

Strands, Strengths and Constraints of Result-Based Payment Schemes to achieve Landscape-scale Environmental Benefits in Scotland.

Key finding and recommendations

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Executive summary

This research brief reviews the potential of results-based schemes for the delivery of multiple benefits **at the landscape scale**. While some findings will be common with result-based schemes working at the farm level, in this briefing we focus specifically on the strengths and weaknesses of alternative **result-based schemes in achieving farmers' coordination** to deliver **landscape-scale** environmental benefits.

Our main result is:

- ✚ Result-based payment schemes (RBPS) **at the landscape scale** have been successful where some type of **collective action already exists, has been present for a number of years and is consolidated**. These are cases where social capital and trust are realised. Rather than to create new collective action, landscape-scale environmental benefits are best implemented by searching for existing cases where collective action is already happening and assess (and support) their potential for the delivery of environmental outcomes, if it is not already the purpose of the collective. RBPS are therefore to be embedded into existing collective action structures.

In addition, the review of the literature shows that where landscape-scale delivery was achieved this depended on the following conditions being realised:

- In cases of RBPS based on existing collective action, it was necessary to ensure flexibility to tailor their implementation to local areas accounting for local forms of social capital, and cultural differences.
- Contract flexibility to adapt management practices to changing circumstances using real-time notification.
- The RBPS was co-designed and ecological targets were identified with local land managers. Also, monitoring involved land managers.
- Collective contracts and collective payments allowed participants to organise internally as is optimal for them and to reduce their administration work (keeping it very simple for individual farmers to participate in collective contracts).
- RBPS mobilised ecological knowledge from farmers and land managers. Building on existing knowledge, through dynamics that allow knowledge exchange and transfer can also reinforce social capital and trust which facilitates landscape-scale environmental outcomes. Schemes kept information accessible and enabled knowledge exchange between farmers.
- Clearly set ecological targets are needed on longer term for the ecological benefits to be monitored and assessed, as some cases showed with RBPS programs over 5 years or more.
- To move from protection of species and habitats to include other processes that underpin ecosystem services.
- In Scotland the current RBPS pilots (part of the "Piloting an Outcomes Based Approach in Scotland, POBAS, project) could be complemented with pilots of **collective** RBPS at the landscape scale where collective action exists or collective actions through land tenure such as the use of common grazing and land rights are in place.

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Why is this important for Scotland?

Beside the continuous crises of biodiversity loss and climate change, current developments following the pandemic and calls to “build back better”, as well as Brexit, set a conjuncture in which innovative propositions such as result-based payment schemes for landscape-scale environmental benefits could significantly contribute to addressing these challenges.

With Brexit each UK nation must write their own agricultural, environmental and countryside policies and laws which before were covered by the Common Agricultural Policy (CAP). Scotland, inversely to other nations in the UK, will continue with the current CAP for the majority of the schemes (Scottish Government, 2021b) from January 2021 until 2024, as was established in the “Stability and Simplicity” consultation (Scottish Government, 2018) and enabled by the rights of the Agriculture (Retained EU Law and Data) (Scotland) Act 2020.

According to the “Stability and Simplicity” proposal of a transition period for rural funding, from January 2021 on, practical simplifications and improvements will be introduced in customer service where delivery of public benefits will be maintained or enhanced and policy outcomes improved (Scottish Government, 2018, p. 4).

A new rural policy framework is under development and will be implemented from financial year 2024-25. The aim of the new rural policy would remain to support farming and food production, ensuring that public investment in social, economic, and environmental capital reflects Scottish ambitions for sustainable and inclusive growth across the country (Scottish Government, 2018).

The Scottish Third Land Use Strategy 2021-2026 sets the concept for rural Scotland and paves the way for rural policy in the next 5 years. It is the umbrella under which other public policies, regulation and legislation are to be implemented. It solidifies the vision and objectives of enduring benefits, enhancing the wellbeing of the nation through working with nature and the stewardship of Scotland’s natural resources (Scottish Government, 2021a).

Sustainable land use in “farmland landscapes” and “semi-natural landscapes” will continue to be ensured through the “greening” and *Cross Compliance* legislation and regulations aiming to minimise the environmental impact of food production and encouraging best practices.

Agri-environmental Climate Schemes (AECS) as they are now will continue to work until 2024 as instruments to deliver Scottish commitments on biodiversity (Scottish Government, 2017) and climate change (Scottish Government, 2020) and deliver the Scottish Rural Development (Scottish Government, 2021b), in both farmland and semi-natural landscapes and beyond cross-compliance. Emphasis has been set more on “semi-natural” landscapes (Scottish Government, 2021a) than on farmland (Scotland Food and Drink, 2018), to deliver the sustainable land use objective through peatland restoration, woodland plantation and other mechanisms.

AECS will continue to be an important mechanism to achieve biodiversity targets and could potentially achieve other national objectives, therefore how these are designed and how they may address persistent landscape-scale mismatch is of primary importance.

Methods and empirical research.

We carried out a literature review of existing result-based payment schemes in Europe. First, we identified a set of result-based payment schemes (RBPS) **which include a landscape-scale dimension**. Secondly, from the set, we selected only the cases that were fully implemented at the landscapes scale and reviewed them in detail, identifying how these schemes were designed, implemented and what they have achieved. Thirdly we grouped common characteristics of these schemes and highlighted the strengths and weaknesses.

While the implementation of result-based schemes with individual farmers is becoming more common, result-based schemes with a landscape-scale dimension in Europe are scattered and few, which limits the experience that can be gained from them for Scotland. However, with the RBPS schemes reviewed for this work we can draw out some commonalities that appear to be underlying characteristics for a result-based scheme at the landscape scale to be successful. These common characteristics offer a solid starting point for the Scottish context.

