



NATURALIT

Optimizing the management of Natura 2000 network in Lithuania (LIFE IP PAF-NATURALIT)

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Outline of key elements for a result-based grassland scheme under AEMs for Lithuania

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List of abbreviations

AEM	– Agri-Environmental Measure
BEF	– Baltic Environmental Forum
CAP	– Common Agricultural Policy
ENRD	– European Network for Rural Development
EU	– European Union
LT	– Lithuania
RDP	– Rural Development Plan



Executive Summary

Within the frame of the LIFE project “Optimizing the management of Natura 2000 network in Lithuania” examples of EU good practices of collective result-based AEMs in Europe and further afield were reviewed and recommendations for future applications in Lithuania derived in a first deliverable report (Schwarz and Nolepa, 2019). This review provided a basis for the integration of innovative and targeted approaches for biodiversity conservation schemes in Lithuania. Key questions that needed to be addressed were how a new pilot biodiversity scheme can be designed and implemented and what key issues need to be considered in the practical implementation. One of the main dilemmas which needed to be dealt with is that a new biodiversity scheme with too little change and risk (compared to previous AEMs) is unlikely to lead to the desired biodiversity improvements and outcome. But a scheme with too much change, or where the risk is too high, is likely to fail and won't be acceptable for farmers and administrations.

A new pilot scheme of a result-based agri-environmental scheme for species rich meadows with two options (with and without livestock management) is suggested:

- **"Extensive management of meadows by grazing livestock"** and
- **"Management of meadows"**.

For each of the two options farmers can choose different levels of ecological qualities they want to commit themselves to achieve as results. The different levels of the results are reflected in different levels of payments. The report includes the menu of indicator species, survey assessment sheets and journals and detailed payment calculations.



1 Introduction

Within the frame of the LIFE project “Optimizing the management of Natura 2000 network in Lithuania” examples of EU good practices of collective result-based AEMs in Europe and further afield were reviewed and recommendations for future applications in Lithuania derived in a first deliverable report (Schwarz and Noleppa, 2019). This review provided a basis for the integration of innovative and targeted approaches for biodiversity conservation schemes in Lithuania. This report is the second deliverable providing:

- An outline for key elements of a result-based AEM focusing on biodiversity conservation in Lithuania.

Key questions that needed to be addressed were how a new pilot biodiversity scheme can be designed and implemented and what key issues need to be considered in the practical implementation. One of the main dilemmas which needed to be dealt with is that a new biodiversity scheme with too little change and risk (compared to previous AEMs) is unlikely to lead to the desired biodiversity improvements and outcome. But a scheme with too much change, or where the risk is too high, is likely to fail and won't be acceptable for farmers and administrations.

This required a better understanding of the particular relevance of the identified good practice key elements in a Lithuanian context from the perspective of different key actors such as ministry administrations and environmental NGOs and land managers. A simple exercise has been conducted with key actors as part of the review reported in Schwarz and Noleppa (2019) to identify priority elements for the pilot scheme. Results suggest a focus on:

- **designing a pilot scheme which will be testing the implementation of a result-based biodiversity scheme on a group of farms and paying specific attention to options how farmers can be involved in the monitoring of the outcome.**

The main objective of the second report – i.e. deliverable (2) – is thus to provide an outline for key elements of a pilot scheme that will then be tested in practice and, taking into account the results of the pilot scheme, validated and further elaborated.

The development of the outline for a pilot scheme was done in collaboration with stakeholders and key experts on relevant topics and themes and included the following engagements:



- Stakeholder workshop to discuss key elements of the outline of the pilot scheme, indicators for and monitoring of results, main cost components that need to be included in the payment calculations and selection of farms.
- Consultations with biodiversity experts on specific ecological and agronomic characteristics of indicators and monitoring requirements
- Consultations with expert who are responsible for the payment calculations in AEMs in the Lithuanian Rural Development Programme to ensure that the suggested payment calculations for the pilot scheme are consistent with current regulations to facilitate subsequent integration of the pilot scheme in the Lithuanian Rural Development Programme after successful pilot testing.

The structure of the report follows short descriptions (fact sheet) of the main aspects of the pilot scheme and provides more detailed information on payment calculations and indicators in the annexes. The outline will be further elaborated and regularly revised according to the results of the pilot testing.

2 Outline of key elements of a pilot scheme

2.1. Introduction

As part of the project “Optimizing the management of Natura 2000 network in Lithuania” (LIFE-IP PAF-NATURALIT) a new pilot scheme of a result-based agri-environmental scheme for species rich meadows with two options (with and without livestock management) are suggested: 1) "**Extensive management of meadows by grazing livestock**" and 2) "**Management of meadows**". For each of the two options farmers can choose different levels of ecological qualities they want to commit themselves to achieve as results. The different levels of the results are reflected in different levels of payments. This suggested payment differentiation is explained in more detail in section 2.5 and Annex 3.

2.2. Scheme objectives and benefits

The result-based pilot scheme aims to enhance farmland biodiversity by remunerating farmers for maintaining and improving plant species diversity on meadows. Traditional, low-input grazing management maintains the botanical diversity of species-rich meadows. Their real importance lies in their species composition. Low



fertility soils coupled with the impact of grazing and cutting means that individual species are unable to dominate, resulting in the very species richest meadows.

