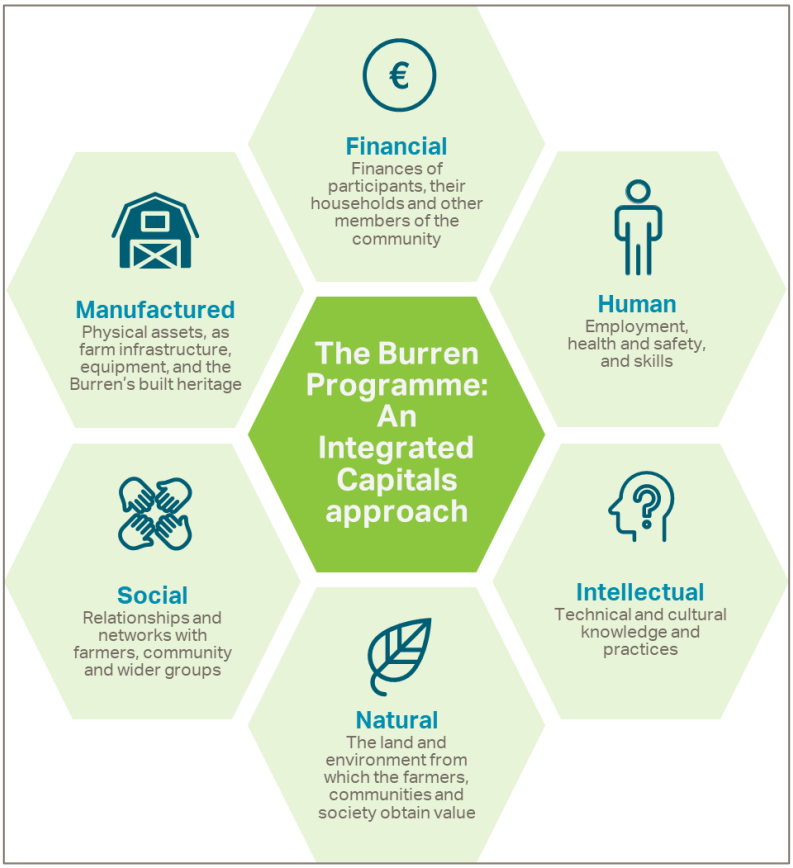
2.1.1 Integrated Capitals

This evaluation of the Burren Programme is concerned not only with the impacts of the Programme on farms and the local environment, but it will explore a range of social, environmental and economic effects. The Burren Programme is an ambitious Agri-Environmental Scheme (AES), and is inherently targeted at Burren farmers and their farms. However, its impact is not limited to agriculture but to wider issues of rural development, and the reach of the Programme has extended to landscape conservation, knowledge systems and innovation, heritage and communities.

A holistic and integrative evaluation process that recognises the socio-ecological systems in the Burren is therefore required. The evaluation framework chosen is an 'Integrated Capitals' approach, which extends the concept of 'capital' used within economics[4] and describes the impacts of the Programme on six different types of capital. These capitals are Financial, Human, Intellectual, Natural, Social and Manufactured capital, as outlined in Figure 2.1.

[2] Folke et al., 2005.
[3] International Integrated Reporting Council, 2005 and International Integrated Reporting Council, 2013
[4] In classical economics capital is distinguished from land and labour as a means of producing goods and services. Capital was recognised as the machinery and tools available, but in economic theory it now extends to all human created assets that can be used in the production process. Capital is considered a factor of production.

Figure 2.1: An 'Integrated Capitals' approach



Source: AECOM, 2020; adapted from International Integrated Reporting Council, 2013.

The distinction between stocks and flows is well recognised within economics. The capitals are stocks, which are a quantity of a system variable that exists at a single point in time; while a flow is a movement of materials or information to or from a stock over time. Traditionally monetary valuation, or the 'cost-of' something is a measure of the flow from an asset (e.g. the cost of maintaining farm buildings). There are various internationally recognised guidelines for the assessment of impacts and dependencies on different capitals, including the Capitals Coalition's Natural Capital Protocol, and Social and Human Capital Protocol.[5]

The benefit of this approach is that it allows for multi-dimensional impacts of certain actions to be fully explored and incorporated within an assessment. For example, intensive grazing of grassland may cause a farmer to increase their income and improve their economic wellbeing, which would represent positive impacts on financial and human capital respectively. However, in doing so, the resulting decline in the quality of species-rich habitat would represent a loss in the stock of natural capital and the value that these habitats provide to society. This approach acknowledges complexity, and considers the whole system in the evaluation framework. Certain elements of a system may be sustainable for a period of time (e.g. farm economic well-being through intensification), but can lead to collapse of other parts of the system (e.g. species decline/collapse). The integrated capitals approach recognises these interdependencies, and tries to capture unintended consequences, by taking a whole systems approach.

In the context of this Evaluation:

- The economic assessment largely aligns with financial and manufactured capital;
- The environmental assessment largely aligns with natural and manufactured capital; and
- The social assessment largely aligns with human, intellectual and social capital.

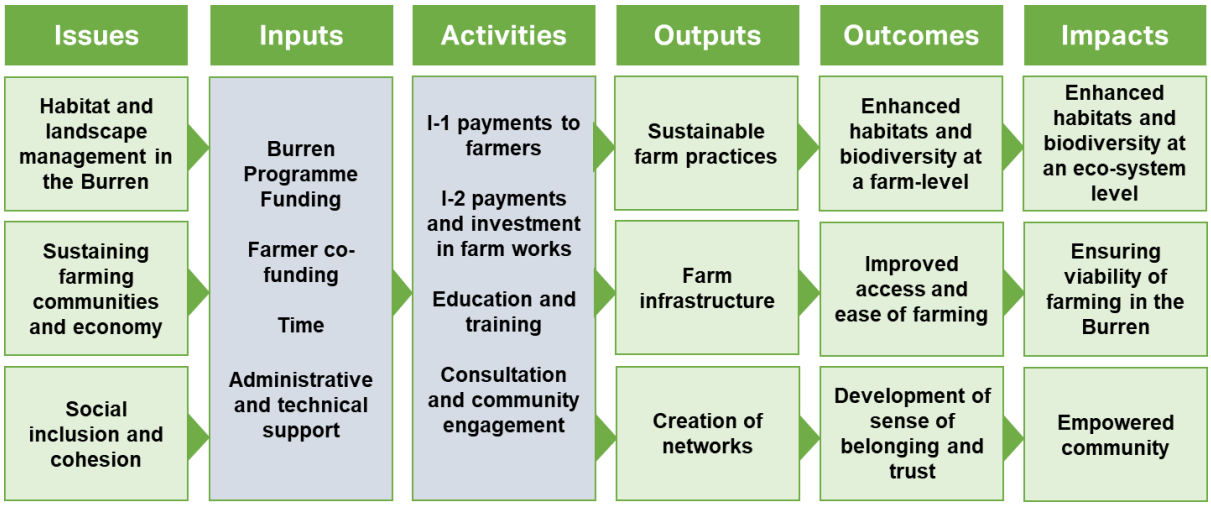
[5] See https://naturalcapitalcoalition.org and www.social-human-capital.org.

However, these are not mutually exclusive classifications, and any interdependencies between assessments or capitals will be highlighted and explored.

2.1.2 Documentation review

An initial document review was undertaken, to establish the Burren Programme Intervention Logic that identifies the programme objectives and expected results. This enabled an expression of the intended impacts – or sets out the changes that the Programme intended to bring about, and against which the evaluation can be undertaken. After reviewing the relevant documentation, the following Logical Framework was drawn up (Figure 2.2). More details of the background and structure of the Burren Programme are given in Section 3.

Figure 2.2 Burren Programme logical framework



Internal Programme reporting and monitoring data from the Burren Programme was obtained as part of this document review process. While this evaluation relies on much of this data, a process of validating this data was undertaken, through a farm survey and a series of stakeholder interviews. Of note is the depth of data that is collected by the Burren Programme Team, particularly in relation to measuring the localised environmental impacts of the Programme at a field level.

2.1.3 Farm Survey

A Farm Survey with participants of the Burren Programme formed a significant part of the evidence-gathering process, and allowed for the identification and assessment of effects on a wide scale. While previous surveys were carried out in 2010, 2013 and 2019, the project team identified gaps and areas in which additional information was required. The 2020 Survey comprised 32 questions, and mainly focused on topics such as:

- Household income and expenditure;
- Involvement in and attitudes towards tourism;
- Farm practices and changes in farm practices;
- Knowledge and knowledge transfer; and
- Social capital and networks.

The 2020 Farm Survey was carried out between 21st July and 24th August 2020. It was distributed via post along with a return envelope to all farmers in the Burren Programme with assistance from the Department of Agriculture, Food and the Marine. To maximise the response rate, a link to an online version of the survey was also distributed for anyone who may have preferred to fill out the survey on a computer, tablet or mobile phone, although most responded with the postal survey.

Out of 328 farmers in the Programme, 146 completed surveys were returned to the study team. 134 of these were returned by post and 12 responded online, representing an overall response rate of 44 per cent. This is considered a good response rate; above the average survey response rate of 33%, but below the 50% response rate, that by rule-of-thumb, is considered excellent.

2.1.4 Interviews

In addition to the Farm Survey, a series of interviews with targeted stakeholders were carried out to augment and ground-truth the literature review and survey results. Chosen to represent a range of different perspectives, thirteen stakeholders were interviewed, including:

- 2 farmers involved in the Burren Programme;
- 2 members of the Burren Programme Team;
- 1 Burren Programme advisor;
- 1 representative from the National Parks and Wildlife Service;
- 1 Local Authority Heritage Officer;
- 1 local economic development representative;
- 1 representative from Burrenbeo Trust;
- 1 gate-maker associated with the Programme;
- 3 local tourism stakeholders.

2.2 Assessment of significant effects

Potential effects on different types of capital were identified using the Logical Framework and subsequently investigated via the evidence review process described above. In order to compare and evaluate each effect, it was necessary to make an assessment as to the relative significance of each effect within the broader context of the Burren Programme.

Effects were defined as ‘positive’, meaning they add to the capital in question; or ‘negative’, meaning that they detract from the capital in question. In order to compare these positive or negative effects across different capitals, a simple matrix-based assessment system was used to classify the overall significance of each effect according to two dimensions: its scale and its impact.

- **Scale** refers to how widely this effect is experienced across the population, or in the case of the environmental assessment, the geographic scale of the impact. Three levels were defined:
  - **Individual** level, meaning that it mainly affects only a single person or limited number of people. For natural and manufactured capital in the environmental assessment, **locally-significant** habitats and environmental features (i.e. those that are limited to participants’ farms) fall into this category.
  - **Programme** level, meaning that it mainly affects those *within* the Burren Programme, such as its participants or farms. For the economic and social assessment, effects that are felt by a large proportion of the Programme’s participants generally fall into this category, with effects impacting smaller numbers of members falling into the previous category. For natural and manufactured capital in the environmental assessment, **regionally-significant** habitats and environmental features (i.e. natural capital held by the Burren region) fall into this category.
  - **Community** level, meaning that the effect has an impact on others *outside* of Burren Programme participants or farms, such as the local community and groups outside of the Burren region. For the environmental assessment, most regionally and **nationally-significant** (i.e. Annex I Habitat) habitats and features fall into this category.
- **Impact** refers to the importance of the effect on the capital in question and the extent to which the Programme caused or facilitated this effect. A qualitative scale was used for the assessment of the Programme’s impact: low, moderate and high.

Figure 2.3 shows the matrix that was used to assess the overall significance of each effect, explicitly recognising that while something may have a high impact on an individual, their overall significance needs to be judged in the overall context of the Programme and of the Community. While these are qualitative scales and therefore require a level of professional judgment to populate, they provide a standardised framework in which to assess and rank the many potential impacts of the Burren Programme.

Figure 2.3: Assessment of significant effects

		Impact			
		Negligible	Low	Moderate	High
Scale	Individual / Local*	Negligible	Negligible	Low	Moderate
	Programme / Regional*	Negligible	Low	Moderate	High
	Community / National*	Negligible	Moderate	High	High

*Only applies to natural/manufactured capital effects in the Environmental assessment

3. Background of the Burren Programme

The next two subsections provide the context for the Burren Programme and for this Evaluation. Section 3.1 describes the context and history behind the Burren Programme, which is followed by an overview of the Programme's current structure in Section 3.2.

3.1 Historical Context

In order to understand the impact of the Burren Programme, it is important to understand its origins and history. This section provides a summary overview of the background and history of the Burren Programme; from its beginnings in the context of changing agricultural practices in the 20th century to its current iteration today. This overview was mostly adapted from Dunford and Parr (2020) as well as from accounts from interviews carried out as part of this assessment, although additional sources have been referenced where applicable.

3.1.1 Farming in the Burren

The Burren has long been shaped by the agricultural practices of those who lived there, and farming in the Burren has a history going back nearly 6,000 years. Although the region was likely once extensively covered by hazel and pine woodlands, these were largely cleared by Neolithic and Bronze Age farmers in their search of fuel, wood, and grazing land. Over time, this clearance may have contributed to the widespread loss of soil in the uplands and the resulting exposure of the bare limestone pavement once buried underneath[6]. Over the following millennia, farming communities continued to make their mark on the Burren, building the mosaic of tombs, forts, tower houses and dry-stone walls that still adorn the landscape today.

Figure 3.1: Typical Winterage field in the Burren

Source: AECOM, 2020.

The Burren's landscape enabled and required the development of unique traditions and farming practices. The Burren is renowned nationally and internationally for its ancient tradition of 'Winterage'; a form of (reverse) transhumance in which cattle are moved into the upland fields over the winter

[6] Dunford, 2002.

months. The bare limestone is thought to act almost as a storage heater, storing heat from the summer months and slowly releasing it over the winter; while the diverse flora in the uplands also provided cattle with a diet that was reportedly rich in minerals and nutrients[7]. By giving cattle enough warmth and food to survive the winter months, when an ample supply of calcium-rich water was also available, this unique combination traditionally provided farmers with an inexpensive place to store livestock over the winter.

While Winterage was enabled by the Burren's unique environment, it has also contributed to it. The movement of stock between upland and lowland pastures discouraged overgrazing and allowed time for habitats to recover and replenish, while the grazing and foraging by cattle helped to reduce encroachment by scrub and rank grasses in species-rich grasslands. With reduced competition from common species, rarer and more delicate species of flower and orchids flourished; reflecting a symbiotic relationship between the Burren's landscape, biodiversity and farming practices that endures today.

Figure 3.2: Flora in the Burren

Source: AECOM, 2020

3.1.2 Changing agricultural practices in 20th Century

While agricultural practices in the Burren have evolved in line with geographic, economic, social and technological change over thousands of years, significant and rapid changes to age-old practices occurred in the latter half of the 20th Century. As a new state that lacked large-scale traditional industry and struggling to compete with other European nations in international markets, Ireland turned to its natural advantages – its fertile grasslands and mild climate – to grow and develop the national economy. Successive governments encouraged increasingly intensive agricultural practices and land use in order to boost production and improve international competitiveness; famously epitomised by a 1929 speech by the then-Agriculture Minister in which he urged farmers to strive for *"One more cow, one more sow, one more acre under the plough"*[8]. These policies were not unique to Ireland, and this trend accelerated and exacerbated when Ireland joined the European Union and the Common Agricultural Policy (CAP), given Europe's striving for food security after the second world war. Subsidies from Europe designed to boost food production encouraged more land reclamation, higher stocking rates, and more widespread use of fertiliser in an effort to extract the highest possible yield from farmed land.

While these policies boosted farmers' incomes and standard of living and helped to improve food security for consumers, the 'one-size-fits-all' model of intensive farming promoted by national and European policy began to harm the fragile ecosystem of the Burren. Increased stocking rates (average stocking rates doubled from 0.38 Livestock Unit per hectare (LU/ha) in 1970 to 0.66LU/ha in 2000) meant that the uplands struggled to provide newer 'continental' breeds of suckler cows with sufficient nutrients during the winter, and farmers began to gradually move away from Winterage

[7] Dunford, 2002.
[8] Leahy, 2019.

grazing due to this and other factors[9]. These included off-farm pressures, with less time to manage extensive winterages; new technologies, such as silage, slurry and slatted sheds; specialisation of farm systems with less goats, horses, store cattle; and new agri-environment schemes like REPS which restricted grazing practices. With reduced grazing in these upland fields, scrub and rank grasses were allowed to grow excessively and began to encroach on species-rich grasslands, leading to increased competition for rare species and a consequential loss in biodiversity. Figure 3.3 below is a stark illustration of this process, showing how scrub can rapidly take over the landscape if left undisturbed.

Figure 3.3: Scrub encroachment in the Burren, 1900-2000

Corkscrew Hill – early 1900s

Corkscrew Hill - 2000

Source: Dunford and Parr (2020)

In contrast to the threat posed by the under-use of Winterages, other aspects of the Burren's environmental and archaeological heritage were threatened by localised intensification of agricultural practices. Farmers increasingly turned to grant-funded 'slatted sheds'[10], fertilisers, and silage feeding to support higher levels of stock on lowland areas, leading to a greater risk of run-off and point source pollution from nitrates and slurry to the Burren's extensive groundwater systems. These changes also had a negative impact on the Burren's built heritage, with approximately 30 per cent of the Burren's archaeological sites lost to land reclamation activities during this period[11]. Dry stone walls were particularly at risk, as they were often demolished to allow vehicle and machine access to fields and replaced with wire fencing.

3.1.3 Early years

The environmental consequences of overly-intensive agricultural practices were not unique to the Burren, and all over Europe, ecosystems in the late 20th Century became increasingly threatened by agricultural, industrial and urban pressures. In 1992, the European Union introduced the EU Habitats Directive in an effort to protect threatened habitats and species, which in 1997, led to the designation of 30,000 hectares of land in the Burren as a Special Area of Conservation (SAC). The SAC was placed on ecologically significant 'Annex I habitats' such as limestone pavements, species-rich grasslands and turloughs, which on many farms, resulted in new restrictions for farmers carrying out land reclamation, scrub clearance and farm works. Farmers in the Burren were angered by the SAC designations and the 'top-down' nature in which it was implemented in the region. The Rural Environment Protection Scheme (REPS), which had been introduced several years earlier as Ireland's first agri-environment scheme, was also viewed as inadequate in allowing farmers to respond to these new regulatory requirements and in addressing the specific environmental challenges faced in the Burren. As a result, a report to the National Economic and Social Council (NESC) reveals the widespread anger and disillusionment within the community at the time stemming

[9] Dunford, 2002.
[10] Slatted sheds are used by many farmers to house livestock during the colder and wetter months when it is not possible to graze the cattle on pasture, due to pasture damage, pugging or inaccessibility due to flooding. The sheds contain a slatted floor to allow animal waste to be collected into a storage tank below.
[11] O'Rourke, 2005 cited in Dunford and Parr, 2020.

from this designation: a loss of control among farmers who felt more like 'the employee than the employer' on their own farms; a loss of pride from the lack of acknowledgement of farmers' local knowledge and management practices; and a loss of trust between the local community and 'outsiders' like the state authorities and environmentalists[12]. The situation in the late 1990s is characterised by the prevalence of 'negative' social capital, with high levels of mistrust and suspicion of government agencies.

In response to these frustrations, a group of local farmers came together to form the Burren Irish Farmers Association (IFA). They successfully negotiated new conditions to be applied to Burren farms in REPS, including a commitment to carry out research regarding the effects of REPS practices on Burren farms. This led to a Teagasc-sponsored research project, in which a PhD student[13] was embedded in the Burren to carry out this research. This project combined scientific research with extensive engagement with local farmers, largely in the form of conversations with local farmers on their farms or in their kitchens. This approach not only allowed the research to harness the traditional knowledge and practices of the Burren and its farmers, but helped establish a culture of honest dialogue and engagement with farmers that continues to characterise the Burren Programme.

This research culminated in the publication of a PhD thesis in 2001 that documented the links between farming and the Burren's famous landscape[14]. The thesis confirmed the importance of grazing to the quality of species-rich grasslands, and identified many of the environmental issues brought about by the polarisation of agricultural practices: abandonment of Winterage, scrub encroachment, excessive fertiliser use, and point-source pollution.

3.1.4 BurrenLIFE (2005-2010) and Burren Farming for Conservation (2010-2015)

The publication of the PhD thesis gave scientific backing to the benefits of more traditional farming practices in the Burren and reportedly resulted in additional impetus for action[15]. In 2004, an application was made to the European Union's LIFE fund with a proposal to develop a 'blueprint' for sustainable management in the Burren by trialling and monitoring the effects of a range of management practices on a group of 20 farms in the Burren. The application was successful, and with an award of €2.23 million, BurrenLIFE began in 2005. BurrenLIFE was led by Dr. Brendan Dunford and administered by a local team of four staff based out of the refurbished schoolhouse in Carron, including a Programme Scientist (Dr. Sharon Parr), Project Administrator and Office Manager (Ruairí Ó Conchúir) and an Agro-Ecological Researcher on secondment from Teagasc (James Moran).

In order to encourage a revival in winter grazing, BurrenLIFE developed a range of modern solutions to allow farmers to more easily access and farm upland fields. One such example is the 'BurrenLIFE Concentrate Ration', which was developed to provide alternatives to silage feeding in Winterage pastures. By the late-20th Century, suckler farming had become the predominant farming system in the Burren. However, it became apparent that Winterage pastures lacked sufficient nutrients and minerals from grazing alone that suckler cows needed, and farmers who kept stock in the uplands generally supplemented their diets with silage. Silage poses several environmental issues for the Burren in particular; discouraging the grazing and foraging necessary to maintain high levels of biodiversity; creating a heightened risk of point-source pollution around silage feeders to the Burren's extensive subterranean water systems; and increasing the risk nitrate and slurry run-off from silage production. In order to encourage winter grazing, but discourage silage use, the Burren Programme developed a feed (the 'Burren Ration') that was tailored to the Burren; containing all the minerals and nutrients that cattle lacked in Winterage pastures, but with high protein levels that stimulated their appetite for grazing and foraging.

It was not BurrenLIFE's objective to simply revert to traditional practices, but to adapt and fuse these practices to modern farming and management methods. Some key outputs of this phase included the Burren Ration (discussed above), a Risk of Nutrient Export (RoNE) model for water-related interventions, and a suite of recommendations regarding best-practice management and farming techniques for the Burren. BurrenLIFE effectively became the trial period for later phases, with the

[12] Dunford and Parr, 2016.
[13] Brendan Dunford; who is also the current manager of the Burren Programme.
[14] Dunford, 2001.
[15] According to interviews carried out as part of this assessment.

outputs, guidelines and data from this phase informing the design (and costing) of a scheme that could be rolled out to a large swathe of farmers in the Burren.

In 2010, the Department of Agriculture Food and the Marine (DAFM) announced funding for a new programme, the Burren Farming for Conservation Programme (BFCP). The aim of the BFCP was to build on the findings of BurrenLIFE, and to expand their implementation to a wider group of farmers in the Burren. The new BFCP grew to include 160 participants, on 15,000 hectares of prime Burren habitat, and it ran between 2010 and 2015 (inclusive). This was succeeded by the Burren Programme which began in 2016, which expanded the reach of the Programme to a larger number of farmers in the Burren. There are now 328 farmers in the Programme, and it covers an area of approximately 23,000 hectares of prime Burren habitat.

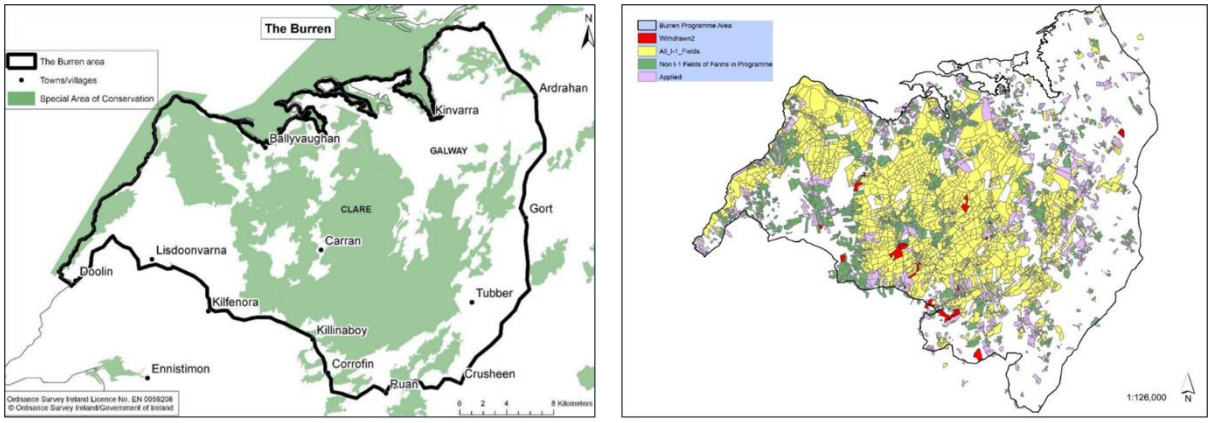
3.2 Structure

This section describes the structure and activities of the current Burren Programme, which has been in operation since 2016.

3.2.1 Joining the Programme

Any pastoral farmer who grazes Annex I habitat in the Burren (whether designated or not) is eligible for the Burren Programme. Figure 3.4 displays a map of SACs in the Burren, as well as a map of all fields in the Programme. As of 2020, the Burren Programme has 328 participants and covers a total area of 23,207 hectares of SAC land and additional Annex I habitat

Figure 3.4: Burren SAC and Burren Programme participation



Burren SACs | Areas in the Burren Programme

Source: Burren Programme, 2020

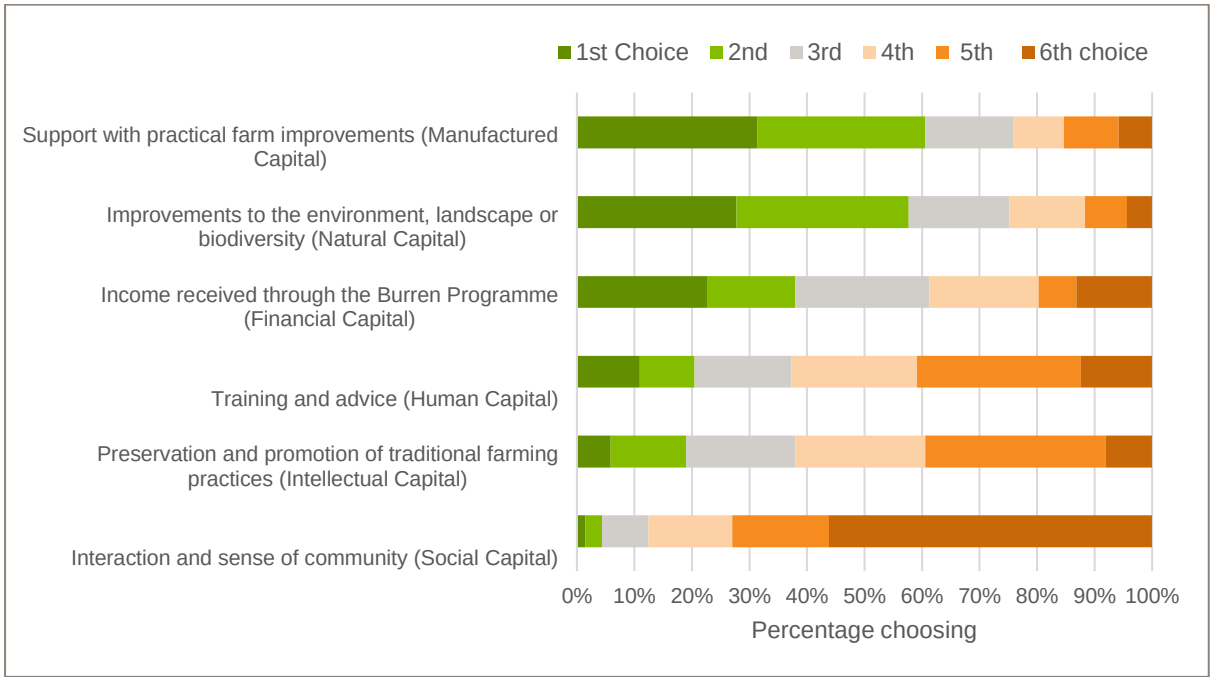
Of this total area, some 13,673 hectares (59%) are 'eligible' to receive Basic Payment Scheme (BPS) payments (as they are considered to be 'grazeable' by livestock). 11,396 hectares (49%) are 'assessable' under the Programme's I-1 field scoring system; this is because some of the BPS eligible area is improved grassland which does not qualify for I-1 payment. Eligibility is determined at the field level, rather than the farm level, and two broad types of field are specified by the Programme. Winterage fields are generally located in the uplands and are more traditionally associated with the practice of Winterage, while Burren Lowland Grasslands (BLG) fields are generally meadow-like and contain a greater variety of plant species than typical improved agricultural land. These field types require slightly different management practices and assessment criteria, which is discussed in the next section. Of the 11,396 hectares of I-1 assessable habitat, 10,554 hectares (93%) are classed as Winterage, 456 hectares (4%) as BLG and an additional 373 hectares (3%) as turlough or wetland.

Following entry to the Programme, participants must prepare a 5-year 'Farm Plan' with an approved Farm Advisor[16]. The Farm Plan is a short, one- or two-page document that provides an overview of the farm (i.e. fields, water sources, monuments) and summarises the proposed actions the farmer intends to carry out over the contract period. The Burren Team considers the simplicity of this Farm Plan, as well as other documents, as being very important for the success of the Programme.

[16] Farm advisors are paid directly by Programme participants,but must be approved by DAFM and the Farm Advisory System.

The Burren Programme follows a 'hybrid' results-based payment model, meaning that it contains both 'results-based' interventions (farmers are rewarded for the results they deliver) and 'action-based' interventions (farmers are partially compensated for the tasks that they do). While these are considered to be the main incentives for farmers, as this Evaluation will demonstrate, there are many reasons that farmers join and remain in the Burren Programme. As part of the 2020 Farm Survey, farmers were asked to rank six key benefits of the Programme, each corresponding to one of the six integrated capitals, in order of personal importance to them. The results of this question are displayed in Figure 3.5 below.