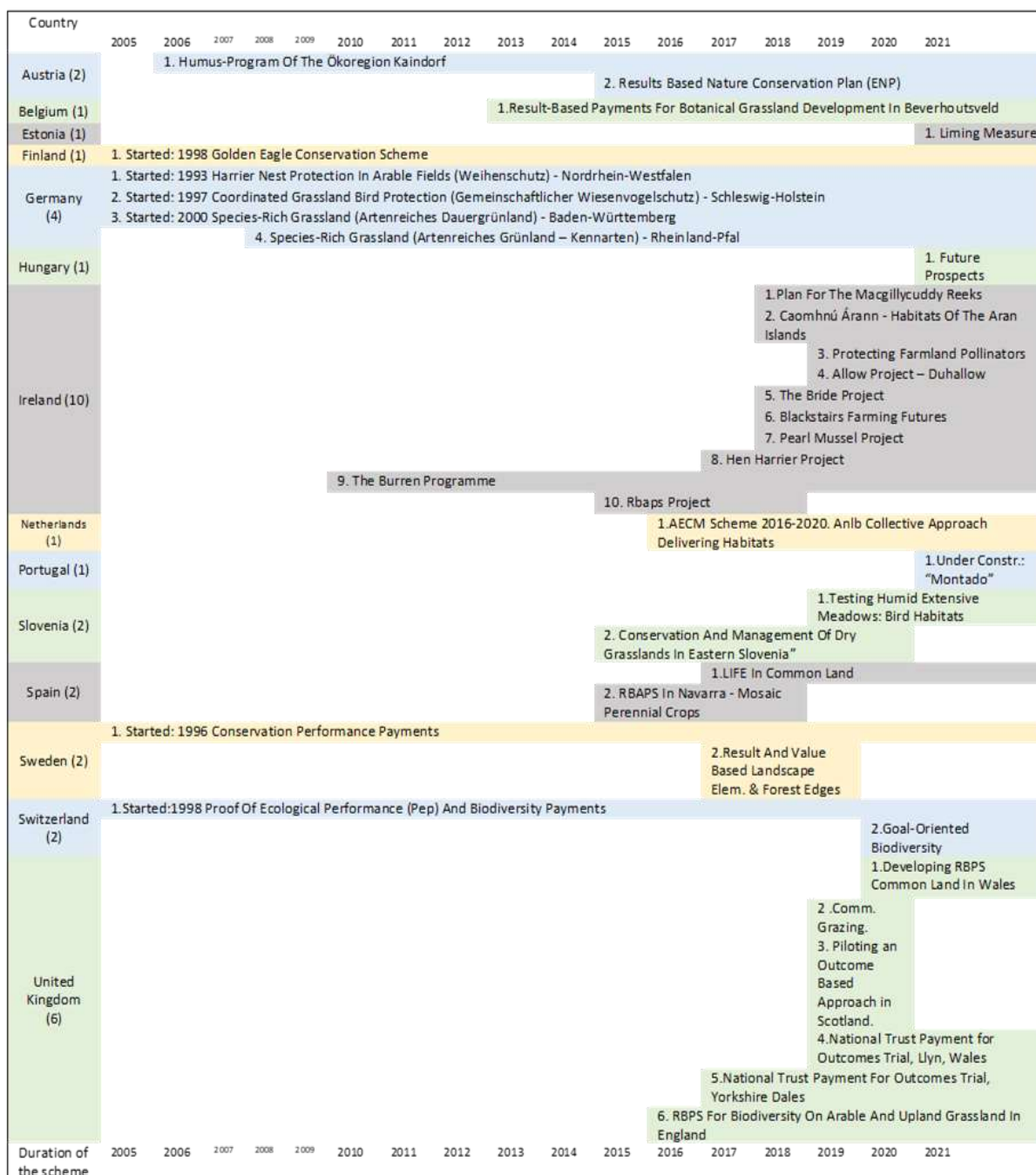
The strength of this work relies on the review of specifically existing landscape-scale RBPS. However more research is needed to test our conclusion and recommendations in relation to cooperation and collaboration in Scotland.

What are Result-Based Payment Schemes (RBPS)?

Result-Based Payment Schemes (RBPS) are also known as payment-by-result schemes, result-oriented, outcome-focused schemes. For consistency with EU terminology, we have taken the concept of Result-Based Payment Schemes (RBPS) in this research brief.

RBPS schemes first appeared in the literature in 1990. Since 2010 and specially from 2015 to now, the number of implemented RBPS has increased significantly. The current schemes are in different stages of development, with some fully implemented, others as pilots and further ones under development as can be appreciated in Figure 1.

Figure 1: RBPS by country, stating year and name of the Scheme.



Source: Information in this figure was collected from Result Based Payment Schemes, 2019.

As can be noticed in Figure 1, in Scotland there is only one case of a pilot RBPS. Piloting an Outcome Based Approach in Scotland (POBAS) is coordinated and implemented by NatureScot. The implementation process has been based on sharing knowledge and the co-design of the scheme with 40 farmers and crofters in four clusters across Scotland in Skye, Argyll, Strathspey and East Lothian (Rouse, 2019, 2020). Although POBAS is not set at the landscape scale, the lessons learned will inform RBPS in Scotland including for their landscape-scale application.