The result-based pilot scheme with the options "**Extensive management of meadows by grazing livestock**" and "**Management of meadows**" is designed to help farmers choose different ways to provide year round species rich meadow habitats that will help pollinating insects, farmland birds, and other farm wildlife to thrive carry out essential services of pollinating flowers and crops. The pilot scheme pays farmers for the provision of results that reflect a certain level of biodiversity on the grassland indicated through a number of indicator plant species. The payment covers income losses and additional costs that occur in the management of the grassland to achieve the required results. A menu of indicator species has been developed and each indicator species has been assigned a score based on rarity using local survey data. Results are achieved when easy to identify indicator species are present on the grassland that will be included in the Agreement and a pre-defined score has been achieved. The indicator species have been selected to cover different types of grassland and are suitable for the specific habitat and biogeographical region of the grassland and farms under contract.

Farmers will be invited to take part in the pilot scheme through an open call of expressions of interest where interested farmers provide data on the extent of the area, number of parcels and description of current management. The pilot scheme offer is non-competitive with fixed payment rates as calculated in Annex 3.

The pilot scheme will provide a range of benefits, both in terms of biodiversity conservation as well as for the farmer and the management of the farm. These benefits include:

- flexibility with a range of options so you can choose those most relevant to your grassland and farm business.
- improved habitats and other resources for a range of species including insects, amphibians and small mammals
- improved nectar sources for insect pollinators and foraging for birds
- additional winter-food sources for seed-eating birds

The flexibility for farmer to select appropriate management regimes is a key element of the result-based approach. The pilot scheme does not define fixed management prescriptions that require the farmer to do certain actions at particular points in time. It allows the farmer to manage the grassland in a flexible manner as long as the management yields the results with the presence of the number of indicator species. The farmer can choose what management is required to achieve the desired result(s) that are defined in the contract.



In this flexible manner it helps the farm business to provide ecosystem services that are not otherwise paid for by the market, such as helping pollinators to carry out essential services of pollinating flowers and crops. By joining the pilot scheme the farmer will be building on the positive environmental work that many farms have already undertaken. In return, the farmer will receive an annual payment for 3 years. The amount you receive depends on the options you choose.

2.3. Eligibility criteria

To be eligible for the pilot scheme the following criteria are suggested that must be met by the farmer and the proposed Agreement Land:

- The land must be permanent or temporary grassland.
- The land to be included in the Agreement must not be managed under any other agri-environment scheme for the duration of the pilot scheme Agreement.
- Applicants must have control of all the land in the Agreement and all the activities needed to meet the requirements of the Pilot Scheme for the full duration of the Agreement.
- The land to be included in the Agreement must be registered on the Rural Land Register to the Agreement holder's SBI (Single Business Identifier).
- Agreement Land must not be in receipt of any other funding other than the area based direct payment [substitute with the name of the direct payment that is most known to the farmer].
- The land to be included in the Agreement must not be under any other grant or management obligation such as Inheritance Tax Exemption.
- The pilot scheme applies to meadows in all geographic areas of Lithuania. Priority will be given to designated EU habitats and sensitive grasslands in the three Lithuanian national parks.
- The land to be included in the Agreement must fulfil an entry threshold and demonstrate the presence of at least 4 indicator species.
- Definition of results and design of pilot scheme indicators
- Identification of indicators suitable for result-based grassland payments in biodiversity conservation schemes, consideration of indicators for good and bad species.
- Definition of different result levels that form the basis for payment differentiation



2.4. Management criteria and recommendations

The pilot scheme does not define fixed management prescriptions. But criteria and directions for sustainable management of the grassland shall be provided to ensure that the results are achieved. Candidate criteria for successful grassland management can be:

- Sward structure is varied.
- Site is grazed by cattle. Mowing only if there is no possibility of grazing.
 - If the meadow is extensively grazed, mowing of areas that are not grazed may not be done annually.
 - Weeds and dominant grasses absent or very low cover.
 - Occurrence of bare soil is minimal.

Management criteria will be further elaborated and tested during the pilot phase.

2.5. Indicators and monitoring

The choice of indicators in a result-based scheme depends on the type of scheme and its biodiversity objectives. Existing examples of result-based schemes have and are using plant indicators, habitat indicators and / or bird indicators that cover:

- Plant species, invertebrates and birds
- Reduction of unwanted plants
- Mosaics of landscapes and habitats

The pilot scheme focuses on biodiversity conservation through species-rich grassland. Plant species diversity in these grasslands is a good indicator for animal diversity and for the provision of ecological services, as a strong positive correlation between plant species diversity in grasslands and pollination (Albrecht *et al*, 2007), and pest regulation functions (Balvanera *et al*, 2006) have been demonstrated. Flower-rich grasslands also contribute to the aesthetic and recreational value of the landscape. Indicators can be either species or groups of several species (from the same genus or several similar species from different genera within the same family) that are characteristic of the particular grassland habitat.

