A model of Result and Value Based Payments for arable field elements and forest edges was positively received by the participating farmers in this three-year pilot study.

The project has provided useful experiences of pros and cons of Result and Value Based Payment models for field elements. These experiences about indicator designs, payment levels and farmer information are useful when possibly introducing such a payment scheme in the future.

The model has the potential to be more efficient than previous Management Based schemes, but its incentives may have to be stronger to enhance the environmental qualities of the field elements.
Result and Value Based Payments for Field Elements and Forest Edges – Project Summary

A three-year pilot study has been carried out to assess whether a Result and Value Based payment model would be viable for agri-environmental payments at the national Swedish level. Theoretical analysis indicates such payments would be more efficient, which is supported by international evidence. The aim of the pilot was to investigate whether or not the model also works in practice and if it has significant advantages compared to previous management and cost-based payments. The pilot study included studying and evaluating the model in terms of effectiveness, efficiency, administrative issues, control properties, transaction costs and farmers’ experiences.

This project was a collaboration between the Swedish Board of Agriculture, the Swedish Environmental Protection Agency, the Swedish National Heritage Board and the County Administrative Boards.

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Cover photo: Knut Per Hasund
1 Mainly positive Results

A model of Result and Value Based Payments for arable field elements and forest edges was positively received by the participating farmers. The model functioned well in most respects addressed by the study. Its indicators were appropriate, although a couple of them should be revised. However, more long-term contracts or a hybrid model of Result and Practice Based Payments are examples of what could maintain and increase the environmental services of the cultivated landscape further. The report provides suggestions on how to develop a more efficient system of payments, together with other experiences of the study regarding introducing schemes to field elements.

2 Efficient payment model needed

According to previous theoretical and international studies, Result and Value Based Payments have potential to be more efficient than Management and Cost Based Payments by promoting better resource allocation and providing economic incentives to enhance the environmental services of the agricultural landscape. To be efficient, policy measures should be directed as close as possible at what is ultimately demanded – the environmental objectives. In the case of this pilot study, it implies that the payments should be allocated to individual landscape elements and to measurable attributes that are correlated to the presence of biodiversity and other public goods.

The project’s payments were directed to landscape elements and forest edges at arable fields. The rationale is that most of the public goods of the cultivated landscape in terms of biodiversity, cultural heritage and how people experience and enjoy the landscape are concentrated in the stone walls, the field islets and other such features.

Over the last century, the number of field elements and the total length of forest edges has declined drastically in Sweden, as have the environmental qualities of many remaining elements. Accordingly, the biodiversity of the agricultural landscape displays an alarmingly negative trend. Since 1994, it has been forbidden to remove field elements, but ceased management of them and the forest edges and abandonment of the adjacent arable fields are severe threats to their biodiversity and the other environmental services they generate.

There have been no agri-environmental payments for field elements and forest edges in Sweden since 2015. Previously, there has been a number of different payment systems in place, all of them heavily criticised for being inefficient, administratively heavy and unappealing to the farmers. There is obviously an urgent need to promote the public goods of the agricultural landscape, and the previous unsatisfactory payment models show that innovative solutions are called for. This was our starting point.
3 A pilot project testing Result and Value Based Payments

Our study area was in Falköping municipality in South-West Sweden, an area with relatively favourable conditions for cultivation. It is rich in stone walls and other field elements. Crop, dairy and various forms of meat production were represented in our sample of 23 participating farmers. Farm size varied from 10 to 400 hectares. About half of the participants were full-time farmers.

Figure 1. Each field element was allocated a basic payment, regardless of its environmental status, which indirectly counteracts the abandonment of fields rich in such elements. The mere existence of field elements provides biodiversity and other public goods, thus motivating the basic payment. Photo: Knut Per Hasund

4 Result or Management Based Payments?

Most agri-environmental payments in Europe have been Management and Cost Based. In principle, farmers are rewarded when carrying out a set of pre-determined management measures; what to do and what not to do. The payments must not exceed the management costs. These are normally calculated as average costs, settled at the national level, and have to be approved in advance by the EU Commission.
With Result-Based Payments, the opposite is true. The farmers are free to do what they want and when, according to their own preferences and the conditions of their farm, the site and the weather. The remuneration is dependent on the attainment of results, that is, when a specific good, service or quality has been delivered.