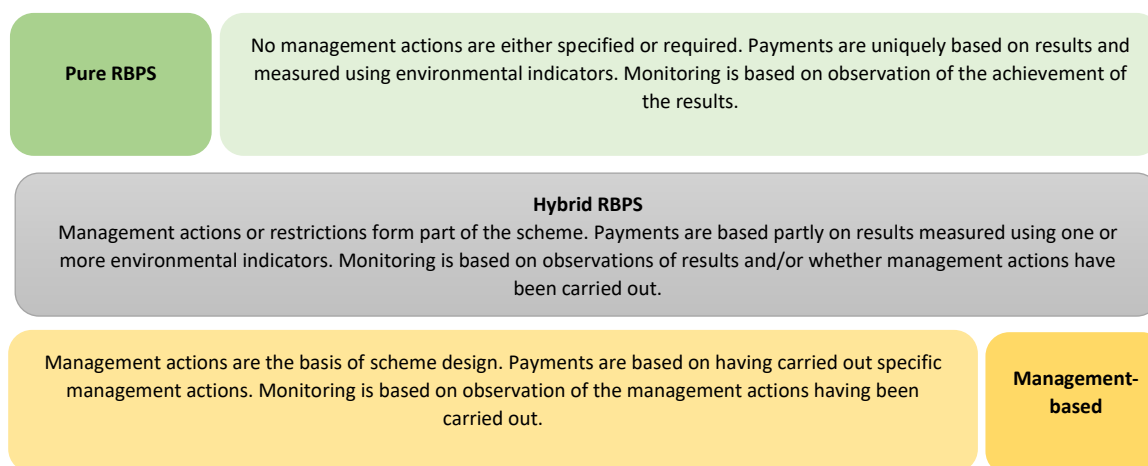
The number of cases of implemented RBPS demonstrates the increasing interest in these schemes in the EU. Researchers and practitioners have discussed the advantages of these schemes (Rouse, 2019, 2020; Allen et al., 2014; Keenleyside et al., 2014; Birge et al., 2017; Herzon et al., 2018). One of the reasons of their interest is because in specific circumstances RBPS have demonstrated to be more cost-effective when delivering targeted and demonstrable biodiversity outcomes. These schemes are particularly advantageous where management measures need to be tailored to local conditions to produce optimal results (Allen et al., 2014).

The rationale of RBPS is to pay farmers only based on delivery of an outcome, a result. However, this implies that farmers have a perfect knowledge of ecological processes and master these, assuming that they can be directly controlled. As such RBPS treat biodiversity and protected species as if these could be produced like any other product of the farming business.

In practice this is not the case. Ecological processes, to halt loss of biodiversity or to enhance it through targeted species, could be subject to high levels of uncertainty beyond the control of a farmer or a group of farmers. The difficulty of predicting ecological processes and the lack of ecological knowledge alongside with the tradition of paying for environmental actions at the farm level, makes it very rare to find “pure RBPS” in Europe. The array of types of combinations from pure RBPS to pure action-based schemes is considerable.

Allen et al (2014), classified RBPS into “pure”, “hybrid” and “management-based”, as presented in graph 2. We followed this classification to study RBPS at the landscape-scale level.

Graphic 2: Different types of Schemes.



Source: Biodiversity protection through results-based remuneration of ecological achievements (Allan et al 2014).

Result-based payment schemes at the landscape scale and their implementation to Scotland.

As mentioned in this research brief, we focused only on the landscape-scale dimension of the RBPS. Researchers and practitioners have discussed other elements of RBPS that can be found in the literature (Allen et al., 2014; Keenleyside et al., 2014; Terwan et al., 2016; Rouse, 2020, 2019; McDonald et al., 2018; Moxey and White, 2014; Herzon et al., 2018; Burton and Schwarz, 2013).

In Scotland, implementation at the landscape scale is necessary for implementation of ecological networks (Lozada-Ellison and Gimona, 2012; Lozada, 2013) wildlife and game management; flooding; non-point source pollution; and wetland management, and some agroecological practices such as biological pest control. Other activities that might

need certain degree of cooperation or coordination are: woodland creation, erosion control, climate change mitigation, water quality (Rajagopalan and Kuhfuss, 2017)

We have reviewed four cases that we found to be implemented at the landscape scale in Europe.

The four cases reviewed here are:

1. **Performance Payment Scheme for Carnivore Conservation (Sweden).** The scheme started to operate in 1996 and covers from the K nk m   Sameby (northern border) region to Idre Sameby (southern border). The ecological objective is to conserve and protect biodiversity through providing incentives for increasing the number of Lynx and wolverines. Explicitly at present conservation policy pays annually for 80 lynx and 90 wolverine offspring which proxy the overall population size of 400 for each species. Payment varies depending on the habitat of wildland, forest or tundra regions. This is a Pure Result-Based Payment which pays for the number of offspring observed (Zabel and Holm-M ller, 2008; Zabel et al., 2010; ‘Reindeer Herders’ Association’, n.d.; Zabel et al., 2014).
2. **Golden Eagle conservation scheme (Finland).** The scheme started to operate in 1999 and covers the Finnish Lapland region. The ecological objective is to conserve and protect biodiversity through providing incentives for successfully establishing golden eagle nests and territories. Finnish government has set out to establish nest sites and territories for its golden eagle conservation policy. Payment varies depending on the habitat of forest, mountain or tundra regions. This is a Pure Result- Based Payment which pays for the number of nests with chicks and territories occupied (Hiedanp   and Borgstr m, 2014; Munves, n.d.; ‘Reindeer Herders’ Association’, n.d.; Nieminen et al., n.d.)
3. **Agrarian collectives (Netherlands).** Formerly these were the environmental co-operatives which in 2015 were renewed to agrarian collectives. The cooperatives have performed different conservation and biodiversity schemes since 1994 and from 2016 the collectives are the only medium through which farmers can apply for agri-environmental climate measures (AECM) as a collective (individual farmers cannot apply for AECM). Ecological objectives are biodiversity and water quality. Ecological indicators are type of habitats. Payments are based on the costs of management actions (Allen et al., 2014; Result Based Payments, 2019).
4. **Municipality of Beernem (Belgium).** The municipality of Beernem owns Beverhoutsveld which is designated as “valuable agricultural area” and has been used by farmers as common land for centuries. Since 2015 a RBPS is being run by the local farmers who developed the scheme with Boeren Natuur Vlaanderen. The scheme pays farmers according to the botanical value of their grassland. The objectives of the scheme are to increase grassland biodiversity, multifunctional nature-inclusive agriculture leading to long term results with fair payments (Result Based Payments, 2019; Boeren Natuur, 2020).