Steps in developing and selecting indicator species include defining the quality criteria for eligible grassland, the creation of a checklist of candidate species and then screening and testing the candidate list to exclude unsuitable indicator species. To provide an example, the indicator list for species rich meadows in Lower Saxony was tested by carrying out a vegetation survey on 258 grassland parcels in eight of



the typical bio-geographical regions of north-western Germany using the same transect method as is used to measure scheme results, and at the same time surveying the complete species richness of the parcel. Each indicator was demonstrated to have a high correlation with overall plant species diversity and with the number of Red List plant species. The survey also showed that of the 31 indicators, around half occurred in 10 per cent or fewer of the sampled transect sections, being typical of only a few of the bio-geographical regions, whilst four of the indicators (*Rumex acetosa*, *R. thysiflorus*, *Cardamine pratensis*, *Ranunculus acris*, and *Anthoxanthum odoratum*) occurred reliably in over 40 per cent of the transect sections in all regions. (Bertke *et al*, 2008; Most and Keienburg, 2006).

If appropriately selected, the indicators (species) used for species-rich grassland have the following strength (Underwood, 2014):

- Indicators are characteristic of hay meadows (no very common species, species typical of meadows, no invasive alien species).
- Indicators are sensitive to negative changes in management, eg too much fertilisation or cutting (no indicator species that are typical of intensively used grassland or of high nutrient levels, or tolerant of high cutting frequencies, or are typical of abandoned meadows).
- Indicators correlate well with overall plant diversity and habitat condition, and plant diversity is closely related to animal diversity (eg flying insects) and ecosystem services in such grasslands.
- Indicators can be used at different thresholds to correspond to the different levels of species richness.
- Indicators are easily identified by farmers after a short training course, and can be assessed by the farmer consistently over a considerable period of years.

Nevertheless indicators for species-rich grassland have some limitations that need to be considered:

- Indicators and measurement method may not pick up deterioration in the grasslands with highest species richness if only the lowest indicator threshold is used.
- This type of indicator is not considered suitable for high conservation value grassland habitats other than meadows (e.g. *Nardus* grasslands), because these habitats are not necessarily very species rich, have environmental constraints and are generally of extremely low productivity (for example,



some Habitats Directive Annex I natural and semi-natural mountain grassland types, dry calcareous grasslands, and dry sandy grassland types).

The lists of indicators for the pilot scheme were developed and selected jointly by the biodiversity specialists and ecologists of the project team with local experts. Lists of example indicators have been reviewed, based on experiences in pilot schemes in other countries (e.g. Germany and UK) and discussed with local experts for their suitability to the specific habitat and bio-geographical region they are to be used in. The biodiversity specialists and ecologists in the project team finally selected a list of indicator species that have been assessed according to:

- Species suitable for baseline setting (can be found in most typical grasslands)
- Rare species suitable for the identification of higher value grasslands
- Easily recognizable species (suitable for wider presentation to farmers)

The list of indicator species is provided in Annex 1.

The achievement of the results that trigger the payment are measured considering the number of indicators species and a system of scores assigned to each indicator species. Similarly to the PBR pilots in England (Chaplin *et al.*, 2019), the scores are based on 'rarity' using local survey data as the basis for the species score and using a DAFOR type score for each species (D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare). Species scores are F=2, O=3, R=4, discounting the more abundant or widespread species.

It is suggested to do four monitoring surveys during the period of the pilot scheme: i) an initial baseline, ii) end of 1st year, iii) end of 2nd year, and iv) end of 3rd year survey. Farmers will do the monitoring themselves following training and guidance by ecological experts. On spot checks of the monitoring done by farmers are suggested. The survey will use transects along the longest possible line across the plot excluding the first three meter on each side. The transect will be divided into equal parts with 7 stops per hectare foreseen and at each stop the farmer will record the indicator species. Then scores are allocated for each species at each observation and a certain minimum total score needs to be reached.

To facilitate the monitoring process a template for monitoring sheet and journal has been developed. The purpose of the journal is to document observations by the farmer and monitoring experts as a basis to review and evaluate the activities and results of the pilot on each of the participating farms. Farmers will be asked to briefly describe the use and conditions of the plots and the activities undertaken (including dates). The template for the monitoring sheet and journal is provided in Annex 2.



2.6. Design of outcome-based payment and payment calculations

Payments are calculated based on the differentiation of grassland management with and without livestock. Consequently two different payment schemes are calculated. Each of the two payment schemes (with and without livestock management) will provide different three payment levels for each of the two options reflecting different ecological qualities and levels of species richness on grasslands.

The calculation of the payment for result-based payment with grazing livestock follows the payment calculation of the RDP measure "Extensive management of meadows by grazing livestock" (Code 10.01) while the calculation of the result-based payment without grazing livestock follows the payment calculation of the RDP measure "Management of Specific meadows " (Code 10.02). Due to the specific nature of result-based approaches adjustments of the payment calculations have been implemented which take into account specific monitoring requirements and training that participating farmers have to fulfill. Otherwise the standardized assumptions of the management-based calculations have been maintained. Following expert discussions no further additional costs for weed control or fertilizer application (at a low level) are included in the calculation of the "with pilot" calculation.

Within the pilot for extensive management of meadows by grazing livestock a payment differentiation has been implemented that accounts for three payment levels recognizing different levels of ecological quality of the achieved results (measured through the scoring results). The payment differentiation is implemented by lowering the stocking rate as a proxy to reflect less energy production from the grassland with increasing ecological quality. The percentage increase of the payment between the three payment levels has then also been transferred to the payment for the measure without livestock, so that the relative increase between the payment levels is the same in both sub-measures.

