



Targeted payments for services delivered by farmers

Possible approaches

Petra Berkhout, Anne van Doorn, Raymond Schrijver



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Petra Berkhout,¹ Anne van Doorn,² Raymond Schrijver²

1 Wageningen Economic Research

2 Wageningen Environmental Research

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Dit rapport verkent de mogelijkheden om binnen het Gemeenschappelijk Landbouwbeleid agrariërs te betalen voor het leveren van maatschappelijke diensten, waarbij de nadruk ligt op grondgebonden diensten voor natuur, milieu, klimaat en landschap. Het beschrijft de voor- en nadelen van verschillende opties gegeven randvoorwaarden vanuit internationale verdragen en Europese regelgeving. Ook gaat het in op de uitvoerbaarheid van verschillende vormen van betalingen voor de uitvoerende instanties en de agrariërs.

This report explores options within the Common Agricultural Policy to strengthen payments to farmers for delivering public services related to land management, with a focus on environmental services. It also discusses the advantages and disadvantages of different systems in terms of compliance with WTO and EU legal conditions, the administrative burden (both public and private), monitoring and control and uptake by farmers.

Key words: environmental service, payment, targeted, agriculture, CAP

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P.O. Box 29703, 2502 LS The Hague, The Netherlands, T +31 (0)70 335 83 30,
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Preface

In October 2017 the new Dutch government presented its coalition agreement, outlining its view on the future of the Common Agricultural Policy (CAP). The overall aim is to focus less on providing income support, and more on innovation, sustainability, food security and food safety. More specifically the aim is to provide incentives to deliver (public) services through targeted payments.

This report explores options to pay farmers for public services related to land management, with a focus on environmental services, and discusses the advantages and disadvantages of different systems in terms of compliance with EU legal conditions and WTO conditions, the administrative burden, monitoring and control and uptake by farmers.

This study was commissioned by the Dutch Ministry of Agriculture, Nature and Food Quality. We thank the members of the steering committee, chaired by Bert-Jan Ruissen, for their valuable comments on earlier drafts of the report.



Prof.dr.ir. J.G.A.J. (Jack) van der Vorst
General Director Social Sciences Group (SSG)
Wageningen University & Research

Summary

S.1 Key findings

Multiple options exist to reward farmers for land-related environmental services for which no market exists. The remuneration could either be based on costs (linked to the input by the farmer in terms of land, labour or capital) or on results achieved (usually defined at the level of output). Currently, most agri-environmental schemes in the EU are schemes based on costs (input), as they are the easiest to implement in terms of administrative public and private burden. The examples given in this report of results-based schemes and a tender system, indicate that other options may be pursued (Chapter 4 and 5).

For any scheme, the starting point should be a proper intervention logic, making the links clear between objectives - input - output - result - impact. Such an intervention logic may also serve as a basis for defining the proper indicators for monitoring and evaluation. Finally, it is important to have a clear environmental baseline as the services delivered should go beyond the environmental baseline. This environmental baseline need not be static, but may change over time. Also, the environmental baseline may vary per region, or country (Chapter 2). The objectives to be achieved and to what extent these objectives can be defined as concrete and region specific, affects whether results-based or management-based payments are more suitable (Chapter 4).

S.2 Complementary findings

The EU legislation for payments to farmers is based on the WTO rules. As the current EU programmes under Pillar 2 of the CAP show, the WTO legal framework offers ample room for paying for environmental services, as long as the payments are not trade or production distorting. The WTO rules don't specify the way costs should be calculated, type of costs that may or may not be included, reference periods to be used, etc., thus leaving room for interpretation. The available literature suggests that this room is currently not used to its full potential (Chapter 3).

The administrative burden - both public and private - is difficult to assess beforehand as much will depend on the actual design of the scheme(s). Deciding on what the best way is to reward farmers for the public services delivered also depends on the objectives of the policy.

There seems to be a trade-off between the specific targeting of measures on the one hand and the feasibility of the monitoring and control of the measures on the other hand. The more targeted and specific payments are, the more burdensome the administration, monitoring and control are likely to become (Chapter 4).

S.3 Method

In its long-term view on the CAP the Dutch government has expressed the aim to move direct income support more into the direction of targeted support for public services to society provided by farmers. This paper explores ways to pursue this goal, with a focus on environmental services as farmers - as largest users of the rural areas - may play a key role in delivering these. Environmental services include positive benefits for nature, biodiversity, landscape, soil, water and climate.

More targeted support is in line with the ideas as outlined in the communication from the European Commission (EC) on The Future of Food and Farming, published in November 2017. According to this communication 'The granting of income support to farmers will be conditioned to their undertaking of

environmental and climate practices, which will become the baseline for more ambitious voluntary practices'. This new delivery model for the CAP offers possibilities to better target the payments.

The paper is largely based on a review of available literature, interviews with experts and a workshop with representatives of the ministry of Agriculture, Nature and Food, the Netherlands Enterprise Agency and the Netherlands Environmental Assessment Agency.

1 Introduction

1.1 Context

In its long-term view on the Common Agricultural Policy (CAP), the Dutch government has expressed the aim to move from direct income support more into the direction of targeted support for public services to society provided by farmers (EZ, 2017). These services may range from environmental services like increased biodiversity, climate change mitigation, clean air and clean water, land management to social services like a living countryside.

Over the past 55 years, the Common Agricultural Policy (CAP) has undergone many changes. Originally conceived in 1962 as a market and price policy, the CAP has transformed into a market and income support policy for farmers, on condition that they fulfil a large number of requirements with regard to the environment, animal welfare, food safety and plant and animal health.

The foundation for the current CAP was laid in 2013, when the ministers of Agriculture reached a political agreement on the CAP for the period 2014-2020. One of the major elements of this reform is that by 2019 each Member State should make steps towards a single equal payment entitlement for all agricultural land (the so-called internal convergence).¹ This payment has two major components: a basic premium (68% of the national envelope for Pillar 1) and a greening premium (30%); farmers receive the greening premium only if they meet conditions regarding nature and the environment. Member States can use part of the available budget for the basic premium to support specific goals and target groups (young farmers, redistributive payment, coupled payments). This latest reform shows an increasing focus on environmental and social objectives. This is in line with the Dutch view on how the CAP should further develop.

In the communication from the European Commission (EC) on The Future of Food and Farming, published in November 2017, the EC states that

'A new CAP should reflect higher ambition and focus more on results as regards resource efficiency, environmental care and climate action. The granting of income support to farmers will be conditioned to their undertaking of environmental and climate practices, which will become the baseline for more ambitious voluntary practices' (EC, 2017:10).

This new delivery model for the CAP offers possibilities to better target the payments.

1.2 Purpose of this paper

This paper explores ways to pursue the goal of more targeted support for services to society provided by farmers. We focus on environmental services as farmers - as largest users of the rural areas - may play a key role in delivering these. Environmental services include positive benefits for nature, biodiversity, landscape, soil, water and climate.

The key questions are:

- Which payments systems can be used in the EU to reward farmers for environmental services delivered?
- What WTO conditions apply to rewarding farmers for public services?
- What EU legal conditions apply to rewarding farmers for environmental services?
- Are the different payments systems to reward farmers compatible with the EU and WTO rules?

¹ Many Member States apply partial internal convergence.

-
- If not, what changes would be necessary in the EU rules to make the payments system compatible?
 - What are the (dis)advantages of the different payments systems in terms of implementation, uptake by farmers, monitoring and control?

The question of what type of public services the agricultural sector may deliver is outside the scope of this paper. The focus is on the pros and cons of different payments systems to remunerate public services - with a focus on environmental services - delivered by farmers.