We studied these schemes and found commonalities which we grouped and present in the green and yellow cards below. In the following text we explain only some of the points highlighted in the cards, these are:

- Collective Action;
- Collective Contracts and Payments;
- Flexibility

We present each of these for each of the schemes.

Collective Action

We found that existing collective action was a common characteristic in the examples studied that allowed landscape-scale delivery to happen. In the four cases these **collective actions had been developed over a relatively long time prior** to the scheme’s implementation.

Collective action since first discussed by Olson in *The Logic of Collective Action* (1965) has evolved and is in continued transformation as society changes. The literature analysing collective action has also been enriched since. There is no

one general theory but a vast and heterogenous array of social sciences theories (Ostrom, 2003). However, since it is not the purpose of this work to discuss collective action *per se*, we will define it as the action taken by a group in pursuit of members' perceived shared interest (Scott and Marshall, 2009).

We found that in Sweden and Finland, RBPS work with the Sami villages. The Sami are the indigenous communities speaking the "sampi" language and who inhabit ancestral lands in the Volga region. Their social organisation and understanding of the nature-society relation differ from those of occidental society (Ingold, 1980). There are many Sami communities spread from mountains to coast in this vast geographical region and they have a specific social organisation for reindeer husbandry (*ibid.*). They have social and cultural rules and dynamics that have allowed them to organise and live in their land for centuries.

In Sweden, in 2015 almost all of the 51 Sami villages were involved in the RBPS and approximately 2500 people were working full time in the reindeer ranching business.

In Finland in 2015, there were more than 56 Sami villages involved with approximately 5980 reindeer owners.

In the Netherlands the "Agrarian Collectives" are the revitalized form of the "environmental cooperatives" that started to emerge in the early 1990s. In a period of 20 years the cooperatives have grown to 160, they were developing a number of rural development activities across the country. The national, provincial government and cooperatives took an intensive consultation as the cooperatives were prospected for the scheme to be applied for large-scale participation. As a result of the consultation in 2011 to 2014 a new approach was piloted and 40 "Agrarian Collectives" were established in 2015 based on the existing social structures but as new entities, professionalised and certified as conservation organisations (Terwan et al., 2016). Since 2016, in the Netherlands only Agrarian Collectives are eligible for the AECM subsidy. The country decided to take a landscape-scale approach as the only option for all types of AECM implementation. Only a collective of farmers can apply as no individual applications are accepted (Result Based Payments, 2019). In 2013 there was an estimate of 25 cooperatives participating in the RBPS covering 150,000 hectares of grassland (Allen et al., 2014).

In Belgium the use of the common land where the RBPS are implemented at the present time builds on a production system that evolved between the XVIIth and XIXth century (De Moor, 2002, 2009, 2004). In 2020 there were less than 50 farmers participating with less than 100 hectares managed under the scheme (Result Based Payments, 2019; Boeren Natuur, 2020).

These results suggest that RBPS may have higher probabilities of success if these are **embedded into and build on pre-existing collective actions**. Social structures work partly based on trust and social capital with specific local social dynamics, with an endogenous organisation with their own norms and rules. These existing structures, which are context-specific (location and time), could be used to implement schemes and measures at the landscape scale.

Suggesting to use collective action for delivering landscape scale environmental objectives is not new and Scotland is no exception, this proposal had been made in the mid-2000s (Davies, 2006; Davies et al., 2004) and later (Lozada, 2013). However, the objective of these earlier studies (Davies, 2006; Davies et al., 2004) has been more about how to stimulate the creation of collective action, new forms of collaboration, how to incentivise participation and in which conditions this may happen, or which elements exist in collective action and to which extend they can be replicated. They have also concentrated on environmental collective action as opposite to farmers and land managers' collective action more broadly.

Our results show that landscape-scale delivery has had several years of success mainly in cases where collective action has existed for a long time prior to the scheme. Therefore, we conclude that for the case of Scotland landscape scale-delivery should be based on existing forms of collective action and the implementation of RBPS prioritised to areas where collective action is already developed. **We recommend to research existing forms of collective action in Scotland (with or without environmental objectives) and to assess to which extend these structures could deliver environmental services.**

There is an important literature identifying patterns of collective action in the UK which could help for the identification of existing collective actions in Scotland (Kuhfuss et al., 2019; Rajagopalan and Kuhfuss, 2017; Davies et al., 2004; Riley

et al., 2018; Wynne-Jones, 2017; Franks and McGloin, 2006) and a few that identify existing cases of cooperation and collaboration (Lozada, 2013)

To study existing forms of collective action is even more relevant in the current context of new cooperation rules as being possible under the two pillars of CAP (since 2014). This institutional framework has changed under the CAP (EU Regulation No 1305/2013, Article 28) and allows Rural Development Regulation group applications for agri-environment-climate measures.

Collective Contracts and Collective Payments.