Detailed payment calculations are provided in Annex 2.1 – 2.4 and payment levels are summarised in Table 1 below.

Table 1 Payment levels of the pilot scheme options (current payment levels of the agri-environmental measure in the Lithuanian RDP in brackets)

Pilot measure	Payment level 1	Payment level 2	Payment level 3
Extensive management with grazing livestock	125 Euro (101 Euro)	141 Euro	158 Euro
Extensive management	93 Euro	105 Euro	118 Euro



with-out grazing live-stock	(69 Euro)		
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Particular attention has been paid in the payment calculations to the consideration and justification of added cost elements for surveying, monitoring and training to be done and attended by farmers. Details and the justification are provided in Annex 2.4.

Additional cost for surveying / monitoring

It is assumed that on average 8.39 ha of land will be entered into the pilot scheme by each farmer. The farmer is required to undertake 4 surveys during the period of the PBR pilot, an initial baseline, end of 1st year, end of 2nd year and end of 3rd year survey. For each survey there will be 7 stops per hectare, at each stop the farmer will record the indicator species. It is estimated that each survey will take a total 1.5 hrs per hectare. This equates to 6 hrs / ha over a 3 year agreement period. The cost per ha and year are 15 Euro.

Attendance of training meetings

Farmers will be required to undertake 1 day's formal training for species identification and survey methodology plus attend an annual meeting for participants in yrs. 1, 2 and 3 and complete an annual postal survey of their experiences (an attitudinal survey). The meeting at the end of the 1st and 2nd year will report back on the progress of the pilot and provide an opportunity for participants to share experiences and best practice. A final meeting, end of the 3rd year will seek to provide feedback and results of the pilot. This will require a total of 8 hrs attendance at each event. The postal survey will take 30 mins to complete and is done at the beginning and the end of the pilot. Travel to and from meetings is estimated at a total of 60 km at EUR 0.30/km. The typical area in agreement is 8.39 ha. The cost per ha is 9 Euro.



References

- Albrecht, M, Duelli, P, Muller, C, Kleijn, D and Schmid, B (2007) The Swiss agri-environment scheme enhances pollinator diversity and plant reproductive success in nearby intensively managed farmland. *Journal of Applied Ecology*, No 44, (4) pp813-822.
- Balvanera, P, Pfisterer, A B, Buchmann, N, He, J-S, Nakashizuka, T, Raffaelli, D and Schmid, B (2006) Quantifying the evidence for biodiversity effects on ecosystem functioning and services. *Ecology Letters*, No 9, (10) pp1146-1156.
- Bertke, E (2005) *Ökologische Güter in einem ergebnisorientierten Honorierungssystem für ökologische Leistungen der Landwirtschaft. Herleitung - Definition - Kontrolle.* PhD Thesis University of Göttingen, ibidem Verlag, Stuttgart, Germany.
- Bertke, E, Klimek, S and Wittig, B (2008) Developing result-orientated payment schemes for environmental services in grasslands: results from two case studies in North-western Germany. *Biodiversity*, No 9, (1-2) pp91-95.
- Chaplin, S., Robinson, V., LePage, A., Keep, H., Le Cocq, J., Ward, D., Hicks, D., and Scholz, E., (2019). Pilot Results-Based Payment Approaches for Agri-environment schemes in arable and upland grassland systems in England. Final Report to the European Commission. Natural England and Yorkshire Dales National Park Authority.
- Most, A and Keienburg, T (2006) Entwicklung und Erprobung von Methoden für die ergebnisorientierte Honorierung ökologischer Leistungen im Grünland Nordwestdeutschlands, in U Hampicke (ed) *Anreiz: Ökonomie Der Honorierung Ökologischer Leistungen.* Workshopreihe 'Naturschutz Und Ökonomie' Teil I, pp101-106. vol. BfN-Skripten 179 Bundesamt für Naturschutz, Germany.
- Schwarz, G. and Noleppa, S. (2019) Overview on EU good practices on innovative agri-environmental measures and recommendations to Lithuania. Report for Project No. LIFE16 IPE/LT/016 Optimizing the management of Natura 2000 network in Lithuania (LIFE IP PAF-NATURALIT).
- Underwood, E (2014) Result indicators used in Europe: Results-based Payments for Biodiversity - Supplement to Guidance Handbook. Prepared for the European Commission, DG Environment, Contract No ENV.B.2/ETU/2013/0046. Institute for European Environmental Policy, London.



Annex1 List of indicators species

Indicator species of unimproved semi-natural grasslands

		Species suitable for base-line setting (can be found in most typical grasslands)	Rare species suitable for the identification of higher value grasslands	Easily recognizable species (suitable for wider presentation to farmers)	Directions for sustainable use
Dry siliceous grasslands					
<i>Antennaria dioica</i>	Dvinamė katpėdė	+		+	Extensive grazing. Mowing only if there is no possibility of grazing.
<i>Astragalus arenarius</i>	Smiltyninė kulkšnė	+			
<i>Botrychium lunaria</i>	Paprastasis varpenis	+		+	
<i>Botrychium multifidum</i>	Daugiaskiltis varpenis		+		
<i>Campanula rotundifolia</i>	Apskritalapis katalėlis	+		+	
<i>Koeleria glauca</i>	Melsvoji kelerija	+		+	
<i>Polygala vulgaris</i>	Paprastoji putokšlė	+			
<i>Scabiosa ochroleuca</i>	Gelsvoji žvaigždūnė		+	+	
<i>Sieglingia decumbens</i>	Pagulusioji tridantė	+			