1.3 Methodology and outline of this paper

The paper is largely based on a review of available literature, interviews with experts and a workshop with representatives of the ministry of Agriculture, Nature and Food, the Netherlands Enterprise Agency and the Netherlands Environmental Assessment Agency.

The paper starts in Chapter 2 with an overview of the concepts and definitions. Chapter 3 discusses the relevant legal frameworks for payments for environmental services to agricultural entrepreneurs. Chapter 4 describes options to pay for public goods and gives an assessment of the different options based on various criteria. Chapter 5 gives examples of different types of payments for public goods as they are currently implemented throughout the EU. The final chapter discusses the findings and concludes.

2 The need to pay for environmental services

2.1 Externalities and public goods

Farmers may decide to adopt their management practices in order to provide environmental services that support biodiversity and ecosystems. If this adoption goes beyond the relevant mandatory standards, farmers behaving in an economically rational way will only be prepared to provide such services if this results in a higher income (Terluin, 2010). In other words, an incentive will be necessary to stimulate the farmer to provide the environmental service.

For most environmental services there is no market price as there is no market for these services. The environmental service is a so-called externality or public good.

'An externality arises when the action of one economic agent influences either the wellbeing of another consumer or the production possibilities of another producer in an indirect way, i.e. in a manner that is not transmitted by market prices. Pure public goods/bads are defined by two features: they are non-rival (consumption of the good/bad by one person does not reduce the consumption available to another person) and *non-excludable* (once the good/bad has been provided to one consumer, it is not possible to prevent others from consuming it). All pure public goods/bads are externalities, but not all externalities are public goods/bads' (Dwyer and Guyomard, 2006: 188).²

The lack of a proper functioning market leads to under- or overproduction of the externality, providing the legitimacy for public intervention to enhance or reduce the provision of the externality. Matters are even more complicated for environmental services due to the so-called jointness of production, where agricultural production already leads to a certain level of provision of environmental services (for instance, extensive grazing leads to an attractive landscape). In such a case, paying for an environmental service could lead to paying for a service that would have been provided anyway.³

2.2 Entry points for public intervention

We build on the intervention logic commonly used in the EU and the CAP (see EC, 2015) to assess how public intervention may enhance the provision of environmental services.

In general, policy measures follow an intervention logic. The intervention logic is the logical link between the problem that needs to be tackled (or the objective that needs to be pursued), the underlying drivers of the problem, and the available policy options to address the problem or achieve the objective (EC, 2015: 10). So the intervention logic makes the relationship clear between policy objectives and policy measures. Often it is not one single instrument/measure that contributes to reaching an objective, but multiple instruments/measures together (EC, 2015:15). The policy measures translate into input,⁴ like money for a certain activity. This input creates an output contributing to result and impact.

² See also Appendix I for further explanation of these concepts.

³ See also Dwyer et al. (2015) for an extensive review of this issue.

⁴ Input is also referred to as intervention. In this paper we will use the term input.

For example, input could be money to finance a cycling lane, the output then being the length of the cycling lane that has been realised. The result is an increased cycling network in the region, leading to the impact of an improved touristic profile of the region.

To measure the performance of policy measures and to what extent policy objectives are achieved, different types of indicators are used: output, result and impact indicators. The indicators are also useful to explain the correlations between measures, output, results and impacts.

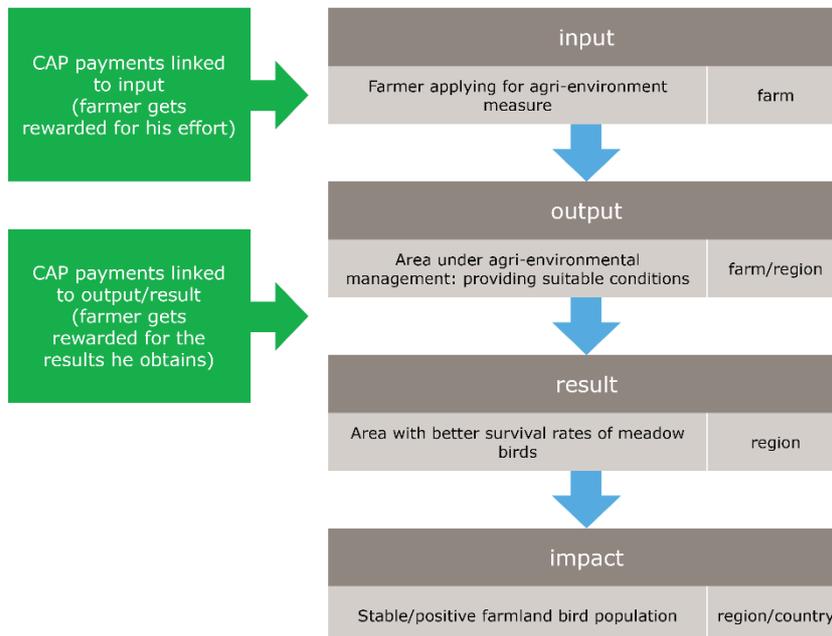


Figure 2.1 Intervention logic of an agri-environmental measure in the CAP

Figure 2.1 clarifies the intervention logic of CAP policy measures and the relationships between input, output, result and impact for an agri-environment measure a farmer may implement. Figure 2.1 also gives an example including a specification of the appropriate spatial scale for measuring the indicator. At the top is the farmer/beneficiary who applies for an agri-environment measure and implements this measure on his land. Input is defined as activities undertaken by a farmer on his farm using his means of production (land, labour and capital). For example, later mowing or leaving land fallow. These activities lead to an output which is directly related to the input: an area of farmland that is mowed at a later date or left fallow. This output should, in our example of an agri-environment measure, help in providing suitable conditions for certain species or habitats. Next, these suitable conditions should lead to the result that the region has a better survival rate of meadow birds; this will also depend on factors the farmer cannot influence. Ideally, the final impact is a stable or even positive farmland bird population.

From this example it follows that depending on the objectives to be pursued, the specification of the spatial scale that is used for monitoring and application of indicators is relevant. In our example for meadow birds, input takes place at the farm level so should be measured at farm level. output takes place and is measured at the farm or regional level. Result and impact should be measured at the regional or national level.

Results-based payment schemes versus management-based schemes

A distinction is sometimes made between *results-based payment schemes* and *management-based payments schemes*. Results-based payments can be defined as a payment related to the achievement of a defined environmental result, while the farmer or land manager is allowed the flexibility to choose the most appropriate management to achieve that result. This result could - theoretically - be realised at the level of output, result or impact, in practice it will most likely be linked to the level of output and occasionally result. Hence, the use of the term results-based payments can be confusing, as result can both refer to the output or result level.

In case the payment relates to defined agricultural management requirements which must be carried out by the farmer or land manager, these are considered to be management-based payment schemes (RBAPS, 2017). These payments are related to the input level in our framework.

2.3 Reference level - polluter pays versus provider gets

The communication of the EC about the future of the CAP (COM (2017) 713) puts forward the idea that future payments of the CAP should be coupled more strongly to environmental objectives. In relation to environmental objectives the CAP presupposes two principles: the 'polluter pays' principle and the 'provider gets' principle.