Figure 3.5: Benefits of participation in the Burren Programme as ranked by participants



Source: 2020 Farm Survey

As the Figure above demonstrates, the support they receive with practical farm improvements are considered to be the most important by farmers (which may also be linked to the assistance they receive from the Programme in obtaining the relevant permissions from various statutory agencies), followed by environmental improvements, and the income they receive. Less important reasons for joining and remaining in the Programme, according to farmers, are the training and advice they receive, preservation of traditional farming practices, and interaction and sense of community with other participants. These results will be referenced at different points throughout this report.

3.2.2 Intervention 1 (I-1)

Intervention 1 (referred to as I-1) is the **results-based** strand of the Burren Programme, meaning that it focuses on rewarding farmers for achieving specific results or environmental outcomes.

In the Programme, the environmental health of eligible fields (i.e. the results that farmers deliver) are assessed using a scoring system developed specifically for the BFCP and amended slightly for the Burren Programme. This system is primarily based on management indicators, meaning fields are evaluated based on evidence that farmers are carrying out management practices (i.e. grazing, feeding, watering systems) promoted by the Programme. The scoring system also takes account of threats to the habitats present (e.g. scrub and weed encroachment etc). Slightly different management indicators are used for Winterage and Burren Lowland Grasslands fields, but overall, take into account factors such as:

- **Grazing -** Whether the field is being grazed appropriately, and whether there are signs of over- or under-grazing.
- **Water -** Whether there are signs of damage to springs and water sources.
- **Silage –** Whether there are signs of supplementary silage feeding. Fields in which silage is fed receive no payments.

- **Species –** Whether key species associated with high ecological integrity can be found, particularly for BLG fields, or whether species which undermine ecological integrity are present

These indicators are signs of the implementation of good management practices, generally those practices that are associated with higher levels of biodiversity, and they act as an overall indicator for the ecological integrity of the field. Fields are scored by trained advisors using a one-page field sheet and the data from this is inputted into a Microsoft Excel-based calculator. Fields are awarded an overall score of between zero and ten that determines the rate of payment farmers receive (see Table 3.1 and Table 3.2 below). The results are shared with the farmers, along with recommendations as to how they could improve their score in following years. The scoring system and its focus on management indicators reportedly makes it easy for farmers to understand, and allows them to make targeted environmental improvements to increase their I-1 payments in future years.

Table 3.1: I-1 payment rates for management of Burren Winterage Pastures

Per hectare payment	Field Score						
	10	*9*	*8*	*7*	*6*	*5*	*4 or less*
0 - 40 ha	€180	€135	€96	€84	€72	€60*	€0
41 – 80 ha	€90	€68	€48	€42	€36	€30*	€0
80 – 120 ha	€45	€34	€24	€21	€18	€15*	€0
>121 ha	€23	€17	€12	€11	€9	€8*	€0

*In order to incentivise continued environmental improvement, scores of 5 no longer receive payments after Years 1 and 2

Table 3.2: I-1 payment rates for management of Burren lowland grasslands

Per hectare payment	Field Score						
	10	*9*	*8*	*7*	*6*	*5*	*4 or less*
0 - 10 ha	€315	€240	€192	€168	€144	€120*	€0
>10 ha	€158	€120	€96	€84	€72	€60*	€0

*In order to incentivise continued environmental improvement, scores of 5 no longer receive payments after Years 1 and 2

3.2.3 Intervention 2 (I-2)

Intervention 2 (or I-2) is the 'action-based' strand of the Programme, where farmers are partially reimbursed for actions that they carry out.

When farmers prepare their farm plan, they also can choose to carry out site enhancement works from a 'menu' of tasks provided by the Programme. These tasks are fully costed by the Programme, and are intended to improve habitat quality (and thus I-1 scores and payments), or make it easier for farmers to out-winter and tend to their livestock. I-2 works are co-funded under the Burren Programme at rates of between 25 and 75 per cent, with higher rates received for tasks that are expected to have the greatest environmental benefit or that are less likely to be carried out without the Programme.

Table 3.3 summarises the main I-2 works funded by the Programme, along with the co-funding rates and main environmental objectives associated with each task. It also makes clear that most of these works result in dual benefits to the environment and to the farmer (hence the co-funding model chosen). These benefits will be explored in greater depth in the economic and environmental assessments.

Table 3.3: Dual objectives and benefits of I-2 works

Task	Funding %	Environmental objective	Farm benefit
Scrub clearance	75%	Reduce scrub encroachment on species-rich grasslands	Increases the area of grazeable land Improves access to Winterage fields
Access tracks	25%	Enable the continued practice of Winterage	Improves access to Winterage fields
Water provision	50%	Reduce risk of pollution to springs, streams and groundwater Encourage Winterage	Provides a secure source of water in Winterage fields Reduces need for supplementary watering Improves livestock health Helps TB control
Gates	75% (Burren), 50% (regular)	Promote use of distinctive 'Burren Gates' Encourage Winter grazing	Easier herding and handling
Stone wall repair	75%	Preserve dry stone walls Promotes targeted Grazing	Easier herding and handling
Fencing	50%	Promotes targeted Grazing	Easier herding and handling
Feed equipment	50%	Encourage use of Burren Concentrated Ration and promotes increased foraging Reduce silage feeding	Reduces need for supplementary feeding Improves livestock health Easier to administer
Livestock handling facilities	25%	Encourage Winter grazing	Easier herding and handling
Habitat restoration	75%	Restore habitats	Improve farm landscape
PPE Safety Gear	50%	Ensure farmer safety in carrying out farm tasks	Ensure farmer safety in carrying out farm tasks

Farmers have full autonomy on whether to carry out I-2 works on their farm as part of the Programme and which tasks to select, meaning that they can select those that are suitable to their individual circumstances. Because the varying co-funding rates and the potential impacts on their field scores, they have additional incentives to choose tasks that are particularly beneficial to the environment on their farm.

As a result, there is strong evidence of the Programme's additionality in terms of encouraging farmers to carry out works beyond those that they would have done anyway. In the 2019 Farm Survey, 47 per cent of farmers responded that they would not have carried out these site works without the financial assistance of the Programme, with another 44 per cent responding that they would have done so on a smaller scale. Just 9 per cent agreed that they would have carried out these works in full, indicating that the assistance of the Programme is key in these works being carried out.

Given the SAC designations and the abundance of archaeological monuments in the Burren, permission from or notification to the local authority, National Parks and Wildlife Service (NPWS) and/or National Monuments Service (NMS) is frequently required before carrying out site enhancement works. While the paperwork and bureaucracy that farmers had to navigate previously acted as a major barrier to farmers in carrying out works, the Programme has developed standards for carrying out works and protocols with the authorities to streamline this process. The Programme effectively operates a 'clearing house' for permissions, using the farm plans to determine whether works require additional permission or impact assessments and if so, provides support and a framework through which farmers can more easily obtain permission to carry out works with assistance from the farm advisor and Burren Programme team. This has reduced the number and cost of permissions required by farmers, particularly for more standard tasks, and reportedly makes it easier and quicker for farmers to navigate the permissions process for more non-standard tasks.

3.2.4 Other actions

In addition to the core I-1 and I-2 interventions, the Programme provides annual training that is compulsory for all farmers to attend. This training covers practical topics relating to the Programme, farm/field management, and site enhancement works. These sessions generally comprise a classroom-based tutorial, followed by a walk and presentation on the farm of another member of the Programme. Based on the interview and surveys, the farm walk components are popular among farmers as they provide direct and practical examples of different management practices in action on participants' farms, as well as providing farmers with an opportunity to talk, share information, and compare practices with other Programme participants in attendance.

As a flagship agri-environment scheme, the Burren Programme also conducts extensive outreach with external groups and with the local community. Since 2010, the Programme has hosted or taken part in nearly 350 events in Ireland and abroad, and maintains links with local, national and international educational, agricultural, cultural and environmental organisations. These networks are described in greater detail in Section 4.

Beyond these formal interventions, the presence of a local team at the Burren Programme's headquarters in Carron, Co. Clare is reportedly a valuable resource for farmers, who can contact the office directly and seek assistance with any issues or queries regarding the Programme and their farm.

3.2.5 Interface with other agri-environment schemes

While the Burren Programme is a local agri-environment scheme tailored to the Burren region, much of this land is also potentially eligible for the Green, Low Carbon, Agri-Environment Scheme (GLAS); an agri-environment scheme administered by DAFM and funded under the 2014-2020 Rural Development Programme. GLAS is a voluntary 'actions-based' AES that operates at a national level, in which farmers are paid for carrying out different optional 'actions' on their farms, such as measures to protect certain bird species, measures to improve water quality, or the management of fields as 'low-input' pastures.

While the Burren Programme and certain GLAS actions target similar environmental objectives, both schemes are required to prevent double funding on the same parcel of land. This means that land managed under certain GLAS actions – particularly the Low Input Permanent Pasture (LIPP) and Traditional Hay Meadow (THM) options – cannot also receive Burren Programme I-1 payments at the same time, and farmers must choose which scheme to join. As an actions-based scheme, GLAS participants with the LIPP and THM actions must adhere to certain management practices that result in reduced productivity/output but improved environmental outcomes, such as lower fertiliser use and mowing frequencies.

However, in contrast to the results-based scoring in the Burren Programme which pays farmers using rates based on the scores they achieve, farmers in GLAS can receive the full payment for their field (€315 per hectare) by carrying out these actions, without necessarily having to demonstrate the equivalent level of environmental results or improvement[17]. For example, a BLG field receiving the average field score of 7 would result in a payment of €168 per hectare in the Burren Programme; just half of what the field could otherwise receive under the LIPP/THM actions at the same level of quality and management. This has led to some criticism by stakeholders who argued that this acts as a disincentive for farmers to join and to manage land under the Burren Programme, as they could potentially earn more income per hectare in GLAS for the same level of effort. As the LIPP/THM actions in GLAS are limited to 10 hectares, this is especially the case for farmers with smaller holdings who may find it more attractive to participate in these actions over the Burren Programme. The interface between these two schemes will be discussed further in the economic assessment.

[17] BLG fields in the Burren Programme are required to achieve a score of 10 in order to earn a payment of €315 per hectare (on the first 10 hectares).

4. Social Assessment

4.1 Introduction

Social Impact Assessment (SIA) is a process for the identification, analysis, assessment and monitoring of the social impacts of a project or programme, both positive and negative. The social impacts are the direct and indirect impacts that affect people and their communities at all stages of the programme lifecycle. This social assessment considers the social, intellectual and human capital of relevance to the Burren Programme (2016 to present day) and Burren Farming for Conservation Programme (2010-2015). Both programmes followed and built upon the BurrenLIFE project (2005-2010) and initiatives taken by various stakeholders in the Burren from the late 1990s. The focus of the social assessment is on the last decade, with explicit recognition that the two programmes were a continuum of initiatives over a longer period, and where appropriate, references are made to important milestones or events prior to both programmes.

A process of identifying and screening social effects was undertaken[18], with a particular emphasis on the social outcomes of affected communities. The social assessment considers the effects of the Burren Programme on social, human and intellectual capital. Specifically, it examines:

- Social capital and network formation
- Education
- Knowledge
- Innovation

The Burren Programme is an agri-environment scheme targeted at farmers within SAC in the Burren region, with much focus on work undertaken at farm level. However, where groups of individuals cooperate and work toward a shared objective, there is potential for networks to be formed around this goal. Identifying and defining both the “communities of association” and “communities of practice” is important for evaluating the social impacts of a programme, as they are the defining building blocks for communicating, generating ideas and innovation, learning and sharing knowledge, and disseminating organisation knowledge. Building trust and a sense of working together towards a common shared goal are defining features of a community. Although this process may not be the primary objective of an agri-environment programme, this building of what is termed ‘social capital’ has the potential to be a valuable secondary impact of an agri-environment programme.

4.2 Social Capital and Network Formation

Networks were formed in implementing the Burren Programme, based around the shared problem the group was facing or addressing. The Burren Programme team monitor the number of people at the events they hold, and the audience they reach (if invited to give talks/seminars). From this dataset, it is possible to identify networks by the type of network and the reach of these networks. Six types of networks with which the Burren Programme maintains formal and informal links were identified using this method, giving insight into the extent of the Programme’s activities, both in Ireland and overseas. These are:

- **Agricultural –** Farmers, farm advisors, agricultural organisations and other agri-environment schemes in Ireland and Europe.
- **Environmental –** Environmental groups, conferences and non-governmental organisations.
- **Cultural –** Cultural groups and general public outreach, primarily through the work of the Burrenbeo Trust.[19]
- **Educational –** Schools, third-level education institutions and courses, and academia.

[18] IAIA guidance (2015) Social Impact Assessment: Guidance for assessing and managing the social impacts of projects
[19] The Burrenbeo Trust is a landscape charity, initially set up as a communication tool/website to inform people about the living Burren and the role of the local community, particularly farmers. Various initiatives stemmed from the Burrenbeo trust, including education and upskilling programmes, farm walks, ‘meitheal’, and voluntary community conservation, organisation of events and festivals, recognition of local excellence and awards etc. https://burrenbeo.com/the-trust/about/

- **Development –** Rural and economic development bodies, conferences and organisations.
- **Policy –** Irish and European policy-makers and regulatory agencies.

Table 4.1 below is useful to illustrate the size of each network, giving an indication as to their overall significance. This table indicates that the Burren Programme has built particularly strong networks with agricultural, environmental, cultural and educational groups and organisations, with the agricultural networks identified as the largest for all three levels; local, national and international.

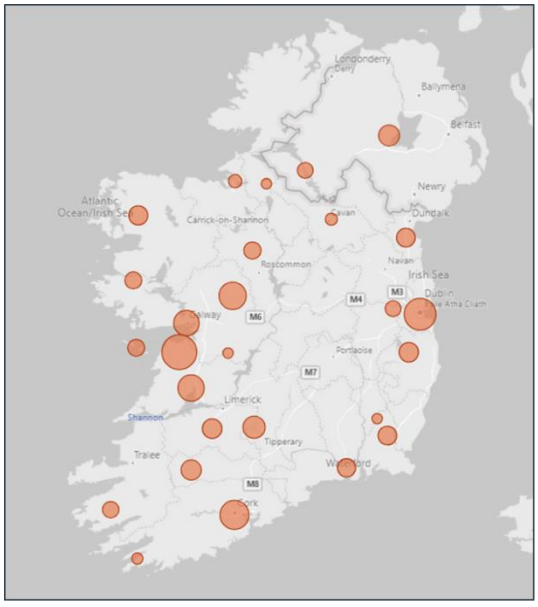
Table 4.1: Burren Programme network types and size

	Local	National	International	Total
Agricultural	691	2,537	1,660	**4,888**
Environmental	76	1,234	1,614	**2,924**
Cultural	1,505	913	165	**2,581**
Educational	735	1,732	373	**2,840**
Development	387	342	228	**957**
Policy	15	321	204	**540**
Total	**3,409**	**7,079**	**4,244**	**14,732**

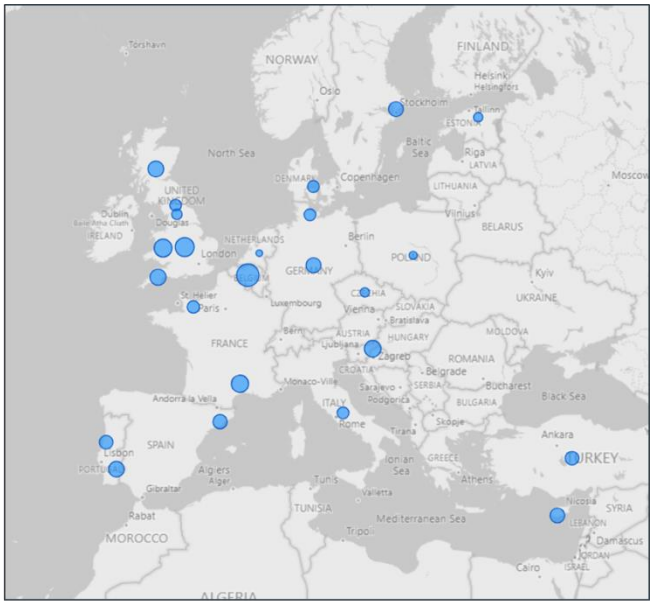
Source: Number of people at events, as per data provided by the Burren Programme

The location and relative strength of these networks (as represented by 'bubble' size) in Ireland and Europe are also mapped in Figure 4.1. As would be expected of an area-specific agri-environment scheme, the reach of the Burren Programme is strongest in the Burren area, while also maintaining strong links with other schemes in Ireland and Europe. These networks, and the potential effects associated with these networks, are discussed in the next sections.

Figure 4.1: Irish and European networks



Irish networks



European networks

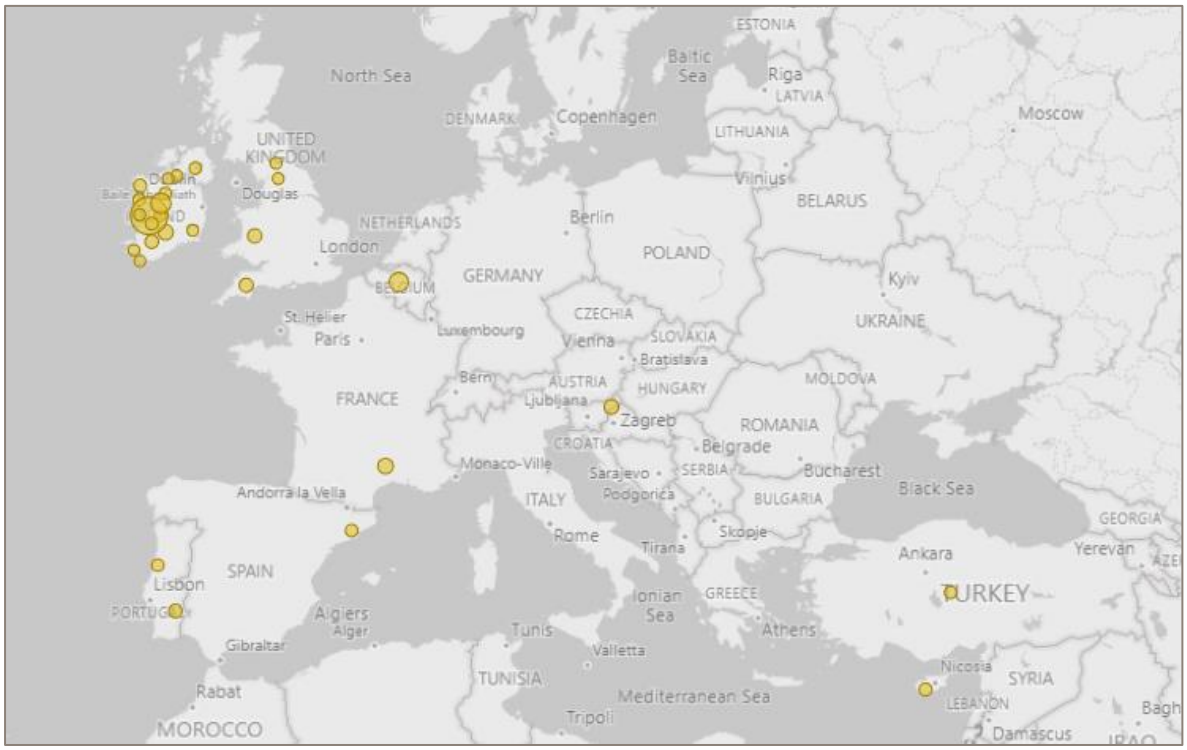
Source: AECOM Analysis / Microsoft Power BI, 2020

4.2.1 Agricultural Networks

The Burren Programme

At a local level, the Burren Programme forms a network of 328 local farmers, which can be identified as the large cluster centred on the Burren in Figure 4.2.

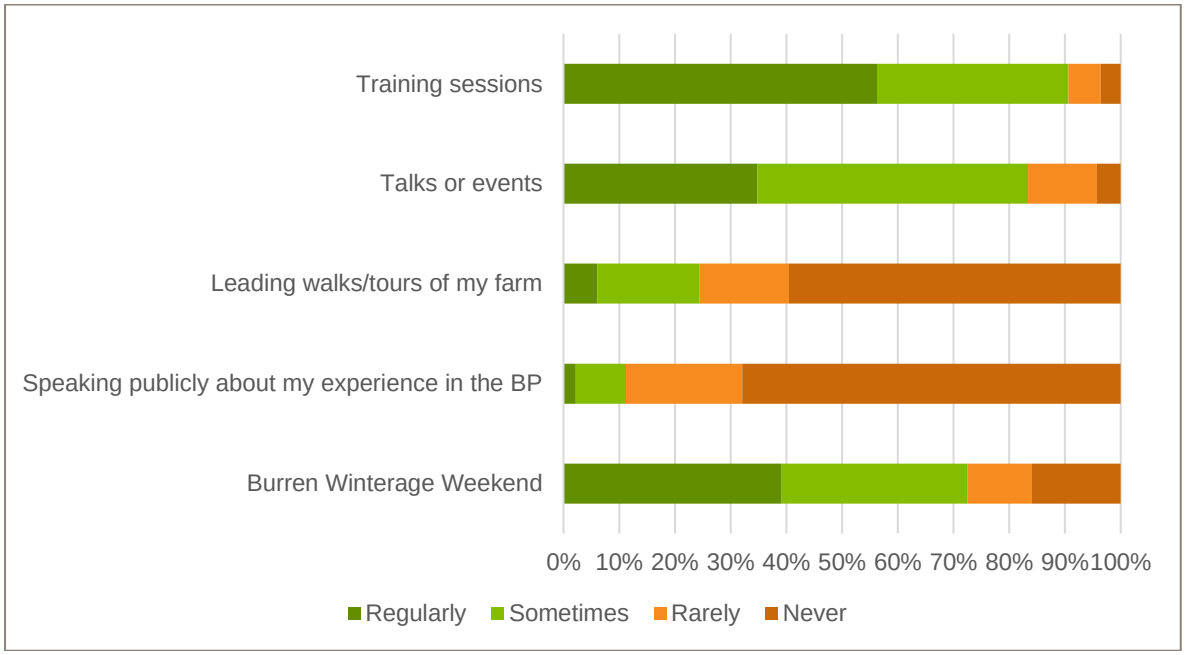
Figure 4.2: Agricultural networks



Source: AECOM Analysis / Microsoft Power BI, 2020

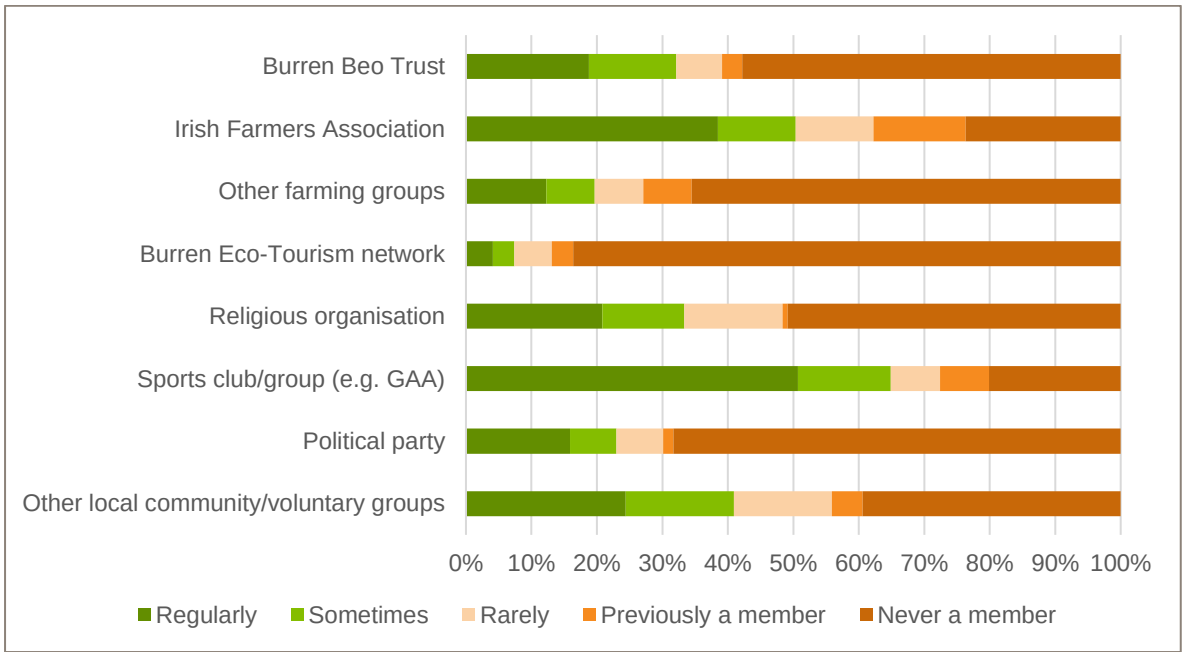
Local networks generally represent a form of 'bonding' social capital, meaning that they help to increase the strength of relationships within an already-established group. This group is ascribed by the eligibility criteria for the Programme, which is open to farmers who farm within the Burren. The Programme organises a number of events and activities, such as mandatory training sessions, talks or the Burren Winterage Weekend, that provide participants with opportunities to interact and strengthen ties with other farmers in the Burren. There is evidence of high participation and engagement in these events, with Burren Programme farmers participating more frequently than in those of other groups and organisations. For example, Figure 4.3 shows that the proportion of farmers 'regularly' or 'sometimes' participating in talks/events (83%) or the Burren Winterage Weekend (72%) is higher than the events of other local groups (shown in Figure 4.4) like the IFA (50%), sports clubs (65%) or local community/voluntary groups (41%).

Figure 4.3: Participation in the Burren Programme's activities



Source: 2020 Farm Survey

Figure 4.4: Participation in other groups/organisations



Source: 2020 Farm Survey

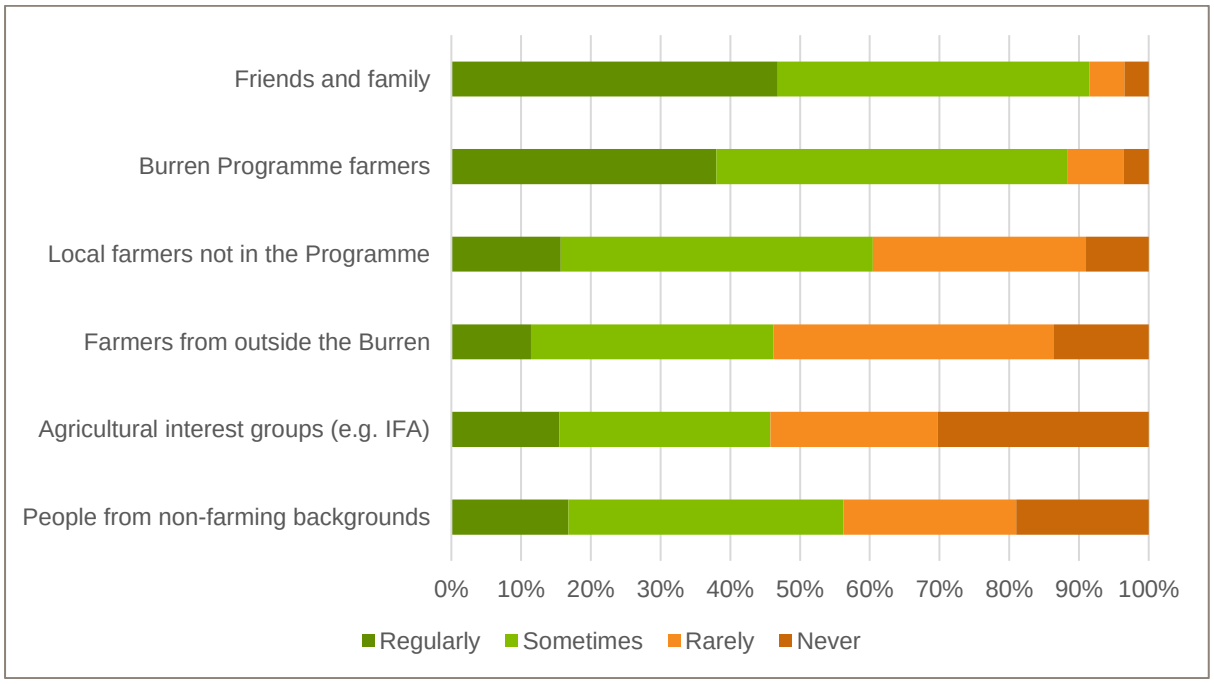
However, despite these high levels of participation, the importance that Burren Programme farmers placed on these opportunities for interaction was more moderate compared to other benefits of the Programme. In the 2020 Farm Survey, farmers ranked *"interaction and sense of community with other farmers"* as the least important aspect of the Programme to them (shown previously in Figure 3.5), indicating that bonding social capital amongst the group is not the key motivating factor in their decision to join and remain within the Programme. However, it should be noted that many Burren Programme farmers are likely to have already established ties with one another as neighbours, local community members, or members of clubs and groups. An overwhelming 87 per cent of farmers responded positively to the survey question of whether they felt a sense of community with other farmers in the Burren Programme, 8 percent gave a mixed response, while only 5 per cent of farmers responded with a 'no' to this question. Interestingly, none of the farmers who did not feel a sense of community were aged over 65 years, indicating an important sense of community and belonging for the older Burren Programme farmers. The Burren Programme provides a platform to solidify and

strengthen existing relationships, although unsurprisingly, this is not a key motivating factor for farmers to participate.

It was noted that the uptake of the Programme by farmers in the Galway Burren was low, and there was a perception of a 'cultural divide' between farmers in the 'Clare' and 'Galway' parts of the Burren; with farmers in the eastern area of the Burren not necessarily associating themselves as part of the Burren. Only 6 per cent of respondents to the 2020 Farm Survey were from the Galway Burren, which suggests that take-up is indeed low, although there were no discernible differences in their answers to questions regarding social capital compared to the rest of respondents. This suggests that levels of social capital among farmers in the Programme is similar, regardless of location.

There is evidence that this network has facilitated more regular information and knowledge-sharing among farmers in the Burren Programme. Farmers were asked in the 2020 survey about the frequency at which they discuss their unique farming practices with various sets of people. As Figure 4.5 shows, Burren Programme farmers are much more likely to discuss their farming practices amongst themselves, compared to discussions with local farmers outside of the Programme or with farmers from outside of the Burren region. Interestingly, there is less discussion between participants and agricultural interest groups (e.g. IFA, Teagasc) than there is with other people from non-farming backgrounds. It was also reported in the interviews (and in some survey responses) that farmers generally enjoy training sessions involving farm walks on other participants' farms, as it gives them an opportunity to discuss and compare their own farming practices with others'. This type of knowledge-sharing is likely to make the implementation of the Programme more effective, as it encourages learning and the application of best-practice management on Burren farms. Although it requires central coordination and organisation, it formalises and fosters the innate sense of curiosity within a community.