<i>Thymus pulegioides</i>	Keturbriaunis čiobrelis	+		+	
<i>Thymus serpyllum</i>	Paprastasis čiobrelis	+		+	
<i>Teesdalia nudicaulis</i>	Smiltyninė pašuolė		+		
<i>Veronica spicata</i>	Varpotoji veronika	+			
<i>Viola canina</i>	Šuninė našlaitė	+			
Dry calcareous grasslands					
<i>Acinos arvensis</i>	Pievinė žvirgždė	+			Extensive grazing. Mowing only if there is no possibility of grazing. If the meadow is extensively grazed, mowing of ungrazed areas may not be done annually.
<i>Anemone sylvestris</i>	Lieknoji plukė		+		
<i>Anthyllis vulneraria</i>	Paprastasis perlutis	+			
<i>Cirsium acaule</i>	Bestiebė usnis	+	+	+	
<i>Dianthus deltoides</i>	Šilinis gvazdikas	+		+	
<i>Galium verum</i>	Tikrasis lipikas	+		+	
<i>Filipendula vulgaris</i>	Pievinė vingiorykštė		+	+	
<i>Fragaria viridis</i>	Šlaitinė žemuogė	+			
<i>Geranium sanguineum</i>	Raudonžiedis snaputis	+			
<i>Gentiana cruciata</i>	Melsvasis gencijonas		+	+	
<i>Helichrysum arenarium</i>	Smėlyninis šlamutis	+		+	
<i>Helianthemum nummularium</i>	Paprastasis saulenis		+		
<i>Jovibarba globifera</i>	Šilinė perkūnropė	+		+	
<i>Origanum vulgare</i>	Paprastasis raudonėlis	+		+	



<i>Phleum phleoides</i>	Stepinis motiejukas		+		
<i>Pimpinella saxifraga</i>	Mažoji ožiažolė	+			+
<i>Polygala comosa</i>	Skiauterėtoji putokšlė	+			
<i>Potentilla arenaria</i>	Smiltyninė sidabražolė	+			
<i>Primula veris</i>	Pavasarinė raktažolė	+			+
<i>Pulsatilla pratensis</i>	Pievinė šilagėlė		+		
<i>Sedum acre</i>	Aitrusis šilokas	+			+
<i>Trifolium montanum</i>	Kalninis dobilas	+			
<i>Vincetoxicum hirundinaria</i>	Šlakinė kregždūnė	+			
<i>Viola rupestris</i>	Smiltyninė našlaitė	+			
<i>Viola tricolor</i>	Trispalvė našlaitė	+			
<i>Viscaria vulgaris</i>	Smaliukė	+			+
Fresh, rarely dry, grasslands					
<i>Agrimonia eupatoria</i>	Vaistinė dirvuolė	+			+
<i>Alchemilla spp.</i>	Rasakila	+			+
<i>Briza media</i>	Kiškio ašarėlės	+			+
<i>Carum carvi</i>	Paprastasis kmynas	+			+
<i>Dactylorhiza maculata</i>	Dėmėtoji gegūnė		+		
<i>Galium boreale</i>	Šiaurinis lipikas	+			+
<i>Libanotis montana</i>	Kalninis skarenis	+			
<i>Helictotrichon pratense</i>	Pievinė poavižė		+		
<i>Nardus stricta</i>	Stačioji briedgaurė	+			+
<i>Ophioglossum vulgatum</i>	Vienalapė driežlielė		+		+
<i>Orchis spp.</i>	Gegužraibė		+		+
<i>Plantago media</i>	Plaukuotasis gyslo-	+			

Extensive grazing, or mowing and grazing of regrown grass. If the meadow is extensively grazed, mowing of ungrazed areas may not be done annually.



	tis				
<i>Platanthera chlorantha</i> , <i>P. bifolia</i>	Blandis		+	+	
<i>Potentilla erecta</i>	Miškinė si-dabražolė	+		+	
<i>Scorzonera humilis</i>	Pušyninė gelteklė		+	+	
<i>Stachys officinalis</i>	Vaistinė notra	+		+	
<i>Trifolium dubium</i> , <i>T. campestre</i>	Mažasis, ganyklinis dobilas	+		+	
<i>Tragopogon pratensis</i> , <i>T. orientalis</i>	Pievinis, rytinis pūtelis		+	+	
<i>Veronica teucrium</i>	Plačialapė veronika	+			
Fresh and humid grasslands					
<i>Bistorta major</i>	Paprastoji gyvatžolė	+		+	Extensive grazing, or mowing and grazing of regrown grass. If the meadow is extensively grazed, mowing of ungrazed areas may not be done annually.
<i>Achillea ptarmica</i>	Čiaudulinė krau- jažolė	+			
<i>Carex panicea</i>	Viksva trainė	+			
<i>Carex flacca</i>	Melsvoji viksva	+			
<i>Carex hartmanii</i>	Hartmano viksva	+			
<i>Gladiolus imbricatus</i>	Paprastasis karde- lis		+	+	
<i>Gymnadenia conopsea</i>	Pievinis plauretis		+		
<i>Ranunculus auricomus</i>	Auksakuodis vėdrynas		+		
<i>Rhinanthus spp.</i>	Barškutis	+		+	
<i>Inula salicina</i>	Gluosniapolis de- besylas	+		+	
<i>Listera ovata</i>	Kiaušininė dvi-		+	+	