An important result was that in all four cases the **contracts and payments were made collectively** allowing the groups of collective action to continue with their own internal organisation, rules, and norms to certain extent. Collective contracts reduced barriers to new collective action. To embed schemes in existing social and cultural contexts, as was the case for these schemes, facilitates participation and cooperation. Furthermore, the schemes reviewed suggest that endogenous organisation should be maintained, as a form of recognising and supporting *flexible institutions that recognise and support local ecological and social processes and dialogue to help support development of new socially normative behaviours* (Björklund et al. 2012; Atwell et al. 2010 cited in Kuhfuss et al. 2019).

In the four cases, the contact between RBPS scheme authority and participants was made through a representative rather than individually between the scheme authority and each farmer. This contact point allowed the collective contract and payments to be implemented. This is a key element of collective action which has been highlighted in the literature (Davies et al., 2004).

In the Swedish case, the point of contact between the different stakeholders involved is the Swedish Environmental Protection Agency (SEPA) which is the scheme's administrative agency and the reindeer-herder or the commune representative. The former represented national objectives to be achieved and the latter represented the interests of the people from the communities. Contracts and payments were made with a representative of the Sami communities rather than individually with each participant of the scheme. Since it is a performance payment scheme, the payments are conditional on the number of certified offspring present on the villages' reindeer grazing grounds. The payments are consolidated within the community group and a body decides how to allocate the funds. (Zabel and Holm-Müller, 2008) posit that each village has a body that allocates the funds. Some studies (Zabel et al., 2010) examine the proportion of funds allocated to public welfare and to individual herders.

In Finland the contact point for negotiation was established through a collaboration between the Finnish government, represented by the State Forest Agency and a representative of the Sami community. In Finland the scheme is modelled after the Swedish one. Contracts and payments are made to the Reindeer co-operative level.

In the Netherlands the contact point between government and farmers was endorsed through the provincial government and the Agrarian Collective. The government and the Agrarian collectives (the co-operatives) have developed a system called, "front door – back door principle". At the front door, the government signs a six-year RBPS contract with the regional cooperative to realise specific habitats on a specified land area at a budget per habitat. At the back door, the cooperative concludes contracts with individual land users. These contracts include all the specific activities and payments needed at field level to realise the habitat at a landscape level. Between the front door and the back door, the regional fine-tuning of conservation activities and payments takes place. Although payments are collective, so as to address free-rider problems, guidelines were developed to arrange for individual payments and for the individual "distribution" of penalties imposed on the cooperative. Because the contracts between the cooperative and its members remain within private law arrangements, there is room for local and individual fine-tuning of measures and payments. For instance some cooperatives redistribute part of the payment according to the number of birds present on individual farms (Terwan et al., 2016, p. 5). In this case, collective contracts also reduced implementation costs, by switching from 13,500 to 40 contracts in 2016, as the contracts are made with the 40 cooperatives rather than individually. The scheme assumed that "*... the cooperatives can be more efficient because they are familiar with the farmers and farmland involved*" (Terwan et al., 2016)

In Belgium the municipality who owns the common land and represents the national government is the contact point with Boeren Natuur, the organisation representing the agromanagement group (united farmers). The municipality signed a collective contract with the agro-management group, which is reviewed every 3 years, and pays the group of farmers every year a fixed payment per hectare. With the advice of Boeren Natuur Vlaanderen, payment levels were developed and agreed upon by the farmers to distribute this money amongst the farmers based on the level of botanical grassland development of the fields (Boeren Natuur, 2020; 'Beverhoutsveld - Boeren Natuur', n.d.).

Although collective contracts and payments might be possible from the point of view of the existing collective action group, an adequate institutional framework needs to be in place and it has been highlighted that national authorities may be critical to new approaches allowed by RBPS (Birge et al., 2017).

Flexibility

We also found **flexibility as a key element for landscape scale delivery**, as can be appreciated in the green cards in more detail. Flexibility in various aspects of the scheme is important: participation of farmers in co-designing, monitoring and evaluating the scheme, to be able to integrate local knowledge and to be flexible to adapt to the local contexts which are socially and culturally different in location and time as has been highlighted in the literature (Keenleyside et al., 2014; Allen et al., 2014; Busck, 2003; Terwan et al., 2016; Burton and Schwarz, 2013; Rouse, 2020, 2019)

We found that flexibility to adapt in time was important for new collective action to happen and allow innovation and improve the use of local knowledge in the scheme's design.





In the Netherlands, contracts for the agrarian collectives allow for more flexibility in terms of time. Real-time notification has become possible, and farmers can make changes and adjust activities 14 days before the activity is to be carried out. This is possible with the use of GIS technology which is compatible with the Land Parcel Identification System (LPIS). The collective administrative system is directly linked to the Payment Agency's administration, real-time notification is possible for activities and location (Terwan et al., 2016).

Cards of commonalities amongst RBPS at the landscape scale.

ECOLOGY & KNOWLEDGE




Results (environmental indicators) easily identifiable. Abundant and accessible information (advisers, workshops, internet)

Ecological goals and benchmarks are translated in simple identifiable and quantifiable outcomes. Ecological targets are long term objectives (longevities). These were:

-  Numbers of Lynx and Wolverines (SE).
-  Number of golden eagle nests (FI).
-  Number of bird nests (NL).
-  Botanical value of their grassland (BE)

LANDSCAPE SCALE Approach.

Use of **existing collective action** (at whichever level). These were:

-  Sami communities which are cultural and traditional regions (SE and FI).
-  Existing cooperatives structures (NL).
-  Common land rights (BE).

DESIGN OF SCHEME.