The level of Value Based Payments is determined in relation to the social value of the demanded environmental benefits: the higher the environmental benefit, the higher the payment.

In recent years, the number of agri-environmental schemes and projects with Result Based Payments has been increasing rapidly in Europe to address various environmental problems; see https://www.rbpnetwork.eu.

5 A payment model based on indicators

The payment model developed and implemented in this pilot study had a basic payment per object, supplemented by value-based, top-up payments for higher environmental status as measured by indicators. For the aim of efficiency, it was important to target the payments at each particular field element or forest edge, in spite of the higher transaction costs this implies.

The basic payment per object was independent of their environmental qualities. The motive for this was that the mere existence of a field element or forest edge contributes to the biodiversity and the other landscape amenities. Remunerating their existence is accordingly an indirect support to fields or landscapes with many such objects. Abandonment and afforestation of the adjacent fields will drastically reduce the biodiversity and other public goods of the field elements and forest edges.

Figure 2. Besides the basic payment, the field elements could receive indicator-based top-up payments for various environmental qualities. The higher the indicator estimate of an element, the higher its payment. Photo: Knut Per Hasund

5
The environmental top-up payments were correlated to the presence of biodiversity and other public goods. To be able to distinguish between objects with higher and lower environmental qualities, a set of Result indicators was applied. The higher the indicator estimate of an object, the higher its remuneration. The number and the design of the indicators are crucial determinants for the efficiency of the payment model, how pedagogic, and how simple it will be to adopt. Accordingly, the indicators are also important for the acceptance of the payment model by farmers, administrative officials, the public and interest groups. The top-up payments for environmental services are aimed at stimulating both the preservation and the enhancement of the environmental qualities of the objects by giving targeted, financial incentives. Besides incentivising, the payments also enable management by providing economic support.

6 Basic payment combined with environmental quality top-ups

With the aim of directing the payments according to the presence of public goods, they were differentiated by size, location and type of object, as well as by environmental qualities as indicated by a set of indicators.

The larger a field element, the more plants, insects and other phenomena of preservation interest it accommodates, other conditions being equal. Hence, larger payments were motivated for larger objects. Analogously, higher payments were for instance allocated to stone walls than to a mere vegetation strip between fields, as this type of element in general has higher biodiversity, cultural heritage and landscape amenities. And the more people that enjoy the environmental services of an object, the higher its social value, other conditions being equal. This was the rationale for a top-up payment for elements in sight of busy roads or nature trails.
Table 1. Examples of conditions for higher levels of basic payments and environmental top-up payments in the pilot study.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lowest level</th>
<th>Middle level</th>
<th>Highest level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear field elements</td>
<td>Length 50 – 100 m</td>
<td>Length 101 – 300 m</td>
<td>Length &gt; 300 m</td>
</tr>
<tr>
<td>Point field elements</td>
<td>1 – 100 m²</td>
<td>101 – 1,000 m²</td>
<td>1,001 – 5,000 m²</td>
</tr>
<tr>
<td>Forest edges</td>
<td>Length 50 – 100 m</td>
<td>Length 101 – 300 m</td>
<td>Length ≥ 301 m</td>
</tr>
<tr>
<td>Value-trees, number</td>
<td>3 – 5</td>
<td>----</td>
<td>≥ 6</td>
</tr>
<tr>
<td>Indicator flowers, number of species</td>
<td>5 – 9</td>
<td>----</td>
<td>≥ 10, or ≥ 1 red-listed species, or ≥ 1 protected species</td>
</tr>
<tr>
<td>Absence of mismanagement species (just the third year of the project)</td>
<td>25 – 50 % of the area or the length of the field element is covered by mismanagement species</td>
<td>----</td>
<td>Less than 25 % percent of the area or the length of the field element is covered by mismanagement species</td>
</tr>
<tr>
<td>Linear field elements without overgrowth</td>
<td>0 – 25 % of the length of the element is covered by trees, thicket or brushwood.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visibility for the public</td>
<td>Some part of the element is less than 100 metres from a larger road, railroad or marked nature trail. Larger roads are roads with 1–3-digit road numbers.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Just “positive” top-up payments were applied, in the sense that the payments could never be lower than the basic payment, even though the indicator may reflect something that is environmentally negative. For example, “absence of overgrowth” merited a higher payment, instead of reducing the payment in the presence of too much thicket and brushwood. The reason was to give the farmers positive stimulus and encouragement rather than economic punishment.