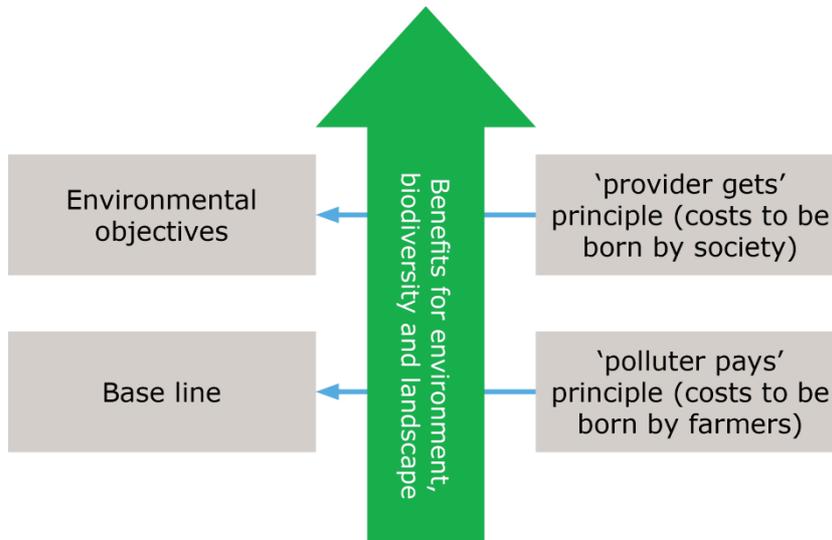


Figure 2.2 Scheme representing the relationships between environmental targets, reference levels and the 'polluter pays' principle and 'provider gets' principle

Figure 2.2 shows, in a schematic way, these two principles (OECD, 2010a). The green arrow represents the positive effects on environment, biodiversity and landscape. Policies from governments or businesses can set environmental *objectives* for water, soil, climate and biodiversity. These objectives build on the minimal environmental *baseline* that is required, in the CAP set by the cross-compliance obligations, involving both statutory management requirements and the rules for good agricultural and environmental conditions.

The costs that a farmer must incur to comply with the environmental baseline that has been set must be borne by the farmer. This is the 'polluter pays' principle. Currently, if recipients of CAP payments do not meet these requirements, their payment may be reduced.

The next level is payments for environmental services, where a farmer can voluntarily opt to enroll in long-term targeted management measures. This approach follows the 'provider gets' principle, it is assumed that the farmer's efforts go beyond good agricultural practice and therefore compensation is needed. This could be granted through the market, as may be the case with organic farming, but will more often require a payment by the government.

The current study focuses on payments for environmental services that go beyond the environmental baseline and for which no market price is attainable. It is important to note that this environmental baseline need not be static, but may change over time. Also, the environmental baseline may vary per region, or country, depending on the specific circumstances.

3 Rules regarding payments to farmers

3.1 International rules for support to agriculture

The internationally acknowledged rules for support to the agricultural sector are established by the World Trade Organisation (WTO) and laid down in the 1995 *Agreement on Agriculture*. This agreement contains rules on market access, export subsidies and domestic support. For this paper, the relevant rules to focus on are the ones on domestic support.

The agreement stipulates that domestic support falls into three categories, called boxes.⁵ Support that is considered to be trade-distorting is in the *Amber Box*. Agricultural subsidies are considered to be trade distorting when they are linked to what a farmer produces. Measures with minimal impact on trade can be used freely, they are in a *Green Box*. They include government services such as research, disease control, infrastructure and food security. They also include payments made directly to farmers that do not stimulate production, such as certain forms of direct income support, assistance to help farmers restructure agriculture, and direct payments under environmental and regional assistance programmes.

Also permitted, are certain direct payments to farmers where the farmers are required to limit production (sometimes called *Blue Box*⁶ measures), and certain aid programmes in developing countries.

For this paper we will focus on the Green Box, as targeted payments to farmers for environmental services rendered will fall into this category.

The Green Box-rules of the WTO

The Agreement on Agriculture sets out a number of general and measure-specific criteria which, when met, allow measures to be placed in the Green Box. These measures are exempt from commitments to reduce support to the agricultural sector, indeed, can even be increased without any financial limitation under the WTO. The Green Box applies to both developed and developing country Members. The general criteria are that the measures must have no, or at most minimal, trade-distorting effects or effects on production. They must be provided through a publicly-funded government programme (including government revenue foregone) not involving transfers from consumers and must not have the effect of providing price support to producers.

Direct payments to producers according to the Green Box

The Green Box also provides for the use of direct payments to producers which are not linked to production decisions, i.e. although the farmer receives a payment from the government, this payment does not influence the type or volume of agricultural production ('decoupling'). The conditions preclude any linkage between the amount of such payments, on the one hand, and production, prices or factors of production in any year after a fixed base period. In addition, no production shall be required in order to receive such payments. Additional criteria to be met depend on the type of measure concerned which may include: decoupled income support measures; income insurance and safety-net programmes; natural disaster relief; a range of structural adjustment assistance programmes; and certain payments under environmental programmes and under regional assistance programmes.

⁵ The information in this section is almost entirely based on and copied from the WTO site: www.wto.org.

⁶ Direct payments under production limiting programmes (often referred to as 'Blue Box' measures) are exempt from commitments if such payments are made on fixed areas and yield or a fixed number of livestock. Such payments also fit into this category if they are made on 85% or less of production in a defined base period. While the Green Box covers decoupled payments, in the case of the Blue Box measures, production is still required in order to receive the payments, but the actual payments do not relate directly to the current quantity of that production.

Annex 2 of the Agreement on Agriculture Domestic support sets out the criteria for environmental payments in Article 12:

12. Payments under environmental programmes

(a) Eligibility for such payments shall be determined as part of a clearly-defined government environmental or conservation programme and be dependent on the fulfilment of specific conditions under the government programme, including conditions related to production methods or inputs.

(b) The amount of payment shall be limited to the extra costs or loss of income involved in complying with the government programme.

3.2 The EU-legislative framework

3.2.1 EU legislation for support to farmers

In general, 'any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the internal market' (Article 107, Treaty on the Functioning of the European Union). Aid to agriculture in Pillar 1 and 2 of the CAP is allowed by way of derogation as long as the payments are made by Member States in conformity with the regulations applying to the aid, like Regulation 1305/2013 for rural development, Regulation 1307/2013 on direct payments and Regulation 1308/2013 on the common market organisation of the markets.

Specific rules apply to safeguard competition, however these only apply to agricultural markets.

Direct payments

Regulation (EU) no 1307/2013 is the current legal basis for the direct payments given to farmers in the EU. Direct payments (the first pillar) by far make up the largest part of the total EU budget for the CAP and have to a large extent replaced the former market and price support system. Since the Mid-Term review of the CAP in 2003, the direct payments of the CAP Pillar 1 fall under the green box rules of the WTO. The payments are decoupled from production and subject to 'cross compliance', requiring farmers to respect food safety, environmental protection and animal health and welfare standards and good agricultural and environmental conditions (GAEC).

Before this Mid-Term Review, the direct payments were generally not decoupled from farm production and therefore considered to be part of the so-called Blue Box of the WTO.

Since 2013 there is an additional requirement that 30% of the direct payments will only be granted if the farmer undertakes certain agricultural practices beneficial for the climate and the environment⁷ (the so-called 'greening' measures).

Rural development measures

Payments for environmental services are mainly financed through the agri-environment-climate measures (AEEM) of the second pillar of the CAP on rural development. Member States are obliged to put agri-climate-environment schemes into place (co-financed by the EU) on the basis of which farmers may adopt measures - on a voluntary basis - that make a positive contribution to the environment and the climate. To avoid overcompensation the remuneration is based on the principle of income forgone and costs incurred (see next section). The CAP payments under Pillar 2 are considered to be in the green box of the WTO.