Figure 4.5: Frequency of discussing unique Burren farming practices with various groups

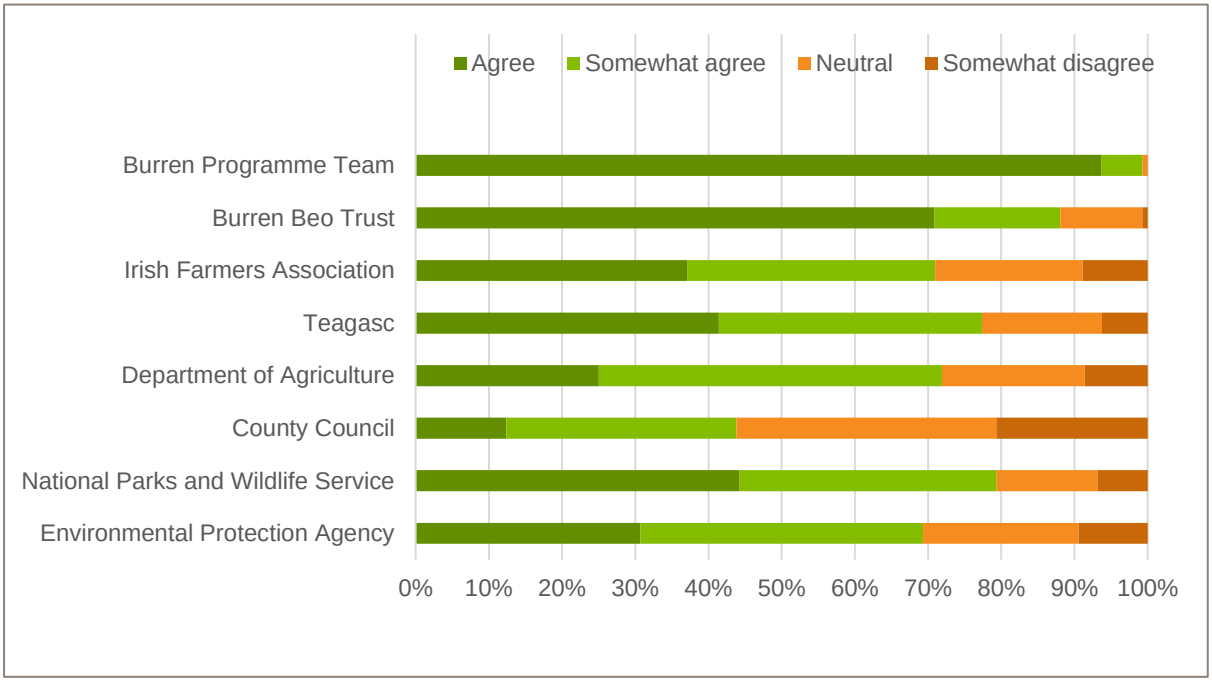


Source: 2020 Farm Survey

The second significant effect associated with the Burren Programme relates to its role as a representative and advocacy body for farmers and the region. It was noted in the interviews that the Burren otherwise lacks a unified representative body for the region; being split between two county councils and several separate municipal districts within these. In the 2020 Survey, an overwhelming majority (93%) agreed fully that the Burren Programme team "understands and represents" their needs as Burren farmers, compared to just 11 per cent who said the same of their local authority, for example (Figure 4.6). This supports sentiments expressed in the interviews regarding the importance of the Programme to its members not just as an agri-environment scheme, but as a body that they trust to represent and advocate for the Burren to outside actors.

By acting as a mediating agency between farmers and the wider statutory agencies, this likely helps to create “bridging social capital” between participants and these agencies. For example, Figure 4.6 indicates that Programme participants have relatively high levels of trust in DAFM and the NPWS, which is notable given the historic levels of mistrust with state agencies during the 1990s over the SAC designations in the Burren and the development of the Mullaghmore Visitor Centre.

Figure 4.6: Farmer’s opinion of level of understanding and representation of farmer needs from selected organisations



Source: 2020 Farm Survey

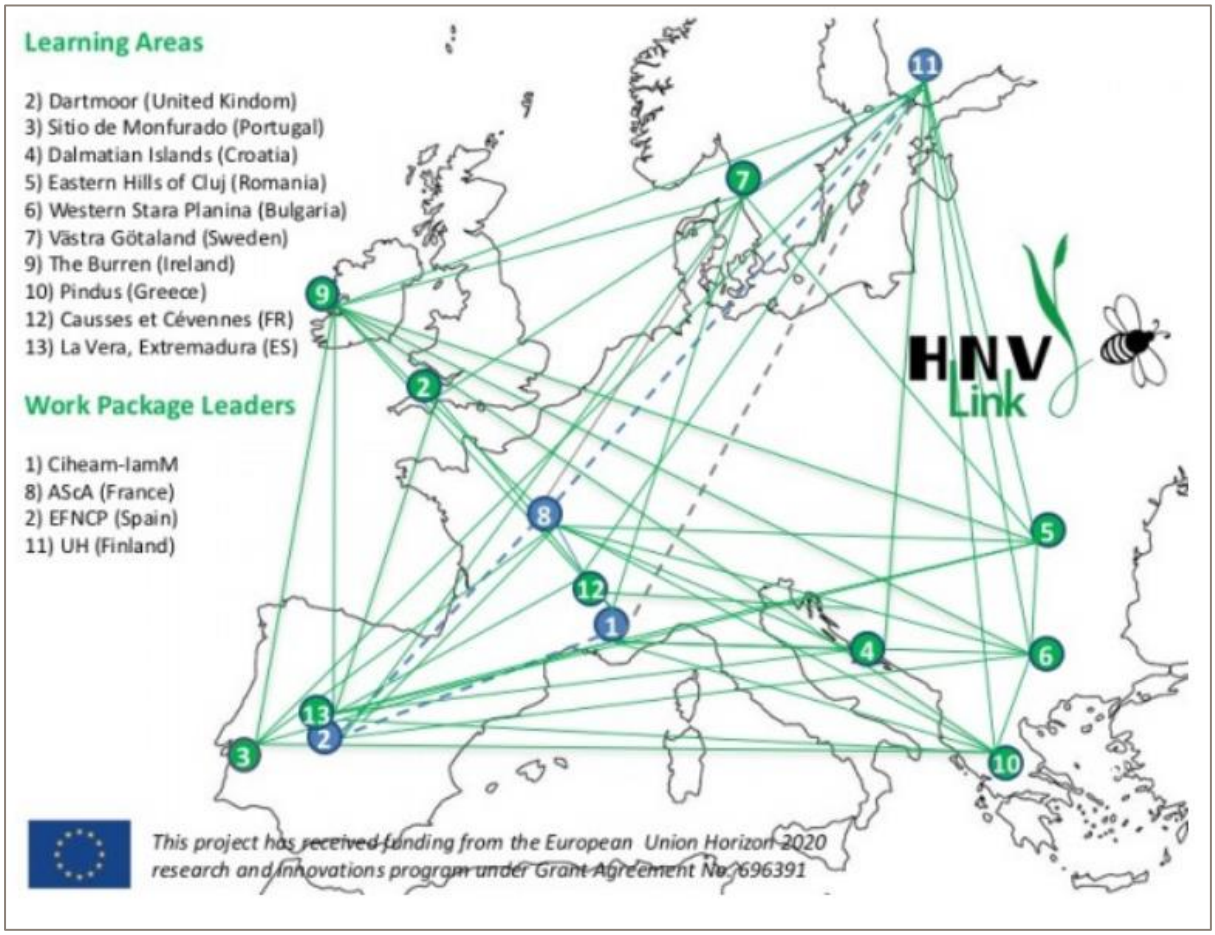
Links with other agricultural and agri-environment groups

The Burren Programme has built strong links with other agricultural and agri-environment groups in Ireland and Europe. In Ireland, the Programme maintains links with and provides advice to other AES such as the Hen Harrier, Pearl Mussel, and Caomhnú Árann projects. These links extend to other AES and LIFE projects in the United Kingdom, France and Portugal. One particularly relevant example is ‘High Nature Value Farming: Learning, Innovation and Knowledge’ (HNV-Link), a network of 13 High Nature Value farming schemes around Europe. The Burren is classed as a ‘learning area’ within this network, meaning that innovations and lessons are highlighted and shared with other members of the network. The Burren Programme was also an instigator of the (Irish) Network of Farming for Nature Ambassadors[20], which had its origins in the Burren Programme Annual Awards. These annual awards are announced at the Burren Winterage Weekend, and celebrate a number of Irish farmers for their environmental performance. They are a community recognition of farming effort and achievement. This is an example of the practice of positive affirmation that is evident in the approach taken in the Burren Programme, similar to the ‘results based payment’ design of the programme, and aligned with the concept of ‘The Good Farmer’, which moves away from the depiction of farmers making decisions predominantly on monetary/economic grounds, but that decisions are taken with regard to culture and symbolism (Burton, et al. 2020).

The effect of these national and international agricultural networks primarily relates to increased knowledge-transfer and the adaptation of practices, innovations and lessons learned from the Burren Programme to other projects. Many of the Burren Programme’s methods have been directly adapted by other schemes: for example, versions of the Burren’s field scoring system and results-based payment model, which provides a way of measuring and rewarding farmers for the environmental results they deliver, have been developed in other AES after witnessing its success in the Burren, such as the Hen Harrier and Pearl Mussel projects.

[20] For more details see: www.farmingfornature.ie

Figure 4.7: HNV-Link learning areas and work packages



Source: IT Sligo, 2020.

Other influences of the Burren Programme are more subtle, and relate more to lessons learned and examples of best practice from the Programme being shared and applied to other schemes and contexts. For example, HNV-Link have published a report on the management 'innovations' from the Burren Programme which has been shared with its members, such as the value of a local-led / participatory approach or the importance of fairly rewarding farmers for their efforts[21]. Burren Programme team members also participated in RBAPS; a project funded by the European Union that was aimed at developing pilot results-based payment schemes in Ireland and Spain. Ultimately this type of knowledge-transfer contributes to the development and adoption of best-practice guidelines for the conservation of HNV farming in Ireland and Europe, and highlights the importance of the Burren's network formation to those outside the region.

[21] Moran and Dunford, 2017.

Table 4.2: Effects relating to Agricultural Networks

Capital and Effect	Nature	Impact	Scale	Significance
Social The creation of a local agricultural network, leading to "bonding" social capital between Burren Farmers	**Positive**	**Moderate**	**Programme**	**Moderate**
Intellectual Increased knowledge- and information-sharing between participants of the Burren Programme	**Positive**	**Moderate**	**Programme**	**Moderate**
Social Increased representation for Burren farmers, leading to "bridging capital" between farmers and agencies	**Positive**	**High**	**Programme**	**High**
Social "Linking" social capital between the Burren Programme and other European agri-environmental schemes	**Positive**	**High**	**National**	**High**

4.2.2 Environmental Networks

As a flagship agri-environment scheme, the Burren Programme also maintains strong links with environmental organisations and non-governmental organisations (NGO) in Ireland and Europe. The Programme team regularly attends and speaks at Irish and international conferences, such as the National Biodiversity Conference in Ireland and European conferences/workshops in the Brussels. As well as this, other environmental and conservation NGOs have been hosted on farm visits to the Burren. As shown in Figure 4.8, the two most important nodes in the environmental network are Dublin and Brussels, indicative of this environmental policy development work.

Figure 4.8: Environmental networks

Note: Many environmental organisations were not linked to specific locations and were not mapped

Relationships between the Programme and environmental groups represent a form of bridging social capital, and there are high levels of professional trust built between the Burren Programme and its participants and environmental agencies and NGOs. These networks with environmental groups are particularly relevant given the historical disputes between the local community and outside groups over the issues of SAC designations and controversial plans for a visitor centre at Mullaghmore during the 1990s. O'Rourke (2005) describes how *'the outsiders were presented as environmentalists, academics, urban yuppies and misfits who were only concerned with the environment and the aesthetics of the landscape, rather than the communities who had to make a difficult living there',* while Dunford (2016) notes the negative connotations surrounding terms such as 'environment' and 'conservation' during this period.[22]

By building dialogue and facilitating regular interaction between those from farming backgrounds and those from environmental backgrounds, the Programme has been impactful in highlighting the mutually-compatible aims of both groups and fostering cooperation between them. In the 2020 Farm Survey for example, a large proportion of farmers (78%) agreed or somewhat agreed that the NPWS *"understood and represented"* their needs as a Burren Farmer, which interestingly, is larger than the percentage who said the same of the IFA (65%), a representative organisation specifically for farmers (See Figure 4.6 above).

Joint initiatives with environmental NGOs are also indicative of these strong relationships, such as the 'Farming Together for Biodiversity Awards', which is run by the Irish Wildlife Trust and which was awarded to two participants of the Burren Programme in 2018. The philosophy of the awards aligns with the reward system set up in the Burren Programme, of rewarding farmers for activity that improves and enhances the environment, recognising excellence and learning from it. In terms of formal recognition for biodiversity and landscape protection at a project-level, the Burren was also awarded the 'European Diploma for Protected Areas' by the Council of Europe in 2013 (Ireland's only area that was awarded this and one of the few sites in Europe to be (largely) in private ownership to receive the award). The BurrenLIFE project was joint winner of the 'Best Ever LIFE Nature and Biodiversity Project in the EU' in 2017 and 'Farming for Nature' won a global award in the 'Act for Biodiversity Challenge' in 2020 for social innovation that improves farmland biodiversity. Farming for Nature is an independent not-for-profit initiative that supports high nature value farming in Ireland, established in 2018, and emerged from the work that was undertaken with farmers in the Burren region, emphasising that farmers are a part of nature and not apart from it. These awards indicate the impact that the Burren Programme and its predecessors have on the wider agri-environmental community, and they raise the credibility and visibility of activities undertaken in the Burren.

These examples are indicative of the trust that has been built up between the farming community in the Burren and wider environmental networks, and highlight the role of the Programme as an intermediary and facilitator for these networks.

Table 4.3: Effects relating to Environmental Networks

Capital and Effect	Nature	Impact	Scale	Significance
 **Social** "Bridging" social capital between farmers and environmental agencies and organisations	**Positive**	**High**	**National**	**High**

[22] For a discussion of some of the tensions in the Burren, see Leonard, L. 2007. The Environmental Movement in Ireland. Springer Science & Business

4.2.3 Cultural heritage and networks

> ***"Many farm families can trace their roots in the area going back centuries, and this gives people a strong sense of tradition, community and place. There's a strong motivation to hand the landscape to future generations in a good condition"*** – Burren Programme Stakeholder

Cultural heritage, and the traditions and practices associated with it, is a form of intellectual capital held by the community that cultural networks help to preserve and promote. The significance of these cultural networks and activities to the Programme's overall impact is potentially wide-ranging, but difficult to pinpoint, and often intersects with topics such as education and knowledge, the preservation of traditions and practices, and pride in their local heritage. However, the effect of these networks is perhaps summarised in two parts: at the farm level, and at the community level.

Farming heritage

As outlined previously, the intrinsic link between farming and the landscape in the Burren has led to the development of unique farming and cultural traditions. Winterage, the practice of moving livestock to upland pastures for the winter, is a prime example of this: while transhumance in the rest of Europe generally involves cattle being moved to upland pastures during the summer months, this seasonal pattern is reversed in the Burren, which is relatively rare in an international context. The significance of this unique farming system is reflected in its inclusion in Ireland's 'National Inventory of Intangible Cultural Heritage', which represents official State recognition of different cultural practices throughout Ireland.

The Burren Programme has helped to preserve farming traditions and practices like Winterage and ensure their continued day-to-day use on farms. To do this, the Programme (as well as BurrenLIFE before it) adopted an approach that was considered to 'pragmatic' rather than 'nostalgic'; it did not seek to simply adopt old traditions exactly as they were carried out hundreds of years ago, but rather, to adapt them by removing barriers to their use on modern farms. This approach can be most clearly seen in the Programme's measures to encourage Winterage, such as funding the construction of access tracks to allow vehicular access to Winterage fields or the development of the BurrenLIFE Concentrate Ration to reduce the need for supplementary feeding. Described by one interviewee as promoting *"ancient farming systems using modern-day technologies*", the model developed by the Burren Programme has facilitated farmers to adopt and continue on these practices on their own farms without negatively impacting efficiency or viability. It is clear that Burren farmers also recognise their role in the Burren's cultural heritage, and feel pride in being able to carry on these traditions. For instance, the overwhelming majority of farmers (97% of respondents) agreed that "[their] farming practices are key to the Burren's unique landscape and heritage", with almost all farmers (99%) also agreeing that "programmes like the Burren Programme are needed to ensure good farming practices are continued in the Burren", an indication of very high additionality of the Programme.

Networks and promotion of cultural heritage

While the Burren Programme has done significant work to preserve these farming practices and traditions on Burren farms, cultural networks and collaboration with other groups provide opportunities to share this heritage with the wider community. The Programme has organised and taken part in a large number of cultural and general public outreach events, both within and outside of the Burren. When discussing cultural networks and outreach, the role of the Burrenbeo Trust, a charity based in the Burren that aims to foster a 'connection' among people with the places in which they live, cannot be overlooked. While a separate entity, the Burrenbeo Trust was often described in the interviews as a "sister organisation" of the Programme due to their close links and often similar aims, and many of these cultural and outreach events were either run by, or jointly with, the Trust.

With many of these events centred on the Burren's unique farming practices and heritage, these cultural networks and collaboration with the Burrenbeo Trust provide a mechanism to share these practices with the wider community. One such example of this collaboration between the two organisations is the annual Burren Winterage Weekend, which was established in 2013 and comprises a series of events and talks held over the October Bank Holiday to mark the beginning of

Winterage[23]. One of the highlights of the Winterage Weekend is the Cattle Drive (shown in Figure 4.9), where community members and visitors are invited to join a local farm family as they move their herd up to a Winterage field. This event, which attracts hundreds of people each year, is a prime example of how the two organisations work together to celebrate farming heritage, and to place it firmly at the centre of community life in the Burren.

Figure 4.9: Burren Winterage Weekend Annual Cattle Drive

Source: Burren Winterage Weekend, 2019.

The Programme collaborates in other events run by the BurrenbeoTrust that help to highlight the links between farming, landscape and culture in the Burren. These include the 'Burren in Bloom Festival', a festival celebrating the landscape and biodiversity of the Burren; a series of monthly farm walks that has run for over ten years; winter heritage talks; and the 'Áitbheo' schools programme, which is discussed further in Section 4.4.

Other cultural networks include the formal collaboration with the Heritage Council, through the development of the Burren Community Charter in 2011. The Burren and Cliffs of Moher Geopark was designated as a United Nations Educational Scientific and Cultural Organisation (UNESCO) site in 2015, highlighting the importance of cultural heritage in the Burren area.

While cultural networks are a mechanism by which farming and cultural heritage can be preserved and shared, it is important not to overlook the role of farmers in this process. An aspect which was discussed in stakeholder interviews was the culture of storytelling among Burren people and farmers, with commentary on the 'unique turn of phrase' that is often used; an oral culture that is maintained, albeit indirectly, through the Burren being a living and farmed landscape. It was reported that 'piseoga' and farming superstitions remain strong among some farmers, and still have the power to govern how farmers manage their land, such as not disturbing a 'lone hawthorn tree' or archaeological monuments (see section 6.4). Oral tradition is an important component of cultural heritage, and it is increasingly recognised as a mechanism for transmitting social values, spiritual philosophies and local history. When given the opportunity, many farmers in the Burren have shown a willingness to pass on this farming heritage to a wider audience. Indeed, several farmers have also participated in the creation of films and documentaries showcasing various aspects of the Burren's farming and cultural heritage, such as TG4's *"An Bhoireann",* Sea Fever Productions' *"The Silver Branch"*, and *"Stories from the Landscape – Cattle Drove"* by Clare County Council; sharing their own stories and experiences and demonstrating the external interest in the farming activities undertaken in the Burren and its way of life. An important impact of the BP has been to move from a situation where people did

[23] The Winterage Festival was founded by the Burren Programme, Burrenbeo Trust and Burren IFA, and is now funded by DAFM.

not realise there was any farming in the Burren, to a situation of the Burren being synonymous with farming, and explicit recognition that the Burren is a farmed, cultural landscape. This is an example of the sense of identity that the Burren Programme has fostered.

Table 4.4: Effects relating to cultural heritage and networks

Capital and Effect	Nature	Impact	Scale	Significance
 **Intellectual** Preservation of traditional farming practices by facilitating their use on modern farms	**Positive**	**High**	**Programme**	**High**
 **Intellectual** Promotion of farming traditions/practices within the wider cultural heritage of the Burren	**Positive**	**Moderate**	**Community**	**High**

4.3 Leadership

The preceding sections presented evidence of social and intellectual capital within the various Burren Programme networks. Social capital is defined by the strength of relationships between people and organisations, and there was evidence of different levels of social capital throughout the Burren Programme's activities.

Although the importance of leadership is often overlooked in the discussion of social capital, the vision and leadership strength of the Burren Programme Team emerged as a key theme throughout the interviews. There was unanimous and immense support for the leadership style of the Burren Team, who were described as *"a unique combination of people, with passion and skills, who are still harmonising",* and the Evaluation identified several key individuals who drove the Programme and forced collaboration at various levels (farm, community, policy) to ensure the Programme was successful.

In particular, the benefits of the 'bottom-up' management style adopted by the Burren Team were highlighted in interviews with stakeholders both inside and outside of the Programme. This contrasts with the historical context of the Programme outlined in Section 3.1, which describes how the Programme emerged during a period where there was considerable acrimony between the local community and state authorities over a 'top-down' approach to implementing new environmental protections in the Burren. Recognising that the unique conditions of the Burren and its environment precluded a 'one-size-fits-all' approach to conservation, early leaders engaged extensively with farmers and community members to design a scheme and a set of management practices that worked for farmers, the environment and regulatory authorities. This engagement process by early leaders was often quite informal, taking place as conversations on farms and in kitchens throughout the Burren, and placed great importance on farmers' views and local knowledge. This 'bottom-up approach' and this respect for local knowledge was reportedly critical not only to ensuring that the environmental solutions that were developed were suitable for the Burren, and for securing long-term buy-in from farmers and the local community.

> ***"His magic ingredient is his huge respect for farmers. You don't generally expect that with an agency – usually they think they are the experts, with a need to impart that expertise onto farmers or general public. He knows the importance of local knowledge and has always listened and valued what farmers had to say. He is excellent at networking and has generated an immeasurable level of goodwill in the Burren. He could be called The King of the Burren"*** – Stakeholder interview, regarding the Burren Programme Manager

This 'bottom-up' approach continues through the implementation phase of the Burren Programme. The management practices promoted by the Programme requires considerable effort on an ongoing basis to work out tailored solutions at a field level, and having a local team in place (as well as the farm advisory system) provides the Burren Programme with the flexibility to work with farmers to determine what is required for a particular landscape or area. This style of local leadership and management remains popular among farmers: when asked in the 2020 Farm Survey about the lessons that other AES could learn from the Burren Programme, the most common themes in respondents' answers related to this local leadership and flexible approach (see Table 4.5).

Table 4.5: Lessons for other AES – key themes from the 2020 Farm Survey

Theme	% of farmers responding
Local leadership / bottom-up management style	**34%**
Programme is flexible / tailored to individual farm circumstances	29%
Programme is tailored to / built around the region's unique characteristics	21%
Programme fairly rewards farmers for the effort they put in	19%
Programme delivers clear environmental results/benefits	19%
Low bureaucracy for farmers / simple to administer	15%
Specific farm practices / techniques	14%

Source: 2020 Farm Survey

While these are generally important lessons for other agri-environment schemes, the stakeholders were also asked how contingent the success of the Programme is on the current set of leaders. Many were aware of the need to build long-term resilience into the structure of programmes like this, and there is evidence of succession planning by the Burren Programme by recruiting locally and building up the Burren Programme team.

One stakeholder, who was involved with the programme from early days, commented that they previously did not think that the model of the Burren Programme could be replicated elsewhere in Ireland, and that its success was down to personal leadership of the Burren Programme team. However, since observing the emergence of Ireland's EIP-AGRI (European Innovation Partnership Operational Groups), such as the Hen Harrier and Freshwater Pearl Mussel projects among others, they identified a similar localised approach as an integral part to their own development. While support and the fostering of local leadership is an activity that can be overlooked in the design of schemes, the evidence from this Evaluation suggests this model is a keystone to their success, and has created an expectation of strong local leadership in future AES.

Table 4.6: Effects relating to Leadership

Capital and Effect	Nature	Impact	Scale	Significance
Social "Bridging" social capital as a result of strong local leadership	**Positive**	**High**	**Programme**	**High**

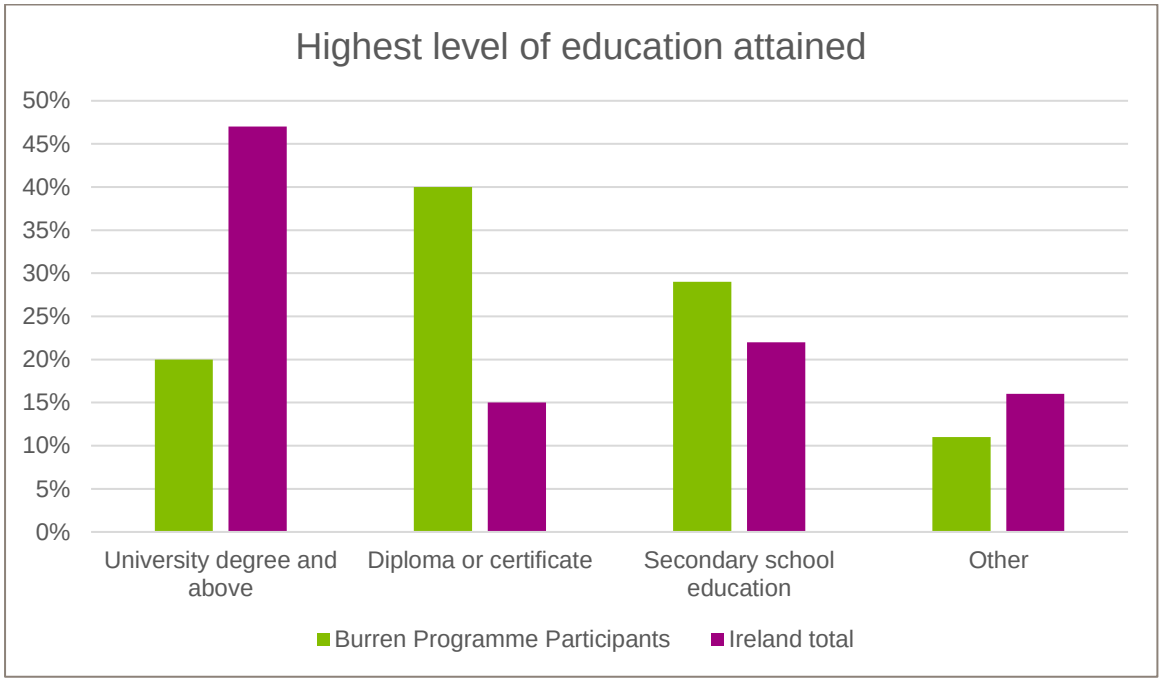
4.4 Education

Education and knowledge are defining features of the Burren Programme, emerging as a central theme in all the interviews on the Burren Programme. A distinction emerged between education and knowledge, and this section will focus on education as the formal communication of knowledge and skills.

The importance of education in society is relatively uncontested, and benefits include fairness and social equity, self-esteem and the potential to become more productive. Traditional indicators for education include measurement of highest qualification obtained, and a previous survey of Burren Programme farmers undertaken in 2019 showed levels of university qualifications lower than the national level, but higher rates for diploma or certificate level qualifications than for all of Ireland. The survey also showed lower rates of farmers who did not complete secondary education, in comparison to the national total[24].

[24] Central Statistics Office, 2019.
Note – this is not because Burren farmers are younger than the national average of farmers - in 2016, 30% of Irish farmers were aged 65 or over while 33% of Burren survey respondents were in this age bracket. Burren farmers are slightly older than the national average.

Figure 4.10: Educational attainment of Burren Programme farmers



Source: Burren Programme (2013, internal data) Attitudinal Survey of Burren Programme Participants and Central Statistics Office (2016) Census,

While formal education is sometimes used as a proxy for skill level[25], it became apparent that the Burren programme is based on a very different approach to education: one that is participative, non-hierarchal and respects a number of knowledge systems.

4.4.1 Educational events and networks

From 2010 and 2019, the Burren Programme / BFCP team organised or took part in hundreds of educational events, including presentations and field trips within the Burren, engagement with local schools, and the delivery of multi-day training courses.

The first type of event identified is the formal training given by the Burren Programme to its participants, advisors and contractors. Farmers in the Programme are required to attend an annual training day, which generally consists of a classroom-based session, followed by a walk and talk on a selected participants' farm. These training sessions are mandatory and as a result, have high levels of attendance as a result, with approximately 90 per cent of farmers reporting that they 'regularly' or 'sometimes' attend training. The Programme also runs training courses for contractors and advisors to guide them in the implementation of the Burren Programme's practices/requirements on farms. While most of these internal courses are aimed specifically at the implementation of the Burren Programme, the Programme has provided more general skills development courses in the past, such as a business development course run in conjunction with the LEADER Programme.

[25] UNECE, 2016.