7 Field elements and forest edges are hot spots

The field elements and forest edges host almost all of the biodiversity and the cultural heritage features of the cultivated landscapes and are also crucial for the scenery and other social qualities. In the plains in particular, they are important for the green infrastructure as they are the only remaining habitats for the flora and the fauna, serving as refuges for shelter, feeding, nesting, hibernation or spreading.

The number of field elements and the total length of forest edges has decreased drastically over the last century. Concurrently, the environmental qualities of many of the remaining elements have also seriously declined. There are three threats: removal of elements, ceased or reduced management, and afforestation of the adjacent fields.
8 Useful experiences; pros and cons

The project has provided useful experiences of pros and cons of Result and Value Based payment models for field elements. These experiences about conditions, payment levels and indicator designs are useful when possibly introducing a future Result and Value Based payment scheme.

8.1 The model, general observations

The definitions of the types of field elements performed well in general, as did the classification of elements by size. Hence, the principle of element and size differentiation appears to be functional since larger elements are more valuable, other conditions being equal.

Our judgement is that the set of indicators in combination with the basic payment have been able to reflect the presence of public goods in the cultivated landscape. They differentiate between more or less valuable objects on a multi-level scale. Most farmers have stated that they understand the rationale of the indicators and that they found them easy to apply. However, a couple of the indicators have to be revised, further developed or better explained.

The project does not give a clear answer to whether the payment top-ups give sufficient incentives for improvements of the environmental qualities of the elements and the forest edges. Theory, cost estimates, the literature and the answers of the farmers indicate that that they should lead to successive, environmental improvements such as increased or better management. However, only minor improvements in the management and the environmental status of the objects were observed over the project time. The short project period of three years may be one explanation. It was expressed at the final farmer workshop that it was not worthwhile carrying out restoration work for additional payments in just three years. The result may also indicate a need for a hybrid model with payments for management actions (such as clearing of brushwood), combined with Result Based Payments for environmental qualities. Another option, with both pros and cons, would be to reduce the basic payments to be able to increase the top-up incentives within the budget constraints.

The economic risk to the farmers of getting unexpectedly lower revenues caused by factors beyond their control, such as unfavourable weather, is assessed as small. The design of the indicators combined with the basic payments and the differentiating into several payment levels make the risk acceptable.
8.2 Management effects

According to the farmer interviews, the project payments have caused 7 of the 18 farmers to increase their management of the field elements or the forest edges, and 3 of them to take new management measures. Another 4 farmers replied that they planned to improve their management over the coming years. However, our field surveys and controls show that only a few management measures have actually been performed. A few elements have been cleared from brushwood or been grazed.

At the final workshop, the farmers explained that the low actual response was due to a lack of time relative to their ambitions, but mainly because of the short project time. Three years is not long enough to make an impact or for it to be worthwhile to restore elements or to change management practices.

8.3 The indicators

8.3.1 Overgrowth with brushwood and thicket is the core indicator

The additional payment for elements having no or little overgrowth of wooden vegetation was appraised as the most fundamental of the indicators. Such overgrowth reduces biodiversity significantly and negatively affects the cultural heritage qualities, the visibility of ancient relics, the landscape amenities, and the recreational accessibility.