A special case of support is laid down in Article 17.6 of Regulation 1305/2013 on rural development. According to this article, where European Union law imposes new requirements on farmers, support may be granted for investments to comply with those requirements for a maximum of 12 months from

⁷ See Whereas (37) of Regulation No 1307/2013.

the date on which they become mandatory for the agricultural holding. This support may help a farmer make the transition to the new situation.

3.2.2 The principle of income foregone and costs incurred

The EU legislation on what may be paid to farmers for agri-environmental-climate measures has evolved over time. The first agri-environmental schemes date back to 1992, when the Mac Sharry reform of the Common Agricultural policy (CAP) introduced the accompanying measures. Since 1992, the wording has changed, but the basic principle remained the same. The most notable change is that at the start of these schemes in 1992 the basis payment could include an incentive, over time this has changed into covering transaction costs (see Table 3.1).

Table 3.1 EU legislation regarding agri-environmental payments.

Regulation	Basis payment	Remarks
<i>Regulation 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside</i>	The amount of aid to be paid needed to be based on the undertaking given by the beneficiary and on the loss of income and the need to provide an incentive (Article 5)	First regulation on agri-environmental ¹⁾ schemes.
<i>Regulation 1257/99 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulations</i>	Support in respect of an agri-environmental commitment shall be granted annually and be calculated on the basis of income foregone, additional costs resulting from the commitment given, and the need to provide an incentive (Article 24)	This wording is similar to Annex 2 of the WTO agreement, except for the last part on incentives which is not mentioned in the WTO agreement.
<i>Regulation 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)</i>	Payments shall be granted annually and shall cover additional costs and income foregone resulting from the commitment made. Where necessary, they may cover also transaction cost (Article 39.4).	Instead of incentive, the term transaction costs is used. The regulation does not give a definition of this term.
<i>Regulation (EU) no 1305/2013 of the European parliament and of the council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005</i>	Payments shall be granted annually and shall compensate beneficiaries for all or part of the additional costs and income foregone resulting from the commitments made. Where necessary, they may also cover transaction costs up to a value of 20% of the premium paid for the agri-environment-climate commitments. Where commitments are undertaken by groups of farmers or groups of farmers and other land managers, the maximum level shall be 30% ²⁾ (Article 28). Article 1(e) defines transaction costs as follows: 'transaction cost' means an additional cost linked to fulfilling a commitment, but not directly attributable to its implementation or not included in the costs or income foregone that are compensated directly; and which can be calculated on a standard cost basis.	This regulation is the current legal framework. The payments on organic farming, on areas facing natural or other specific constraints and on forest-environmental and climate services and forest conservation must satisfy these criteria as well. If the support for the agri-environmental schemes falls outside the scope of this regulation, the state aid rules apply (Article 81). The percentage of 20% for transaction costs is new, the basis for this percentage is unclear ²⁾

1) The term first used was agri-environmental schemes, in 2013 this changed to agri-environment-climate measures, reflecting the new priority given to combat (the effects of) climate change.

2) Article 37 of regulation 702/2014 declaring certain categories of aid in the agricultural and forestry sectors and in rural areas compatible with the internal market in application of Articles 107 and 108 of the Treaty on the Functioning of the European Union uses the same percentage.

3.3 Conclusion

Based on the analysis in this chapter we conclude that paying for environmental services is likely to be compatible with the WTO rules, as long as payments are based on the principles as laid down in Annex 2 of the Agreement on Agriculture Domestic support. The most critical condition is that the payment does not distort trade or stimulate production.

Targeted payments are compatible with EU legislation as long as the height of the payment is based on the principle of income foregone and costs incurred, and where necessary transaction costs.

The essence of calculating the payments rates, is to give a proper reward for the activities undertaken by the farmer and the ensuing costs, avoiding under- and overcompensation. Member states are responsible for the implementation of relevant reference levels. If necessary, an amount should be deducted from agri-environment-climate payments to exclude funding of practices required under legislation, or other conditions like the 'greening' conditions applied to direct payments, as well as practices already funded by the EU through other instruments. In other words: the services rendered in the schemes should be additional to what is already established by the CAP through mandatory standards, greening and GAEC.

4 Payment options

4.1 Cost based or results based?

Payments to farmers for environmental services can be based on the costs for the farmer of delivering the service, or on monetary valuation of the result (the defined environmental service at the level of output, result or impact) delivered.

In the absence of a well-functioning market for the result, economic theory provides different methods for valuing the result. In practice these methods are quite difficult to implement, due to among other things a lack of proper data, spatial heterogeneity of environmental services, and jointness of production (see e.g. Degoulet et al., 2017; Pannell and Roberts, 2015; OECD, 2015). So monetary valuation of results is an option, but requires addressing many methodological issues, starting with a good estimation of the demand curve for the environmental service.⁸

In practice, most EU agri-environmental schemes are therefore based on the costs for the entrepreneur of entering into a management scheme (Degoulet et al., 2017). In some schemes, payments are varied on the basis of achieving a certain result, not in the sense that the results are monetarised, but on the basis of the quality of the desired environmental outcome. According to RBAPS (2017),

‘there are a few so called ‘pure’ results-based schemes in the EU where farmers receive a payment for a biodiversity outcome independent of what management practices they use. However, most of the schemes are ‘hybrid schemes’ where farmers are paid partly for the successful delivery of results and partly for adhering to defined management practices or carrying out specific actions. Sometimes a results-based payment may be offered as a top-up to payments for carrying out specific management actions.’

An example is the Welsh Glastir agri-environment scheme that pays for the delivery of specific environmental goods and services aimed at combatting climate change, improving water management and maintaining and enhancing biodiversity (Reed et al., 2014). The scheme was launched in 2009 by the minister of Rural affairs, who stated that:

‘The purpose of [this] agri-environment scheme [is] to enable the Welsh government to buy environmental goods and services from farmers that are not supplied through normal market mechanisms. The Welsh government is therefore the customer and the farmer is the supplier.’

The scheme is designed to deliver measurable outcomes at both farm and landscape level in a cost-effective way. The payments for Agri-environment measures are calculated based on ‘income forgone’ rather than the level of ecosystem services delivered (Wynne-Jones, 2013).

However, the Welsh Government has recently consulted on the potential to supplement CAP funding with private investment via private schemes for Payments for Ecosystem Services (PES) to provide additional payments that are ‘outcome based and directly attributable to environmental products, goods and services’ (Welsh Government, 2014, pp. 48). Citing the progressive decline in CAP budgets and pressures on domestic budgets, they argue that ‘long term management of the farmed and forested landscape for environmental goods and services is likely to become increasingly dependent upon the availability of market based incentives’.

⁸ There are no clear WTO rules for results-based payments. This does not necessarily imply that results-based payments are incompatible with the WTO rules. It could be argued that as long as these payments do not distort trade or stimulate production, results-based payments will be acceptable.

Costs incurred - income foregone

Taking costs as starting point, the payment could be based on different levels:

- The costs of delivering the environmental service for every single participant, based on the cost supply curve of the individual farmers
- The costs of delivering the environmental service for a collective of participants, based on the average cost supply curve of the collective
- Idem at regional or national level, based on average cost supply curves for the region or at national level.

The payment is determined by the amount of input of a farmer in terms of land, labour and capital. In the current system of AECM this is calculated on the basis of income foregone and costs incurred. The resulting payment can reflect real costs if these costs are calculated for each farmer individually, but usually the payments are based on averages of a group of farmers. So in practice, this definition leads to *calculated* payments based on the income foregone and costs incurred of an *average* farmer. In reality, for some farmers this average may lead to undercompensation, for some it may lead to overcompensation compared to their actual cost of complying with the management requirements. As such, the current system not always gives the proper incentives to enrol into a scheme.