> ***"There was a lack of education on local history while I was at school, and I was never taught about the Burren. I have learnt more from Brendan and Ann [co-founders of the Burrenbeo Trust] about the Burren. That's not a fault of the education system but we need to acknowledge the importance of local knowledge systems and the role of NGOs in educating children"*** - Burren Stakeholder

The second type relates to the Burren Programme's engagement with a network of primary schools, most of which are located in the Burren. Participants of the Programme collaborate with the Burrenbeo Trust on their 'Áitbheo' programme, which is a place-based learning programme for primary school students. Although the Burrenbeo Trust is a charity separate from the Burren Programme, the two organisations share a common purpose with their focus on 'learning landscape', which concentrates on ways to raise awareness among children of their connection to place and work within the local community through engaging people and establishing their connections to their surroundings[26]. One stakeholder who grew up on a farm in the Burren commented that there was a lack of education on local history while they were at school, and commented that they learned more in the last fifteen years from the Burren Programme's extended team. While they did not necessarily criticise the formal education system, they stressed the importance of local knowledge systems and the role that non-governmental agencies have in educating children, and that really important learning occurs outside of the formal education system. This perspective was also shared by Burren Programme farmers, with 94 per cent agreeing that school programmes like this are essential to ensure that traditional farming practices are continued in the Burren.

Finally, the Burren hosts numerous educational visits from third level students enrolled in environmental and agricultural-related courses, again with strong local links to the Burren College of Art. Many of these third-level visits are linked with NUI Galway which operates a research centre in Carron, while GMIT in Galway/Mayo, UCC in Cork and UCD in Dublin also have established relationships with the Programme. There are also several links to international universities, mainly located in the United States.

As education is the process of transmitting skills and knowledge from person-to-person, the impact of these educational networks depends largely on the skills/knowledge that people gain from them. It is important to note that most training carried out the Burren Programme is largely tailored the specific actions and requirements of the Programme, meaning that the overall increase in participants' skill levels as a result is likely to be limited. For participants of the Programme, the importance that they place on the Burren Programme's training is mixed: although most farmers rated the training they received from the Programme positively when asked in the various surveys that have been carried out, when compared to the other benefits they receive from the Programme, farmers gave this a relatively low rank (4th out of 6 potential benefits). This is not surprising given that the training offered by the Programme is generally limited to its implementation, and suggests that its overall impact on skills development and human capital has been low. For others outside the Programme, such as primary and third level students, the overall impact is also likely to be relatively low. Instead, the aim of this training is largely to build on existing knowledge and skills, and to show participants how to apply it to this context.

Table 4.7: Effects relating to links with education providers

Capital and Effect	Nature	Impact	Scale	Significance
Human Training and skills development for farmers, contractors and students	Positive	Low	Community	Moderate

4.4.2 Landscape learning and the role of farmers

While the Programme team provides education and training, a particular aspect of the Burren Programme is the recognition of farmers as educators themselves. It was reiterated in several

[26]Bird, 2017.

interviews and comments from the farmers surveyed that there is a deep level of respect of farmer's knowledge shown by the Programme. According to one stakeholder, this attitude is a recognition that *"no-one knows more about a farm that the farmer themselves",* and that farmers play an important role as educators across the farming community and to the wider public. In explicit recognition of their knowledge, a programme of monthly farmer-led walks was instituted (along with the Burrenbeo Trust) to provide community members with an opportunity to learn about the different landscapes of the Burren directly from those who know it best.

What has resulted is a sense of pride and a sense of place, and a growing confidence within the farming community. One farmer commented that before the programme, Burren farmers were a "forgotten people", considered to be living out in the wilderness. This farmer recalled that his brother was nicknamed "the fella from the rocks" when he first attended school in a neighbouring city. Although this was in the 1950s and a different era, it was noted that Burren farmers have a strong sense of identity and a sense of pride. The Burren Team confirmed this observation, particularly farmers' strong sense of pride in their land and in the Burren. One of the main advantages of the Burren Programme from their perspective is the increase in knowledge and understanding of each piece of land, such as the identification of archaeological monuments and field names when drafting each Farm Plan.

This, as well as the general respect shown by the Programme to farmer knowledge, has instilled in some participants greater confidence in their knowledge and in their role in educating others on the Burren's landscape. This can be seen in the relatively high percentage of farmers who reported having led walks or tours of their farms for visiting groups as part of the Programme (40%), as well as the proportion (32%) who have spoken publicly (e.g. to the media or at events) about their own experiences. It is evident that the Programme has helped to instil greater confidence among some farmers in their role as educators, and has provided a framework (e.g. through its events, farm walks, links with external organisations) through which this role can be more easily facilitated.

Given that it is a farmed landscape that has been shaped by ancient and modern farming practices, farmers are integral to 'place-based learning' or 'landscape learning' in the Burren. Place based learning is "*an essential part of creating a direct connection with a landscape, this then leads to a sense of respect and responsibility, and overall empathy for a place that is then crucial to its conservation and sustainable use".*[27] There was overwhelming awareness amongst farmers of the role their farming practices play in maintaining the Burren's unique landscape and heritage with, 98.6 per cent of farmers agreeing to this statement in the farmer survey. The Burrenbeo Trust was considered by stakeholders to be an 'enabling' organisation for the Burren Programme, as it has contributed to raising awareness of the Burren's environment through establishing clear and structured communication channels. It is clear that a particular Burren pedagogy is emerging, with considerable significant interest generated from many other groups in the 'landscape learning' model that is being developed in association with and leveraging from activities undertaken in the Burren Programme.

Table 4.8: Effects relating to Education, Training and Education Networks

Capital and Effect	Nature	Impact	Scale	Significance
Human Greater confidence among some farmers in their role as educators	**Positive**	**High**	**Programme**	**High**

4.5 Knowledge and Innovation

'Education' is used to describe learning processes, usually associated with formal settings, while the information and messages that are conveyed through the learning and discovery process constitute 'knowledge'. One of the biggest problems identified in the 1990s in the Burren was the loss of traditional farming knowledge and skills from the day-to-day operation of farms, given the changes to farming practices and the intensification and mechanisation of farming that had occurred over the

[27] Burrenbeo 2012. Learning Landscape Symposium – Final Report for the Heritage Council.

preceding decades. This process is documented elsewhere[28], but a significant concern was the depletion of innate or indigenous knowledge associated with traditional farming practices. Innate or indigenous knowledge is intrinsically linked to culture and heritage. This section is further divided into knowledge from the scientific process, the intentional use of scientific methods for knowledge formation; and indigenous knowledge systems, the intentional harnessing of farmer and local knowledge into the Programme. The Burren Programme's predecessors adapted the science-based knowledge system to local farm practices and vice versa.

4.5.1 Knowledge from the Scientific Process

The context of the Burren Programme dates back to the mid-1990s, when there was growing disquiet amongst farmers and farm leaders about the institution of new SAC designations in the Burren, and the perceived inadequacy of the then recently introduced Rural Environment Protection Scheme (REPS) in allowing farmers to respond to these designations. There were significant concerns that the "one-size-fits-all" approach of REPS was not resulting in the "right" type of farming practices for the Burren, given its unique environmental and geological conditions. The Burren Irish Farmers Association (IFA) succeeded in getting a derogation from the Department of Agriculture, and a commitment that research would be carried out to determine the compatibility of REPS with the Burren. A Walsh Fellowship-funded study commissioned by Teagasc, UCD, Burren IFA and the NPWS resulted in the publication of a PhD thesis entitled *"The Impact of Agricultural Practices on the Natural Heritage of the Burren"*[29]. This thesis combined scientific methods with local knowledge through a process of spending *"hundreds of hours listening to farmers, in their kitchens over cups of tea or while walking with them on their land*", and was reportedly a key step in giving "scientific credibility" to the traditional farming practices associated with the Burren.

The publication of the PhD and associated book 'Farming and the Burren' was described as a "revelation" and a "game changer" by stakeholders involved during these early years, as it helped to convince authorities of the merits of a tailored, farming-focussed approach to conservation in the Burren. On the back of this, funding was secured for BurrenLIFE. Over five years between 2005 and 2010, the BurrenLIFE team conducted rigorous studies and trials of different farming systems across twenty Burren farms in order to gain a greater understanding of the technical aspects of feed budgets, the nutritional value of Winterage, potential impacts on pollution and water quality, and interdependencies between farming practices and the flora and fauna of the Burren. Some key outputs of this phase included the Burren Concentrated Ration (discussed previously in Section 3.1.4), a Risk of Nutrient Export (RoNE) model for water-related interventions, and a suite of recommendations regarding best-practice management and farming techniques for the Burren.

While a systematic and rigorous evidence-based approach was used, it was not a technical top-down approach, but one which incorporated traditional farming methods and the needs and participation of the Burren farmers along with botanical, zoological and agricultural science. Repeatedly, through the stakeholder interviews and through the farm survey, the respect given to the farmers by the Burren Team was emphasised, and there is evidence that traditional knowledge systems were incorporated and mainstreamed into the systematic and science led approach. Another factor that is seen as contributing to the success of the Burren Programme is that many of the scientists involved in the early years stayed in the area after undertaking their studies. It was noted that the studies of the late 1990s were not the first to focus on the Burren farming systems and landscape. The BurrenLIFE programme was different however as the scientists involved gained the trust of farmers, and stayed in the Burren to advocate for the solutions to the problems they identified.

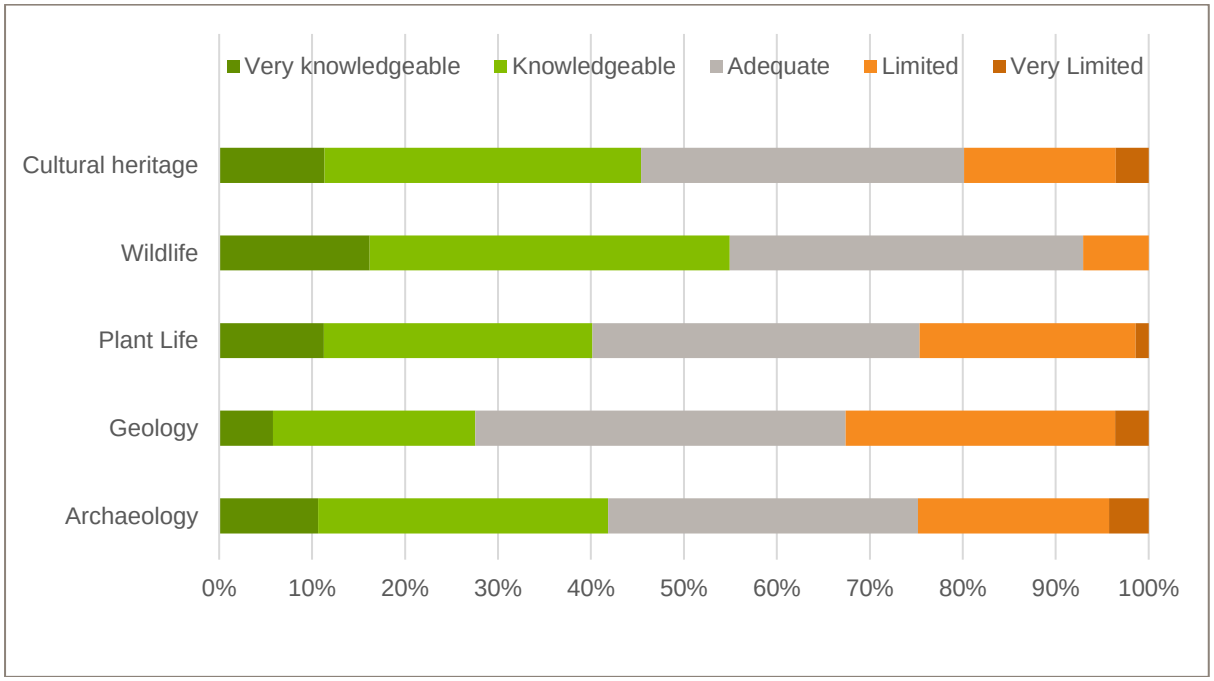
4.5.2 Indigenous Knowledge Systems

The concept of 'local knowledge' was developed in sociology where it is found that knowledge production is essentially a local process, and that there is more than one way of knowing or understanding the world[30]. Knowledge claims are not ruled by absolute standards (e.g. no absolute truth, or absolute science) but knowledge emerges from local negotiations and judgements in particular contexts.

[28] See Section 3.1 for the historical context to the Burren Programme
[29] Dunford, 2001.
[30] Turnball, 2008.

In the 2020 Farm Survey, farmers were asked to rate their knowledge of different aspects of the Burren and the majority of farmers considered this to be at least 'adequate', if not knowledgeable or very knowledgeable. Over 93% of farmers thought they had at least adequate knowledge of Burren wildlife; indicative of innate knowledge among farmers about the Burren from their farming practices and traditions. This was followed by cultural heritage (80%), plant life (75%) and archaeology (75%). Geology was the aspect where the greatest number of farmers (32.6%) felt their knowledge was not adequate.

Figure 4.11: Farmer self-rating of knowledge on aspects of the Burren



Source: 2020 Farm Survey.

In designing the BurrenLIFE programme (precursor to the BFCP and the Burren Programme), time and resources were dedicated to melding different knowledge systems through applied research on Burren farms. This process was considered inclusive and participative and has resulted in what the Burren Programme Manager describes as *"ancient farming systems using modern-day technology"*. This is not a system that is nostalgic, but was clearly designed to incorporate a variety of knowledge systems: pastoral management, nutritional capacity of the Burren, biodiversity values, ecosystem dependencies, cultural traditions, heritage systems and new technologies. Farmer's knowledge was seen as part of the solution, and one of the initial aims in establishing BurrenLIFE was to harness this and fuse it with the scientific process.

This is a practice that continues and is clearly evident in the Burren Programme. In recognition of the diversity of habitats and landscapes on Burren farms, the Programme makes efforts to harness and incorporate knowledge at a field level into their processes. For example, when drawing up a Farm Plan with a new member, the farm advisor collects and records the name of each field in this Plan given that they can contain information about how people appreciated their physical landscape and cultural connections to the land. An example of this link is a field called 'Creg na Gabhar', or 'Creg of the goat'; reflecting the fact that the field is so rough and rocky that only a goat could manage to scale it.

While farmers are respected for their innate knowledge, the farmers also commended the Burren Programme Team that "*they know the area so well".* Stakeholders and farmers commended the depth of knowledge that is captured and retained by the team, and the extent to which they readily share this with participants of the Programme. For example, one farmer retold an anecdote during an interview of how a member of the Burren Programme team convinced them to set aside a hectare and a half exclusively for bees by pointing out the rare orchids there and explaining their importance to pollinating insects. Others commented on their willingness to help farmers identify different species of flora on their farm. These examples show a mutual respect between the Burren Programme team and its participants regarding each other's innate knowledge, as well as a willingness to share it.

This mutual respect extends to the Burren Programme farm advisors, who take on responsibility for much of the day-to-day engagement with farmers, particularly when carrying out field assessments and developing farm plans. The results of the 2019 Farm Survey highlight the positive role of advisors in terms of ensuring that the Programme incorporates farmer knowledge and circumstances into its implementation. 92 per cent of respondents agreed or strongly agreed that farm advisors *"tailor advice to [my] needs"*; 95 per cent that their advisor *"knows [my] farm and technical requirements"*; and 95 per cent that their advisor *"understands [my] plans and ambitions".* It is clear that respect for farmer knowledge and an acknowledgement of the unique circumstances of every field and farmer extends through all aspects of the Programme, and forms a key ingredient to its successful implementation.

4.5.3 Innovation

Innovation is a component of intellectual capital: how education and learning leads to changes in process. Innovation can be seen in the form of new products, through changes in process, or changes in how people approach tasks and activities. While some of these are more discernible than others, all represent new innovations that can have wide-reaching impacts both within and outside the Burren Programme.

Some of these innovations are rather specific to the Programme, and relate to technical solutions to specific environmental issues faced on Burren farms. For example, as described in Section 3.1.4, the "Burren Concentrate Ration" was developed by the Programme in response to the specific nutritional deficiencies for cattle during Winter; the use of which has allowed Burren farms to out-winter their livestock in Winterage pastures. Some of these 'technical innovations' are summarised in the table below.

Table 4.9: Technical innovations for Burren Farms

Innovation	Description / purpose
Burren Concentrate Ration	Supplementary feedstuff specially developed and produced for the cattle in Winterage, which contains sufficient nutrients for the winter months. By decreasing the reliance on silage (or keeping cattle indoors) in the winter, this promotes foraging and growth of rare plants, and it also reduces the impact on water quality
Burren Risk of Nutrient Export (RoNE) model	A model to assess the impact of different farming systems on nutrient export (i.e. water pollution from nitrates, slurry etc.) and water quality in the Burren.
Water Management Systems	Adopting/adapting new technology to overcome the challenges that a porous karst landscape poses for water supply for livestock. This facilitates the continuation of Winterage, ensuring livestock have sufficient water to remain in the Burren uplands, facilitating their continued grazing. New technology adaptation includes solar pumps, solar electric fences, appropriate troughs and the fencing off of sensitive springs and water bodies.
Burren Gates	The problem of accessing Winterage grazing land was overcome through a series of initiatives in the Burren Programme. Replacing the practice of knocking and rebuilding walls for livestock access with traditional 'Burren Gates' was one such initiative, tapping into the built heritage and traditional skills that evolved historically in the area.

However, other innovations of the Programme relate more to innovations of process and management; that is, *how* the Burren Programme has been designed and implemented, and can have a much more wide-reaching impact on other schemes, locations and contexts. During the interviews, all stakeholders were asked what they considered innovative about the Burren Programme, and farmers in the Farm Survey were also asked about what lessons other agri-environment programmes could learn from the Burren Programme. The responses to this question in the 2020 Farm Survey, as shown in Table 4.10 below, are dominated by process and management innovations, such as the importance of local leadership and a bottom-up management style; the

flexibility of the Programme to the farm and region; the reward system; and reduced bureaucracy and administration.

Table 4.10: 2020 Farm Survey - lessons for other AES

Theme	% of farmers responding
Local leadership / bottom-up management style	34%
Programme is flexible / tailored to individual farm circumstances	29%
Programme is tailored to / built around the region's unique characteristics	21%
Reward system / Programme fairly rewards farmers for the effort they put in	19%
Programme delivers clear environmental results/benefits	19%
Low bureaucracy for farmers / simple to administer	15%
Specific farm practices / techniques	14%

Source: 2020 Farm Survey

Innovation is significant when it is adopted by other groups of people, and as outlined in the preceding sections, the Burren Programme's model contains many relevant lessons for other agri-environment schemes elsewhere in Ireland and Europe. Many of these lessons have in fact been applied to the design and implementation of other AES within the Burren Programme's large network (described in Section 4.2.1), such as the development of the similar scoring systems and hybrid 'results-based' payment models by the Hen Harrier, Freshwater Pearl Mussel and other EIP projects.

Table 4.11: Effects relating to innovation

Capital and Effect		Nature	Impact	Scale	Significance
	**Intellectual** New innovations and technical solutions for Burren farms	**Positive**	**High**	**Programme**	**High**
	**Intellectual** Innovations relating to management and process for other agri-environment schemes	**Positive**	**High**	**Community**	**High**

4.6 Summary of social effects

The Social Assessment examined the main social effects of the Burren Programme. These effects mainly corresponded to social, intellectual and human capital, and encompassed topics such as the social capital and networks, leadership, education, skills, knowledge and innovation.

A summary table of the social effects that were identified is displayed in Table 4.12 below. Twelve social effects – consisting of five relating to social capital, five to intellectual capital, and two to human capital – were identified in this Assessment; many of which had impacts beyond the Burren Programme itself. Nine of these were assessed as having high significance, with the remainder as moderate significance.

While it was often difficult to fully isolate the social impact of the Burren Programme from other organisations, particularly the Burrenbeo Trust, several highly significant effects can be specifically attributed to the Programme, particularly given its role in forming networks between Burren farmers and external agricultural, environmental, cultural and educational groups and bodies. The significant effects of these networks include improved trust levels or 'bridging capital' with external groups and agencies, preservation of farming heritage at a farm and community level, and the innovations stemming from the Programme; some of which have since been applied to other agri-environment schemes around Ireland and Europe.

Table 4.12: Summary of social effects of the Burren Programme

Capital and Effect	Nature	Impact	Scale	Significance
Social The creation of a local agricultural network, leading to "bonding" social capital between Burren Farmers	Positive	Moderate	Programme	Moderate
Intellectual Increased knowledge- and information-sharing between participants of the Burren Programme	Positive	Moderate	Programme	Moderate
Social Increased representation for Burren farmers, leading to "bridging capital" between farmers and agencies	Positive	High	Programme	High
Social "Linking" social capital between the Burren Programme and other European agri-environmental schemes	Positive	High	Community	High
Social "Bridging" social capital between farmers and environmental agencies and organisations	Positive	High	Programme	High
Intellectual Preservation of traditional farming practices by facilitating their use on modern farms	Positive	High	Programme	High
Intellectual Promotion of farming traditions/practices within the wider cultural heritage of the Burren	Positive	Moderate	Community	High
Social "Bridging" social capital as a result of strong local leadership	Positive	High	Programme	High
Human Training and skills development for farmers, contractors and students	Positive	Low	Community	Moderate
Human Greater confidence among farmers in their role as educators	Positive	High	Programme	High
Intellectual New innovations and technical solutions for Burren farms	Positive	High	Programme	High
Intellectual Innovations relating to management and process for other agri-environment schemes	Positive	High	Community	High

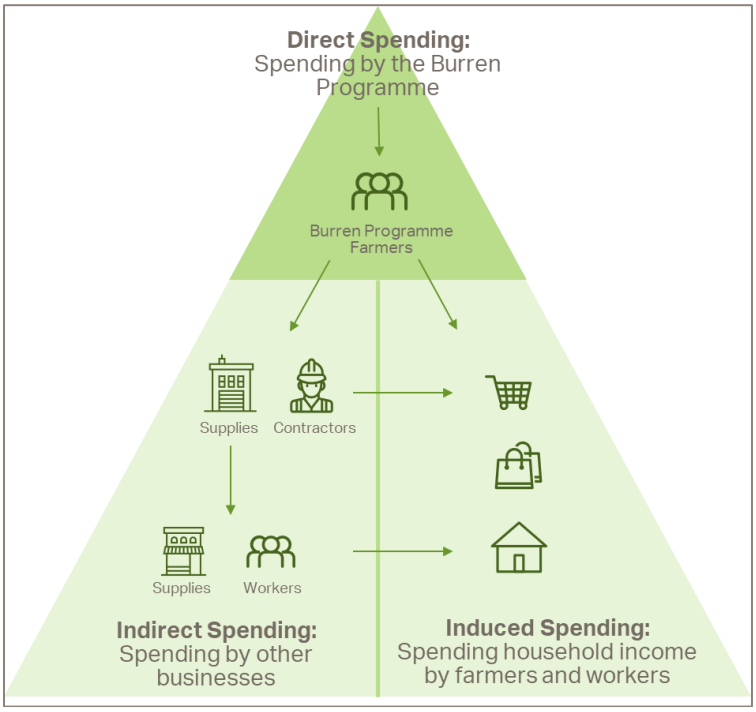
5. Economic Assessment

The economic assessment examines the impact of the Burren Programme on the local economy of the Burren region. Intervention payments (1 and 2) are paid directly to farmers, contributing to farm household income directly (or "financial capital") in the Burren region. Payments are also made to administer the Programme. There are elements of co-funding for Intervention 2 payments, which means the programme stimulates other rounds of economic activity outside the direct farm payments. While changes to the financial capital of farms, households and businesses are an inherent part of the economic assessment, it is not the only consideration, and there are impacts of the Programme on local economic activity and economic wellbeing. There are also effects on manufactured capital from the I-2 payments, and effects on human capital through employment effects.

When considering the economic impact of a Programme's expenditure, it is important to consider not only direct expenditure, but the potential impacts of that expenditure on the wider economy. One person's expenditure is another's income, and any expenditure on the Burren Programme can trigger successive rounds of spending that ripple through the economy and stimulate economic activity and employment. This is known as the 'Multiplier Effect', and can be split into three distinct types of expenditure:

- **Direct expenditure** refers to the initial increase in expenditure, which in this instance, is the money that is spent directly on the Burren Programme.
- **Indirect expenditure** refers to the additional spending that arises as suppliers to the Programme and to businesses increase their production in order to respond to that initial change in demand. For example, if a farmer in the Burren Programme purchases from a local gate-maker, the gate-maker may increase their purchases of iron from another supplier.
- **Induced expenditure** refers to effects of increases in spending by households given the increase in farm income. This is spent in either in local businesses (e.g. expenditure in local shops) or outside the local area, such as on mortgage payments, holidays etc.

Figure 5.1: The multiplier effect



Source: AECOM, 2020

As this evaluation is looking at the wider effects of the Programme on the Burren, a set of "Type II" multipliers were developed for the Burren Programme, which measure the direct, indirect and induced effects of its expenditure on overall output and employment in the Irish economy[31]. Separate Type II multipliers were developed to estimate these effects at a local level (i.e. within 20 miles of the Burren region), to estimate the effect of the Programme in the local area.

5.1 Programme Expenditure

The Burren Programme's expenditure consists of three key streams:

- Intervention 1 (I-1) payments are results-based payments that farmers receive for delivering environmental outcomes in their fields. As outlined previously, eligible fields are scored each year based on their management and habitat quality, and they receive payments per hectare based on these scores. Bonus payments are received for scores of 9 and 10, which are intended to provide an additional incentive for farmers to target greater levels of habitat improvement.
- Intervention 2 (I-2) payments are paid to partially reimburse farmers for the cost of carrying out site enhancement works under the Burren Programme. The material and labour cost of tasks are co-funded by the Programme at rates ranging between 25 and 75 percent, with more environmentally-targeted tasks receiving higher rates of funding. Farmers are required to co-fund the remainder of the works cost.
- As with any programme, the Burren Programme also incurs costs in implementing the Programme. While this includes standard administrative expenses relating to staff and the running of its local office in Carron, it also includes costs associated with processing farmer payments, monitoring, processing approvals/permissions, running training/educational events and other activities.

Table 5.1 shows the total expenditure of the Burren and Burren Farming for Conservation programmes since 2010, split into I-1 payments, I-2 payments and implementation-related costs. It also shows an estimate of the farmer contribution paid towards I-2 works, giving an indication as to the overall direct expenditure from the Programme.

Table 5.1: Burren Programme direct expenditure

	Burren Programme (2016-present)	Burren Farming for Conservation (2010-2015)	Total
I-1 payments	€3.1 million	€2.7 million	€5.8 million
I-2 payments	€1.3 million[32]	€2.3 million	€3.6 million
Implementation	€1.4 million	€1.5 million	€2.9 million
Programme expenditure	**€5.8 million**	**€6.5 million**	**€12.3 million**
I-2 farmer contributions	*€0.8 million*	*€1.5 million*	*€2.3 million*
Direct Expenditure	***€6.6 million***	***€8 million***	***€14.6 million***

Between 2016 and 2020, over half of the Programme's expenditure (53%) went towards I-1 payments, in comparison to just over 40 per cent in the BFCP. The proportion of the overall budget for I-2 payments was higher for the BFCP (35%) than for the Burren Programme (22%), which may reflect participants front-loading larger capital investments when they first entered the Programme.

The proportion of overall budget spent on implementation-related costs decreased between 2016 and 2020 in comparison to the BFCP (2010-2015), despite growth in the numbers of farmers participating

[31] Multiplier Analysis is a subset of Input-Output analysis in economics, which constructs an economic model by industry, tracing what one industry supplies and purchases to another. Households are classified as final consumers of what is produced. For further information see United Nations (2018) Handbook on Supply and Use Tables and Input-Output Tables with Extensions and Applications.

[32] It should be noted just €780,000 of this has been claimed to date by farmers as of June 2020.

in the scheme. This highlights efficiencies in administration over time, and the ability to do "more with less" as systems are put in place to administer the Programme.

Overall, the Burren Programme and its predecessors have resulted in payments of almost €10 million directly to farmers since 2010. The next three sections describe the impact of these payments and this expenditure in terms of household and farm income, farm improvements, and local economic activity and employment.

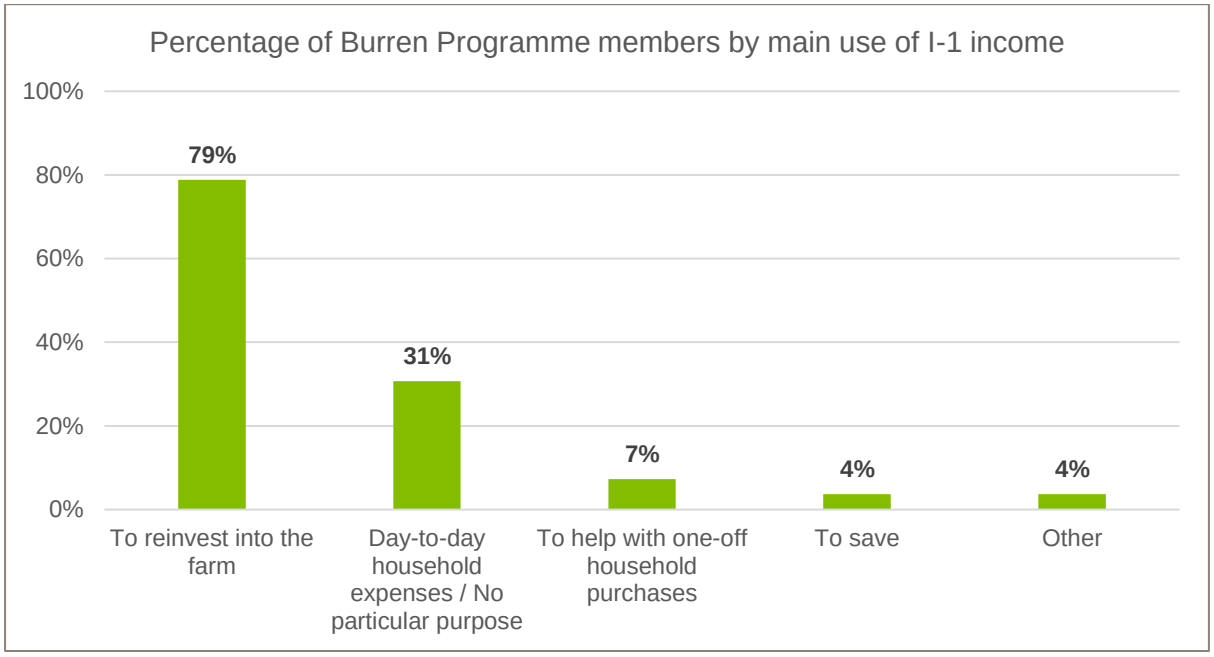
5.1.1 Income

Household and farm income

I-1 payments are the results-based element of the Burren Programme, meaning that their purpose is to reward farmers for achieving specific and measurable results (the environmental impacts of which are discussed in the Environmental Assessment). A total of €5.8 million was paid to farmers in the form of I-1 payments since 2010. In 2019, farmers received between €0 and €9,400, with an average payment of €2,613 per farm and a median payment of €2,058.

