Result and Value Based Payments for Field Elements in the Agricultural Landscape

– experience from a Swedish pilot study

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Abstract

Result Based and Value Based agri-environmental Payments are potentially significantly more efficient for some environmental problems than the currently dominating Management Based and Cost Based Payments. A Swedish pilot study is testing such payments for field elements and forest edges. The study explores innovative approaches of structure indicators and reduction of farmers' risk with mainly positive results. Since stone walls and other field elements are heterogeneous objects, composite indicators are developed to reflect a set of environmental quality variables on biodiversity, cultural heritage and socio-cultural landscape public goods.

Keywords: Agri-environmental payments, indicators, multifunctional agriculture, result based payments, risk, value based payments

Introduction

Result Based Payments for agri-environmental services are meeting an increasing interest in academics and not least in policy implementation (Burton & Schwarz, 2013; Engel *et al*, 2008; Herzon *et al*, 2018). A major reason is that such payment models may have advantages in terms of efficiency, farmers' appreciation and legitimacy.

The dominating model for agri-environmental schemes of the EU Common Agricultural Policy, CAP, is still Management Based Payments. For each such scheme, more or less detailed sets of conditions state what the farmers have to do or must not do. It may concern restrictions on fertilization, grazing intensity, harvest dates and other management practices. With Result Based Payments, it is only the amount of environmental services delivered that counts. The farmers are free to choose management practices and levels to what suits the site, the weather, the firm and the farmer him- or herself the best. Rather than being based on what practices the farmer must adhere to, the payments are based on the monitored estimates of indicators, designed to reflect the provision of the demanded environmental service(s).

There are several reasons to develop more efficient agri-environmental schemes and to investigate or exploit the potential of Result Based Payments. Management Based Payments may have several shortcomings and have been criticized in many respects (see e.g. Burton & Schwartz, 2013; Keenleyside *et al*, 2014; Reed *et al*. 2014). Their environmental effects are in many cases missing or unclear (see e.g. Kleijn *et al*., 2001, or the meta study by Kleijn *et al*., 2006). A problem is that Management Based Payments may have poor additionality, giving dead weight losses by continuing to provide payments to farmers even where the targeted

outcome is not delivered (Herzon *et al*., 2018). Nevertheless, the agri-environmental schemes are important and a large advance in CAP, having a major role for the supply of biodiversity, cultural heritage and public goods related to the European agricultural landscapes.

The budget for the agri-environmental payment schemes of CAP is quite large. The CAP Pillar 2 budget is 13 660 MEUR per year in the programme period 2014 – 20, plus national co-financing (EU, 2013). How much of the Pillar 2 budget that goes to these schemes vary between member states. For the forthcoming programme period, the EU Commission is advocating a more extensive implementation of Result Based Payments (European Commission, 2017).

A growing number of pilot projects or Rural Development Schemes are already operating with payments based on result indicators; see e.g. Burton & Schwarz (2013) or Herzog *et al.* (2018) for surveys. Most of them are of relatively small scale, and many are directed to permanent grasslands using vascular plant indicators. This is unfortunate in view of the conclusion that there is an efficiency potential in introducing Result Based Payments in more regions, at a larger scale and using them to address more types of environmental problems (Gibbons et al, 2011; Hasund, 2011; Herzon et al., 2018).

This paper presents and discusses a pilot study in the Falbygden area of Sweden that has some innovative elements:

- It is directed to the public goods of field elements and forest edges, environmental services not earlier addressed by Result Based Payments
- The payments are mainly based on structure indicators, and just partly on species indicators
- It is testing the concept of Value Based Payments, Value Based Payments, as an alternative to the prevalent Cost Based Payments
- The payment model design has a multiple approach to reduce the participating farmers' risk of lower payments than expected

Advantages appear to outweigh the disadvantages

International experience and scientific articles (see e.g. Burton & Schwartz, 2013; Keenleyside et al, 2014; Matzdorf & Lorenz, 2010; Wätzold & Dreichsler, 2005; Zabel & Roe, 2009) indicate that Result Based Payments are more efficient in general than Management Based Payments, with higher environmental utility at lower costs. Larger environmental benefits may be achieved at lower costs because Result Based Payments give farmers economic incentives directed straight at what is demanded from society. Farmers would then focus on delivering more of what they are paid for, such as more species, instead of just trying to comply with prescribed management practices (that may be more or less appropriate to give the environmental service) (*ibid*.). By paying according to the presence of environmental services, the Result Based Payments give a socially more efficient allocation of resources (Hasund 2012).