It was the most chosen top-up payment in the project. Our experiences of its indicator are good for several reasons. The judging of the rate of overgrowth performed well for the farmers and for the controllers. It has decisive importance for the environmental status of the objects and its rationale was well understood by the farmers.

Figure 3. Higher indicator-based top-up payments and payments at several levels may be justified for the absence of bush and brushwood, since it is crucial for the biodiversity, landscape scenery and the cultural heritage Photo: Knut Per Hasund
8.3.2 Value-trees are easy to judge

Solitary, large or old trees, particularly of some species, benefit many other species and the landscape view. Some trees are also important for the cultural heritage, not least coppiced trees. Monitoring the presence of value-trees was easy and inexpensive. Value-trees should preferably be included as an independent indicator, which could be differentiated.

8.3.3 The flower indicator was problematic

The flower indicator was based on a list of 26 plant species that should be fairly common, easy to identify and be showing good maintenance, representing high overall biodiversity. Red-listed or protected plant species also qualified (see Table 2).

The flower indicator had its pros and cons. An advantage was that it was closely related to the demanded, overall biodiversity. The majority of the farmers were positive to it, and many felt pride when finding listed species on their land. Farmers also became interested in which plants grew on their field elements.

The indicator was, however, time-consuming to survey and monitor. The visibility of the plants varies over the seasons as the plants may be hidden by large grass and herbs, which leads to different results depending on the time of the field survey. Most plants are also slow to react to management changes.

Consequently, the flower indicator does not work well enough to be part of a future scheme for field elements, at least not in this design. If applied, our indicator should be modified and have less weight in the payments.

8.3.4 Mainly positive experiences of the other indicators

The indicator on absence of unwanted species (expressing poor management) was easier to assess and seems to show changes in management and biodiversity quicker than the flower indicator. It is based on the coverage (<25%; 25 – 50%) of nettles, ground elder and other listed species.

The top-up payment for objects closer than 100 metres to trails and roads with more traffic operated without any problems.

Forest edges with a variety of open and dense spots, and various flowering species of trees and bushes are more valuable for the scenery and the biodiversity than a dense wall of trees. However, many farmers found this variation indicator difficult to understand and apply for. Considering the importance of this attribute, we recommend that this indicator is revised or better explained.
8.4 The payment levels

The payments ended up at 220 SEK/ha (c. 22 EUR/ha) on average, in this landscape rich in stone walls and other field elements. The allowance per farm varied between 3,200 – 69,500 SEK per year. It seems, however, that the incentives have to be stronger to enhance the environmental qualities of the field elements – whereas the budget limits will probably restrict the payments to be below those paid in the project. Lower basic payments and relatively higher top-up payments should encourage the farmers’ interest in improving the environmental status of the elements. The payment levels should be somewhat revised if implementing such a scheme, with 30 – 50 percent lower basic payments and a higher payment for “absence of unwanted species”. The number of payment levels per indicator should not be reduced, but rather increased for some (e.g. brushwood, unwanted species).

Table 2. Examples of basic payments and top-up payments in the project. Swedish crowns* per year and stone wall that satisfies the indicator criteria.

<table>
<thead>
<tr>
<th>Stone wall length</th>
<th>Short (50–100 m)</th>
<th>Medium (101–300 m)</th>
<th>Long (&gt; 300 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic payment</td>
<td>200</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td>Top-up payment for environmental qualities:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle drive</td>
<td>400</td>
<td>600</td>
<td>900</td>
</tr>
<tr>
<td>Absence of brushwood and thicket</td>
<td>250</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>Value-trees (number) 3 – 5</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>&gt; 6</td>
<td>150</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>Indicator flowers 5 – 9 species</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>&gt; 10 species or ≥ 1 red listed/protected</td>
<td>300</td>
<td>500</td>
<td>700</td>
</tr>
<tr>
<td>Cultural heritage qualities</td>
<td>100</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>Unwanted species 25 – 50 %</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>≤ 25 %</td>
<td>300</td>
<td>500</td>
<td>700</td>
</tr>
<tr>
<td>Visibility to the public</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
</tbody>
</table>