These types of farm payments generally represent a positive increase in the financial capital and purchasing power of farmers and their households. Although it accounts for the majority of the Burren Programme's budget, the evidence suggests that the impact of I-1 payments on household income and purchasing power is relatively minor. The 2020 Farm Survey indicates that most Burren Programme households (73%) do not rely solely on farming for their household income, and when compared to median household incomes in the Burren region of €38,191[33], the median I-1 payment corresponds to just over 5 percent of overall household income. This income received from the Programme does not seem to have had a major impact on purchasing power either: most notably, only 30 percent of farmers stated that they used I-1 income they receive from the Programme for day-to-day household expenses, compared to nearly 80 percent who reinvested this income back into their farm. This shows a clear commitment by Burren farmers to making improvements to their land, either indicative of the characteristics of the farmers that have entered the programme, or a reflection on the behaviours of farmers that the programme has fostered.

Figure 5.2: Use of I-1 income by Burren Programme participants



Source: 2020 Farm Survey

The income received from the Burren Programme was not the main motivation for farmers to participate (previously shown in Figure 3.5). Farmers were asked to rank the potential benefits that the Burren Programme brought to them, and their top ranking was the support they got with practical

[33] Central Statistics Office, 2016.

improvements, followed by improvements to the environment. Income received was ranked third, indicating that while important, income was not the central consideration for farmers. This suggests that the overall impact of the Programme on household income is low, and that farmers are driven instead to reinvest this back into their farms to increase their natural and manufactured capital.

While the Burren Programme is unlikely to have had a significant impact on household income or purchasing power, the evidence suggests has had a positive impact on the financial viability of family farms. According the 2019 Teagasc Farm Survey, the average Family Farm Income[34] on cattle rearing farms (which includes suckler farms) is €9,188; a figure that has fluctuated significantly in recent years due to weather, changes in beef prices, and input costs[35]. I-1 income accounts for a more significant proportion (28%) of average Family Farm Income than it does of household income, and also represents a relatively stable and predictable source of income in the face of fluctuating farm incomes and external challenges.

> ***"A good environment is a 'product' that can be produced by farmers, but just like food, society must be willing to pay for it"***
> - Burren Programme Stakeholder

While the payments have had a moderately positive impact on farm viability, the Farm Surveys and interviews also revealed wide-ranging concerns over the impacts of external factors on the financial viability of farming, and a perception that it was becoming increasingly difficult for farmers with small or average-sized holdings to make a living from farming and food production. Farming was often described as a *"passion"* by survey respondents and interviewees, with many emphasising that while farmers need to make a living, they are primarily motivated by their love of it rather than a desire to make profit. However, this perspective also coincided with concerns about farm succession and a belief that young people are less likely to choose farming as a career due to these issues of financial viability. This belief is supported by a 2015 Teagasc study, which indicates that a high proportion of farms in the Burren and in north Clare are classed as 'vulnerable', meaning that they rely on subsidies to a greater extent than farms in other parts of the country[36].

In this context of declining agricultural incomes, the Burren Programme and its model of 'environmental farming' - described by one stakeholder as a model of paying farmers for both the agricultural and environmental 'goods and services' that they maintain and produce - was viewed as key to diversifying farm incomes and improving the long-term financial viability of family farms.

Table 5.2: Effects relating to I-1 payments

Capital and Effect	Nature	Impact	Scale	Significance
€ **Financial** Increased household income and purchasing power for Burren Programme members	Positive	Low	Programme	Low
€ **Financial** Increased farm income and improved financial viability on Programme farms	Positive	Moderate	Programme	Moderate

Payment rates and farm size

While the I-1 payments have had positive impacts on household and farm income, the payment rates were also raised as an area for improvement by about 34 per cent of farmers in the survey, as well as other stakeholders in the interviews.

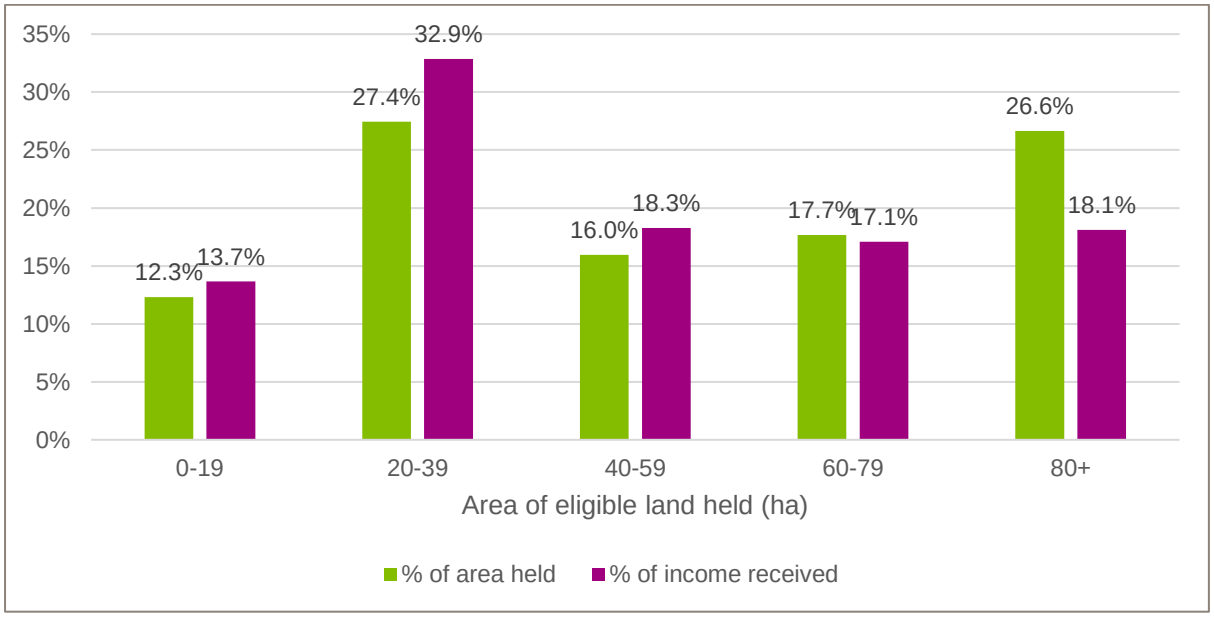
As outlined previously in Section 3.2.5, the most common suggestion related to the payment rates, particularly in relation to perceived inequities between the payment rates and requirements of Burren Programme and GLAS, another AES run by DAFM and funded under the 2014-2020 Rural Development Programme. One of the main advantages of the Burren Programme's results-based

[34] Family Farm Income is defined as the farm's gross output (including direct payments) minus direct costs and overheads
[35] Donnellan *et. al.,* 2020.
[36] O'Donoghue *et. al.,* 2015.

model from the surveys and interview is the concept of fairness; that farmers feel the payment they receive reflects the work that they put in. However, it was also argued that the work and level of effort required to achieve the full rate of payment in the Burren Programme (€180/€315 per hectare for a Winterage/BLG field) was much greater than that required to achieve the equivalent rate of payment in GLAS, where farmers could receive the full €314 per hectare under the LIPP/THM options by managing their fields in a certain way, without the results-based element and assessment[37]. As farmers cannot receive both GLAS LIPP/THM and Burren Programme payments for the same field, this may act as a disincentive for farmers to join the Burren Programme.

It was also pointed out that there was a particular disincentive for farmers with smaller holdings, who may be required to carry out disproportionately higher levels of work compared to the benefits they receive. While the Burren Programme does provide higher rates of payment on the first 40 hectares of a farmers' land in an effort to encourage farmers with smaller holdings to join, the impact of this is less clearly seen in the I-1 payment data. For farmers within each holding size bracket, Figure 5.3 shows a comparison between the percentage of the overall land area they hold and the percentage of the overall income they received in 2019. While showing that farmers with holdings of less than 40 hectares generally received proportionally more income than the land that they hold in the Programme, the effect of this on incomes is largely limited to farmers with medium-sized holdings (between 20 and 60 hectares) in the Programme, who received between 15 and 20 per cent more income relative to the land they hold. In contrast, the smallest cohort of farmers – those with a holding of less than 20 hectares – received just 11 per cent more income relative to the size of their holding, which suggests that this intended incentive is not felt as strongly by them.

Figure 5.3: Comparison between area held and income received



Source: Administrative data supplied by the Burren Programme, 2020.

The evidence does suggest that there is not as great an incentive for those with smaller farms to join, particularly given the perceived inequities between the Burren Programme and GLAS. It may therefore be worth exploring additional incentives for the first number of hectares in the Programme. The Department of Agriculture, Food and the Marine have recently submitted an amendment to the European Commission to introduce a new payment band under the Burren Programme for the first 10 hectares.

5.1.2 Farm improvements

In addition to the direct I-1 payments received, approximately €3.6 million was paid to farmers in the form of I-2 payments. Farmers receive these payments to partially cover the cost of carrying out farm

[37] Under GLAS, management of land as a 'Low Input Permanent Pasture' or 'Traditional Hay Meadow' imposes restrictions for grazing, topping and nitrates use, but does not assess or link payments to the results of these actions in terms of habitat quality or biodiversity.

works under the Burren Programme, and are required to co-fund the remainder. These works are funded at varying percentages based on how targeted the measure is towards environmental outcomes, and this breakdown of tasks, funding and funding rates is provided in Table 5.3 below.

Table 5.3: Breakdown of I-2 works and funding

Task(s)	% of claimed funding (2016 – present)	BP Quantity (2016-present)	BFCP Quantity (2010-2015)	% funded
Scrub paths	10.1%	50 km	163 km	75%
Scrub bands & areas	57.2%	115 ha	242 ha	75%
Walls	7.9%	20 km	109 km	75% (internal), 50% (external)
Fencing	3.6%	16 km	32 km	50%
Gates	4%	55 Burren Gates, 88 field gates	144 Burren Gates, 559 field gates	75% (Burren), 50% (field)
Water	7.0%	104 troughs, 5 pumps, 10 storage tanks	439 troughs, 33 pumps, 76 storage tanks	50%
Feed Equipment	1.6%	59 feed bins, 41 troughs	128 feed bins, 180 feed troughs	50%
Track	5.2%	11 km of new and upgraded track	53 km of new and upgraded track	25%
Habitat Restoration	1.8%	-		75%
Other	1.5%	-		Various

Source: Administrative data provided by the Burren Programme, and Dunford and Parr (2020).

As I-2 payments are paid to cover the cost of farm works, they do not directly benefit farm or household income in the same manner as I-1 payments. However, there is strong evidence that farmers receive significant economic benefit from these works. As stated above, when asked to rank the benefits of the Burren Programme in order of personal importance, support with practical improvements was ranked highest (using a preferential method of scoring).

One of the main benefits associated with these improvements are efficiencies and time saved when carrying out farm tasks. Time use is an important component of human capital, and more efficient time use can have significant benefits for farmers in the Burren Programme, particularly given that many (37%) are part-time farmers. In the 2020 Farm Survey, 63 percent of farmers agreed that works carried out under the Burren Programme had resulted in time savings or efficiencies on their farm. The main sources of these (also shown in Figure 5.4) are related to:

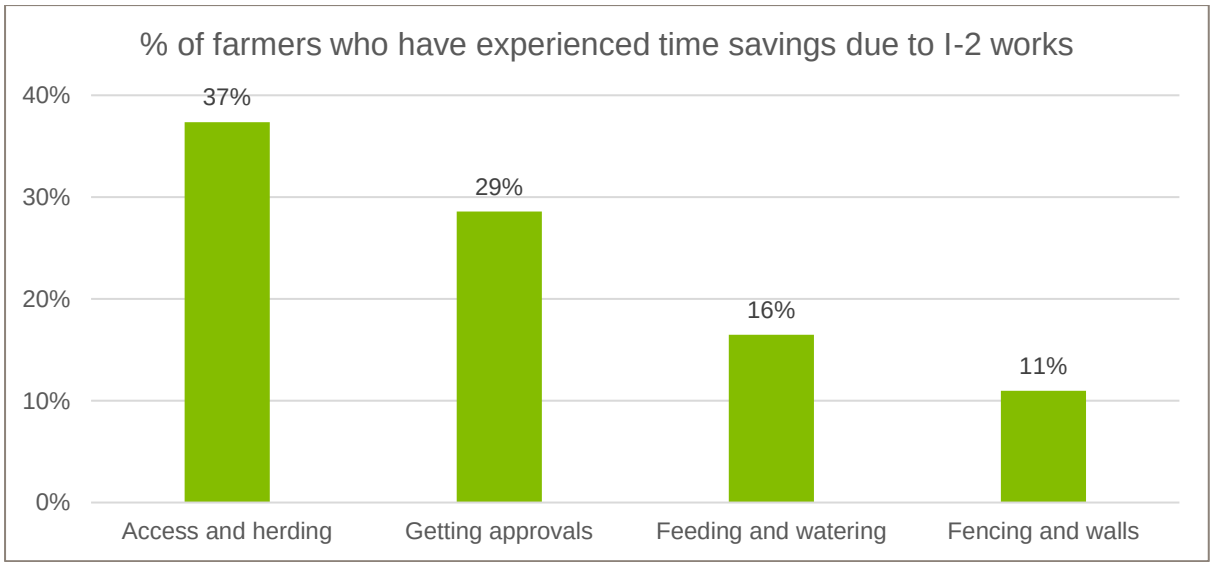
- **Access –** The Burren Programme funds measures aimed at improving access to Winterage land, namely the construction of access tracks and scrub clearance, allowing farmers to herd and tend to livestock in Winterage land more easily and efficiently.
- **Water and feeding –** Shortages of food and water during winter months requires supplementary feeding/watering by farmers who keep stock in the upland pastures (Winterage). Transporting food and water upland is a labour-intensive job, and this often discouraged farmers from using Winterage pastures, particularly for those with poor access. The Burren Programme's funding for water provision measures, as well as the feeding of 'Burren Ration' reduces the need for supplementary feeding and watering. The Burren Programme's policies towards silage feeding and the use of the Burren Ration are also likely to have reduced the need for silage production.
- **Permission and approval –** For farms located within the SAC, major farm works typically require permission from the NMS, NPWS and/or local authorities. While farmers in the past reportedly often did not have the time, resources or expertise to navigate this approval process, the Burren Programme now provides an integrated and structured framework through which farmers can plan works, get advice and seek approval; thereby reducing time spent by farmers on this task. The Burren Programme has developed protocols and has effectively assumed the approval process for standard works, leading to efficiencies and cost savings for farmers and

authorities. For more complicated or non-standard works, the Programme and farm advisors still provide assistance with completing applications and organising any additional expertise (e.g. archaeological input) that may be required.

- **Fencing, gates and walls –** The Programme provides funding for stone wall repair and regular fencing, which prevents stock from wandering and allows more efficient herding.

While many of these tasks have a defined environmental purpose within the Burren Programme (which are discussed further in the environmental assessment), there is strong evidence that they provide practical benefits to farmers in terms of reducing the time and effort involved in carrying out day-to-day farm tasks; thereby streamlining management practices on farm in a way that suits the farming system on that farm.

Figure 5.4: Most common sources of time savings among Burren Programme farmers



Source: 2020 Farm Survey

While most farmers reported experiencing time savings, it is also important to consider that some farmers may spend more time carrying out farm works now as a result of the Burren Programme, which could represent a negative impact on human capital. In the 2020 Farm Survey, farmers reported spending a median of 20 days personally carrying out I-2 works each year, with most farmers spending some time doing so personally (very few reported relying solely on contractors). However, regular and more labour-intensive tasks such as scrub clearance and stone wall rebuilding reportedly accounted for most of this time, and could potentially represent a negative human capital impact for farmers less able to do this work. It should be noted however, that a substantial number of farmers have argued that the rates paid for scrub clearance (in particular) do not reflect the labour-intensive nature of the work.

Although this time may seem high, the evidence from the surveys and interviews suggests that the increased workload is not overly excessive or significant. A key feature of the Burren Programme is that farmers have full autonomy over their farm plans and their choice of which works to undertake as part of the Programme. As a result, farmers generally choose the works that benefit them and they recognise the value of the time that they invest: in the 2019 Farm Survey, 66 per cent agreed that the "payment system fairly reflects the workload involved in meeting Burren Programme requirements". I-2 works are also generally carried out during the winter, when there may be less tasks to carry out than during the summer. Some even enjoy this work, with one farmer commenting that they *"don't count how many hours [I] dedicate to the Burren Programme; it's [my] hobby, [my] work, [my] passion".*

As it is likely that any additional time spent is balanced out by time saved, there is strong evidence that these works have also improved the viability of farming in the Burren. It was reported that up until 2008, farming in the Burren was almost *"frozen in time"*, as farmers didn't have the time, resources or support to farm land in the Burren in a sustainable manner or to navigate the approval process for carrying out vital farm works. In some cases, this often led to illegal or substandard farm works, but in many cases land, particularly in Winterages, was simply abandoned. By clearing scrub, improving

access, providing secure sources of food and water, and allowing farmers to more easily secure approval when carrying out these vital works or maintenance, the Programme has also made it viable to farm certain fields that may have otherwise been abandoned.

Although difficult to quantify the extent, the evidence from the farm surveys and interviews indicates that these undertakings have had a significant impact in improving the overall viability of farms in the Programme. For instance, in the 2020 Farm Survey, farmers rated the "support with practical improvements to the farm" as the most important benefit they received from the Programme, while 83 per cent of respondents to the 2019 Farm Survey also agreed that the Burren Programme had a major or moderate impact in terms of "*improv[ing] the viability of [my] farm and ensur[ing] continued use*".

"This programme has totally transformed my lands and my view of that land. My farm was on the verge of being abandoned as it was overtaken with scrub and we were not allowed to do anything. It was taking not hours or days but weeks to do the herding. We cleared a lot of scrub, built walls and improved the water.
It is now a JOY to go over and do the herding. You can see the animals and with the walls done, once you put them in, there's no out!" - Burren Programme Farmer

Table 5.4: Effects relating to farm works/improvements

Capital and Effect	Nature	Impact	Scale	Significance
Human Increased workload and greater time spent by Burren Programme participants carrying out I-2 works	Negative	Low	Programme	Low
Human Reduced day-to-day workload and time-saved by 63% of participants due to efficiencies from access, watering and feeding measures	Positive	High	Programme	High
Manufactured Greater farm viability from improved farm infrastructure and access	Positive	High	Programme	High

5.1.3 Local economy and employment

This section examines the indirect economic impacts of the Burren Programme on economic activity and employment in the Burren. While the Programme is a relatively small scheme in terms of direct expenditure, it has been designed so that much of its economic impact remains in the local community. In addition to the fact that most of this expenditure has gone directly to local Burren Programme farmers, several other interventions and policies of the Programme have helped to maximise the impact of this expenditure on the local economy. These include:

- **Contractors –** Burren Programme farmers often hire small teams of contractors for more labour-intensive tasks such as scrub clearance or stone wall rebuilding. The Burren Programme maintains a database of 46 mostly-local contractors on its website from which farmers can easily source labour for tasks.
- **Suppliers –** Participants are also encouraged to source equipment and supplies for farm works locally. As with contractors, the Programme keep a database of 65 suppliers from which farmers can source supplies and equipment for I-2 works, 49 of which based within the Burren, Clare or south Galway.

- **Burren Programme team and advisors –** The Burren Programme is staffed by a local team based out of its office in Carron, with many of the farm advisors also based within the region.
- **Farm works –** Certain site enhancement works also promote local crafts and traditions. For example, the Burren Programme encourages the use of 'Burren Gates', a traditional style of gate found only the Burren, by funding them at a higher rate (75%) than regular field gates. Burren gates are manufactured by three local businesses, and according to interviews conducted, the use of Burren gates has seen an uptick not only among Burren Programme farmers and those outside the Programme. This demand is reported to have led to the creation of additional jobs by some of these gate-makers[38].

These measures help to ensure that although small, most of the money spent by the Programme remains within the Burren and supports local economic activity and employment. Using information provided by the Burren Programme, the 2020 Farm Survey and the national input-output (IO) tables from the Central Statistics Office[39], local output and employment multipliers were developed to demonstrate how these expenditures and policies have impacted the local and national economy[40].

The methodology for developing an IO model for the Burren Programme is largely based on the Eurostat's *Manual for Supply, Use and Input-Output Tables (2008)*, with bespoke sectors created to estimate the specific impacts of I-1 and I-2 expenditure. A new sector was also created for I-1 farmer expenditure (i.e. how farmers spend their I-1 income), to reflect the results of the Farm Survey in this regard.

To estimate 'local' multipliers, a parallel 'local IO model' was developed to show how expenditure moves between households and businesses within the local economy. Overall, this was based on an IO model for the Mid-West region developed by AECOM, which was adjusted based on several additional assumptions regarding the spending patterns of I-1 and I-2 expenditure in relation to the local economy. These assumptions included:

- 98 per cent of I-1 income was paid to farmers in the local area, with the remaining 2 per cent going to farmers outside the Burren.
- 64 per cent of I-1 income farmers received was reinvested into their farms, with 34 per cent treated as general household expenditure, and 3 per cent as savings. This means that farm expenditure was subsequently apportioned to the domestic sector for agriculture, while household expenditure was apportioned to other sectors based on the spending patterns of households in the base IO model.
- 'Local expenditure' was defined as expenditure in businesses located within 20 miles of the Burren. Based on the 2020 Farm Survey, it was estimated that approximately 72 per cent of farm expenditure and 70 per cent of day-to-day household expenditure was local.

Table 5.5 and Table 5.6 show the Type I (the impact of direct and indirect spending) and Type II (the impact of direct, indirect and induced spending) output and employment multipliers for the Burren Programme; both national and local.

Table 5.5: Type I multiplier estimates for the Burren Programme

	Type I Output Multipliers (€ per € spent)		Type I Employment Multipliers (FTE per €m)	
	National	Local	National	Local
I-1 Payments	1.0	1.0	0	0
I-2 Payments	1.65	1.41	26	24
Implementation	1.30	1.12	21	18
All	**1.22**	**1.12**	**11**	**10**

[38] Additional impacts associated with Burren Gates are discussed in the Environmental Assessment
[39] Central Statistics Office, 2015.
[40] 'Local' is defined as being located in the Burren, Clare and South Galway; or within 20 miles of the Burren as farmers were asked in the 2020 Farm Survey.

Table 5.6: Type II multiplier estimates for the Burren Programme

	Type II Output Multipliers (€ per € spent)		Type II Employment Multipliers (FTE per €m)	
	National	Local	National	Local
I-1 Payments	2.64	1.97	13	8
I-2 Payments	2.01	1.72	30	26
Implementation	2.69	1.92	25	20
All	**2.51**	**1.90**	**20**	**15**

For instance, Table 5.6 above shows the Type II output multipliers calculated for the Burren Programme, which provide an estimate of the direct, indirect and induced economic activity generated by each euro spent. This indicates that each euro spent on the Burren Programme generates €2.51 in output, including €1.90 within the local Burren economy. This varies slightly depending on the specific activity in question, with the local multiplier for I-1 expenditure (1.97) showing a marginally higher local impact per euro, followed by public administration expenditure (1.92) and I-2 payments (1.72). The primary reason for this difference is the higher proportion spent on direct income transfers and wage/salaries in the I-1 and implementation expenditure respectively, as this means that a higher proportion entered the local economy as income and remained within the local economy as household and business expenditure.

Overall, the Burren Programme's Type I multipliers are generally less or similar to that of other sectors and Programmes, such as the national agricultural sector (1.5) and the Rural Development Programme (RDP) (1.42)[41]. However, as a large proportion of its budget goes directly to farmers and contractors in the form of I-1 and I-2 payments, the induced impact of the Programme's expenditure is more substantial, and its Type II multipliers are significantly higher. In comparison, these Type II multipliers are 1.83 for the agricultural sector and 1.6 for the Rural Development Programme.

Table 5.6 also shows the Type II employment multipliers calculated for the Burren Programme, which provides an estimate of the direct, indirect and induced FTE[42] employment supported by the Programme's activities. A local employment multiplier of 15 was calculated, meaning that every €1 million spent on the Programme supports an average of 15 local FTE jobs each year. This also varies greatly depending on the type of expenditure in question, with I-2 expenditure again supporting significantly more local jobs per million euro than other types of expenditure. This is largely because of the direct use of local contractors and businesses by farmers when carrying out I-2 works.

Table 5.7: National and local economic effects of the Burren Programme

Type II output effects	Burren Programme (2016-present)	Burren Farming for Conservation (2010-2015)	Total
Total National Output	**€14,640,087**	**€15,664,637**	**€30,304,724**
Of which Local	*€11,080,305*	*€12,075,839*	*€23,156,145*

By applying these multipliers to the annual direct spend of the Burren Programme, Table 5.7 shows that the expenditure and activities of the Burren Programme have generated €14.6 million in economic activity since 2016. This includes €11.1 million in local economic activity, demonstrating that the Burren's economy has benefited significantly from the current iteration of the Programme. Over the entire lifetimes of the Burren and Burren Farming for Conservation programmes, they have resulted in approximately €30.3 million in additional economic activity, including €23.2 million within the local economy of the Burren.

[41] Indecon, 2019.
[42] Full-Time Equivalent (FTE) jobs are used to account for the high rates of part-time and casual work undertaken in the Burren Programme. For example, if two full-time contractors each spent half of their time working on the Burren Programme, this is equal to one FTE job created.

Table 5.8: National and local employment effects of the Burren Programme

Average annual FTE employment (Type II employment effects)	Burren Programme (2016-present)	Burren Farming for Conservation (2010-2015)	Average
Total Employment	**29**	**24**	**26**
Of which local	*22*	*19*	*20*

By applying the Type II employment multipliers to its direct I-1, I-2 and implementation expenditure, Table 5.8 estimates that the activities of the Burren Programme have supported an additional 29 direct, indirect and induced FTE jobs each year, including 22 jobs within the Burren region. The impact of the Programme on employment is largely driven by I-2 expenditure and the use of local suppliers and contractors by farmers when carrying out works. Over their entire lifetimes, the Burren Programme and BFCP have supported an average of 26 FTE jobs each year; 20 of which were estimated to be located in the Burren.

It should be noted that this excludes the potential impact of the Programme described previously in terms of improving farm viability and contributing to keeping farmers on the land. The exact impact in this regard is difficult to estimate given the range of other factors at play, although in the 2019 Farm Survey, 3.6 per cent of farmers indicated that they would have ceased farming if not for the payments received from the Burren Programme, while an additional 9 per cent stated that they did not know. It is difficult to extrapolate these answers to the wider population given the range of other factors that are likely to affect a farmer's decision to stop farming, such as personal circumstances, farm succession or the availability of alternative employment and income sources. However, the evidence outlined in previous sections generally shows that the income received and farm works carried out have greatly improved the viability of farms, and have contributed to the continued use of farmland in the Burren.

Table 5.9: Effects relating to the local economy and employment

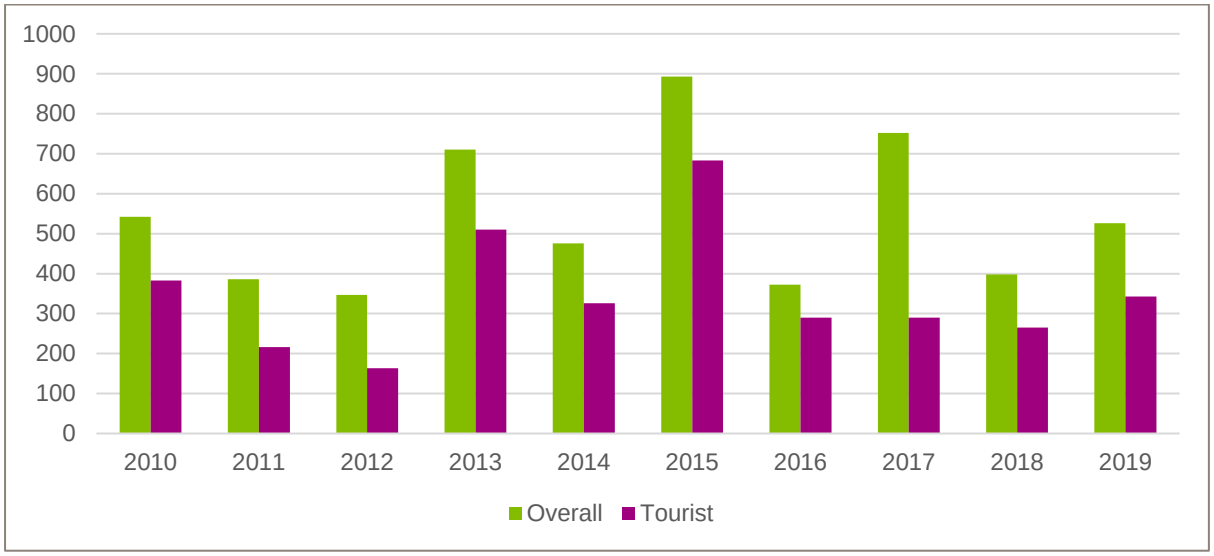
Capital and Effect	Nature	Impact	Scale	Significance
Financial Increased local economic activity, with €23 million generated since 2010.	**Positive**	**Moderate**	**Community**	**High**
Human Increased local employment, with an average of 20 FTE jobs supported since 2010.	**Positive**	**Moderate**	**Community**	**High**

5.2 Agri-Tourism

The Burren and Cliffs of Moher are a significant tourism draw in Ireland, and the Cliffs of Moher Visitor Experience is the second most visited fee paying attraction in the country (receiving 1.6 million visitors in 2018). While there is widespread recognition that the Burren's distinctive landscape is a draw for tourists from around the world, the interviews revealed a perceived inequity between the benefits that farmers, as custodians of that landscape, deliver for tourists and the benefits that they receive in return. It was argued that more could be done to redistribute the incomes generated by the increasing number of visitors to the region.