Flexibility to:

- + Co-design the scheme with group of farmers (All).
- + National to local tailored social and cultural differences (All).
- + Local knowledge to innovate and respond to changing local conditions by allowing flexible contracts accepting changes 14 days before the management should be carried out (NL).

MONITORING

Inclusive:

- + Participant farmers, local advisers/local groups.
- + Evaluations that inform new potential projects.

CONTRACT & PAYMENT

Collective contracts and payments. Payments are redistributed within the collective by the collective.

- + Contract with the Sami communities (SE).
- + Sami reindeer co-operative (FI).
- + Agrarian collectives (cooperatives) legally established and certified as conservation organisation (NL).
- + Contract farmers using common land rights. Land owned by the municipality (BE).

SUCCESS FROM NATIONAL PERSPECTIVE.

National objectives are to **achieve ecological targets**. Long-term schemes have achieved it.

- + Increases in lynx and wolverine population (SE).
- + Increased population of golden eagles. Number of nesting territories has notably increased (FI).
- + No scientific evidence from other (new models) schemes (NL and BE)

SUCCESS FROM LOCAL PERSPECTIVE.

- + The **payment is an important source** of income & increased collective action (SE).
- + **Trust** between herders and managing authorities & changes in **attitudes to predators** (FI).
- + **No disruption of the social structure**. Schemes are adapted to the local social dynamics of cooperatives/common land rights (NL and BE).
- + **Less administrative** paperwork.
- + Freedom to innovate and increase local ecological knowledge.

NEGATIVE ECOLOGICAL FEATURES

- + **Monitoring accuracy**. Level of damage caused by carnivores (SE and FI).
- + **Costly and time-consuming monitoring costs and time consuming** can become unfeasible (SE and FI)
- + **Costs of engaging with larger groups** may be too high (SE).
- + **Participation may only be motivated by money** (FI)
- + **Ecological outcomes did not improve** (for bird nesting, 2014) NL.
- + **Focus on some indicators may lead to less incentive to protect habitats** (NL)

NEGATIVE ECONOMIC & SOCIAL ATTRIBUTES

- + **Level of payment is low** (SE)
- + **Reindeer owners do not find the scheme entirely satisfactory** (FI)
- + Cultural heritage aspects of reindeer management are not considered which can **damage the social structure of the community** (SE).
- + Some management practices may affect farm revenues which may **not be covered by the scheme** (NL)

In addition to these findings, we have identified other significant observations in the literature. Some of them are specific to landscape-scale delivery and others more general to any form of RBPS as can be seen in the green and yellow cards. We mention some of these below.

One of other characteristics which are more general for all RBPS but that could potentially help and reinforce the use of existing social structures was that the RBPS was linking into elements of local knowledge. **Co-designing the contracts** with participants is a form of **recognition of their knowledge** and to ensure social-cultural buy-in, in the same way that it is when involving participants in the monitoring. In both cases local knowledge is acknowledged and valued. In all four cases local knowledge was included in one or another way. In the Netherland case, the contract flexibility also allowed for it to be changed on short notice (14 days) before the activity should be carried out. This

allowed environmental innovation, for making optimal use of local knowledge and for adjusting activities to the actual situation in the field e.g. due to weather conditions (Terwan et al., 2016). Co-designing the schemes and appreciation of farmers' work have been mentioned in the RBPS literature as a success factor on several occasions (Allen et al., 2014; Davies et al., 2004; Kuhfuss et al., 2019).

Flexibility of policy is determinant as it will allow better communication, recognition of social and cultural differences and will allow changes with real-time data. As it has been mentioned in Kuhfuss et al (2019, p. 11): *"Policy design that takes account of farming cultures (Emery and Franks, 2012), socio-cultural buy-in, dialogue, and trust-building with the institutions facilitating governance processes is of critical importance"*.

Landscape-scale collective action is not a guarantee of ecological gains. RBPS at the individual field level and collective RBPS present common ecological issues in relation to: (i) setting clear ecological goals (in this case that requires a landscape-scale delivery, recognising that these might compromise other outcomes) and (ii) monitoring as being expensive and potentially inaccurate. Furthermore, to observe and account for ecological benefits, time is needed, and the five years duration of the AES might be insufficient.

It has been mentioned that RBPS should move from species indicators to habitat protection, however it should be noticed that achieving multiple benefits at the landscape scale under RBPS is challenging as indicators should be able to reflect the overall health of an ecosystem. Under the current institutional framework in Scotland this is even more challenging to achieve.

Since RBPS allow participants to optimise farmers' knowledge and level of actions, they are favoured to be used over other types of schemes where there is a **clear action to which biodiversity is sensitive**. They are especially advanced where **private knowledge** is present for targeted ecological outcomes (Gibbons et al., 2011), however RBPS are not the panacea for environmental problems in farmland and landscape-scale outcomes.

Conclusion and Recommendations

This research brief reviews the potential of results-based schemes for the delivery of multiple benefits at the landscape scale. It highlights strengths and weaknesses of alternative **result-based schemes in achieving farmers' coordination** to deliver landscape-scale environmental benefits. We **focused only on the landscape-scale dimension** of the RBPS, complementing other elements of RBPS that researchers and practitioners have discussed in the literature (Allen et al., 2014; Keenleyside et al., 2014; Terwan et al., 2016; Rouse, 2020, 2019; McDonald et al., 2018; Moxey and White, 2014; Herzon et al., 2018; Burton and Schwarz, 2013; Zabel, 2019).