The dynamic efficiency properties are a great advantage of Result Based Payments, They enable more flexibility in production (see e.g. Burton & Schwartz, 2013; Klimek et al., 2008 or Zabel & Roe, 2009). Farmers are not constrained to technology that may be more expensive. Instead, they are in principle free to adapt the production to their own, the site's, the farm's and the weather's conditions. There are also stronger incentives to develop new production methods for the joint production of agricultural commodities and environmental

services (Burton & Schwartz, 2013; Dörscher & Musshoff, 2015; Keenleyside et al, 2014; Zabel & Roe, 2009).

Result Based Payments are better received by farmers, which leads to more positive farmer attitudes, higher scheme participation and better scheme performance (Fleury *et al*., 2015; de Sainte Marie, 2010; Schroeder et al, 2013). Farmers welcome the idea of Result Based Payments because they interpret them as a sign of acknowledgement for their skills and knowledge (Fleury *et al*., 2015). By creating a social norm among farmers concerning biodiversity, the Result Based Payments may give more long-lasting effects than just temporal impacts on farming practices (*ibid*.) Transaction costs might be higher or lower depending on the design. If well designed, they have a potential to simplify the CAP and the schemes' control properties (Hasund, 2011).

Disadvantages of Value Based Payments might be a potential risk of delayed signals of environmental impact (Hasund, 2013) and possibly a higher financial risk for the farmers (Burton & Schwartz, 2013; Keenleyside et al, 2014; Matzdorf & Lorenz, 2010; Wätzold & Dreichsler, 2005; Zabel & Roe, 2009).

A pilot project to test Result Based Payments for field elements and forest edges

The aim of the Falbygden Pilot Project is to study how an efficient RBP-scheme for field elements and forest edges may be designed, how it works administratively, which environmental effects it gives, and how it is perceived by the farmers. The project is running over a three year test period. The 23 farms and farmers enrolled are fairly representative for the Falbygden area, made up of crop and husbandry farms, small and large farms, full time and part time as well as young and old farmers.

The scheme is developed to promote a socially efficient supply of public goods generated by forest edges (towards arable land) and arable field elements, such as stone walls and solitary trees. The objective of social efficiency implies that the payments should be settled at levels where the social marginal benefits equal the social marginal costs of providing the public goods (Hasund, 2013).

The objects that the payments are directed towards are the linear field elements: stone walls, old cattle drives, ditches and permanent vegetation strips between fields; the point elements: field islets, cultivation stone cairns and solitary trees; plus forest edges. Alleys, field roads, ponds and other types of field elements are excluded because of project constraints.

There are two reasons for the choice of field elements and forest edges as scheme objects. At present there is no other agri-environmental scheme within the Swedish Rural Development Programme directed at these objects that would interfere with our study. (A pilot study with Result Based Payments directed at pastureland, for example, would be difficult to conduct and interpret, as there is a scheme in place directed at them.) Secondly, the public goods of the cultivated landscape are concentrated to the field elements and the forest edges.

In general, considering social efficiency and the Polluter Pays Principle, agri-environmental payments are justified only for public goods that are positive externalities. The public goods of concern in our study may accordingly be divided into the categories biodiversity, cultural heritage, and socio-cultural landscape qualities, such as scenery, recreational access and local identity.

Uncultivated field islets, stone walls and other field elements are almost the only remaining habitats in the agricultural plains, and "ecological hot spots" in all cultivated areas. They are important for a large number of species, plants, birds, mammals, insects, etc. as habitats for

breeding, shelter or hibernation. Linear elements also serve as dispersal corridors across cultivated fields between fragmented populations of plants and animals, and therefore important for the green infrastructure of cultivated landscapes (Artdatabanken, 2014; SBA, 2019). Both field elements and forest edges increase the variation and heterogeneity of landscapes, characters that are attractive to all the user groups studied by Hahn *et al*. (2018).