Agri-tourism was highlighted by some as a significant opportunity to increase the income that farmers directly receive from tourism in the Burren. 15 per cent of farmers in the 2020 Survey reported earning any income directly from agri-tourism, with the most common methods being leading farm walks (5%) and providing accommodation (5%). The Burren Programme has also provided some direct agri-tourism opportunities for its participants and since 2010, has hosted 5,400 people on farm walks on participants' farms (including approximately 3,500 from outside the Burren). It also encourages any visitors to use local farmers and businesses for meals, accommodation and transport. Still, the potential direct impact of this in terms of income and financial capital is small overall, with just 5 per cent of farmers reporting to have earned any agri-tourism income linked to the Burren Programme.

Figure 5.5: Farm visits linked to the Burren Programme



Source: Data provided by the Burren Programme

The surveys and interviews indicated that while there was interest among some farmers in exploring new agri-tourism opportunities, they faced significant barriers in doing so. A lack of capital, targeted business supports, and issues of public liability were all cited as deterrents to developing new agri-tourism products and businesses. A lack of toilets, parking and poor road infrastructure were also identified as challenges to increased levels of tourism. It was suggested that the Programme could more proactively link with other local bodies and agencies to develop solutions to these barriers, such as providing additional training/information sessions. Notwithstanding these specific challenges, it was also recognised that different skillsets and motivations are needed to operate farms as visitor/tourist businesses. As with any career, farming is a vocation for those with a specific interest, and many farmers do not necessarily have the desire, time, or tolerance for risk to establish and operate a tourism business in addition to their farming activities and off-farming employment.

Beyond developing new agri-tourism products, other ideas for increasing the share that farmers receive of tourist income included a tourism tax or new walk schemes in which farmers received payments and liability cover in exchange for allowing walkers to access their lands.

While the direct impact of the Burren Programme in terms of agri-tourism tourism may be relatively low, it likely contributes (along with other organisations and bodies) to the appeal of the Burren as a tourism destination. The Burren Programme and its work has been featured in at least 100 newspaper, TV and radio pieces since 2010 about the Burren and the role of farming to its landscape and heritage. Some of these pieces have had an international reach; with one article by *The Guardian* being shared nearly 9,000 times[43]. In the 2020 Farm Survey, farmers also reported growing interest in the Burren from tourists, as well as greater levels of awareness of its farming practices and heritage, suggesting that there may be additional future opportunities for farmers to capitalise on this interest.

Table 5.10: Effects relating to agri-tourism

Capital and Effect	Nature	Impact	Scale	Significance
Financial Increased agri-tourism income linked to the Burren Programme	**Positive**	**Low**	**Programme**	**Low**

5.3 Summary of economic effects

The Economic Assessment examined the main economic effects of the Burren Programme, particularly in terms of its impact on the financial capital of households, farms and local businesses.

[43] McSweeney, 2020.

Table 5.11 summarises the main economic effects of the Burren Programme as well as their significance. Eight economic effects mainly impacting financial and human capital were identified, with four of these assessed as high significance, one as moderate, and three as low.

The most significant economic effects of the Burren Programme are linked to farm workload and viability, as well as local economic activity. The Programme funds farm works and infrastructure, like scrub clearance, access tracks, water supply facilities and fences/gates, that have resulted in significant efficiencies for farmers in carrying out day-to-day farm tasks. With improved access, more secure food and water supplies and easier livestock handling, the overall viability of farms and certain parcels of land has improved for many Burren farmers.

Some of the effects associated with the Burren Programme's expenditure were also found to be significant. While the I-1 income that farmers receive have a relatively minor impact on household income (given its relatively small scale for most households), the aggregate impact on the local community is more significant. Overall, it was estimated that the BFCP and Burren Programme's expenditure has generated approximately €23 million in economic activity and has supported an average of 20 FTE jobs each year in the local community.

Table 5.11: Summary of economic effects of the Burren Programme

Capital and Effect	Nature	Impact	Scale	Significance
Financial Increased household income and purchasing power for Burren Programme members	Positive	Low	Programme	Low
Financial Increased farm income and improved financial viability on Programme farms	Positive	Moderate	Programme	Moderate
Human Increased workload and greater time spent by Burren Programme participants carrying out I-2 works	Negative	Low	Programme	Low
Human Reduced day-to-day workload and time-saved by 63% of participants due to efficiencies from access, watering and feeding measures	Positive	High	Programme	High
Manufactured Greater farm viability from improved farm infrastructure and access	Positive	High	Programme	High
Financial Increased local economic activity, with €23 million generated since 2010.	Positive	Moderate	Community	High
Human Increased local employment, with an average of 20 FTE jobs supported since 2010.	Positive	Moderate	Community	High
Financial Increased agri-tourism income linked to the Burren Programme	Positive	Low	Programme	Low

6. Environmental Assessment

The objectives of the Burren Programme are:

- To ensure the sustainable agricultural management of high nature value farmland in the Burren;
- To contribute to the positive management of the Burren's landscape and cultural heritage; and
- To contribute to improvements in water quality and water usage efficiency in the Burren region.

The environmental assessment corresponds to changes in natural capital, and it examines how the Programme has impacted on natural capital assets such as habitats and water. It also examines some impacts to the Burren's built heritage, a form of manufactured capital.

A separate Draft Ecological Impact Assessment was carried out by the Programme which assessed the full range of environmental impacts linked to the Burren Programme[44]. This section summarises the most significant impacts from the Ecological Impact Assessment, integrating them with the reporting framework established for this Evaluation. It will also examine some additional impacts not contained in the Ecological Impact Assessment.

6.1 Habitat Quality and Biodiversity

Habitats and biodiversity are a form of natural capital that provide a variety of benefits to people, communities and wider society. These benefits can vary significantly from person-to-person and place-to-place, and they range from the tangible benefits people receive (such as food production, or from tourism or recreation opportunities), to the intangible social, cultural or spiritual significance that people attach to different landscapes, species and habitats.

This section provides an overview of the impact of the Burren Programme on habitat quality and biodiversity, and estimates the monetary value of the improvements delivered by the Programme. While valuing natural capital is difficult and inherently depends on the attitudes and perceptions of people towards different environments and habitat types, this Evaluation takes advantage of a Willingness-to-Pay (WTP) study on habitats in the Burren[45], as well as data provided by the Burren Programme to provide this estimate.

6.1.1 Habitats in the Burren Programme

The Burren comprises a rich variety of different habitat types, from karst limestone pavements and turloughs, to species-rich grasslands and hazel woodlands. It is a very unusual landscape, and the breadth of different habitat types facilitates the maintenance of high biodiversity: approximately 70 per cent (or approximately 1,100) of Ireland's known species of flora are found in the Burren, despite accounting for just 0.5 per cent of Ireland's area[46]. Rare orchids, arctic-alpine plants, Mediterranean and woodland plants grow alongside each other in the fields and on the hills of the Burren, and the Burren has become synonymous with its 'blooms' in the spring and summer.

As an area that is characterised by distinctive, rare and biodiverse habitats, it is reasonable to expect that society places a high value on this landscape and its conservation. The Burren currently receives over a million visitors each year, with most visiting natural-themed attractions in the area such as the Cliffs of Moher, Aillwee Caves and the Burren National Park. A Willingness-to-Pay (WTP)[47] study on habitats in the Burren estimated that Irish taxpayers place an aggregate value of approximately €5,614 and €8,017 per annum on conservation of each hectare of karst limestone pavement and orchid-rich grasslands respectively in the Burren[48]. Significantly, these WTP values for Burren habitats were the same regardless of where survey respondents lived, suggesting that people from all over the country recognise the significance of the Burren and value its conservation.

[44] Mullen, 2020.
[45] Van Rensburg et. al., 2009.
[46] Webb and Scannel, 1983 in Dunford, 2002.
[47] Willingness-to-Pay is a method of economic valuation for non-market goods and services that attributes a monetary value based on the maximum amount that consumers/taxpayers are willing to pay for its existence or conservation.
[48] Van Rensburg *et. al.,* 2009. Values updated to 2019 prices and values for the purposes of this Evaluation, which is detailed further in Appendix C.

As outlined previously, the Burren Programme and its predecessors were established to preserve and enhance the ecological integrity of farmed habitats in the Burren; habitats that had come under increased pressure due to changing agricultural practices in the 20th Century. The Burren Programme is primarily concerned with the preservation of Annex I habitats covered by the EU Habitats Directive (i.e. Annex I habitats) and those found in the different SACs of the Burren (see Figure 3.4 in Section 3.2). Several habitat types in the Burren are affected by grazing and grassland management, and the national trends with regards to these habitats are summarised in Table 6.1 below.

Table 6.1: National conditions and trends of grazed habitats in the Burren Programme

Habitat	Overall assessment of conservation status	Overall trend of conservation status	Relevant pressures / threats
Orchid-rich Calcareous Grassland (6210)	Bad	Deteriorating	Conversion from one type of agricultural land use to another (H); Undergrazing (H); Overgrazing (M); Scrub Overgrowth (M)
Alpine and Boreal Heaths (4060)	Bad	Improving	Overgrazing (H)
Juniper Scrub (5130)	Favourable	Stable	Overgrazing (L); Abandonment of grassland management (L)
Calaminarian Grasslands (6130)	Inadequate	Deteriorating	Undergrazing (L)
Lowland Hay Meadows (6510)	Bad	Deteriorating	Conversion from one type of agricultural land use to another (H); Application of natural/synthetic fertilisers (H/M); Abandonment of grassland management (M); Livestock farming without grazing (M)
Turloughs (3180)	Inadequate	Stable	Overgrazing (M)
Alkaline Fens (7230)	Bad	Deteriorating	Abandonment of grassland management (H); Overgrazing (H)

Source: National Parks and Wildlife Service, 2019

*H = High Importance; M = Medium Importance; L = Low importance

As the table above shows, that conditions in most of these habitats are less-than-favourable, and that many are affected by issues like that the Burren Programme aims to address, such as undergrazing and land abandonment, as well as intensification (overgrazing, fertilising, conversion etc). The Burren's characteristic low-intensity farming practices, particularly the practice of winter grazing of its upland pastures, are key to the preservation of these species-rich habitats. The rare species of flora found in the Burren are particularly vulnerable to competition from more common rank grasses and scrubs; the levels of which can be controlled by optimal grazing patterns and direct interventions. The traditional practice of Winterage and seasonal grazing provides this optimal grazing regime; ensuring sufficient grazing levels to limit encroachment by scrub and rank grasses, while still preventing overgrazing and allowing flora to grow and flourish during the spring and summer months. This relationship was investigated in the early years of the Programme's development, and it was confirmed that both over- and under-grazing on Burren farms were associated with

"It is no coincidence that almost all of the more interesting species and communities of Burren flora are found on winter-grazed upland grasslands.

The thin, nutrient-poor, unimproved soils and winter grazing regime serve to prevent the more competitive plant species and litter from monopolising the vegetation, while the absence of animals in the flowering season allows the often-minute herb flora to prosper unhindered.
- Dunford (2002)

lower levels of 'species richness'[49] and biodiversity than on farms who practiced a winter grazing regime[50]. This is also aided by scrub clearance, which also helps to reverse encroachment and overgrowth on species-rich grassland habitats.

Figure 6.1: Examples of flora in the Burren

Source: Burren Programme, 2020.

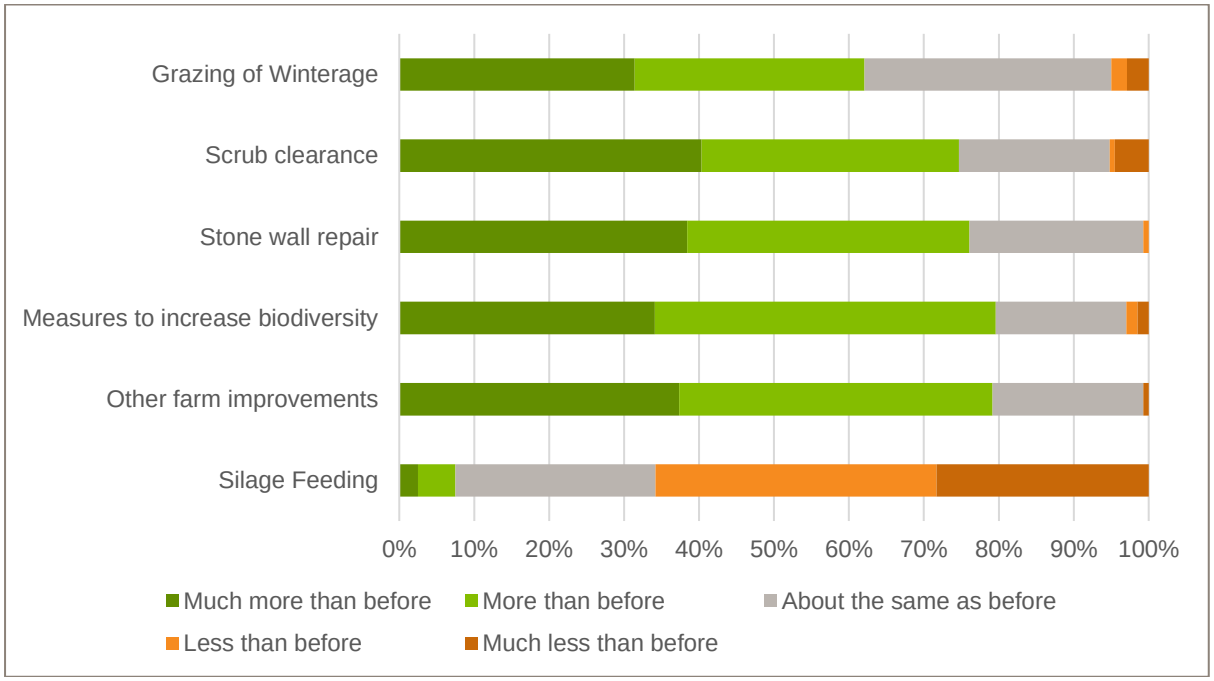
6.1.2 Impact of the Burren Programme

When established, the Burren Programme aimed to reverse these negative trends of undergrazing and land abandonment by promoting practices known to have a positive effect on habitat quality and biodiversity (such as Winterage and scrub clearance), while discouraging those associated with overly-intensive agricultural systems. In evaluating the overall impact of the Burren Programme on natural capital, it is important to address two related questions: how the Burren Programme has impacted farm practices, and how these practices have impacted the environment.

In relation to farm practices, the impact of the Burren Programme in encouraging and incentivising sustainable farm practices is evident from the surveys and interviews. The majority of farmers in the 2020 Farm Survey (63%) agreed that they had changed their farm practices since joining the Programme and when asked about specific farm practices, they generally reported carrying out sustainable practices like Winterage grazing, scrub clearance, and biodiversity-enhancing measures at much greater frequencies than before they joined the Programme (see Figure 6.2). Respondents also reported carrying out harmful practices, like silage feeding, much less frequently than before.

[49] The number of plant species per m^2
[50] Dunford, 2002.

Figure 6.2: Frequency of actions compared to before the Burren Programme

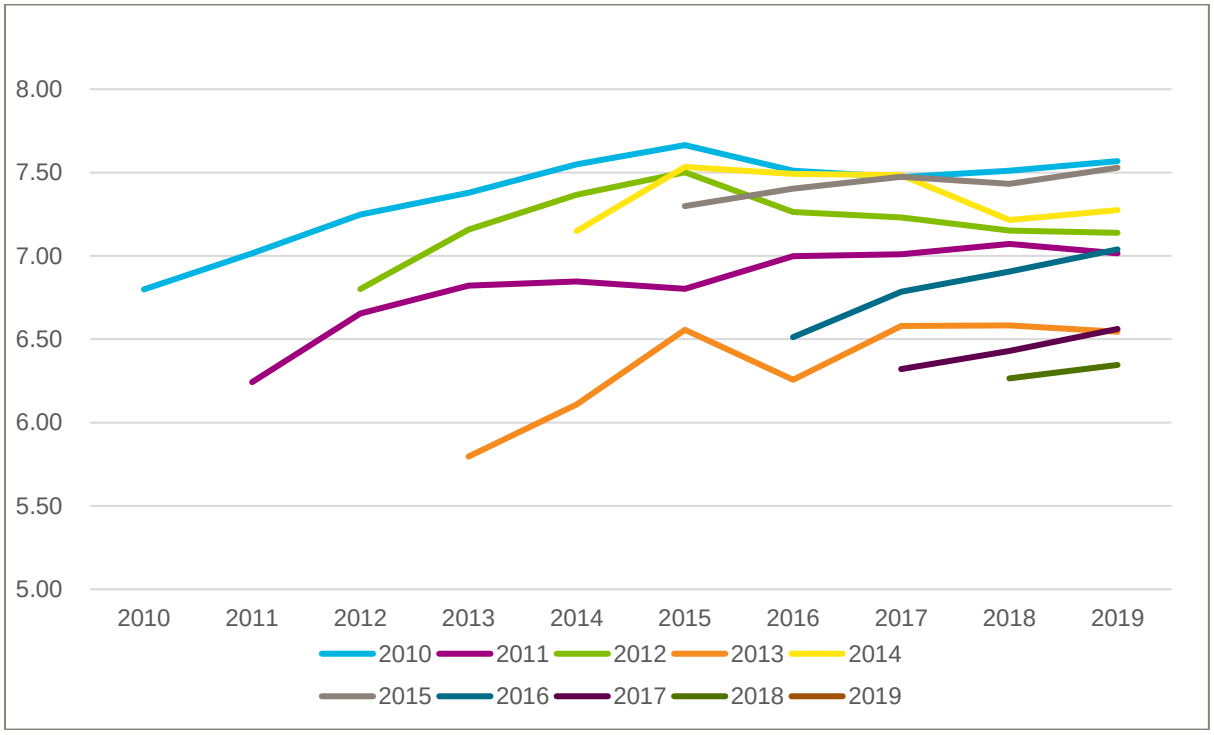


Source: 2020 Farm Survey

In order to assess progress and to reward farmers for the environmental health of their holdings, the Programme developed a Field Scoring System based on these optimal management practices to assess and reward farmers for the ecological integrity of their fields. This Field Scoring System also provides a rich source of monitoring data for the impact of the Burren Programme on habitat quality over its lifetime, and also provides strong evidence that the Burren Programme has encouraged more sustainable farm practices.

Figure 6.3 shows how average field scores have changed over time, with significant improvements seen in the average scores received by fields immediately following their entry to the Programme. On average, scores of fields in the Burren Programme have improved by approximately 0.1 points per year in the Programme, although as the figure shows, the actual pattern of this tended to be a steep improvement in the first few years, followed by a plateau. This rapid increase suggests that participants of the Programme have responded quickly to the structure and incentives of the Programme by changing their management practices in a more environmentally-sustainable way.

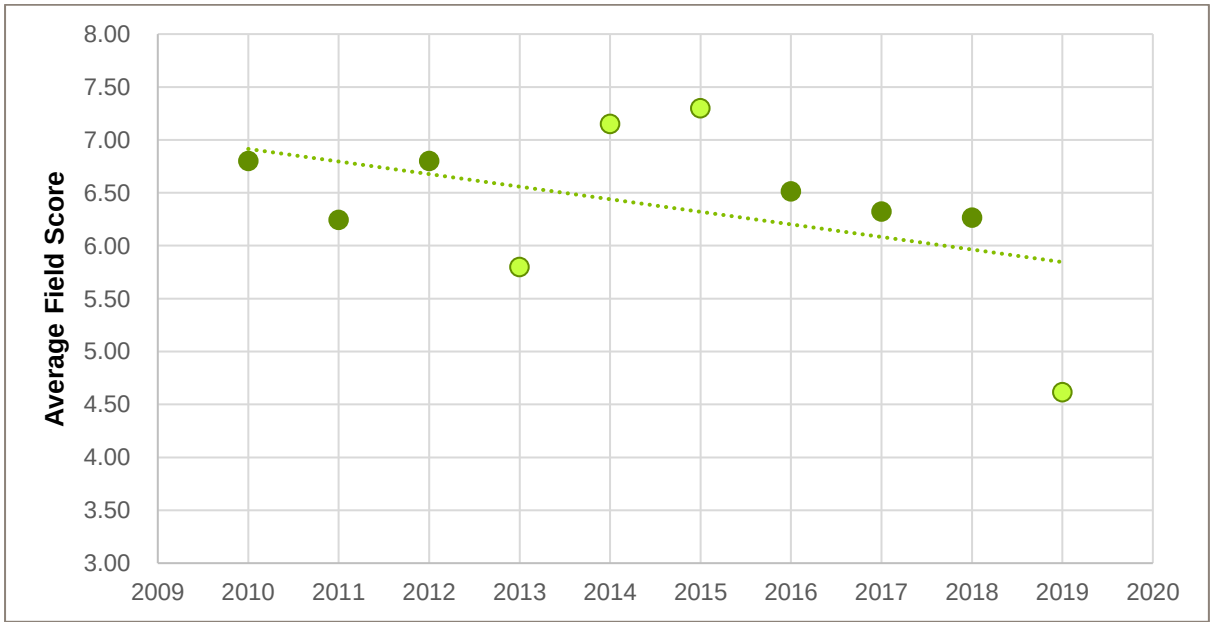
Figure 6.3: Change in average field scores by year of entry to Programme



Source: Administrative data supplied by the Burren Programme. It should be noted that most fields entered the Programme between 2010-2012 and 2016-2018, and there were very few entries in 2013, 2014, 2015 and 2019.

This positive impact on habitat quality is underscored by the counterfactual; or the potential decline that may otherwise have occurred without the Burren Programme. While equivalent data regarding habitat quality is not available for fields outside the Programme, some trends can be inferred by examining the starting scores of fields in their first year in the Programme. As these fields in their first year have not yet been affected by the Burren Programme's interventions, comparing the trends in the starting scores of these fields can provide some indication as to the overall condition of fields outside the Programme. Figure 6.4 displays these trends, showing a general decline in these starting scores over time, and suggests that field scores (and therefore, habitat quality) are unlikely to increase on their own in the absence of the Burren Programme's interventions.

Figure 6.4: Average scores of fields in their first year in the Burren Programme



Source: Administrative data supplied by the Burren Programme. It should be noted that most fields entered the Programme between 2010-2012 and 2016-2018, and there were very few entries in 2013, 2014, 2015 and 2019 (highlighted).

While this on its own is not conclusive and may be affected by other factors (such as the characteristics of farmers who join the Programme later), it is a reversal of the trends observed in Figure 6.3, and when combined with evidence from the literature review and interviews, provides additional evidence that the increase in field scores after joining the Programme is due to the support and incentives provided by the Programme.

The relevance of this Field Score data to the overall environmental quality and health of fields in the Burren is supported by an Ecological Impact Assessment (EIA) carried out by the Burren Programme[51]. The EIA confirms that scrub clearance and appropriate grazing practices promoted by the Programme have had significant positive impacts on the ecological integrity of species-rich grassland habitat in the Programme, namely *Alpine and Boreal Heaths, Calaminarian grasslands, orchid-rich calcareous grasslands, lowland hay meadows and turloughs.* As Annex I habitats, these habitats are all internationally-significant and are characterised by high levels of floral biodiversity, but as outlined previously, have experienced significant declines in their conservation status in recent years at a national level. In relation to biodiversity, the EIA also concludes that these practices have also had positive impacts on certain specific species of fauna that rely on these habitats, such the protected Marsh Fritillary Butterfly.

The impact of the Burren Programme on delivering to the quality of these habitats is also supported by the National Parks and Wildlife Service's assessment of the status and trends of habitat in Ireland[52]. For example, in relation to orchid-rich calcareous grasslands, the NPWS concluded that *"the Burren Programme and AranLIFE programmes are counterbalancing negative trends outside these areas"* by maintaining sustainable levels of cattle grazing and carrying out scrub clearance, with positive impacts from the Programme on other habitats also noted in the report.

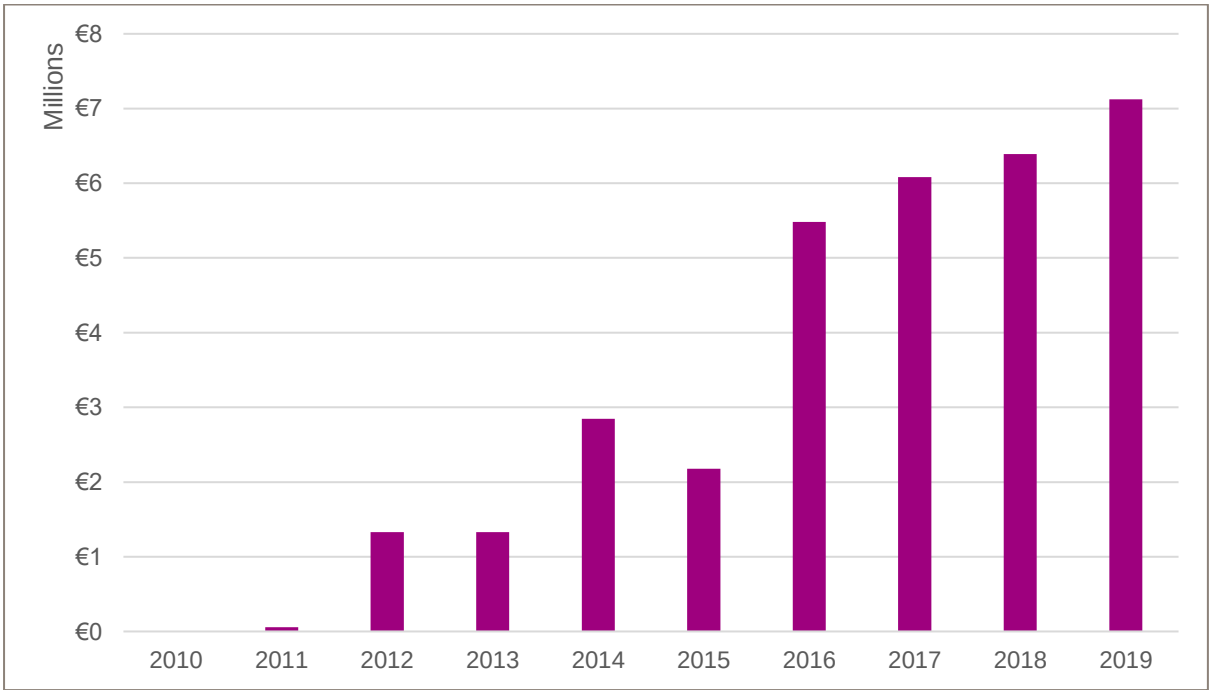
The evidence therefore strongly supports that the Burren Programme has been successful in encouraging farmers to adopt more sustainable farming practices, and by doing so, it has delivered clear environmental benefits across nearly 23,000 hectares of high nature value farmland in the Burren.

The values of the landscape and habitat improvements delivered by the Burren Programme were monetised using the Field Score Data and Willingness-to-Pay (WTP) values established by Van Rensburg *et. al.* (2009). This WTP study surveyed members of the public, who were asked to choose between different sets of Burren habitats, management levels, and management costs, and used this information to elicit the value of well-managed limestone pavement and species-rich grassland habitats. Based on these results, they estimated a WTP value of € 4,420 per hectare of well-managed habitat in the Burren. The annual improvements in habitat as measured by the field scores were then monetised using these values[53] and aggregated over the entire period of the BFCP and Burren Programme. It was estimated that since 2010, the Burren Programme and BFCP have delivered at least €32.8 million in landscape and habitat improvements. This only measures the value of habitat *improvements* that are measured by the Programme, and does not include the deterioration in habitat quality that is likely to be avoided by participation in the Burren Programme, meaning that this is a relatively conservative estimate of the true value of its impact. The calculation of this value is outlined in greater detail in Appendix C.

Figure 6.5 displays the value of the natural capital improvements delivered by the Burren Programme over time. As the figure shows, the value of these natural capital improvements has grown over time as more land entered the Programme and the longer land has remained in the Programme. During the BFCP years (2010-2015), the value of these natural capital improvements averaged €1.6 million per year, with this increasing substantially to €6.2 million per year during the Burren Programme period (2016-present).

[51] Mullen, 2020.
[52] NPWS, 2019.
[53] The original WTP values estimated by Van Rensburg *et. al.* (2009) were updated annually from their original 2009 values based on growth in the number of taxpayers and real incomes. This is outlined in greater detail in Appendix C.

Figure 6.5: WTP value of natural capital improvements delivered by the Burren Programme



Source: AECOM Analysis, 2020.

This is likely to be a conservative estimate, as it measures only the *improvements* in the field scores observed over the Programme period. As outlined previously, it is likely that the Burren Programme helped to prevent declines in habitat quality that would otherwise have occurred in its absence, as indicated by the habitat trends seen at a national level. Even assuming an average decline in the baseline field score of 0.1 points per year (based on the trendline in Figure 6.4 above) would greatly increase the value of the natural capital improvements delivered by the Burren Programme; as this would measure not only how much habitat quality has *improved* during fields' time in the Burren Programme, but also how much of a decline was prevented by the Burren Programme. Incorporating this rate of decline in the baseline into the analysis increases the total value of natural capital improvements to €63.8 million; an increase of €31 million. While this second figure is not conclusive, as there may be other factors that influence these starting scores (such as the characteristics of the farmers who join the Programme at different points) it does illustrate that the estimate of €32.8 million, one that excludes potential declines in habitat quality outside the Programme, is a relatively conservative one.

These natural capital improvements of €32.8 million delivered by the Burren Programme are also particularly notable when compared to the approximately €12.3 million that has been spent on the Programme to date, suggesting that the Burren Programme's 'hybrid' model is a particularly effective and efficient model of delivering environmental results. It should also be noted that while field scores have increased, stocking densities have not significantly changed since 2000; at an average stocking density of approximately 0.79 LU/ha (compared to 0.66 in 2000). This suggests that the farming system promoted by the Burren Programme is sustainable both environmentally and economically; delivering clear environment benefits without requiring farmers to de-stock or negatively impacting their income.

This interpretation of field scores comes with a note of caution: a plateau in field scores is visible in Figure 6.3 and Figure 6.5 (in the value of natural capital improvements), with scores rising quickly following farmers' entry into the Programme, likely as a result of the initial change in management practices; before settling within a range of between 6.5 and 7.5. This suggests that on average, farmers may face either greater difficulties or fewer incentives to continually improve the habitat quality of their fields beyond this initial improvement, and may result in the Programme appearing less effective over time. This may be linked to payment rates (particularly the apparent inequities between the rates in the Burren Programme and other AES discussed in Section 3.2.5 or the additional time that it takes to achieve this additional level of improvement. These issues may need to be examined to ensure that the Programme continues to deliver environmental improvement for the Burren.