More (local) variety in the level of payments is a way to lessen this problem; another option is to try to establish a payment that would secure participation by at least x% of the farmers. This essentially requires knowing the 'supply-curve' for environmental services by farmers, which is difficult for a government due to lack of information. One way of solving this information-asymmetry problem is by using auctions or tenders, as they 'induce farmers to reveal their estimated compliance costs or their net pay-offs via their auction bids. Auctions could thus reduce farmers' information rents and improve the cost-effectiveness of agri-environmental payment schemes' (OECD, 2015:69).

In case the level of the payment is coupled to results at output level, the payment will usually also be based on the costs made by the farmer to attain the output. Final payment is conditional on realising the defined output, but the level of the payment is based on the same principles as with input.

In theory it is also possible to base the payment on results defined at the level of result or impact. For result and impact, the link between input by the farmer and the final result or impact be may feeble due to circumstances out of control for the farmer. Therefore, using these levels as the basis for payment is not considered a feasible option.

Payments for agricultural practices beneficial for the climate and the environment ('greening')

A specific case in paying for environmental services is the current greening component of the direct payments within the CAP. This 'greening' component on top of basic area payments seeks to enhance the environmental performance of the agricultural sector to protect the environment and biodiversity (EC, 2017a). In this respect this component shows similarities with the AECM of the second pillar of the CAP. However, unlike the AECM there is no clear foundation for the 30% and the percentage is the same for all greening measures. A recently published report by the European Court of Auditors (2017) finds that the current intervention logic for the greening measures is incomplete. It also finds that 'On average, greening subsidies exceed significantly the cost to farmers (including from lost income) of meeting greening requirements' (Ibidem, 2017:46). Also, 'greening requirements are generally undemanding and largely reflect normal farming practice'. Hence, 'greening remains essentially an income support scheme' (Ibidem, 2017:47).

The current greening payments therefore do not give the proper incentives to increase the delivery of environmental services. If greening payments are to be used to enhance the delivery of environmental services, it will be necessary to enhance the conditionality and strengthen the link between the outcome aimed at, the costs to achieve this and the payment granted.

4.2 Criteria to assess payments

This section assesses the types of payments presented in Section 4.1 from various perspectives:

- Compliance with the WTO agreement;
- Compliance with EU legislation;
- Efficiency in terms of administrative burden for both government administrations and farmers;
- Effectiveness in terms of expected uptake by farmers.

The assessment is done qualitatively based on available literature and expert knowledge.

Compatibility with EU and WTO legal framework

The WTO framework regarding agricultural support is quite clear. The fundamental requirement for support to be allowed is that it should neither have trade distorting effects nor effects on production; payments for environmental services should be limited to the extra costs or loss of income involved in complying with the programme. These conditions have also been incorporated in the current EU legislation for AECM.

Within this framework, there is quite some room for manoeuvre, as the current EU-programmes under Pillar 2 of the CAP show. The WTO rules don't specify the way costs should be calculated, type of costs that may or may not be included, reference periods to be used, etc., thus leaving room for interpretation (see also Degoulet et al., 2017). Barnes et al. (2011) question if this room for manoeuvre is used to its full potential.

The current EU agri-environmental programmes and the resulting payments have not been challenged by any member of the WTO, including the inclusion of transaction costs for which there is no clear basis within the WTO rules and which may be necessary to avoid risks of under-compensation (negative incentives for participation). The main reason is perhaps that this type of payment can hardly be considered trade or production distorting, especially as most of these programmes tend to reduce production. Bureau (2017) follows the same line of reasoning and argues that even if the agri-environmental payments would not be in line with the rules of Annex 2 of the Agreement on Agriculture Domestic support, the amount of the payments would be much lower than the EU WTO commitment on non-exempt trade-distorting support.

New forms of support are likely to be compatible with the WTO rules as well, as long as payments are based on the principles as laid down in Annex 2 of the Agreement on Agriculture Domestic support. Following the line of reasoning of the previous section, targeted payments for public goods rendered by farmers or groups of farmers would be in line with WTO rules, as long as the payment does not distort trade or stimulate production.

Administrative burden for beneficiaries (private administrative costs)

Administrative burden is defined as the cost for business and/or citizens to comply with information obligations arising from government regulations (also known as private administrative costs). To estimate the administrative burden of legislation and regulations it is important to know:

- What information obligations derive from legislation and regulations;
- What actions an entrepreneur or citizen must take to comply with an information obligation;
- How much time and costs these operations involve for the entrepreneur or the citizen.

This information makes it possible to precisely identify which parts of legislation and regulations cause costs. The detailed information at the same time provides input for amendments, for instance to simplify procedures. However, it is important to note that this is a theoretical approach to reality. The outcome of an administrative burden measurement for businesses will never be a 100% accurate representation of the actual administrative costs.

In order to be able to meet a certain information obligation, an entrepreneur has to perform different actions (for example, gathering information, processing information, etc.). These actions require, on the one hand, a spending of time and money (rate). On the other hand, the activities must take place

at a certain frequency (once a year or several times a year) and be executed for/by a particular target group. The calculation of the administrative burden is based on the four variables mentioned above: time, rate, frequency and target audience. The sum of the administrative burden of the various transactions underlying an information obligation gives the administrative burden for an information obligation.

Whether or not the administration is *perceived* as burdensome will also depend on, for instance, the perception of the administration as being necessary or not (in relation to the goals of the measure). Likewise, if a higher administrative burden is outweighed by increased effectiveness, it may well be worthwhile.

Administrative burden for the paying agencies (public administrative costs)

In general schemes based on output/results will be more costly and difficult to implement (Delgoulet et al., 2017), than schemes based on input. Next to the initial set-up costs, the actual monitoring and control will usually be more strenuous.

Much will depend on the actual outline of the schemes. For instance, the number of schemes a farmer can enrol into, the parameters of the measures, whether the contract is a one year or multi-year contract, the possibility to pool data from different sources for control purposes, whether field inspection is necessary or control can be done automatically, whether agreements are issued through tenders or collectives etcetera.

Promising developments in ICT and remote sensing could in the (near) future make output- or results-based payments easier to implement and control. A recent publication (Howison et al., 2017) shows that it is possible to detect with satellite data of Sentinel-1 different types of grassland: herb rich and herb poor meadows. These kind of techniques can play an important role in the monitoring of output/results-based payment schemes.

Also, the more individual an application can be, the more likely it is the scheme will become more expensive. For example, if for every applicant the costs incurred and income foregone need to be established, the administrative burden will be much higher compared to a situation with a more general scheme with average rates. The administrative burden for the paying agency can be reduced in case payments occur through contracting a cooperative of farmers.

A specific way to grant contracts is through tendering. Tendering contracts requires specialist skills and knowledge; tenders also require more information and time than traditional simpler methods for allocating programme funds (see Pannell and Roberts, 2015).

According to Reed et al. (2015) results-based schemes have the potential to allocate financial resources more efficiently, and with more flexible incentives that are more likely to facilitate innovation by landowners and managers (based on Gibbons et al., 2011; Hasund, 2013). As such results-based payments could be more targeted than management (input)-based payments, and at the same time allow for a manageable monitoring and control.

On the other hand, Burton and Schwarz (2013) and Uthes and Matzdorf (2013) conclude that little evidence exists on the performance of results-based schemes, partly because of their limited implementation. Nevertheless, given the expected effectiveness of payments based on outcome, extra efforts may well be worth it to develop indicators and methods for data collection. Moreover, promising developments in ICT and remote sensing will make these types of payments more easy to implement and control.

