European Network for Rural Development

Promoting the Transition to a Green Economy

ENRD Thematic Group on Resource Efficiency

Working document

Synthesis Report on Resource Efficiency in six Rural Development Programmes

based on case studies of six rural development programmes in the EU

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1. Introduction

The ENRD Thematic Group (TG) on Resource Efficient Rural Economy was set up in autumn 2016 and concluded its planned work in July 2017. The work of the TG throughout the year concentrated on how to support the integration of resource efficient activities and thinking relating to soils and water into the implementation of rural development programmes.

Rural Development Programmes are investing in activities that can support resource efficiency. At least 30 % of the EAFRD funding component of RDPs must be reserved for measures contributing to the environment and climate. Two rural development priorities, four specific focus areas and several rural development measures have direct relevance to resource efficiency. The relevant priorities include Priority 4 on restoring, preserving and enhancing ecosystems, and Priority 5 on promoting resource efficiency. The relevant focus areas within these priorities are:

- 4b: Improving water management, including fertiliser and pesticide management
- 4c: Preventing soil erosion and improving soil management
- 5a: Increasing efficiency in water use by agriculture
- 5e: Fostering carbon conservation and sequestration in agriculture and forestry

The TG focused on the use and management of soils and water and more specifically the sub-themes of soil and nutrients, soil carbon, and water availability. In addition to these three sub-themes, the work of the TG identified three horizontal / cross-cutting guiding topics on which it focused the research efforts. These were the motivation gap; knowledge gap; and policy gap. To address these issues, three related but distinct strands of work were undertaken in the context of the Resource Efficiency TG activities:

1. Framing background analysis of the content and focus of RDPs across the EU with respect to resource efficiency, examining the design and implementation of measures;
2. A comparative regional analysis to investigate the approaches taken in different RDP regions to address resource efficiency, regarding the broader policy and institutional setting;
3. Identification and collection of good practice examples where resource efficiency has been improved by EAFRD and other funding and support through RDPs.

This document provides an overview of the second work strand, namely a summary overview of the key findings of six country/regional case studies prepared in the framework of the ENRD Thematic Group on Resource Efficient Rural Economy. It is not intended to cover all aspects of the case studies or of the resource efficiency theme and should in no way be considered as a comprehensive report. More details on the TG are accessible on the ENRD website (http://enrd.ec.europa.eu/thematic-work/greening-rural-economy/resource-efficiency_en)

The information presented here is based on information provided in the case studies. When other sources of information have been used, this has been specifically referenced in the footnotes.

2. The context

Rural development support through Pillar II is integral to resource efficiency actions in EU rural areas. From a rural perspective, lightening the load on freshwater systems and reducing pressures on soils will allow ecosystems greater scope to adapt to changing climate and weather patterns, and in turn support the economic sectors that rely on the effective functioning of these systems, in both urban and rural areas. The following summary statements describe key challenges related to the state of soils and water in the EU-28 also affecting the case study regions.

The TG performed an in-depth analysis of the following EU Member States /regions:

- Italy (Emilia-Romagna)
- Finland (mainland)
- Belgium (Flanders)
- Greece
- Hungary
- Germany (Lower Saxony)

First, a short summary description is provided of the most common context variables that characterise the case study territories. This is followed by a more detailed description of the RDP areas studied.

General context: The six case study regions represent a diverse range of climatic and economic conditions. Several case study territories are characterised by the decreasing tendency in the number of farms (FL-BE, FI, Lower-Saxony-DE, ERR-IT), in some cases coupled with the growth of larger, more specialised, intensive farms (FL-BE, IT-ERR).

Water: The availability and quality of water resources in the six case study territories is diverse. Poor water quality is not prevalent in any of the territories examined, however, when water quality is compromised this relates to a large extent to diffuse pollution from manure, herbicides or pesticides.

Soils: The degradation of soils has been mentioned in all case study territories. Causes are diverse and include erosion caused by wind or water (EL, HU), overgrazing (EL), leaching of minerals and nutrients from soils due to high acidity (FI). Erosion and soil loss is considerable in three of the study territories (ERR-IT, EL, HU).