Over the last century, the number of field elements has gone down drastically (Ihse, 1995; SLU, 2017). Their environmental status in general continuous to deteriorate (SLU, 2017; SBA, 2018, 2019).

Scheme design: Trade-off between precision and simplification

Following the guidelines of OECD (2008, 2010a, 2010b) and others, the result indicators (and accordingly the payments) are designed to be directed as closely as possible to the demanded environmental services, that is, strongly linked to the public goods. A second requirement is that they should be objectively measurable in quantitative terms and not discretionary, to achieve transparency and equal treatment across farms.

The main indicator criteria used in the development of the indicators were policy relevance, quantitative and temporal responsiveness, stability, monitoring costs, pedagogic features and simplicity (cf. Hasund, 2011). After a tentative and iterative process, payments based on composite indicators were settled for each type of object. As an example, Table 1 below shows that the payments for stone walls are determined by their length and the quality indicator. The indicator is composed of the quality factors: absence of overgrowth (brushwood, thicket), "value trees", presence of positive indicator species, absence of ground covering by dominating weeds, cultural heritage qualities, and public visibility. It is line with the call expressed by Zabel & Roe (2009) for a plurality of performance indicators to reflect complex biodiversity conditions.

Table 1. Payment rates for stone walls and their environmental qualities, as measured by predefined indicators in the Falbygden pilot project. Swedish crowns (SEK)* per year

	Length of stone wall		
	Short 50 – 100 m	Medium 101 – 300 m	Long 301- m
Base payment	200	300	500
Quality add-on payments			
Absence of overgrowth	250	400	600
Value trees, 3 – 5	100	100	100
Value trees, ≥ 6	150	200	200
Indicator plant species, 5-9	200	200	200
Indicator plant species, ≥ 10	300	500	700
Ground covered by dominating weeds, ≤ 50 % of surface	200	200	200
Ground covered by dominating weeds, ≤ 10 % of surface	300	500	700
Cultural heritage qualities	100	200	300
Public visibility	100	125	150

* 1 SEK ≈ 0,095 EUR (May 2019)

The reason for differentiating the payments by length is of course that, *ceteris paribus*, a longer stone wall provides more environmental services than a short one. It could be more optimal to multiply length in meters with the indicator estimate instead, but for simplicity, the alternative of three length classes was chosen. New digital technology combined with more precise remote sensing may simplify, lower costs and increase accuracy of the differentiation in a not too far future.

There are two components of the payment model, a basic payment plus add-on value payments. The base payment applies for the mere existence of the field element or the wood fringe. On top of that, the farmer may get add-on payments for the environmental quality of the respective field element or forest edge as assessed by the indicators.

Besides giving economic incentives to enhance the environmental quality of the objects in question (pastureland, field elements), the second but often neglected function of agri-environmental payments is to finance the supply these environmental services. There is a quantity and a quality dimension of the provision of field element public goods. The environmental services of the field elements may decline by three processes: change of management (quality), removal of the element (quantity), and abandonment and afforestation of the surrounding fields (quality). Hence, in environmental effectiveness and social efficiency perspectives, the mere existence of a field element motivates the base payment. By paying for the presence of field elements, the risk of removal of the elements or abandonment is reduced, also for farmers who may not have the time to survey and apply for add-on value payments. This payment structure is actually an indirect support to marginal land rich in field elements and forest edges in mosaic landscapes of the mixed and the forest regions, while the plains with rationalized large fields will be less favoured.

Cultural heritage qualities are reflected in the indicator by a factor that is satisfied if the stone wall is in good shape (not decayed, etc.) or listed in the National Cultural Relics Register (https://app.raa.se/open/fornsok/). The latter factor may be automatically included in the indicator assessments from the register in a possible, future implementation. The base payment to the stone wall itself is partly motivated by its cultural heritage value, and hence a further remuneration for the supply of cultural heritage public goods. It is one of the reasons why the base payment is higher for stone walls than for ditches, for example.

A stone wall that is seen by many persons has, *ceteris paribus*, a higher value than another one, enjoyed be less people. It is the social efficiency rationale for introducing the indicator factor “public visibility”, giving hither payments to field elements in the vicinity of trekking routes or roads with much traffic.