Gibbons et al. (2011) provide an analytical framework for analysing the effects of one key design consideration: payment by management or results in the context of biodiversity services. They conclude that payment by management is favoured where there is a clear action that can be specified at an appropriate level and to which biodiversity is sensitive. Also the difficulty to monitor the targets and results, relative to management actions, will influence whether payment by management or results is favoured.

Uptake by farmers and targeting

According to Geoff and Hart (2000) the main reasons for farmers to participate are financial reasons - AECM provides a secure source of income - and the wish to promote environmental conservation at the farm. Main reasons not to participate are: 1) AECM does not fit with farm management plan; 2) the compensation is too low and 3) farmers do not see how the scheme would benefit the goals pursued.

We assume that the uptake by farmers will be higher if the payment sufficiently covers the costs of participating in the scheme, the measures are more targeted and meaningful and the measures fit better into the farm management plan. Concerning this last point, long-term schemes (longer than 6 years) may be needed to achieve certain environmental goals, currently schemes in the EU have a maximum length of 6 years. Longer-term schemes may deter farmers as it will limit their choices for the long-term development of the farm.

Payments linked to costs incurred and income foregone are likely to be more popular among farmers than fixed rate payments that do not have a relation with the incurred costs and income foregone. These assumptions are also underpinned by Lastra-Bravo et al. (2015). In a qualitative meta-analysis on the factors driving farmers' participation in EU agri-environmental schemes they found that the level of payment offered by a scheme is one of the most important drivers for farmers to adopt an AECM. However, any farmers would consider fair payments and lower levels of disruption to their normal agricultural activities an acceptable alternative to higher payments requiring greater changes to their farming systems.

In addition to the above-mentioned criteria, the choice for type of scheme is dependent on a number of variables, like the type of environmental service to be delivered and the number of people involved. Guiding questions how to relate environmental goals to CAP instruments have been developed by Doorn et al. (2017). For the most relevant environmental needs concerning the sustainable use of natural resources, climate change and biodiversity and landscape, the authors assessed which instrument of the CAP is most appropriate. The guiding questions to determine this were:

1. To what extent can a generic approach be effective or is a specific approach needed?
2. Should negative effects be prevented or should positive effects be promoted?
3. Are measures simple or difficult to integrate into the farm management?
4. To what extent are farmers motivated to commit themselves?
5. Is collaboration between farms necessary to address a need?

These questions could also be useful to determine what type of payment is most appropriate for which goal. This is outside the scope of this project but seems like an important step to direct CAP payments towards rewarding environmental services.

5 Paying for public goods - practice

This chapter illustrates a few types of payments as presented in Chapter 4 with practical examples from different European countries. For each example the following is discussed: the objective of the measure, information about the payment, the conditions that are required for implementation and the mechanisms needed for control and monitoring.

5.1 Direct payment coupled to green measures (current greening)

Objectives

Payments for agricultural practices beneficial for the climate and the environment. The stated objective for the EFA measure is 'to safeguard and improve biodiversity on farms'.

Payment information

At present 30% of the budget for direct payments in Pillar 1 is allocated to direct payments coupled to greening. Compliance with the greening measures is obligatory to receive direct income support. In case of non-compliance beneficiaries will receive less greening premium and in case the farmer does not comply at all the basic payment support will also be partly cut (at most by 17%).

Conditions for implementation

The current mandatory greening consists of three types of measures EU wide:

- Crop diversification for arable farms larger than 10 ha
- The maintenance of permanent grassland
- At least 5% Ecological focus areas (EFAs) with 15 ha or more eligible arable land

The first two kinds of measures are similar throughout the Union, with possibly some differences in exemptions rules.

Member States have a choice of 10 standard elements that they can make available to farmers to fulfil their EFA obligations on arable land. Which elements count as EFA differs per member state. For example in France, Germany and Ireland land lying fallow, nitrogen-fixing crops, catch crops, eligible forestry, short rotation coppice, field copse, hedgerows, drains and buffer strips all count as EFAs, while in the Netherlands only catch crops, nitrogen fixing crops, short rotation coppice and landscape elements count as EFA.

Control mechanism/monitoring

Applications for payment under the Greening Payment will be subject to administrative checks, controls by remote sensing using satellite imagery or aerial photography, and on-farm inspections (on the spot checks OTSC) to verify eligibility for payment. It is a requirement to carry out eligibility checks on 10% of applicants to verify that the actual area and landscape features declared as EFAs are correct. 5% of applicants who are required to observe the other greening practices will also be inspected.

5.2 Cooperative approach to results-based payments in the Netherlands

Objectives

To increase the effectiveness of AECM by giving more responsibility for nature management to local groups of farmers (a cooperative). Every cooperative drafts its own nature management plan, against the backdrop of goals defined at provincial level. This bottom-up approach, including the use of local knowledge, increases the attractiveness for farmers to enrol in the management schemes.

Payment information

In the Netherlands this new model for payments for AECM was adopted in 2015. Before 2015 payments were paid to individual farmers if they carried out standard management measures for fixed rates, based on the mean income foregone and costs incurred. That model led to a low share of participation on high-productive soils, as the AECM payment was insufficient to compensate the income foregone on these soils. In the new model, AECM-payments are rewarded to regional cooperatives of farmers instead of individual farmers.

Conditions for implementation

The agri-environmental measures are specifically focused on the conservation of species of the Birds and Habitat Directive and only farmers in areas that are favourable for certain species can apply for AECM payments. In this model the cooperative is the beneficiary for the paying agency and as such an intermediate between the paying agency and the farmers. The payments are maximised to the highest compensation rate allowed (according to the EU regulations) (based on costs incurred and income foregone) and fixed based on the agreement between the cooperatives and the regional government.

Control mechanism/monitoring

This structure allows for increased flexibility at farm and field level with regard to measures and payments. Due to the position of the cooperative as final beneficiary, the cooperative can develop a suitable internal financial policy within the EU financial framework. It can adjust the individual payments to local circumstances (for instance to motivate relatively intensive farms to join the scheme), introduce result-based payments, e.g. per successful nest (to avoid paying for 'empty fields') and apply a payment differentiation based on farming intensity (to also attract areas under intensive farming). The cooperative contracts a slightly larger land area with the farmers than with the government to create an area buffer for errors or fields dropping out. It also creates a modest financial buffer by using slightly lower payments than the maxima that schemes allow for.

5.3 Subsidy for (part of) income foregone/costs incurred in entry-level scheme Czech Republic

Most information is taken from Keenleyside et al. (2011).

Objectives

Management-based agri-environment measures are still the most common type of such measures in Europe today. A classic example is the entry-level scheme of the Czech Republic (Keenleyside et al., 2011). Entry-level schemes generally address broad environmental objectives that can be achieved quite easily by most farmers and bind them to undertake actions just above the mandatory requirements in a country. In the Czech Republic there are two main entry-level categories: one for extensive grassland management that aims to limit the risks of both intensification and underuse, and are targeted at grassland where no priority habitats have been identified and one concerning arable management for resource protection and biodiversity.

Payment info

The Czech entry-level programme consists of separate thematic schemes each with a list of obligatory management actions and a flat rate euro per hectare payment for the area of land entered into the

scheme. The payments are based on a difference in gross margin between packages and typical practices and express the income forgone, either because of the management requirements or because of opportunity costs in the case of converting arable land to grassland. There is no geographical differentiation of payments in the Czech Republic. The payments are not degressive, and large farms with hundreds or thousands of hectares of grassland may be encouraged to apply because they can benefit from economies of scale.