The literature has highlighted the elements that make successful collective action for landscapes scale environmental benefits. In this sense our results reinforce previous findings (Lozada, 2013; Lozada-Ellison and Gimona, 2012; Davies et al., 2004; Kuhfuss et al., 2019; Rajagopalan and Kuhfuss, 2017; Riley et al., 2018; Wynne-Jones, 2017; Franks and McGloin, 2006; Emery and Franks, 2012; Macleod et al. 2020). However, a main emphasis of the literature has been on understanding how collective action works to be replicated and recreated in other areas. We found and therefore highlight that rather than creation or replication of collective actions, the priority should be to look at existing forms of collective action and assess the extent to which these can deliver environmental benefits. Our conclusion and recommendations are:

1. Create an inventory of farmers'/land managers' collective action in Scotland.
2. Assess to which extent these could be used as a social structure to deliver environmental benefits at the landscape scale (social structures in which RBPS can be embedded).
3. Assess to which extent these collective actions, or which of these, could work with collective contracts and payments.

New CAP rules are in place to encourage cooperation amongst farmers and future agricultural policies in Scotland allow for the creation of new frameworks that could allow for implementation of other forms of organisation. Davies *et al.* (2004) and Lozada (2013) had started an inventory of identifying some of these collective actions. The proposal of this research brief is to use that work as a starting point and update it and extend it to other forms of collective actions. This finding aligns with previous results on landscape scale adaptive management. Lozada (2013) has highlighted characteristics of land managers' cooperation and existing forms of cooperation in the Dee catchment from an adaptive co-management perspective. Macleod *et al.* (2020) provide a useful set of recommendations that complement those included in this research briefing, highlighting the key role of existing social relationships at the landscape scale for landscape level co-management of environmental objectives.

Next Step

Following from the conclusion and recommendations of this research brief and the inventory of existing collective actions we propose as next step to test these collective actions. The pilots implemented in Scotland (POBAS) will provide useful elements of response. A next step would be to test RBPS at the landscape scale with existing forms of collective action versus individual farmers.

While linking payment to the actual provision of environmental benefits in RBPS has potential to increase the cost-effectiveness compared to standard practice-based AECS, as well as increasing the flexibility for farmers to choose practices that best suits their own constraints and local organisational settings, RBPS for landscape scale environmental benefits also come with specific challenges that require further investigation. One question in particular is the acceptability of the uncertainty associated with a payment conditioned on environmental outcomes that depend on the action of other farmers' action but also other external factors (e.g. climate, pests and diseases). Participatory and behavioural experiment approaches are particularly well suited to address this question and provide elements of guidance for the design of future AECS based on a collective RBPS approach (Colen *et al.* 2016).

Reference list.

- Allen, B. *et al.* (2014) *Biodiversity protection through results based remuneration of ecological achievement*. (December), 167.
- Anon (n.d.) *Beverhoutsveld - Boerennatuur* [online]. Available from: <https://www.boerennatuur.be/beverhoutsveld/> (Accessed 20 April 2021).
- Anon (n.d.) *Reindeer Herders' Association*
- Birge, T. *et al.* (2017) Probing the grounds: Developing a payment-by-results agri-environment scheme in Finland. *Land Use Policy*. [Online] 61302–315. [online]. Available from: <http://dx.doi.org/10.1016/j.landusepol.2016.11.028>.
- Boeren Natuur (2020) *Collective agri-environmental scheme for species rich grassland in Beverhoutsveld-Belgium*. p.2.
- Burton, R. J. F. & Schwarz, G. (2013) Result-oriented agri-environmental schemes in Europe and their potential for promoting behavioural change. *Land Use Policy*. [Online] 30 (1), 628–641. [online]. Available from: <http://dx.doi.org/10.1016/j.landusepol.2012.05.002>.
- Busck, A. G. (2003) Hedgerow planting analysed as a social system - Interaction between farmers and other actors in