Species Indicators versus Structure Indicators

Result Based Payments to promote biodiversity or environmental services of agricultural landscapes appear in most cases to be based on a single indicator of plant species. A permanent grassland qualifies for the payment if a given number of species is observed there, say six out of a pre-determined list of 20 species. In the field element pilot we are also testing such an indicator factor, with two-level add-on payments if observing more than four respective more than nine species from the list, or at least one of any protected or red-listed plant species. The 20 species of the list are deemed to reflect “good management” status. If a number of them are present, it is expected there should also be a rich occurrence of insects and other species. There is, however, as Reed *et al.* (2014) write, a risk that “Payments tend to focus on single ecosystem services, and therefore ignore possible knock-on effects”.

In our model, the flora species indicator factor is a supplement to the indicator's structure based factors, "absence of overgrowth" and "value trees", and an optional alternative to the structure factor "absence of ground covering by dominating weeds".

If there is overgrowth of brushwood and thicket along a stone wall or some other field element, its biodiversity will be quite poor. As overgrowth is non-historic, obscuring, a sign of ceased management, preventing recreational access and considered to be aesthetically negative, the overgrowth factor is also an indicator of cultural heritage qualities and socio-cultural landscape qualities. This indicator factor is well understood by the farmers, and in line with their own views of what signifies "well-managed" fields.

"Value trees" is another structure factor of the scheme, expressing the occurrence of solitary and large, old, coppiced or otherwise specific trees, according to pre-defined criteria. The reason behind choosing value trees for the indicator is that they may be exceptionally rich habitats, of cultural historic interest, and enhancing landscape scenery, Old oak trees may, for instance, host 1 000 other species, including bats, birds, insects, lichen, etc. By directing the payments according to the features generating the public goods, the indicator effectively covers a wide range of environmental services.

Our experience is that structure indicators, if well designed, do have several advantageous properties. They are more stable, more effective, easier to measure (also over the seasons) and consequently inducing lower transaction costs. No expert or acquired knowledge in botany is required, although this may not necessarily be a demerit of species based indicators. Klimek *et al.* (2008) and Wittig *et al.* (2006) report that farmers are able to learn and identify the plants of a species list. It is also the experience from our study, observing just a few incorrect applications. On the other hand, many of the farmers have not applied for the flora bonus payment, in spite that our field surveys reveal that the indicator species are present in sufficient numbers. When interviewed, they explain that they do not have time to spare to take stock of the plant species on all their field elements.

It could also be mentioned here that the indicator factor is designed as absence of overgrowth. A lower base payment combined with a bonus payment for the absence of overgrowth is chosen, instead of a higher base payment with reductions for overgrowth. Positive rewards and incentives, even for negative qualities, are preferred because of psychological mechanisms affecting farmer attitudes and behaviour.

Value Based Payments

A widespread misunderstanding is that the WTO-rules restrict the agri-environmental payments to being cost based. Unlike the WTO agreement, the CAP rules do, however, not allow the payments to exceed the farmer's additional costs of producing the environmental service, including possible income forgone. In the field element pilot, we are instead applying *Value Based Payments*, differentiated according to the quantity or quality of environmental services. It means in principle that the higher the (environmental) value, the higher the payment (Hasund 2013). This differs from the present C*ost Based agri-environmental Payments* of CAP. A typology of payment forms is illustrated in Figure 1.

Figure 1: Typology of payment forms

		Principle of pricing	
		Cost Based agri-environmental Payments	Value Based agri-environmental Payments
Type of conditions for receiving payment	Result Based agri-environmental Payments	A few, small scale schemes in some EU member states	Socially efficient design
	Management Based agri-environmental Payments	The majority of present agri-environmental payments	(Technically possible, but in reality less relevant)

Source: From Hasund & Johansson (2016)

Value Based Payments will lead towards a socially efficient production of the environmental public goods if developed with rates where marginal social costs equal marginal social benefits. They have thence the potential to give optimal economic incentives and a socially more efficient allocation of resources (Hasund, 2013). The prevalent Cost Based Payments do have shortcomings in this respect, caused by focusing on costs instead of what it would be worth to increase the supply of the respective environmental services. Reed *et al*. (2014) formulate a further critique "--- input-based agri-environmental schemes in the EU and elsewhere make a number of simplifications, for example, ---, using standardised payment rates that may not reflect spatial or temporal variation in biophysical conditions, management costs or ecosystem service values".