* 1 Swedish crown: c. 0.1 Euro

Most of the project’s farmers reported that the payments covered their additional costs for making the application and enhancing the management of the field elements and the forest edges. Some of them told that the management has to be profitable to be worthwhile, and they would not have participated if the remuneration was lower.
8.5 A combination of information measures is effective

The information supplied was well received by the participating farmers, saying that they could understand the aim of the scheme, the criteria of the indicators, the application procedure, etc. This applies to both the written and the oral information, its quantity and most of its quality. Our conclusion is that it is possible to effectively communicate Result and Value Based Payment schemes for such complex environmental objects as field elements too.

The information and the presentation of a Result Based Payment scheme are crucial for its success. The combination of workshops, written brochures, websites and field walks was effective in enabling two-way communication with the farmers. Field walks offer opportunity to demonstrate and discuss the indicators’ design in a practical way, and are less expensive than individual advisory services, as well as serving a social function.

Figure 4. This stone wall could have merited a higher payment if free from tall grass and unwanted herbs. The diversity of other species could then increase, its visibility and cultural heritage qualities would be enhanced and the accessibility for recreation ramblers would be improved. Photo: Knut Per Hasund
8.6  Administration, monitoring and control work well

Administration, applications, controls and payments have worked well in the small scale of the project. Our judgement is that a possible, future Result and Value Based Payment scheme may and should be incorporated into the Swedish digital application system. However, the difficulties in constructing an operating IT system may be the largest obstacle in the short-run to introducing such schemes at the national level.

8.7  The farmers prefer Result Based Payments

The participating farmers are positive towards Result Based Payments in general and to the payment model of the project. All respondents in our survey said that they prefer payments like the ones in the project compared to the previous, Management Based Payments of Sweden.

Among the reasons stated by the farmers are:

- It is more positive to work with Result Based Payments, and less stressful.
- There is greater flexibility, both in terms of management methods and management levels.
- The skills of the farmer are valued, which promotes responsibility and pride.
- The model is understandable and sound.
- The independence from the single farm payment and the differentiation into several payment levels combined with the absence of sanctions if delivering at a lower level make the model less risky. “If you are short of time one year, you can improve the situation next year.”

“Initially you are used to the old kind of payments, but after you understand how the new model works you realise that it is much better. Alteration and acceptance may take time.”
9 Recommendations

Result and Value Based Payments for landscape elements of cultivated fields can well be designed as in the model of this project, but – if employed – with lower basic payments and partly modified indicators and top-up payments. Efficient resource allocation, financial incentives to maintain and improve the environmental status, flexibility for the farmers and for site conditions etc., potentially easier controls and not least that the farmers like the model are among the more important arguments reported by the project. What speaks against introducing such a scheme are the transaction costs of introducing a new scheme. The authorities need to adopt their IT system and to develop administrative routines and train staff. The farmers have to learn about the scheme.

The model with basic payments and indicator-based top-up payments has proven to be expedient. Hence, the basic payments should be included, although modified. The number of indicators and the corresponding top-up payments could remain roughly the same, or possibly be slightly increased in order to increase accuracy. The farmers in the project said that the number of indicators was not problematic and that in most cases they were easy to understand. Some of the indicators should be tightened, but their design remain mainly as those of the project. A few more payment levels should be considered. Structure indicators are recommended for the top-up payments, possibly combined with some single species-based indicator.

Figure 5. In a Result Based Payment scheme, the farmer is free to choose when and how to improve the environmental status of the objects; by grazing, mowing, burning or whichever methods and combinations suit the site and the farmer. It is the results that count.
Photo: Knut Per Hasund