	guonė				
<i>Sanguisorba officinalis</i>	Vaistinė kraujalakė	+		+	
<i>Serratula tinctoria</i>	Dažinė geltė		+		
<i>Sesleria caerulea</i>	Melsvasis mėlitas		+		
<i>Succisa pratensis</i>	Pievinė miegalė	+			
<i>Selinum carvifolia</i>	Kmynalapis kalnasargis	+			
<i>Trollius europaeus</i>	Paprastasis burbulis		+	+	
Humid and wet grasslands					
<i>Cardamine pratensis</i>	Pievinė kartenė	+			Extensive grazing, or mowing.
<i>Caltha palustris</i>	Pelkinė puriena	+		+	
<i>Cirsium oleraceum</i>	Gelsvalapė usnis	+		+	
<i>Cirsium rivulare</i>	Paupinė usnis		+	+	
<i>Dactylorhiza longifolia</i>	Baltijinė gegūnė	+		+	
<i>Dactylorhiza cruenta</i>	Raiboji gegūnė		+		
<i>Dactylorhiza incarnata</i>	Raudonoji gegūnė	+		+	
<i>Epipactis palustris</i>	Pelkinis skiautalūpis		+	+	
<i>Geranium palustre</i>	Pelkinis snaputis	+		+	
<i>Lathyrus palustris</i>	Pelkinis pelėžirnis		+		
<i>Parnassia palustris</i>	Pelkinė mandrauninkė		+	+	
<i>Polygala amarella</i>	Karčioji putokšlė	+			
<i>Primula farinosa</i>	Raktažolė pelenėlė		+	+	
<i>Stellaria palustris</i>	Pelkinė žliūgė	+			
<i>Thalictrum flavum</i>	Geltonasis vingiris	+			
<i>Valeriana officinalis</i>	Vaistinis valerijonas	+		+	



Annex 2 Scoring assessment sheet and journal

Lithuanian Result-based Pilot Scheme: ADD NAME OF PAYMENT / CONTRACT OPTION											
Scoring Assessment and Journal											
Farmer		Date of scoring:				Surveyor:					
Field Number:		Field Size									
Stops		Species score	1	2	3	4	5	6	7	Total score	
Code	Positive indicator species										
1	ADD SPECIES										
2	ADD SPECIES										
3	ADD SPECIES										
4	ADD SPECIES										
5	ADD SPECIES										
6	ADD SPECIES										
7	ADD SPECIES										
8	ADD SPECIES										
9	ADD SPECIES										
10	ADD SPECIES										
Code	Negative indicator										
1	ADD SPECIES										
2	ADD SPECIES										
3	ADD SPECIES										
4	ADD SPECIES										
5	ADD SPECIES										
6	ADD SPECIES										
7	ADD SPECIES										
8	ADD SPECIES										
9	ADD SPECIES										
10	ADD SPECIES										
ADD / DELETE ROWS AS NEEDED											
Total field score											



Farmer observations

Use and conditions:

Please add comments regarding the use and condition of the field, for example used for grazing, closed up period, hay time date, made into hay or haylage, weather conditions, rough estimate of bale numbers – up or down from previous years.

Activities undertaken:

Please add management activities undertaken, for example mowing, drains maintained, rushes or weeds treated, fertiliser/muck applications, liming undertaken.

Date / Period:

Activity:

Date / Period:

Activity:

Date/ Period:

Activity:

Filled by experts / scheme management

Comments or any recommended actions:

Any issues to be brought to farmers attention for immediate action or to rectify in short/medium term:

**Annex 3 Payment calculations and economic justification****Annex 3.1 Result-based pilot scheme "Extensive management of meadows by grazing livestock"****1) Result-based pilot scheme "Extensive management of meadows by grazing livestock"
- Payment level 1**

Traditional farming				Applying environmental measures in the pilot			
Expenditure EUR/ha		Income EUR/ha		Expenditure EUR/ha		Income EUR/ha	
		Milk, meat liveweight				Milk, meat liveweight	
		4,913t/cow*1cow*0,65*2 37 Eur/t*0,5 +	516			4,421t/cow*0,48 cow*0,65*237 Eur/t*0,3+	175
Fertilizers, plant protection and fertilization	186	0,36 t/for one cattle*1,1 of one cattle *0,75*1019 Eur/t *0,5				0,36 t/for one cattle*0,4 of one cattle*0,75*1019 Eur/t*0,7	
				Mowing of un-grazed grass residues	26		
Hay production	132			Grazing (9,4 d. h* 4.75 Eur/d.h)*0,48+	32		
(mowed twice)				+(5,6 d. h/ha* 4.75 Eur/d.h) *0,4			
				Cost of surveying (monitoring) and reporting	15		
				Attendance of meetings	9		
				Transactional	20		



				costs			
Total	318		516	Total	102		175
Gross profit, EUR/ha			198	Gross profit, EUR/ha			73
				Compensatory payment, EUR/ha			125
<i>Based on LAEI skaičiavimai and own calculations.</i>							