A consequence of the nationally uniform, cost based payments for permanent grassland is that many of the semi-natural pastures in Sweden richest in biodiversity are abandoned or not included in the scheme anymore and degrading into lower ecological status (TUVA, 2018). A major reason is that the costs of managing these traditional meadows or semi-natural pastures optimally are higher than the payment rate, based on calculations of national costs in average. It causes environmental losses and social inefficiency, since the social net benefits of the public goods in many of these sites are significantly higher than the costs and the payment rates.

Although the use of Value Based Payments is not restricted by the Agreement on Agriculture of the World Trade Organization (WTO), it is not settled whether they will be classified into the WTO 'green box' or 'amber box'. If not violating the criteria of the green box, there are no limits on the use as these payments (Hasund and Johansson, 2016). The Value Based Payments are permitted also if classified into the WTO 'amber box', but their size is then restricted by a legally binding ceiling level on trade distorting support. The EU has, however, a large margin of many billions of euros to that ceiling. Consequently, there are no WTO restrictions on how large the payments per hectare may be as long as the ceiling is not exceeded. Furthermore, the payments are not counted into the aggregate amount of restricted support if the support is less than 5 percent of the value of favoured market products (*ibid*.).

Considering that the uniform payment rates are blunt, environmental services are lost because of the inadequacy of Cost Based Payments, the Value Based Payments have the potential to be efficient, and that there in practice are no WTO limits against Value Based Payments, we

are making an attempt to design Value Based Payments in the field element pilot study. The payment rates are based on evaluation studies combined with ecological, cultural heritage and landscape rankings. The process resulted in a relatively wide range of payment levels (cf, Table 1), on average higher than the level in the corresponding scheme of the previous Swedish Rural Development programme. The payment rates may be revised by forthcoming work.

A multiple strategy to reduce farmers' financial risk

A possible risk of Result Based Payments pointed out in many papers (see e.g. Burton & Schwarz, 2013; Keenleyside *et al*, 2014) is that the scheme revenues of the affiliated farmers may decline from one year to another by factors beyond their own control, such as weather conditions (Matzdorf & Lorenz, 2010) or measures taken by neighbouring farmers (Aviron *et al*., 2010). Consequently, this may cause financial stress for the farmers, but also reduce farmers' inclination to enrol in the scheme.

The critique appears to be exaggerated. The Result Based Payment scheme revenues do normally constitute just a minor part of total farm revenues. And as Klimek *et al.* (2008) points out, farmers may diversify their total income risk by enrolling in agri-environmental schemes. Moreover, the indicator estimates and accordingly also the payments do in the schemes that we have studied not vary drastically across years. If they decline, it may not take place in all the fields, further reducing the magnitude of the revenue decline. A fourth objection against the critique is that farmers are used to annual revenue fluctuations as yields and commodity prices vary from year to year. Matzdorf & Lorenz (2010) write that their interviewed farmers expressed that they accept the risk, and that it would not deter them from continuing to participate in the scheme.

Regardless of these objections and considering the possible risk, we apply in our pilot project a strategy with five elements to reduce the suppliers' financial risk.

A basic measure to reduce unduly fluctuating indicator estimates (and annual payments) is certainly to choose and design temporally robust indicators. It is, however, an art to design indicators that are sensitive enough to changes in the supply of environmental services, but do not react to temporary factors. For example, in our pilot, we chose as an indicator of good management to use the proportion of the ground covered by nettles and some other weeds that are sensitive to repeated mowing or grazing. An alternative indicator could have been the height of the grass sward. It was refused because it varies visibly with annual precipitation and the time of monitoring.

Composite indicators are used to measure the environmental services of say a stone wall or the other field elements. As the payment for the respective field elements then is determined by several factors, such as the presence of brushwood, weed coverage and positive indicator species, it will be less vulnerable to uncontrollable conditions. Although the payment may decline partly if one of the factors deteriorate, the total payment is relatively stable.