- Denmark. *Journal of Environmental Management*. [Online] 68 (2), 161–171.
- Davies, B. (2006) “Carrots, sticks, sermons or hugs? Designing co-ordinated policy measures for the uptake of environmental management options.”, in L Gairns et al. (eds.) *Managing rural diffuse pollution : agriculture and environment VI : proceedings of the SAC and SEPA biennial Conference, Edinburgh, UK, April 2006*. 2006 Edinburgh: SAC Environmental. pp. 165–172.
- Davies, B. et al. (2004) Challenges in creating local agri-environmental cooperation action amongst farmers and other stakeholders. *SEERAD Final Report,* 498200 (November), 131. [online]. Available from: <http://macaulay.ac.uk/socioeconomics/research/CoopActionReport.pdf>.
- Emery, S. B. & Franks, J. R. (2012) The potential for collaborative agri-environment schemes in England: Can a well-designed collaborative approach address farmers’ concerns with current schemes? *Journal of Rural Studies*. [Online] 28 (3), 218–231.
- Gibbons, J. M. et al. (2011) Should payments for biodiversity conservation be based on action or results? *Journal of Applied Ecology*. [Online] 48 (5), 1218–1226.
- Herzon, I. et al. (2018) Time to look for evidence: Results-based approach to biodiversity conservation on farmland in Europe. *Land Use Policy*. [Online] 71 (December 2017), 347–354.
- Hiedanpää, J. & Borgström, S. (2014) Why do some institutional arrangements succeed? Voluntary protection of forest biodiversity in southwestern Finland and of the golden eagle in Finnish Lapland. *Nature Conservation*. [Online] 729–50.
- Ingold, T. (1980) *Hunters, Pastoralists and Ranchers*. Cambridge University Press.
- Keenleyside, C. et al. (2014) *Results-based Payments for Biodiversity Guidance Handbook: Designing and implementing results-based agri-environment schemes 2014-20*. 1–40.
- Kuhfuss, L. et al. (2019) *Pro-environmental practices among farmers at a landscape scale : why and how? An interdisciplinary review of the literature*. 1–37.
- Lozada-Ellison, L. & Gimona, A. (2012) ‘assessing the potential of adaptive co-management for ecosystems services delivery: the case of ecological networks in the dee valley, Scotland’, in 2012 SAC-SEPA Conference 2012 Proceedings. pp. 201–206.
- Lozada, L. M. (2013) *Cooperation and coordination for landscape scale conservation: qualitative and experimental economics approach*. Thesis. The University of Birmingham.
- McDonald, J. A. et al. (2018) Improving private land conservation with outcome-based biodiversity payments. *Journal of Applied Ecology*. [Online] 55 (3), 1476–1485.
- De Moor, M. (2002) 5. *Common land and common rights in Flanders*. [Online] (January 2002), 113–141.
- De Moor, M. (2004) The Commons in an Age of Global Transition: Challenges, Risks and Opportunities, the Tenth Biennial Conference of the International Association for the Study of Common Property. *La Agricultura Orgánica en México: Un Ejemplo de Incorporación y Resistencia a la Globalización*. 19. [online]. Available from: <http://dlc.dlib.indiana.edu/dlc/handle/10535/1679>.
- De Moor, T. (2009) Avoiding tragedies: A Flemish common and its commoners under the pressure of social and economic change during the eighteenth century. *Economic History Review*. [Online] 62 (1), 1–22.
- Moxey, A. & White, B. (2014) Result-oriented agri-environmental schemes in Europe: A comment. *Land Use Policy*. [Online] 39397–399. [online]. Available from: <http://dx.doi.org/10.1016/j.landusepol.2014.04.008>.
- Munves, J. (n.d.) *Sami culture: Reindeer Herding in Finland*
- Nieminen, M. et al. (n.d.) *Mortality and survival of semi-domesticated reindeer (Rangifer tarandus tarandus L.) calves in northern Finland*. 31 (1).
- Ostrom, E. (2003) How types of goods and property rights jointly affect collective action. *Journal of Theoretical*

- Politics*. [Online] 15 (3), 239–270.
- Rajagopalan, D. & Kuhfuss, L. (2017) *Agri-Environmental Concerns and the Potential for Catchment-Scale Cooperation near Five Case-Study Research Farms in Scotland: an overview of the initial scoping exercise RESAS1.4.3b D1: Workshop Summaries / m8: Research Agenda Co-Constructed with Stakeho*. 1–33.
- Result Based Payments, N. (2019) *Result Based Payments Network* [online]. Available from: <https://www.rbpnetwork.eu/> (Accessed 10 January 2021).
- Riley, M. et al. (2018) Will farmers work together for conservation? The potential limits of farmers' cooperation in agri-environment measures. *Land Use Policy*. [Online] 70635–646.
- Rouse, C. (2019) *Piloting an Outcome Based Approach in Scotland (POBAS)*.
- Rouse, C. (2020) *Piloting an Outcome Based Approach in Scotland (POBAS)*. (June 2020), 1–14.
- Scotland Food and Drink (2018) *Ambition 2030*.
- Scott, J. & Marshall, G. (2009) *collective action*. In *A Dictionary of Sociology*. [online]. Available from: <https://www.oxfordreference.com/view/10.1093/acref/9780199533008.001.0001/acref-9780199533008-e-312>.
- Scottish Government (2021a) *Scotland's Third Land Use Strategy Getting the best from our land*. (March), .
- Scottish Government (2017) *Scottish Biodiversity Strategy: progress report 2014-2016 - gov.scot* [online]. Available from: <https://www.gov.scot/publications/scottish-biodiversity-strategy-report-scottish-parliament-2014-2016/> (Accessed 19 April 2021).
- Scottish Government (2021b) *Scottish Rural Development Programme (SDRP)*. *Scottish Government*. [online]. Available from: <https://www.gov.scot/policies/agriculture-payments/scottish-rural-development-programme-srdp/>.
- Scottish Government (2020) *Securing a green recovery on a path to net zero: climate change plan 2018–2032 - update - gov.scot* [online]. Available from: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (Accessed 19 April 2021).
- Scottish Government (2018) *Stability and simplicity: proposals for a rural funding transition period - gov.scot* [online]. Available from: <https://www.gov.scot/publications/stability-simplicity-proposals-rural-funding-transition-period/pages/8/> (Accessed 10 February 2021).
- Terwan, P. et al. (2016) *The cooperative approach under the new Dutch agri-environment climate scheme*. 16. [online]. Available from: https://enrd.ec.europa.eu/sites/enrd/files/w12_collective-approach_nl.pdf.
- Wynne-Jones, S. (2017) Understanding farmer co-operation: Exploring practices of social relatedness and emergent affects. *Journal of Rural Studies*. [Online] 53259–268.
- Zabel, A. (2019) Biodiversity-based payments on Swiss alpine pastures. *Land Use Policy*. [Online] 81 (November 2018), 153–159. [online]. Available from: <https://doi.org/10.1016/j.landusepol.2018.10.035>.
- Zabel, A. et al. (2010) Outcomes and Determinants of Success of a Performance Payment Scheme for Carnivore Conservation. *SSRN Electronic Journal*. [Online]
- Zabel, A. et al. (2014) Performance Payments for Groups: The Case of Carnivore Conservation in Northern Sweden. *Environmental and Resource Economics*. [Online] 59 (4), 613–631.
- Zabel, A. & Holm-Müller, K. (2008) Conservation performance payments for carnivore conservation in Sweden. *Conservation Biology*. [Online] 22 (2), 247–251.