Conditions for implementation:

The Czech Republic is at the forefront of geographical targeting of entry-level schemes with detailed field-level targeting of soil protection and other agri-environment schemes fully integrated with the Land Parcel Identification System (LPIS) system. Farmers can download from the website a detailed map of their fields (based on LPIS) and identify which areas of the field are eligible for the arable conversion scheme. This GIS-based approach is regarded as both environmentally and financially efficient, has also been adopted for higher level schemes, and may be extended to other entry-level schemes (for example cover crops) in the next programming period.

Control mechanism/monitoring:

A solid body of evidence, covering both agronomic and environmental factors and the interaction between them, is an essential basis for designing effective agri-environment management actions and schemes. In the Czech Republic data used in designing entry-level grassland schemes came mainly from agricultural statistics (for example on input use, intensity of animal production), farm economic data (especially profitability of cattle grazing and stocking rates) and the Research Institute of Plant Production, who provided expertise on nutrient management and grassland response.

5.4 Fixed rates for result-based payments for AECM, the MEKA programme B4 in Baden-Württemberg

Most information is taken from the RBAPS inventory of results (EC, 2017).

Objectives

The general idea of the result-based programmes is to improve the cost-effectiveness of agri-environmental measures (Matzdorf and Lorenz, 2010). The MEKA programme 'MarktEntlastungs- und Kulturlandschaftsausgleich' stands for a market relieve and cultural landscape compensation scheme in the German region of Baden-Württemberg. The MEKA-B4 is one of the successors of the original programme which was launched back in 1992 and aims to preserve species-rich grassland by offering payment to farmers who manage species rich grassland containing at least 4 key plant indicator species (Russi et al., 2016). According to Matzdorf and Lorenz (2010) results show that results-based AEMs in the MEKA programme can have a positive impact on cost-effectiveness depending on the concrete design and the implementation process. Russi et al. (2016) concluded that the payment was high enough to cover the costs of part-time farmers, less productive fields and hay producers, but not high enough to attract intensive cattle raisers and biogas producers, partly due to the changing market conditions.

Payment information

Farmers are paid a fixed rate of €60 per hectare for the field parcels in which four indicator species are found in each of the transect thirds. The payment rate was calculated on the basis of income forgone and costs incurred and also a reduction in input costs was included. The four species must appear within the regional catalogue of 28 key species (partly species, partly general). When first introduced, the payment was designed to be a small top-up premium for the extensive management of species rich meadows. For the 2014-2020 programming period the measure 'species rich grassland' is upgraded with a higher premium. Farmers can select the results-based component for species rich grassland either in addition to a management-based base payment for extensive management of grassland or as a stand-alone payment.

Conditions for implementation

The programme is open to all farmers in all different environmental regions of Baden-Württemberg from the lowlands at about 100 m above sea level up to the mountains of over 1,400 m above sea level. The scheme is open to all farmers if their meadow or pasture fulfils the minimum threshold of indicator species present. At least 4 key species from a list of 28 potential species must be present.

Control mechanism/monitoring

Farmers have to record dates of mowing / pasturing and of fertiliser application to the meadows under the scheme, but there are no restrictions on the actual management practices required. Farmers are responsible for monitoring the presence of at least 4 key species in each of three transect sections on each parcel every year. Control and compliance checking is carried out through the normal IACS control mechanism with around 5% of all applicants controlled in any one year.

5.5 Contracts for AECM, payments for costs incurred when results are delivered, a Swedish case

This information is taken from the inventory of results (REF).

Objectives

The objective of this scheme is the protection and preservation of two large carnivores, native to Swedish Lapland, the Lynx (*Lynx lynx*) and Wolverine (*Gulo gulo*). It is targeted at areas of Sami reindeer herding in the north of Sweden - typically wildland, forest and tundra and has been taken up widely across the 51 Sami communities.

Payment info

Payments are made according to the number of Lynx and Wolverine offspring observed each year as a proxy for the total population. The annual target is to record 90 Wolverine offspring and 80 Lynx offspring which are thought to indicate overall populations of around 400 of each species. The level of payment is determined according to the cost of the damage that each Lynx or Wolverine offspring is expected to cause throughout their lifetime. The payment level in 2007 for each certified Lynx and Wolverine offspring was SEK200,000 (~€22,045) with additional payments for lone sightings of each species. The level of payment is determined according to the cost of the damage that each Lynx or Wolverine offspring is expected to cause throughout their lifetime. The payments are made to the Sami villages as a common pool resource to be distributed as they see fit. In many cases the herders have a say in how the money is distributed but not always.

Conditions for implementation

There is relatively limited empirical evidence to suggest whether the scheme has had a successful impact on species numbers. However, both Lynx and Wolverine populations have increased and it is thought that this is at least in part due to the scheme. There is some evidence to suggest that incidents of poaching have fallen since 1996, although it is not clear how much of this poaching can be ascribed to the Sami reindeer herders.

Control mechanism/monitoring

The monitoring framework is very detailed and requires annual carnivore inventories each winter. One representative from each village is responsible to liaising with the managing authority. This predator representatives must complete training in surveying and measurement before carrying out any monitoring. Monitoring is carried out in cooperation between the sephards) and scheme rangers from the County managing authority who come out to verify predator dens or lairs.

5.6 Tender for AECM, payments for costs incurred when results are delivered, Northern Germany

Information from Groth (2009) about the adapted case-study payment scheme in the county Steinburg in the northernmost federal state of Germany (Schleswig-Holstein) for grassland plant biodiversity.

Objectives

This payments scheme combines a payment-by-results approach with the use of discriminatory-price conservation procurement auctions (explanation under payment info) and that will reduce informational rents. The case-study was designed to maximise the services obtained from a limited budget and carried out as part of a research programme to conserve environmental services in agriculture.

Payment information

In the discriminatory-price procurement auction a sealed bid is submitted for every site, but all accepted bids are receiving payments according to the individual bid-price. This auction design implies incentives for bidders to bid a price above the individual opportunity costs and to ensure themselves information rents, if the bid finally is successful.

Within such auctions a buyer of environmental services (the conservation agency) invites bids from suppliers of environmental services (the landowners) and closes contracts with the lowest bid-prices.

Conditions for implementation

The auction design in the adapted case-study was a 'sealed-bid discriminatory-price conservation procurement auction that was budget-constraint'. This means that a limited budget was assigned to farmers with the best offers, solely based on their bid-price in an auction where those bids were collected in sealed envelopes. All farmers were enabled to take part in the field experiment auctions with their grassland sites located in the case-study area (the county Steinburg in Northern Germany). The ecological goods and their represented ecological quality were defined by the number of different plant species per control plot. For that purpose, 40 species were selected and included in a catalogue of species as part of the bidding documents. The specific auction design was a repeated sealed-bid discriminatory-price multi-unit conservation procurement auction, with a separate budget-constraint for each quality of ecological goods.

Landowners not exactly meeting the ecological requirements of the ecological good the bid targeted on have not been paid at all. It was left to the farmers to decide how to achieve the desired number of species.

According to Groth (2009) the prerequisite for a payment-by-results approach for plant biodiversity is that ecological services need to be standardised according to their ecological quality and must meet certain conditions and requirements. Furthermore, the ecological goods should act as an indicator and - in addition to their actual usefulness - should imply positive effects on other natural resources.

Control mechanism/monitoring

The results were assessed by means of on-the-spot controls on the grassland sites at the end of the contract period.

6 Discussion and conclusions

The objective of this report was to answer the following questions:

- Which payments systems can be used in the EU to reward farmers for environmental services delivered?
- What WTO conditions apply to rewarding farmers for public services?
- What EU legal conditions apply to rewarding farmers for environmental services?
- Are the different payments systems to reward farmers compatible with the EU and WTO rules?
- If not, what changes would be necessary in the EU rules to make the payments system compatible?
- What are the (dis)advantages of the different payments systems in terms of implementation, uptake by farmers, monitoring and control?