Another strategy is to have indicators or indicator factors with several payment levels. Continuous payment differentiation, or many steps of increasing payments by higher indicator estimates will, besides giving quick, positive feedback for environmental improvements, also involve lower financial risk for the farmers. Indicators designed to take the value zero or one may be more disastrous for farmers with small margins. Following this principle, the Burren project in Ireland is for example using a ten score scale for indicator assessments. Our Swedish pilot project is using three-step scales for some of the indicator factors.

The risk is further reduced by the two payment types design of the indicators, the base payment per element and the indicator based add-on value payments. The base payment is void of risk and guarantees a minimum payment per field element.

Finally, information and exchange of experience is used, not just to improve management and the environmental results in general, but also to counteract the consequences of negative, exogenous influence.

In the pilot project, we observe some increasing payments compared to year one as farmers have improved the environmental status or their field elements or been more skilled in making their applications. However, we observe just a few, minor reductions of payments. Farmers in the pilot area have equally not expressed any fear of getting lower payments. This should be interpreted with some caution, since they are aware that it is just a three year project. It is also not possible to make any general conclusions about the financial risk, as the project time is still too short. Our preliminary conclusion is nonetheless that the financial risk of farmers may be minimized to an acceptable level by an appropriate scheme design.

Participating farmers are mainly positive to the RVB-scheme

The research part of the project that goes parallel to the development and implementation of the scheme is using a set of sources to gather empirical data: administrative control of applications, farmer interviews by an independent consultant, field surveys, workshop with farmers in discussion teams and extended farmer interviews (not yet conducted).

The analysis of the applications shows that there were just a few mistakes made and most of those would have been avoided if the scheme had been run within the geo spatial aid application.

The questions for the telephone interview were developed by staff from our team together with an independent consultant, who carried out the interviews. All farmers of the pilot and an equal number of non-participating farmers of the district were interviewed.

A small excerpt from the results shows that 72 percent of the participating farmers declared that they got sufficient written information to make their applications. The quality of the written information was judged as very good by 17 %, good by 72 % and satisfactory by the remaining 11 % of the farmers. Our interpretation of these answers is that it is possible to communicate effectively about scheme relevant questions also for as complex objects as field elements and forest edges.

Among participants, 42 % answered that it was easy or very easy (scores 4 and 5 in a scale of 5) to identify the positive indicator plants, while 24 % reported that they found it difficult (score 2/5). Besides lack of time for inventory of indicator plants, difficulties in identifying the plants or insufficient number of present plants were reported as reasons for not making applications for this bonus payment.

Answering whether the scheme had changed their management of the field elements, 39 % told us that they had taken more measures than they had previously done and 17 % that they had taken management measures that they had never taken before. Some farmers, 22 %, answered that they had planned but not yet taken extra management measures. Equally many answered that they have not planned to increase their field element or forest edge management. It may be the case that the elements on some of these farms are already optimally managed, so there is no potential for improvements. Since the project period is just three years, and the farmers know that it ends, it was not considered meaningful to ask

whether the scheme has contributed to maintain the management they already carry out on their elements.

According to our field surveys, the figures above may be somewhat too positive. Confronting the farmers with this issue in the workshop, they said that the time constraints had prevented them from doing all that they had planned, and although they still plan to increase their management, they would have done even more if the scheme were running over a longer period.

The most common management measure carried out or to be carried out is clearing of brushwood and thicket (58 % of farmers). Mowing or grazing are also common measures, each reported by one third of the farmers. Removing the cut grass is positive for the flora by transporting off nutrients, but labour consuming and reported by just 25 % of the farmers. Restoration of stone walls is reported by 17 % of the farmers, but it is likely to be putting back stones that have fallen down rather than more demanding work. One third of the farmers also report other measures.

The project time is too short to observe any changes of flora or other biodiversity variables in the area, and it was not expected when planning for the project.

In the workshop, the farmers expressed that they understood the aims of the project, that is, of promoting the landscape public goods and testing new forms of scheme designs. Some of them also told us that they had learned about these environmental services and grown more interest in their maintenance.

All farmers enrolled in the scheme and having an opinion answered that they prefer the pilot project's Result and Value Based Payment scheme over the management scheme of previous programme periods. It must be kept in mind that this is not necessarily representative for all farmers, since the participants that (voluntarily) joined the project may be more interested in this kind of schemes. Seven farmers had no experience of the previous scheme and did not have any preference.