1) Result-based pilot scheme "Extensive management of meadows by grazing livestock"
- Payment level 2

Payment level has been set at the middle between the calculated payment levels 1 and 3.
Payment level: 141 Euro / ha

1) Result-based pilot scheme "Extensive management of meadows by grazing livestock"
- Payment level 3

Traditional farming				Applying environmental measures in the pilot			
Expenditure EUR/ha		Income EUR/ha		Expenditure EUR/ha		Income EUR/ha	
		Milk, meat liveweight				Milk, meat liveweight	
		4,913t/cow*1cow*0,65*237 Eur/t*0,5 +	516			4,421t/cow*0,38 cow*0,65*237 Eur/t*0,3+	135
Fertilizers, plant protection and fertilization	186	0,36 t/for one cattle*1,1 of one cattle *0,75*1019 Eur/t *0,5				0,36 t/for one cattle*0,3 of one cattle*0,75*1019 Eur/t*0,7	
				Mowing of un-grazed grass resi-	26		



				dues			
Hay production	132			Grazing (9,4 d. h* 4.75 Eur Lt/d.h)* 0,38+	25		
(mowed twice)				+(5,6 d. h/ha* 4.75 Eur/d.h) * 0,3			
				Cost of surveying (monitoring) and reporting	15		
				Attendance of meet- ings	9		
				Transactional costs	20		
Total	318		516	Total	95		135
Gross profit, EUR/ha			198	Gross profit, EUR/ha			40
				Compensatory payment, EUR/ha			158
				Compensatory payment EUR/ha			<u>158</u>

Based on LAEI skaičiavimai and own calculations.

**Annex 3.2 Result-based pilot scheme "Management of meadows"**

2) Result-based pilot scheme "Management of meadows " (without grazing livestock) - Payment level 1							
Traditional farming				Applying environmental measures			
Expenditure EUR/ha		Income, EUR/ha		Expenditure EUR/ha		Income, EUR/ha	
		Hay	149			Hay	0
						(not suitable for fodder)	
	25			Grass management	12		
Mineral fertilizers	29			Mineral fertilizers (NPK)	0		
Plant protection products (sprayed on half areas)	52			Plant protection products	0		
				Cost of surveying (monitoring) and reporting	15		
				Attendance of meetings	9		
				Transactional costs	14		
Total	106		149	Total	50		0
Gross profit, EUR/ha			43	Gross profit, EUR/kg			-50
				Compensatory payment, EUR/ha			<u>93</u>

Payment levels 1 and 2: The percentage increase of the payment between the three payment levels has then also been transferred to the payment for the measure without livestock, so that the relative increase between the payment levels is the same in both sub-measures.

Payment level 2: 105 Euro / ha

Payment level 3: 118 Euro / ha



Annex 3.3 Agronomic and economic justification from the existing agri-environmental measures included in the Lithuanian Rural Development Programme

1) Result-based pilot scheme "Extensive management of meadows by grazing livestock"

Agronomic and economic justification						
Fertilization and fertilizers (NPK)	82	Fertilizers for 1 ha N - 240kg; P-220kg; K-200kg Plant protection products for 1 ha: Starane 1,5 l*69 Eur/l 1 cow maintained by 1 ha of pasture. Milking 4,913 t of milk. Milk price - 237 Eur/t From perennial herbaceous fodder 65% of milk is produced Cows are kept in a cowshed. 1.1 cattle maintained by 1 ha of pasture. Makeweight price – 1019 Eur/t From perennial herbaceous fodder 75% of cattle makeweight is produced Milk production makes up 50%, cattle meat - 50%.				
Plant protection products	104					
Hay production	64		Mowing of ungrazed grass residues	26.5		
grass mowing	26.5		grass mowing	26.5	0,48 cow maintained by 1 ha of pasture. Milking 4,421 t of milk from one cow. Milk price - 0,254 Eur/kg From natural grassland fodder 65% of milk is produced. Cows are grazed.	
grass tedding	13.7					
collecting and						
transporting	23.8					
			Grazing of cows	44.7		



			(driving cattle, give water, etc.) (9,4 d. h/ha 4.75 Eur/d.h)		0,4 cattle will be main- tained by 1 ha of natural meadow. Makeweight price.- 1019 Eur/t From natural grassland fodder 75% of cattle makeweight is produced Cattle are grazed. Milk production will make up 30%, cattle meat - 70%.	
			Grazing of cattle (driving cattle, give water, etc.) (5,6 d. h/ha 4.75 Eur/d.h)	26.6		
<i>Šaltiniai:</i>						
1. Statistikos departamento duomenys, 2009-2011;						
2. Mechanizuotų žemės ūkio paslaugų įkainiai. II dalis. Pasėlių priežiūra ir šienapjūtės darbai, 2013;						
3. LAEI skaičiavimai.						
Income			Income			
Milk yield per cow, kg/cow	4913		Milk yield per cow, kg/cow	4421		
2009	4811		(10% reduction due to grazing in natu- ral pastures)			
2010	4901					