Table 6.2: Effects relating to habitats and biodiversity

Capital and Effect	Nature	Impact	Scale	Significance
Natural Improvements in landscape and habitat quality worth at least €32.8 million	**Positive**	**High**	**National**	**High**
Natural Greater levels of biodiversity in the Burren	**Positive**	**High**	**National**	**High**

6.2 Water

Another of the Burren Programme's objectives is to *"contribute to improvements in water quality and water usage efficiency in the Burren region"*. The unique geology of the Burren makes it particularly susceptible to water pollution and poor water quality. Due to the thin soil, porous limestone rock, and extensive groundwater systems, pollutants can more easily enter the water system of the Burren and cause a widespread decline in water quality. The ecological integrity of several Annex I habitats in the Burren can be negatively impacted by pollution and poor water quality; the national conservation trends of which are summarised in Table 6.3 below.

Table 6.3: National conditions of habitats affected by poor water quality in the Burren

Habitat	Overall assessment of conservation status	Overall trend of conservation status	Relevant pressures / threats
Petrifying springs (7220)	Inadequate	Deteriorating	Mixed source pollution to surface and ground waters (H)
Cladium fens (7210)	Inadequate	Stable	Mixed source pollution to surface and ground waters (M)
Hard water lakes (3140)	Bad	Deteriorating	Agricultural activities generating diffuse pollution to surface or ground waters (H); Agricultural activities generating point source pollution to surface or ground waters (H)
Vegetation of flowing waters (3260)	Inadequate	Deteriorating	Agricultural activities generating diffuse pollution to surface or ground waters (H); Agricultural activities generating point source pollution to surface or ground waters (H)
Turloughs (3180)	Inadequate	Stable	Agricultural activities generating diffuse pollution to surface or ground waters (H)
Alkaline Fens (7230)	Bad	Deteriorating	Agricultural activities generating diffuse pollution to surface or ground waters (M)

Source: National Parks and Wildlife Service, 2019

*H = High Importance; M = Medium Importance; L = Low importance

As the table above shows, all of these habitats are in poor condition at a national level, with pollution from agricultural activities being a key source of poor water quality. This is a particular risk in the Burren given its unique geology, and a 1996 study noted that changes in farming systems and increased silage production the Burren in the 1990s had led to an elevated risk of point-source and run-off pollution from effluent, artificial fertilisers and slurry[54]. The study found that around 92% of silage sites in the Burren were likely to be leaching effluent to groundwater bodies, posing a significant risk to water quality in the region.

Given the heightened risk of water pollution from farms in the Burren and the negative impact this could have to sensitive habitats, several elements of the Burren Programme are aimed at reducing potential negative impacts from agriculture, including:

[54] Drew, 1996.

- **Condition of water sources –** The condition of water sources is a criterion in the field scoring system, accounting for approximately 20% of the weight given to the overall field scores. Farmers receive positive or negative scores based on the condition of springs or streams on their land, such as the presence of animal dung or the condition of wetland vegetation, which provides additional financial incentives to address sources of pollution. The Programme also funds 'habitat restoration' measures, which often involves walling or fencing off water sources, to aid farmers in this.
- **Silage –** As outlined above, run-off from silage production and point-source pollution from silage feeding heightens the risk of water pollution in the Burren. To discourage its use, fields in which silage has been fed automatically receive a score of zero. In addition, alternative supplementary feeding systems have been researched, developed, tried and tested (the Burren ration, as described in Section 3). Funding is also available to purchase storage bins and troughs to promote this alternative system.
- **Watering facilities –** As outlined previously, the Burren Programme also funds the installation of new watering facilities for livestock, such as rainwater harvesting systems, pumping systems, water storage tanks and water troughs. While these have obvious benefits in terms of farm efficiency and animal wellbeing, they also provide an alternative to animals drinking directly from local streams and watercourses, which reduce the risks of pollution from animal dung.
- **Winterage –** Finally, the outwintering of cattle also reduces the need for/use of slatted houses during the winter, which lowers the risk of effluent leaching into the soil and groundwater.

Figure 6.6: Example of a water storage tank

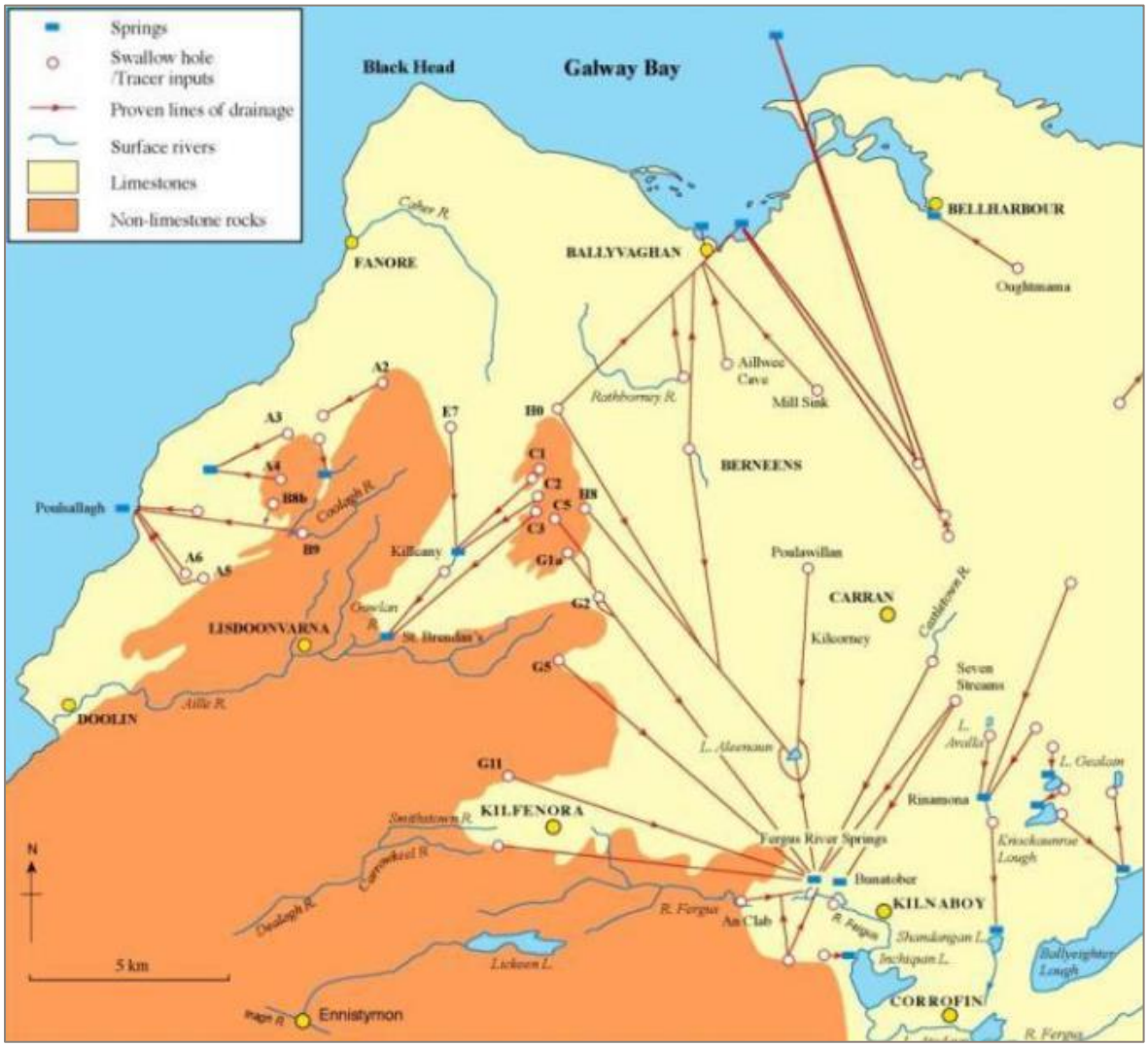
Source: Burren Programme, 2020

It is reasonable to assume that the management practices implemented on Burren Programme have had a positive impact in terms of reducing pollution from participants' farms to surface and groundwater bodies. As part of BurrenLIFE, a 'Risk of Nutrient Export' (RoNE) was developed to model the pollution risk levels associated with various types of management systems in the Burren. The RoNE model showed that the 'BurrenLIFE' model of farming (i.e. Winterage grazing, low fertiliser use) was associated with a lower risk of pollution than the 'traditional' model (i.e. slatted sheds, high fertiliser use)[55]. There is also significant evidence that farmers in the BFCP and Burren Programmes have indeed moved towards this optimal farming model: in the 2020 Farm Survey, 62 per cent of farmers stated that they grazed Winterage more, and 66 per cent stated that they used less silage than before they joined the Burren Programme.

[55] Bartley et. al, 2009.

However, the impact that these changes in practice have had on the overall water quality of the Burren is less clear. Given the Burren's karst landscape, its vast underground aquifers and the speed at which water can move through the system, it can be particularly difficult to trace and identify specific sources of pollution. As Figure 6.7 displays, the results of water tracing exercises have revealed long and unpredictable drainage lines, making it difficult to predict when water first enters the ground, or where it will later emerge. This uncertainty also makes it difficult to monitor water quality or attribute any measured changes to the Burren Programme or to pinpoint any changes to one particular activity.

Figure 6.7: Water tracing in the Burren



Source: Drew and Bunce, 2019

Indeed, water quality monitoring carried out by the Environmental Protection Agency (EPA) and as part of the EIA showed mixed results in the catchments that are within the area covered by the Burren Programme. The quality of rivers and streams (which are relatively uncommon in the Burren given the karst landscape) within the Burren Programme's catchment area between 2013 and 2018 is described as "stable" by the EPA, with the majority of surface waterbodies at 'Good' Ecological Status and three at 'Poor' status. The three surface waterbodies with poor ecological status are located in the south-west of the Burren; only one of which is noted as being under significant pressure from general agricultural sources, although it is also affected by other pressures such as urban wastewater emissions and tourism. Results of groundwater quality monitoring carried out as part of the EIA are also mixed. While pollution from non-faecal sources (e.g. artificial fertiliser, silage effluent) is low in groundwater bodies, faecal contamination is high in general across the Burren, particularly during the summer and autumn months. The source of this contamination is unclear, but the review suggests slurry spreading, pressure from tourism, or contamination from septic tanks as the most likely explanations.

These results, which are contained in greater detail in Appendix D, suggest that while the Burren Programme's water quality interventions are likely to have had a significant impact in reducing surface water pollution and run-off on participants' farms, there has been a negligible impact on the overall water quality of the region, given the range of other pressures affecting water quality. The EPA review of water quality concludes that "*in this predominantly karst hydrogeology area, changes in farm management activities in the Burren Programme area are likely to be less connected to water quality compared with other regions. There is also very significant dilution of nutrient sources arising from human activities in the large underground aquifer. This means that groundwater quality changes arising from changes in farming practice in this region, which is not typically highly stocked, is largely undetectable."*

Table 6.4: Effects relating to pollution and water quality

Capital and Effect	Nature	Impact	Scale	Significance
Natural Reduced water pollution on participants' farms	**Positive**	**High**	**Regional**	**High**
Natural Improved water quality in the Burren	**Positive**	**Low**	**Regional**	**Low**

6.3 Scrub Clearance

As outlined in the Section 3.1 (historical context), although the hazel woodlands that historically dominated the landscape were cleared for wood, fuel and farmland, changing farming practices and the reduction in the use of Winterages have led to increased levels of scrub encroachment on priority habitats. Scrub clearance is one of the main tasks carried out by farmers in the Burren Programme, accounting for around 65 per cent of all I-2 funding, and since 2010, approximately 385 hectares of dispersed hazel and blackthorn scrub have been cleared in the Burren. In addition to grazing management, scrub clearance is an essential part of preserving and preventing encroachment on Annex I habitats and species-rich grasslands. Scrub can also damage archaeological sites and negatively impact other species that depend on open grassland habitats, such as the Marsh Fritillary Butterfly, meadow pipits, skylarks and the cuckoo. As outlined previously, the impact of scrub clearance activities in terms of these priority habitats was examined in the EIA, and it was concluded that scrub clearance under the Burren Programme has had a significant positive impact on Annex I habitats, particularly calcareous grasslands, alpine and boreal heaths and calaminarian grasslands. Preventing scrub encroachment is an essential part of preserving the quality and biodiversity of Annex I habitats in the Burren, and this context should be stressed when discussing any potential adverse impacts associated with scrub clearance.

As with any habitat, scrub still provides some benefits and ecosystem services, such as providing habitat for birds and animals or sequestering carbon dioxide. While acknowledging the significant benefits provided by scrub clearance, it is also important to consider and assess the significance of potentially adverse impacts and the mitigation measures employed to address these within the broader context of this environmental assessment.

Figure 6.8: Abandonment and scrub encroachment in the Burren

Source: AECOM, 2020.

Some of the potential adverse impacts, such as the removal of mature habitat, disturbance of birds and wildlife and damage from machinery, are considered in the Burren Programme's Ecological Impact Assessment, although the EIA generally determines their significance to be low or negligible. The main reasons for this are the strong mitigation measures employed by the Programme when carrying out scrub clearance; most notably the fact that farmers are generally not permitted to remove mature scrub and woodland habitats. This prevents significant habitat, such as mature hazel woodland, from being cleared under the Programme.

However, an additional potential negative impact of scrub clearance not considered by the EIA is the loss of carbon sequestration potential. A report by the EPA noted that scrub and non-forest woodland habitat acts as a carbon sink as it grows, and found that scrub can sequester approximately 2.4 tonnes of CO_2 per year as it grows[56]. Based on this, it is estimated that the removal of 385 hectares of immature scrub between 2010 and 2019 has resulted in lost sequestration potential of approximately 6,000 tonnes of CO_2 over the lifetime of the Programme, or an average of 546 tonnes per year. Using the shadow cost of carbon of €20 per tonne[57], the cost of this lost CO_{2e} sequestration potential to date amounts to approximately €120,000 since 2010. As this figure is small in terms of potential emission levels and monetary values (i.e. the annual equivalent of approximately just 15 households), it suggests that the impacts of scrub clearance in terms of carbon emissions and sequestration are also negligible.

The frequent use of glyphosate for scrub clearance and its potential impacts on the environment and human health was also commented upon in the surveys and interviews. While use of glyphosate is a decision for each individual farmer, a few farmers suggested that the use of glyphosate should be banned in the Burren, and while not calling for a ban, some other interviewees acknowledged that there were concerns among some participants regarding its use on environment and human health. This issue was considered in the EIA, which noted that the Burren Programme places several restrictions on the use of herbicides, and penalties (including withholding of I-2 payments and reduction in I-1 scores) for its misuse, to minimise the potential that it could enter the Burren's water system, and concluded that the overall significance of these activities are low. It is also important to note that hand removal of scrub was recognised as a time-consuming activity, and the complete

[56] Black *et. al.,* 2019.
[57] Department of Public Expenditure and Reform, 2019. 'Central Technical Parameters to the Public Spending Code'

removal of scrub is often not possible without the use of herbicides. However, given the concerns among some participants, the use of glyphosate was identified as having a negative impact on social capital and trust between some participants and the Burren Programme.

However overall, the EIA suggests that any potential negative environmental impacts of scrub removal are minimal due to the robust mitigation measures employed by the Programme, with any residual environmental impacts greatly outweighed by the benefits for rare and vulnerable open habitats and the species that rely on them for their survival.

Table 6.5: Summary of the effects of scrub clearance

Capital and Effect	Nature	Impact	Scale	Significance
Natural Reduced scrub encroachment on Annex I habitats, leading to improved habitat quality and biodiversity	Positive	High	National	High
Natural Loss of carbon sequestration potential from scrub clearance	Negative	Negligible	National	Negligible
Social Negative effects on social capital from use of glyphosate	Negative	Moderate	Individual	Low

6.4 Built Heritage

The Burren landscape is an area that contains a significant concentration of stone monuments in Ireland, and the tombs, monuments and walls that adorn the landscape reflect a rich history going back thousands of years. Given that stone endures, in comparison to clay, wood and other more transient building materials, the Burren landscape comprises a striking cultural legacy.

As described in Section 3.1, changes in farming practices during the late 20th Century resulted in widespread damage to the Burren's archaeology and the loss of 30 per cent of its archaeological monuments. As a result, the Programme has put in place measures to ensure the protection of archaeological monuments, and to improve the Burren's built heritage.

6.4.1 Walls

Dry stone walls are a defining feature of the Burren's landscape, and have served farmers for thousands of years by enclosing field boundaries and providing shelter for livestock from weather conditions. As well as serving a practical purpose for grazing and herding livestock, the tradition of dry stone walling is also recognised as a unique and intangible component of the Burren's archaeological and cultural heritage, and is promoted by the Burren Programme and Burrenbeo Trust.

The cultural and heritage value of stone walls are linked to traditional farming practices, with unique Burren structures still in evidence. These include Feidín walls, cross or 'T' shaped walls built for stock shelters on Winterage and turf thuiles for collecting and drying cow dung, which was used for fuel in former times. Many of the walls throughout Ireland were built for a cattle-based economy, including the 'bawn' wall, the meaning of which has its origins in the translation from Irish of a cattle enclosure, 'Pooteen' or sheep's pass to keep cows enclosed while letting smaller animals through the walls. As the stone is not held together by mortar, dry stone walls are susceptible to damage and deterioration over time, and require regular repair. They are also vulnerable to damage from intensive farming practices, and it was noted in the interviews that many were knocked down before the Programme to provide vehicle and machine access to fields without gates.

Dry stone wall repair requires each stone to be put in place by hand, a specialist skill that some farmers (particularly those who may be older) find too labour-intensive to accomplish alone. As a result, the Burren Programme funds stone wall repair tasks at a rate of 75 per cent (50% for external boundaries) to encourage farmers to preserve and repair dry stone walls on their farms. This incentive was successful, with 78 per cent of farmers in the 2020 survey stating that they have repaired stone walls more often than before they joined the Burren Programme. Since 2010, the Programme has funded the repair of approximately 130,000 metres of damaged dry stone wall, corresponding to highly significant effect on manufactured capital. The Burren Programme also strongly promotes the identification and preservation of ancient mound wall systems from the late Neolithic period and employs a dedicated 'field monument advisor' to assist with this task.

Table 6.6: Effects relating to dry stone walls

Capital and Effect	Nature	Impact	Scale	Significance
Manufactured Preservation and repair of at least 130,000 metres of traditional dry stone walls	**Positive**	**High**	**Regional**	**High**

6.4.2 Burren Gates

The Burren Programme has pioneered the installation and use of 'Burren Gates', which is a traditional style of gate found in the Burren. The impracticalities of traditionally-built Burren Gates, such as their cost, weight and restrictive width, often resulted in them being unsuitable for modern farms, and according to interviews, farmers mostly opted for regular field gates when installing or replacing gates on their farms as a result. Seeking to preserve the traditional style and aesthetic of these gates on participants' farms, the Programme coordinated with local forges and gate-makers to manufacture a gate based on a traditional, local design and subsidised the cost of buying and installing these gates.

In order to promote their use, these 'Burren Gates' are co-funded by the Programme at a rate of 75 per cent, compared to 50 per cent for regular field gates. Despite this, their uptake compared to field gates has relatively been low, with 199 'Burren Gates' and 647 regular field gates installed or retrofitted since 2010.

While the significance of this in terms of manufactured capital may be relatively low, there is also an impact on human capital in terms of the revival of traditional skillsets. Four local gate-makers produce 'Burren Gates', and according to one of these gate-makers interviewed as part of this assessment, the demand from farmers in the Burren Programme has helped to support additional employment. Their use in the Programme has also reportedly increased the popularity of Burren Gates among farmers and other landowners outside the Burren Programme; an example of the Programme's indirect impact in terms of reviving and sustaining employment and traditional skillsets.

Table 6.7: Effects relating to 'Burren Gates'

Capital and Effect	Nature	Impact	Scale	Significance
Manufactured Installation and retrofit of 199 Burren-style gates on participants' farms	Positive	Moderate	Local	Low
Human Increased employment and revival of traditional skillsets	Positive	High	Individual	Moderate

6.4.3 Archaeology and Monuments

As described in Section 3.1, land reclamation and changes in agricultural practices in the late-20th Century also resulted in extensive damage to the Burren's archaeological monuments, with an estimated 30 per cent of monuments destroyed during the period.

While there are no interventions and little data to evaluate the specific effects of the Programme on archaeological monuments (other than stone walls), the Programme places the protection of local archaeology at heart of the planning and approval process for I-2 works. The Burren Programme has a Field Monument Advisor, which is co-funded by the Heritage Council, the National Monuments Service and the Burren Programme. In discussion with the farmer, the Field Monument Advisor assesses all I-2 work which may impact archaeology or monuments and acts as a mediator between the farmer and the National Monuments Service, assuming any reporting obligations and facilitating the mapping of archaeological monuments.

With this support, the Programme has overhauled the process of securing permission for and carrying out works on participants' farms. When drawing up farm plans and before carrying out any work, participants' fields are surveyed by the farm advisor (or a member of the Programme team if additional expertise is required), and any archaeological monuments are identified and logged. In the case of works near monuments for which additional permissions are required, the farm advisor and Programme help with securing that permission and ensuring that any works carried out are done so in line with regulations and best-practice guidelines. By providing this guidance and oversight for farm works, the Programme is able to ensure that monuments are not harmed and that the archaeological heritage of the Burren is preserved. This is also an example of the Burren Programme's service to farmers; the reduction in transaction costs of complying with statutory obligations, while also ensuring that the monuments are protected. It also increases farmer knowledge of archaeology, and strengthens the bonds between farmers and land/landscape.

This is also aided in some cases by scrub removal, which can have a positive impact on fragile archaeological monuments threatened by encroaching and overgrown scrub. While data is not available to quantify the extent of this effect, interviews with heritage stakeholders indicate that these works have had a significant impact on monuments where removal was carried out, particularly wedge tombs and ringforts.

There is also some evidence that the Programme has increased awareness among farmers of archaeological monuments on their farms, with participation in the Burren Programme corresponding to a small increase in self-reported knowledge of the Burren's archaeology over the past decade. In

the 2009 farm survey, 62 per cent of farmers reported their knowledge of the Burren's archaeology as 'adequate', 'knowledgeable' or 'very knowledgeable'; a percentage that increases to 75 per cent in 2020. This is supported by interviews with Burren Programme farmers and team members, who confirmed that many farmers have been made aware of monuments on their farms that they did not necessarily recognise previously, and now take greater care so as not to damage them while farming or carrying out works.

Table 6.8: Effects relating to archaeological monuments

Capital and Effect	Nature	Impact	Scale	Significance
 **Intellectual** Increased knowledge/awareness among farmers of archaeological monuments	**Positive**	**Moderate**	**Programme**	**Moderate**

6.5 Summary of environmental effects

The Environmental Assessment considered the Burren Programme's impact on the natural and built environment of the Burren, which mainly corresponds to natural and manufactured capital. Eleven effects were identified, six of which correspond to natural capital, two to manufactured capital, and one each to social, human and intellectual capital. The range of capitals included in the Environmental Assessment again reflects the multi-dimensional impact of the Programme and its interventions.

Overall, the most significant impacts of the Burren Programme relate to its effects on habitats and biodiversity in the Burren. There is strong evidence that the Burren Programme has delivered improvements in the quality of habitats and the biodiversity on Burren farms, most notably seen in the increase in the scores of most fields in the Programme. When monetised using willingness-to-pay values for habitats in the Burren, the value of these natural capital improvements was estimated at approximately €32.8 million over ten years. In terms of water quality, while the practices of the Programme are likely to be significant at reducing surface water and point-source pollution on and from participants' farms, the overall impact of these practices on the wider quality of the Burren were considered to be low given the range of other pressures affecting water quality.

Potential negative effects associated with scrub clearance, such as a reduction in immature scrub habitat and the loss of CO_2 sequestration potential, were considered to be of low significance compared to the benefits of scrub clearance to designated habitats, as well as the mitigation measures employed by the Programme. A negative social capital effect of low significance was also identified relating to the use of glyphosate for scrub clearance. Furthermore, the Programme resulted in positive impacts to the Burren's archaeological and built heritage (types of manufactured capital), namely the rebuilding of stone walls, the installation of traditional Burren Gates, and awareness of archaeological monuments on farms.

Table 6.9: Summary of environmental effects of the Burren Programme

Capital and Effect	Nature	Impact	Scale	Significance
Natural Improvements in landscape and habitat quality worth at least €32.8 million	Positive	High	National	High
Natural Greater levels of biodiversity in the Burren	Positive	High	National	High
Natural Reduced water pollution on participants' farms	Positive	High	Regional	High
Natural Improved water quality in the Burren	Positive	Low	Regional	Low
Natural Reduced scrub encroachment on Annex I habitats, leading to improved habitat quality and biodiversity	Positive	High	National	High
Natural Loss of carbon sequestration potential from scrub clearance.	Negative	Negligible	National	Negligible
Social Negative effects on social capital from use of glyphosate	Negative	Moderate	Individual	Low
Manufactured Preservation and repair of at least 130,000 metres of traditional dry stone walls	Positive	High	Regional	High
Manufactured Installation and retrofit of 199 Burren-style gates on participants' farms	Positive	Moderate	Local	Low
Human Increased employment and revival of traditional skillsets	Positive	High	Individual	Moderate
Intellectual Increased knowledge/awareness among farmers of archaeological monuments	Positive	Moderate	Programme	Moderate

7. Conclusions

The Burren Programme is an agri-environment scheme, funded under the 2014-2020 Rural Development Programme, that aims to protect the unique landscape and farming systems endemic to the region. The successor to two earlier programmes, the 'BurrenLIFE' scheme which ran from 2005-2010 and the 'Burren Farming for Conservation Programme' (BFCP) from 2010-2015, now covers over 23,000 hectares of land in the Burren. Anyone who farms a holding with Annex I habitat in the Burren is eligible to apply to join the Programme, and it now encompasses 328 farmers in the Burren.

The objectives of the Burren Programme are primarily environmental; to promote a sustainable model of farming that is suited to the Burren and helps to preserve and enhance its distinctive habitats, most notably its species-rich grasslands and the biodiversity therein. Central to this is the traditional practice of 'Winterage', a form of transhumance where livestock are moved to upland fields over the winter months. This movement promotes the 'right' type of grazing among cattle; preventing overgrazing, while also reducing the encroachment of common rank grasses and scrub. These conditions facilitate the growth of rare species of flowers and orchids; contributing to the rich biodiversity for which the Burren has become famous. During the 20th Century however, changing economic and political conditions caused agriculture in the Burren to become increasingly intensive and mechanised, leading to underuse of winterages by many farmers, increased levels of scrub encroachment, and a resulting loss of habitat and biodiversity.

> ***"It is no coincidence that almost all of the more interesting species and communities of Burren flora are found on winter-grazed upland grasslands.***
>
> ***The thin, nutrient-poor, unimproved soils and winter grazing regime serve to prevent the more competitive plant species and litter from monopolising the vegetation, while the absence of animals in the flowering season allows the often-minute herb flora to prosper unhindered.***
> - Dunford (2002)

The aim of the Burren Programme and its predecessors has been to encourage farmers to move towards a more sustainable model of agriculture in the Burren, a model described as *"ancient farming systems using modern-day technologies",* by providing financial incentives to farmers and by developing solutions to the barriers they face in doing so. It is described as a 'hybrid results-based' scheme, meaning that it rewards farmers for both the actions they carry out and the environmental results they deliver. 'Intervention 1' is the results-based strand of the Programme, which provides financial rewards to farmers who can demonstrate environmental improvements in their eligible fields. This is enabled by a straightforward but innovative 'field scoring' system developed by the Programme; where fields are scored each year against a range of sustainable management indicators, with farmers receiving payments based on the scores they achieve. 'Intervention 2' is the 'actions-based' strand, and involves compensating farmers for carrying out a range of tasks aimed at improving the environment and facilitating sustainable farming practices on their farms. While farmers have full autonomy over the choice of works they undertake, most tasks provide practical infrastructure which helps with the day-to-day running of the farm, such as fencing, access tracks or water infrastructure. The Burren Programme is administered locally by a team in Carron, and supported by a network of trained farm advisors who liaise with farmers, prepare farm plans and conduct field assessments.

In terms of its core objectives, it is clear that the Burren Programme has been successful in inducing behavioural change among its participants and encouraging the adoption of more sustainable agricultural practices on Burren farms. Farmers in the Programme report having adopted the practices encouraged by the Programme, such as more targeted Winterage grazing, farm improvement works and scrub clearance at higher rates than before they joined the Programme, with corresponding reductions in more harmful practices such as silage feeding. In terms of evaluating how these changes have affected the environment, this Evaluation has greatly benefited from the breadth and quality of data collected by the Programme, particularly through the innovative field scoring system that it developed. As a result, there is strong evidence that the Programme delivered significant improvements in the quality of the habitats it oversees, with the value of these natural capital

improvements estimated at approximately €32.8 million over 10 years. Compared to its total expenditure of €12.3 million since 2010, this indicates that the Programme has delivered significant value for money in terms of delivering on its environmental objectives.

However, in addition to 'what' the Programme was able to deliver, this Evaluation also sought to provide insight into 'how' these benefits were achieved. The structure of the Burren Programme, specifically its 'hybrid' model of 'results-based' and 'actions-based' interventions, was found to be a key part of this; with the 'results-based' intervention providing the right incentives and rewards for farmers to target greater levels of ecological improvement, and the 'actions-based' intervention providing the necessary infrastructure and financial support to enable them to easily do so. The analogy of the "carrot" (referring to rewards for good management practices) and the "stick" (referring to punishments for negative practices) was commonly brought up by stakeholders in relation to the different approaches that agri-environment schemes can take to deliver results; the conclusion being that the Burren Programme has been successful by placing greater emphasis on this "carrot" than on penalties and punishments.