Experiences and future prospect

Field elements and forest edges are generally neglected or underestimated in European agri-environmental policy and payment schemes, in spite of their crucial role for biodiversity, cultural heritage and various landscape amenities.

The pilot project on field elements and forest edges presented here was initiated to test if the positive results of Result Based Payments from theoretical findings or international experiences of such payments for permanent grassland could be implemented efficiently in practice also for these types of objects.

The preliminary experiences are by and large positive. Our interpretation is that farmers are able to understand and get involved also in a RVB-scheme with multiple indicator components and payment rates, each defined by performance criteria. However, a few farmers reported that they did not apply for some specific add-on value payment (plant species, but in particular the forest edge variation) because they did not understand its criteria. The problem could possibly be solved by revising the indicator or by individual advisory service, in addition to the written information and field walks offered by the project.

One result is that we consider omitting the flora species component of the indicator in the recommended model for various reasons. It is time demanding to measure and difficult to control reliably, although it has some appealing properties, not the least to be directed closely

to the ultimate ends of biodiversity preservation and to enhance the enthusiasm or proudness of farmers when identifying and observing the plants on their elements.

Within the long list of candidate indicator components that we considered testing, but refrained from because of the urge to simplify the scheme, are a quantitative measure of the positive indicator plants, a distinction between deciduous versus conifer tree forest edges, and more levels for the brushwood payment. A possible technical scheme improvement that could simplify reporting and control and that was suggested by some farmers in the workshop, would be to document the observed species by photos, tagged with GPS-coordinates.

Value Based Payments are not restricted to give just cost compensation, but do also imply an option to agriculture in making profit also on producing public goods, and not just on market commodities. Given that the payment rates reflect the social value of the public goods, and since 50 % of the enrolled farmers answered that the scheme payments with some margin covered their additional costs for supplying the delivered environmental services, we conclude that there is an efficient win-win solution for the environmentalists and the farmers. The 21 % that answered that the payments did not cover their costs may perhaps cut down on the management unless it gives them personal landscape benefits. It is not an efficiency problem, as the costs are not justified by the additional environmental services.

Nevertheless, if introduced at larger scale, mechanisms have to be applied to verify that the Value Based Payments do not exceed the social value of the addressed public goods. There is a risk that they may become undue subsidies, favouring the eligible producers and disturbing the commodity markets.

The future of Result and Value Based Payments is an open question. To our understanding, the model of the pilot may be partly revised and extended by more types of elements to an efficient scheme at national level. It may also be modified and developed for semi-natural pastures and other permanent grassland since there are many similarities between the tasks.

Result and Value Based Payments may possibly be implemented in more countries and for more agri-environmental problems as parts of the Rural Development Programmes in the forthcoming CAP-period. The body of experiences and good examples grow, and the Commission expresses interest.

Until the Commission has abolished the rule that the payment tariff must not exceed additional costs, the room for value based schemes seem to be limited to two roads within the CAP framework. One option would be to introduce them as EcoSchemes in Pillar 1, a new component of CAP proposed by the Commission. They have no general limits on the tariff levels.

The other road would be to differentiate the payment rates according to environmental values under the ceiling of the calculated, average additional costs of supply in the country. The highest payment could, for example, then coincide with the maximally permitted rate (settled by the cost calculations). Objects with lower environmental status would get payments below the cost based maximum. For Sweden, it would be a viable step towards a more efficient incentive structure and resource allocation when it comes to the agri-environmental payments for pastureland. The present Management Based Payments have a rate settled at about half the calculated additional costs, approved by the Commission. There is accordingly a potential within the present budget to double the payments for the top objects and to reduce the excess payments for the pastures delivering less public goods.

A final, more general experience and recommendation is to run pilot projects in smaller scale on new agri-environmental measures before implementing them at a national level. Never before has there been a pilot project in Sweden to test a new agri-environmental scheme

design. We have learned a lot to come up with a revised model for possible implementation. Much inefficient resource use and bad-will could have been avoided historically if there had been forward planning for more *in vivo* testing.

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