2011	5026				
Milk price, Eur/t	237		Milk price, Eur/t	237	
2009	617		2009	617	
2010	864		2010	864	
2011	985		2011	985	
Make-weight, kg/cattle, year	360		Makeweight, kg/cattle, year	360	
2009	360		2009	360	
2010	360		2010	360	
2011	360		2011	360	
Price of cattle, Eur/t, liveweight	1019		Price of cattle, Eur/t, liveweight	1019	
2009	3159		2009	3159	
2010	3388		2010	3388	
2011	4064		2011	4064	
<i>Šaltiniai:</i>					
1. Statistikos departamento duomenys, 2009-2011;					
2. LAEI skaičiavimai.					
Fertilization and fertilizers Eur/ha	286	82	Fertilization and fertilizers Eur/ha	0	
2009	64		Amount, t	0	
2010	63		Price Eur/t	0	



2011	72		Value Eur	0	
Fertilization (2 times)	16		Fertilization and delivery	0	
<i>Šaltiniai:</i>					
1. AgroMax, Joniškio agrochemija, Agrochema, Baltic Agro ir kitų firmų, prekiaujančių trąšomis duomenys apie trąšų ir pesticidų kainas, 2010–2012;					
2. Aplinkosaugos ir tręšimo planavimas, 2009;					
3. Tręšimo rekomendacijos, 2011.					
			Transactional costs	Eur/ ha	
			Costs due to lost time	20	
			for more detailed accounting		
			for consultations		
			in training courses		
			for time performing checks		
			for search of in- formation		
			Total	20	
			<i>Šaltinis:</i> Anketinių apklausų rezulta- tai.		



2) Result-based pilot scheme "Management of meadows"

Agronomic and economic justification							
Income, Eur/ha	149			Income, Eur/ha	0		
Grass yield (hay), t/ha	2,38			Grass yield (hay), t/ha	1,43		
2010	2,29						
2011	2,27						
2012	2,60						
Hay price, Eur/t	62.5			Hay price, Eur/t	0		
2010	61.9			2010	0		
2011	61.9			2011	0		
2012	63.3			2012	0		
Fertilizers	Amount, kg/ha	Price, kg/ha	Value, Eur/ha	Fertilizers	Amount, kg/ha	Price, kg/ha	Value, Lt/ha
Ammonium-Nitrogen		0,99	28.5				
2010	100	0,83	23.9	2010			
2011	100	1,08	31.1	2011			
2012	100	1,05	30.2	2012			
Total			28.5	Total			0
Plant protection products	Amount, kg/ha	Price, kg/ha	Value, Eur/ha	Plant protection products	Amount, kg/ha	Price, kg/ha	Value, Lt/ha
Starane			104				0
2010	1,50	240	104	2010			0
2011	1,50	240	104	2011			0



2012	1,50	240	104	2012			0
Total			360	Total			0
Work	Work h	Price, Eur/h	Value, Eur/h	Work	Work h	Price, Eur/h	Value, Eur/h
Fertilization	0,14	4.75	0.66				
Spraying	0,33	4.75	1.59				
First mowing	2,47		11.75				
grass mowing	0,86	4.75	4.10				
tedding and raking	0,58	4.75	2.75				
collecting and transporting	1,03	4.75	4.90				
Second mowing	2,32		11.05	Grass management	2,47		11.75
grass mowing	0,71	4.75	3.40	grass mowing	0,86	4.75	4.10
tedding and raking	0,58	4.75	2.75	tedding and raking	0,58	4.75	2.75
collecting and transporting	1,03	4.75	4.90	collecting and transporting	1,03	4.75	4.90
Total	5,27		25.05	Total			11.75
				Transactional costs	Eur/ha		
				Costs due to lost time	14		
				for more detailed accounting			
				for consultations			
				in training courses			
				for time performing checks			
				for search of information			



				Total	48		
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Annex 3.4 Economic justification of added cost elements for surveying / monitoring and training

Additional cost for surveying / monitoring

It is assumed that on average 8.39 ha of land will be entered into the Pilot scheme by each farmer. The farmer is required to undertake 4 surveys during the period of the PBR pilot, an initial baseline, end of 1st year, end of 2nd year and end of 3rd year survey. For each survey there will be 7 stops per hectare, at each stop the farmer will record the indicator species. It is estimated that each survey will take a total 1.5 hrs per hectare. This equates to 6 hrs / ha over a 3 year agreement period.

LT hourly salary: 7.32 Euro per hour equates to 43.92 Euro per ha over the three year period. Per year the cost per ha are 14.64 Euro – **15 Euro / ha and year.**

Attendance of training meetings

Farmers will be required to undertake 1 day's formal training for species identification and survey methodology plus attend an annual meeting for participants in yrs. 1, 2 and 3 and complete an annual postal survey of their experiences (an attitudinal survey). The meeting at the end of the 1st and 2nd year will report back on the progress of the pilot and provide an opportunity for participants to share experiences and best practice. A final meeting, end of the 3rd year will seek to provide feedback and results of the pilot. This will require a total of 8 hrs attendance at each event. The postal survey will take 30 mins to complete and is done at the beginning and the end of the pilot.

Travel to and from meetings is estimated at a total of 60 km at EUR 0.30/km

The typical area in agreement is 8.39 ha. The cost per ha is **9 Euro.**

Description	Units	Number	Cost EUR/unit	EUR/year
Attendance at workshops & training event	hrs	8	7.32	58.56
Travel costs	km	60	0.30	18
Attitudinal survey	hrs	1	7.32	2.44
Total				79
Cost per ha	8.39 ha			9.42