While this incentive structure is crucial, the importance of securing 'buy-in' from participants and from the local community was also a common theme. There is overwhelming support for the Burren Programme, not just from the farmers in the scheme, but from all stakeholders that were contacted for this Evaluation. Much of this support stems from the tangible benefits that farmers and the community have received from the Programme. While income from I-1 payments is perhaps the most obvious example, in fact, this Evaluation found that it is not the most significant. Instead, the support the Programme gives for physical farm improvements and infrastructure – that is, providing funding and a framework in which they can easily secure approval for certain farm works - were ranked as the most important benefit to farmers. Farmers agreed that these improvements enabled them to adopt sustainable farming practices like Winterage by improving access to upland fields, providing secure food and water supplies, and generally allowing them to herd and handle livestock more easily. This is particularly important for part-time farmers: time savings that enable farmers to farm alongside other paid employment. The Programme also provided a framework through which farmers could seek approval to carry out site enhancement works in designated areas, which has greatly reduced the paperwork and bureaucracy that had previously been a barrier to farmers seeking to do so. For some, these improvements have allowed them to farm certain tracts of land that had become badly neglected, thereby demonstrating how the Burren Programme has helped to ensure the long-term financial and economic viability of their farms.

> ***"This programme has totally transformed my lands and my view of that land. My farm was on the verge of being abandoned as it was overtaken with scrub and we were not allowed to do anything. It was taking not hours or days but weeks to do the herding. We cleared a lot of scrub, built walls and improved the water. It is now a JOY to go over and do the herding. You can see the animals and with the walls done, once you put them in, there's no out!"*** - Burren Programme Farmer

The community and local economy have also received tangible benefits from the BFCP and Burren Programme, and their activities since 2010 have generated approximately €23 million in local economic activity and supported an average of 20 local FTE jobs each year. Much of this is the result of a concerted effort by the Programme to encourage farmers to use local businesses, contractors and craftspeople when carrying out works; thereby ensuring that any economic impact remains mostly within the Burren.

In addition to these tangible benefits received by farmers and the community, the 'bottom-up' structure and management style of the Burren Programme was a critical factor in securing buy-in. The predecessors to the Burren Programme emerged from a period where trust between locals and 'outsiders' had reached a low-point due to a series of controversies regarding land designations and visitor access in the Burren during the 1990s. At the time, these changes were implemented by state agencies without significant consultation, and resulted in feelings of anger, disillusionment and distrust among farmers and the local community. In contrast, the early leaders involved in the Burren Programme took a 'bottom-up approach' to its development; engaging with and listening to farmers, respecting their innate knowledge of the Burren's farming practices and landscape, and incorporating their views and knowledge into the design of the Programme. This secured greater buy-in among

farmers not only for the Programme itself, but for its objectives in terms of sustainable management of the Burren's High Nature Value Farmland.

This farmer-centred approach continued into the implementation phases with the installation of a local team based in Carron. Most stakeholders highlighted the general importance of a local team to the effective operation of an agri-environment scheme like the Burren Programme, as it helps to build trust and allows the scheme to be flexible enough to adapt to the unique circumstances of the area and of individual farms. However, the collective leadership qualities of the Burren Programme team, as well as the respect that they show to farmers and local knowledge, were also highlighted as a significant factor in the success of the Burren Programme. The Burren Programme team were described by one stakeholder as *"a unique combination of people, with passion and skills",* and it is clear that participants of the Programme view the team not only as administrators, but as advocates and representatives for the Burren's farmers and unique farming system.

The presence of a local team also helped to maximise other social benefits of the Burren Programme to those both inside and outside the Programme. In particular, there was strong evidence of the Programme's role in creating networks; acting as an intermediary through which knowledge, innovation and practices from the Programme are shared with other agricultural, environmental, cultural and educational groups. Locally, the Burren Programme acts as a network which provides regular opportunities for farmers to meet, share information and learn from one another. Outside the Burren, other agri-environment schemes in Ireland and Europe have benefited from the lessons and innovations shared by the Programme, many of which have been directly adapted or incorporated within their own schemes. These networks, particularly its close collaboration with the Burrenbeo Trust in organising events and talks, have also helped to preserve these farming traditions and practices, and to showcase their importance to the landscape and the cultural heritage of the Burren.

While this Evaluation has found evidence of a range of positive effects associated with the Burren Programme, it has also identified potential areas for improvement that could be considered. These include comparative equity of payments with other schemes like GLAS; insight into how to incentivise farmers outside the Programme (particularly those with smaller holdings) to join and to increase the Programme's reach throughout the Burren; and challenges facing the Burren Team in terms of succession planning and ensuring that the gains made from the Programme, over the last 15 years, can be built upon and sustained in the future iterations.

"A good environment is a 'product' that can be produced by farmers, but just like food, society must be willing to pay for it"
- Burren Programme Stakeholder

Despite this, the evidence examined as part of this Evaluation suggests that the Burren Programme has been a successful Programme overall, resulting in clear social, environmental, and economic benefits for its participants and for the Burren. It serves as a potential model for agri-environment schemes in Ireland and Europe; one that has been developed with the support of local stakeholders, that is tailored to suit local environmental and social conditions, and that targets specific and measurable environmental outcomes. More generally, the Burren Programme highlights the role of farmers as 'custodians' of the landscape who, when given the appropriate structures, incentives and support, can deliver a range of eco-system services to the benefit of all. In the context of a need to find ways of diversifying farm incomes on the one hand; and to address widespread issues of climate change and ecological decline on the other, this model of 'environmental farming' - of ensuring farmers and rural communities are paid for the full range of eco-system services they deliver - is a way in which agriculture, environment and rural development can go hand-in-hand.

Appendix A - References

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Appendix B - 2020 Burren Programme Participants' Survey

Section 1 – Introduction and Background

1. Where in the Burren are you mainly located? (Tick one from list of parishes)

Ballyvaughan - Fanore	
Doolin - Lisdoonvarna	
Kilfenora - Noughaval	
Corofin - Kilnaboy	
Carron – New Quay	
Tubber - Boston	
Crusheen - Ruan	
Kinvara – Doorus - Ballinaderreen	
Gort – Ardrahan - Tierneevin	
None of these	
Don't Know / Prefer not to say	

2. What age are you? (Tick one)

Under 30 years	
between 30 to 49 years	
between 50 and 64 years	
65 years and over	

3. How many people are in your household? (Enter number of people)

4. **What is your gender? (Tick one)**

Male	
Female	
Other	
Prefer not to say	

5. **Below are 6 potential benefits of membership of the Burren Programme.**

   Can you please rank these items from 1 to 6 in order of importance to you? (place 1 beside the most important benefit to you, 2 beside the second most important and so on)

Potential Benefit	**Your Rank**
Training and advice received from participating in the Burren Programme	
Improvements to the environment, landscape or biodiversity	
Support with practical improvements to the farm (e.g. fencing, water troughs etc.)	
Income received through the Burren Programme	
Preservation and promotion of traditional farming practices	
Interaction and sense of community with other members of the Burren Programme	

Section 2 – Farm Income

These next questions are intended to get a greater understanding of the effect of the Burren Programme on farm income.

6. **Which one of these statements best describes your situation? (Tick one)**

Farming provides 100% of my household income	
Farming provides more than 50% of my household income	
Farming provides less than 50% of my household income	
Don't know / Prefer not to say	

7. In 2019, did you receive payments (I-1 Payments) for your Field Score from the BP? (Tick one)

I did not receive any payments for my Field Score	
Less than €500	
€500 - €1500	
€1500 - €3000	
More than €3000	
Don't know / Prefer not to say	

8. [If yes to 7] Did you use this income for any particular purpose? (Tick all that apply)

Day-to-day household expenses / No particular purpose	
To help with one-off household purchases (e.g. car, home etc.)	
To reinvest into the farm	
To save	
Other	
Don't know / Prefer not to say	

9. To what extent would you usually purchase from businesses located in (or within 20 miles of) the Burren for the following? (Tick one for each)

	Mostly within the region	Around Half in the region	Very little in the region	Don't know
Household Shopping				
Farm supplies and equipment				

10. In your opinion, how do you think that interest in the Burren from outside the region has changed over the past decade? (e.g. tourist, scientific)

11. In 2019, did you directly earn any income from agri-tourism? (i.e. directly from tourists/visitors to you or your farm)

Yes	
No	

12. [If yes to 11] Was this linked to your participation in the Burren Programme? (e.g. visiting groups directly organised through the Programme)

Yes, mostly	
Yes, partially	
No	

13. [If yes to 11] What were the main sources of this tourist income? (Choose all that apply)

Leading farm walks or tours for visiting groups	
Providing transport	
Providing lunch or refreshments	
Providing accommodation	
Selling farm products to visitors	
Other (Please specify):	

Section 3 – Farm Works & Management

These next questions are intended to understand the effects of the works carried out under the Burren Programme on your farm.

14. Compared to before you joined the Burren Programme, how often do you do the following farm practices: (Tick one for each)

Practice	Much more than before	More than before	About the same as before	Less than before	Much less than before
Grazing of Winterage					
Silage feeding					
Scrub clearance					
Repairing stone walls					
Carrying out other farm improvements					
Measures to increase biodiversity					

15. **Has participation in other agri-environment schemes (e.g. GLAS, REPS, AEOS) also had a significant impact on any of these farm practices?**

16. **In 2019, approximately how many days did you personally spend carrying out I-2 works on your farm?**

17. **Do any farm tasks *take less time now* because of the Burren Programme? (e.g. getting permissions, efficiencies from farm improvements)**

18. **In the last year, have you helped another Burren Programme member to carry out I-2 work on their farm? (Tick one)**

Yes	
No	

19. **[If yes to 18] Were you financially rewarded for this? (Tick one)**

Yes	
No	

20. **[If yes to 18] And approximately how many days did you spend doing this? (Enter number of days)**

21. How often do you discuss your unique Burren farming practices with the following groups? (Tick one for each)

	Regularly	Sometimes	Rarely	Never
Friends and family				
Burren Programme farmers				
Local farmers who are not in the Burren Programme				
Farmers from outside the Burren region				
Agricultural interest groups (e.g. IFA, Teagasc etc.)				
People from non-farming backgrounds				

22. In your opinion, what are the biggest environmental challenges on your farm?

Section 4 – Heritage and Community

These next questions are intended to understand the effect of the Burren Programme on the heritage and community of the Burren.

23. How would you rate your knowledge on the following aspects of the Burren? (Tick for each option)

Aspect	Very knowledgeable	Knowledgeable	Adequate	Limited	Very Limited
Archaeology					
Geology					
Plant Life					
Wildlife					
Cultural Heritage					

24. Please indicate the extent to which you agree with the following statements? (Tick for each option)

Statement	Agree	Somewhat agree	Neutral / No Opinion	Somewhat disagree	Disagree
My farming practices are key to the Burren's unique landscape & heritage					
I have changed my farming practices since joining the Burren Programme					
I am confident that my farm successor will continue to farm this way					
Programmes like the Burren Programme are needed to ensure good farming practices are continued in the Burren					
There are enough farmers in the Burren Programme to ensure its success					
School programmes are important for ensuring traditional farming practices					
Government and local authorities understand the importance of farming to the Burren's unique landscape and heritage					
The general public understands the importance of farming to the Burren's unique landscape and heritage					

Appendix C - Valuing Natural Capital Enhancements

This Appendix accompanies the environmental assessment, and outlines in greater detail the data sources and methodology used to monetise the changes in natural capital delivered by the Burren Programme.

Within environmental economics, the main methodology used to value non-market goods is known as 'Willingness to Pay' (WTP). Recognising that value is subjective and may change from person to person, WTP methods generally involve surveying a sample of the population and trying to elicit the maximum amount they would personally be willing to pay for a certain non-market good, or in this instance, habitat conservation. A variety of methods are generally used to elicit WTP values, from stated preference (where individuals are simply asked the question about their WTP), to Choice Experiment games, in which people are asked to choose between different sets of options with varying characteristics and costs.

As an area that is characterised by distinctive, varied and biodiverse habitats, it is reasonable to expect that society would place a high value on habitat conservation in the Burren. A WTP study by Van Rensburg *et al* (2009) for two types of habitats in the Burren estimated that Irish taxpayers were willing to pay an average of €59.24 and €56.40 for the conservation of karst limestone pavements and orchid rich grasslands respectively. Survey respondents were presented with several pictures of typical examples of these habitats, along with a description of varying quality levels and appropriate conservation measures for each. To ascertain the values of well-managed habitats, they were asked to choose between different sets of habitats, management practices and annual cost levels. Significantly, these WTP values for Burren habitats were the same regardless of where survey respondents lived, suggesting that people all over the country recognise the Burren as a habitat of national significance and value it as such.

With approximately 18,000 hectares of karst limestone pavements and 12,000 hectares of orchid-rich grasslands in the Burren, the study indicated that the overall WTP conservation value for these two Burren habitats were €3,774 per hectare of karst limestone pavement and €5,389 per hectare of orchid-rich grasslands in 2009 values.

As these are WTP values, they vary from year-to-year based on two things: the number of Irish taxpayers (as Van Rensburg et. al. originally aggregated individual WTP values based on the population of Irish taxpayers); and real income growth. Table 7.1 below shows the resulting WTP values per hectare of fully-improved habitat for each year in the Burren Programme. As the Field Score Data does not explicitly distinguish between habitat types at a field-level, the overall weighted value provided by Van Rensburg *et. al.* was used. It should be noted that this aggregate value is based on a 60%-40% split between limestone pavement and orchid-rich grasslands respectively, and as the Burren Programme likely covers an area with a higher proportion of grasslands and heaths than the Burren as a whole, this figure may slightly underestimate the overall value of the habitat improvements delivered by the Programme. However, sensitivity testing carried out on these splits indicate that the total monetary value of habitat improvements delivered by the Burren Programme does not change significantly in this scenario.

Table 7.1: Willingness to Pay Values for Burren habitat

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
No. of Irish taxpayers	*1.15m*	*1.14m*	*1.22m*	*1.26m*	*1.31m*	*1.37m*	*1.41m*	*1.53m*	*1.58m*	*1.58m*	*1.58m*
Real income growth factor	1.00	1.00	0.96	0.95	0.94	0.94	0.96	0.97	0.98	1.01	1.04
WTP Value per hectare	€4,420	€4,563	€4,707	€4,816	€4,945	€5,166	€5,401	€5,942	€6,229	€6,401	€6,575

In order to apply these values to the Burren Programme, a measure for the natural capital improvements brought about by activities undertaken in the Programme was required. The Field Scores (as described in Sections 3.2.2 and 6.1) which provides a considerably detailed database, was used for this purpose. As outlined previously, the field scoring system is based on indicators relating to whether fields are managed in an environmentally-sustainable manner, such as appropriate levels of grazing, scrub encroachment and signs/risks of pollution to water bodies; and therefore form an appropriate indicator for the quality of the habitats examined in the Van Rensburg study.

Although the exact relationship between individual field scores and the conditions of Annex I habitats is a matter for future research, the general relationship between conservation values and field scores is strong. Firstly, the field scoring system was developed following extensive research and trialling carried out in the Programme's early years and during BurrenLIFE, and is based on the management practices that have been proven to be beneficial for Annex I habitats in the Burren[58]. Secondly, the Ecological Impact Assessment shows that the field scores in the Programme are positively linked to improvements in the quality of Annex I habitats, and are responsive to farm works carried out and to changes in management practices under the Burren Programme; indicating that changes in their overall habitat quality are reflected as changes in the field scores. Thirdly, key stakeholders both inside and outside the Programme that were interviewed as part of this Evaluation agree that the scoring system reflects attributes of good habitat management and biodiversity.

In order to use changes in field scores to assess the changes in habitat conservation values under the Burren Programme, the ten-point scale was linked to the WTP values established by the Van Rensburg study. For the purposes of this Evaluation and in the absence of alternative evidence as to this precise relationship, a linear relationship between field scores and WTP values was assumed. This means that, for example, a field score of 5 in 2019 was assumed to represent a conservation value of €3,288, or 50% of the overall WTP value per hectare.

Fields were divided into 10 groups according to the year they joined the Programme (i.e. those who joined in 2010, 2011 etc.), and among each group, their average field score was calculated for each year in the Programme. Taking their starting score as the baseline for each cohort, the annual difference between average field scores and this baseline was taken as the natural capital improvement for that year, monetised, and aggregated based on the area held by that cohort. Table 7.2 provides a worked example showing how natural capital improvements were estimated and monetised for a hypothetical 1-hectare field.

Table 7.2: Example of measuring habitat improvements for a 1 hectare field

		Formula	2015	2016	2017	2018	2019
A	Total WTP Value per hectare	-	€5,401	€5,942	€6,229	€6,401	€6,575
B	Field Score (Baseline)	-	5	5	5	5	5
C	Field Score (Improvement)	-	5	6	6	7	7
D	Natural Capital Value (Baseline)	*A x B x 10%*	€2,701	€2,971	€3,115	€3,201	€3,288
E	Natural Capital Value (Improvement)	*A x C x 10%*	€2,701	€3,565	€3,737	€4,480	€5,602
F	Annual Natural Capital improvements delivered by Burren Programme	*E - D*	€0	€594	€622	€1,279	€2,314

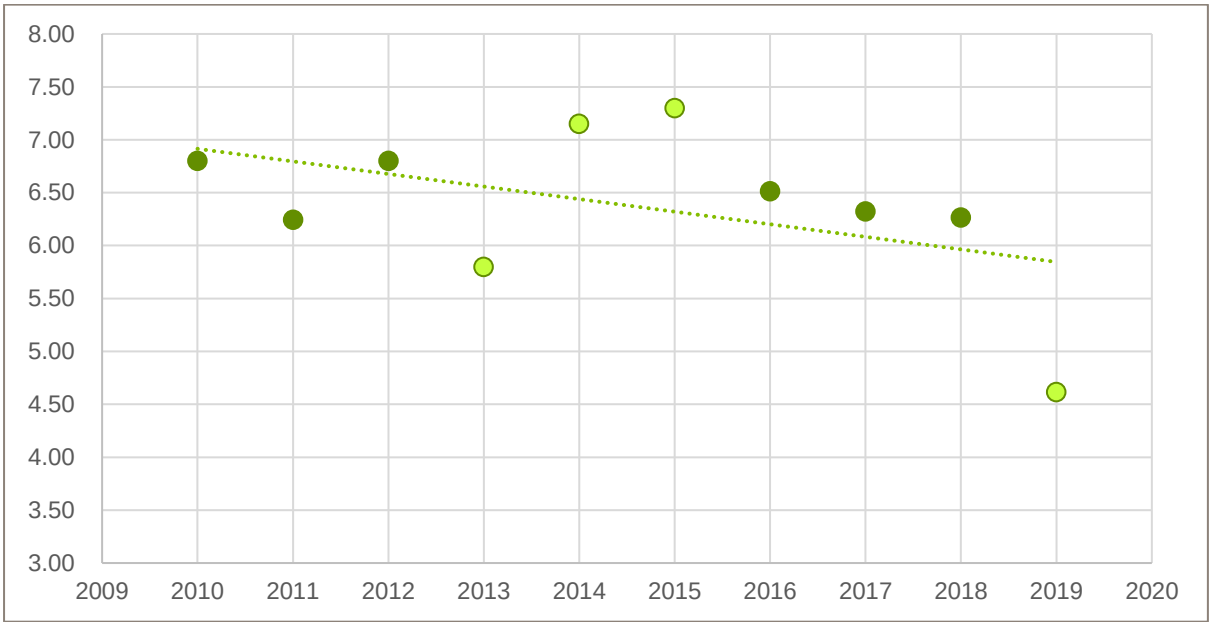
Note: the 10% value in Table 7.2 above is simply to convert the 10 point scale of Field Score Values into constituent decile rating.

Using this methodology, the WTP value of the natural capital improvements delivered by the Burren Programme was estimated at a total of €32,815,901 between 2010 and 2019.

[58] See Dunford (2002)

This method relies on the assumption that growth in field scores is directly attributable to the Burren Programme, and that in its absence, the baseline field scores (on average) would stagnate rather than grow. Notwithstanding the substantial evidence of the Burren Programme's impact described previously in the environmental assessment, there is some additional supporting evidence from the field scores of this additionality. While they do not explicitly measure the field scores of fields outside the Programme, examining the starting scores of fields in their first year in the Programme (i.e. before the Burren Programme's interventions are applied) can provide an implicit understanding of this baseline; of how field scores might otherwise progress in its absence. Table 7.2 shows these trends over time, and does indicate that average field scores would likely stagnate (if not decline) without the Programme's interventions.

Figure 7.1: Average scores of fields in their first year in the Burren Programme



Source: Administrative data supplied by the Burren Programme. It should be noted that most fields entered the Programme between 2010-2012 and 2016-2018, and there were very few entries in 2013, 2014, 2015 and 2019 (highlighted).

Even an average decline in this baseline field score by 0.1 points per year (as is indicated by the trendline above) would greatly increase the value of the natural capital improvements delivered by the Burren Programme; as this would measure not only how much habitat quality has *improved* during fields' time in the Burren Programme, but also how much of a decline was prevented by the Burren Programme. Incorporating this rate of decline in the baseline into the analysis increases the total value of natural capital improvements to €63.8 million; an increase of €31 million. While this second figure is not conclusive, as there may be other factors that influence these starting scores (such as the characteristics of the farmers who join the Programme at different points) it does illustrate that the estimate of €32.8 million, one that excludes potential declines in habitat quality outside the Programme, is a relatively conservative one.

Appendix D - EPA Water Quality Monitoring Overview

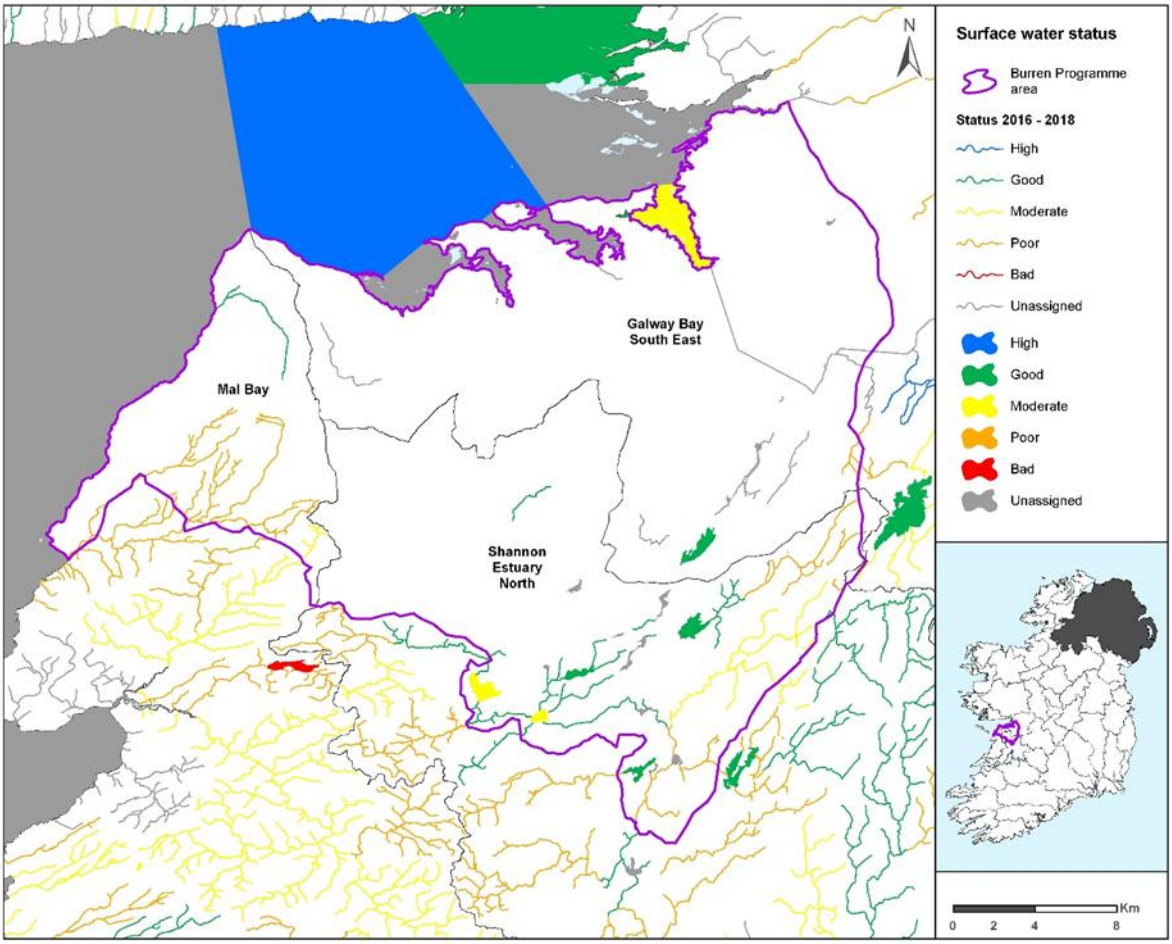
This Burren Programme area crosses three catchments; Shannon Estuary North (Catchment 27), Mal Bay (Catchment 28), and Galway Bay South East Catchment (Catchment 29). The area is predominantly underlain by karstified limestone and the groundwater and surface water systems in the area are closely interlinked, containing karst and the associated assemblage of springs, swallow holes and numerous caves. There is essentially no natural connected surface drainage network in this area west of Gort. Surface drainage is entirely absent in the north Clare part of the area, where virtually all rainfall in the area enters the bedrock aquifer and makes its way underground a number of groundwater flow routes towards the coast at Ballyvaughan or Kinvara.

In this predominantly karst hydrogeology area, changes in farm management activities in the Burren Programme area are likely to be less connected to water quality compared with other regions. There is also very significant dilution of nutrient sources arising from human activities in the large underground aquifer. This means that groundwater quality changes arising from changes in farming practice in this region, which is not typically highly stocked, is largely undetectable.

Due to the limited number of streams and rivers there are a limited number of surface water quality monitoring stations. The following is a summary of the water quality based on the available monitoring data from 2013 to 2018:

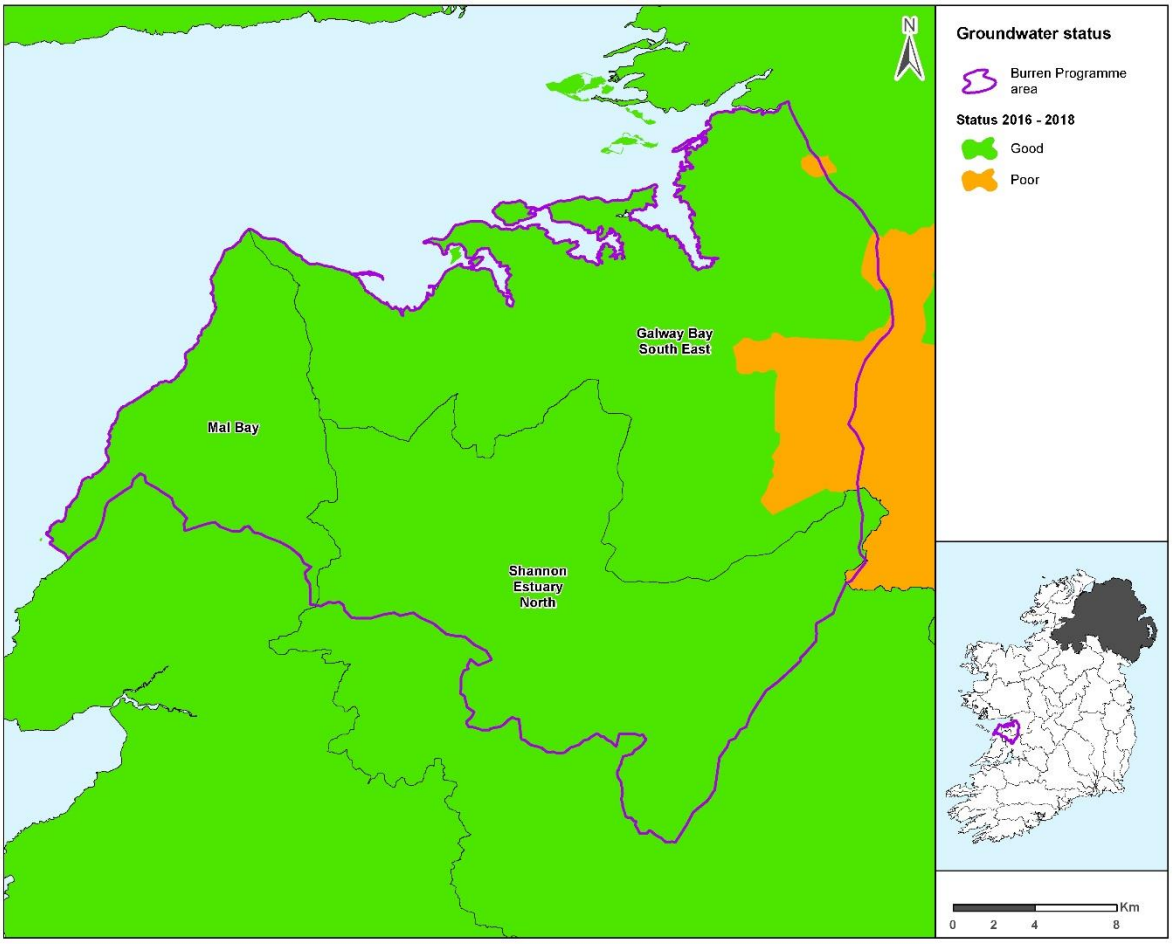
- The majority of water bodies in the Burren Programme area are at Good Ecological Status and are achieving their water quality targets.
- The water quality has generally been stable in recent years.
- Three water bodies, the CLOONEEN (CLARE)_010, AILLE (CLARE)_010, and AILLE (CLARE)_020 are at Poor Status and not meeting their targets.
    - CLOONEEN (CLARE)_010: The agriculture pressure identified here is associated with pasture (Dairy) in the upper part of the waterbody, including issues from field drains and changes to the river habitat.
    - AILLE (CLARE)_010: Agriculture is not identified as a significant pressure in this waterbody, with Wastewater identified as the significant pressure, along with Forestry.
    - AILLE (CLARE)_020: Agriculture (Pasture) is identified as a significant pressure, although multiple other significant pressures have been identified in the waterbody. Wastewater emissions from Lisdoonvarna coupled with low flows were identified as the likely reason for the decline in 2018 (Moderate to Poor) but the development in the area arising from Tourism is placing additional pressures on the waterbody.

Figure 7.2: Surface water status in the Burren, 2016-2018



Source: EPA, 2020.

Figure 7.3: Groundwater body status in the Burren, 2016-2018



Source: EPA, 2020.