Which payments systems can be used in the EU to reward farmers for environmental services delivered?

Multiple options exist to reward farmers for environmental services, either based on costs or results achieved. Currently, most agri-environmental schemes in the EU are management schemes based on costs (input), as they are the easiest to implement in terms of administrative public and private burden. The examples given in Chapter 5 of results-based schemes and a tender system, indicate that other options may be pursued. The basis for calculating payments in these schemes will most likely be costs as well, as monetary valuation of results is quite difficult.

For any scheme, the starting point should be a proper intervention logic, making the links clear between objectives - input - output - result - impact. Such an intervention logic may also serve as a basis for defining the proper indicators for monitoring and evaluation. Finally, it is important to have a clear environmental baseline. This environmental baseline need not be static, but may change over time. Also, the environmental baseline may vary per region, or country.

What WTO conditions apply to rewarding farmers for public services? What EU legal conditions apply to rewarding farmers for environmental services?

The EU legislation for payments to farmers is based on the WTO rules. As the current EU programmes under Pillar 2 of the CAP show, the WTO legal framework offers ample room for paying for environmental services, as long as the payments are not trade or production distorting. Currently most agri-environmental payments are based on costs, and the WTO rules don't specify the way costs should be calculated, the type of costs that may or may not be included, reference periods to be used, etc., thus leaving room for interpretation. The available literature suggests that this room is not used to its full potential.

There are no clear WTO rules for results-based payments. This does not necessarily imply that results-based payments are incompatible with the WTO rules. It could be argued that as long as these payments do not distort trade or stimulate production, results-based payments will be acceptable. In discussions about the effectiveness of the current measures of Pillar 2 in terms of uptake by farmers, the lack of incentives in the current payments is much put forward. It seems though that this is more due to national budget constraints than to limiting WTO rules.

What are the (dis)advantages of the different payments systems in terms of implementation, uptake by farmers, monitoring and control?

The administrative burden - both public and private - is difficult to assess beforehand as much will depend on the actual design of the scheme. The administrative burden should be balanced against the effectiveness of the scheme. If increased administrative burdens are outweighed by increased effectiveness, it may well be worthwhile. For farmers, the level of payment offered by a scheme is one of the most important drivers to enter into an agri-environmental agreement.

Deciding on what is the best way to reward farmers for the public services delivered also depends on variables like the type of environmental service to be delivered and the number of people involved. In addition, relevant questions to ask are: is a generic approach effective or is a more (location) specific approach required? Are measures simple to integrate into farm management or not? Is (regional) collaboration between farms necessary to realise the goals or not?

These questions could also be useful to determine what type of payment is most appropriate for which goal. This was outside the scope of this project but seems like an important step to direct CAP payments towards rewarding environmental services.

Finally, there seems to be a trade-off between the specific targeting of measures on the one hand and the feasibility of the implementation, monitoring and control of the measures on the other hand. The more targeted and specific payments are, the more burdensome the administration, monitoring and control are likely to become. Taking this trade off into account, it seems that payments steering on results at output level (e.g. area of farmland providing suitable conditions) is a promising way forward.

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Appendix 1

Public goods

The concept of public goods and services in agriculture is much described and debated in scientific literature (see for instance OECD, 2013; Dwyer et al., 2015; Kretsch et al., 2016). Based on a review of this literature, we use the following definitions.

Public goods are goods that are accessible to everyone and can be enjoyed jointly. The public goods concept developed from economic theory (Samuelson, 1954). The OECD (2013) uses a classic definition of public goods: these are goods that satisfy the two criteria of being non-excludable and non-rival:

- Non-excludability: The nature of the good is such that it is impossible to exclude anyone from consuming it.
- Non-rivalry: The same good can be consumed by anyone without diminishing the consumption opportunities available to others.

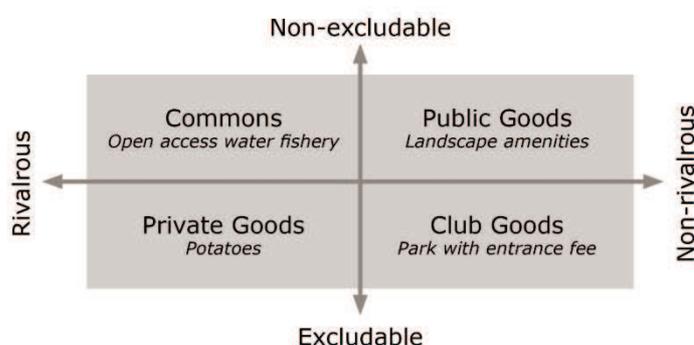


Figure A1.1 Overview of different types of goods according to the criteria of excludability and rivalry

Pure public goods are goods that satisfy the two criteria of being non-excludable and non-rival. In reality, few products fully meet both criteria. Goods that are neither private goods (i.e. fully rival and excludable goods) nor pure public goods (i.e. fully non-rival and non-excludable goods), the so-called impure public goods, can be further sub-divided into two main groups, common pool resources (CPRs) and club goods, according to the degree of their excludability and rivalry (Figure A1.1) (OECD, 2013:16).

Pure public goods are rare and usually not delivered through market mechanisms. Examples of public goods that are provided through agriculture are: farmland biodiversity, landscapes, and quality of natural resources such as water and soils. Furthermore, agriculture has an influence on economic or social public goods such as the development of vibrant and prosperous rural communities. As a result of being non-excludable and non-rival, public goods are insufficiently provided in commercial markets.

The most important market failure is the free rider problem: as no individual property rights can be assigned to public goods, people tend to free ride on other people's contribution under free market conditions. The classic term 'public goods' comprises both tangible goods and intangible goods or services. Public goods produced by the agricultural sector often do have tangible as well as intangible characteristics. A hedgerow for instance is a physical component of a landscape, whereas enjoying the beauty of it from a distance road can be regarded a recreational service. Similar a dyke offers protection from flooding, but the actual safekeeping is an intangible service.

The public goods concept was introduced in the agricultural policy discourse over the last two to three decades (Dwyer et al., 2015), often to argue for a new orientation of farm support under the CAP:

away from its historic objectives of increasing agricultural productivity, ensuring a fair standard of living for the agricultural community, stabilising markets, assuring availability of supplies and reasonable prices for consumers.

Ecosystem services (ES) is another often used concept that partly overlaps with the public goods concept, and stems from ecological science. Ecosystem services are 'the aspects of ecosystems utilised (actively or passively) to produce human well-being' (Fisher et al, 2009). The concept highlights the inter-dependency and feedback loops between countless ecosystem processes, elements and outputs, the 'services' they deliver to society, the derived benefits and how these are valued by society, including their functional and socioeconomic value.

Many classes of ES show features of public goods, in particular with regards to non-excludability, which is to some extent responsible for either the under-provision or overuse of the respective ES (Kretsch et al., 2016:1). However, while the term 'public goods' describes or characterises many ES, this is not always accurate and there are also other characteristics of ES (e.g. uncertainty, jointness, irreversibility) that are important considerations for governance or management.

Wageningen Economic Research
P.O. Box 29703
2502 LS The Hague
The Netherlands
T +31 (0)70 335 83 30
E communications.ssg@wur.nl
www.wur.eu/economic-research

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Wageningen Economic Research
P.O. Box 29703
2502 LS Den Haag
The Netherlands
E communications.ssg@wur.nl
www.wur.eu/economic-research

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