The resource efficiency context of the six case study territories is summarised below.

Emilia Romagna / Italy (ERR)

General context: The region is situated along the lower stretches of the Po Valley. It has 4,459,246 inhabitants and covers 22,451.5 km2. The territory is mainly characterised by plain, hilly, and mountain areas. 60% of the territory is agricultural land. Emilia Romagna provides a considerable part of the Italian agricultural production with more than 73.000 farms (4.6% of Italian farms, 0.6% of European ones) with 1.1 million hectares. Agricultural systems in Emilia-Romagna are mostly oriented towards high-quality traditional and local production Regarding farming tendencies, the last ten years have been characterised by abandonment of small and marginal farms resulting the growth of average farm size, and the importance of horticulture on an increasing trend, while fruit production is decreasing.

Soils and water: Landslides, flood risk, and soil erosion are the key factors that affect soils in ERR. The soil loss rate is higher than the EU average (EU 2.46 t/ha - ERR 5.64 t/ha, even higher in mountain areas). 28% of ERR territory is vulnerable to nitrate pollution. The average organic carbon stock in soil (top 30-cm layer) is lower than the EU average, however, there is an annual increase of CO2 in the soil (0.015 t C/ha/year on arable land, 0.37 t C/ha/year on meadows and pastures, 1.42 t C/ha/year in forests). Regarding water use in agriculture, water scarcity is an issue. 24% of UAA irrigated - mainly in the plain area – with high-efficiency methods used in 83% of the irrigated area. Nitrate contamination of groundwater is not significant (in line with the EU standard). 60% of samples taken from surface water contaminated with pesticide.

Finland

General context: 7.6% of the territory of Finland is agricultural land. The number of farms is decreasing in all regions of Finland. The duration of growing period varies between 110-180 days – this is a natural constraint for agricultural production. The significance of irrigation is minor as annual precipitation exceeds annual evaporation.

Soils and water: The most common types of soil in Finland are coarse mineral soils and organic soil, while clay soils are concentrated in Southwest Finland. The naturally acidic Finnish soil facilitates the leaching of nutrients and metals from soil in arable land. The carbon content of farmland soils is decreasing both in mineral and organic soils. The key challenges relating to water bodies in Finland include eutrophication, acidification and clouding of water bodies. 85% of lakes, 65% of rivers and 25% of coastal waters are in good or excellent ecological status - 54% of coastal waters have only satisfactory ecological status. The primary cause of impaired ecological status of water bodies is the diffuse nutrient pollution (mainly from agriculture). The share of agriculture in anthropogenic phosphorus loading is 68.6%, for nitrogen this is 56.2%.

Flanders / Belgium

General context: Flanders is characterised by moderate sea climate and sandy to loamy soils. There is competition for land due to high population density. 46% of the territory is utilised agricultural area (UAA). Agriculture is largely intensive, and intensive farming causes high nutrient pressure and excess manure. Intensive sectors in agriculture include pig breeding, poultry and dairy farming, vegetables and fruit growing. The number of farms is decreasing by 4% annually, but the total UAA is constant – which means that the size of farms is increasing.

Soils and water: The limited use of animal manure and conversion of grasslands to arable land has reduced the organic matter content of Flemish soils. Erosion is primarily caused by mud streams and floods near residential areas due to sealed surfaces. The nutrient pressure on water is high, the main source being animal manure – with 30% of water sampling points under the Nitrate Directive with a high nitrate concentration. The replenishing of groundwater layers is low and insufficient despite sufficient rainfall. Farmers invest in the reuse and recuperation of surface water due to high groundwater extraction tax and high price of tap water

Greece

General context: 94.3% of the territory is rural. UAA equals 5.2 million hectares out of which 27.5 % is highlands in the mainland and 21% is located on the islands. 28.8% of UAA is under high intensity farming.

Soils and water: Natural factors that lead to soil erosion are rain, wind and steep slopes, especially in the mountain areas. The erosion rate is high - above the EU average. 35-40% of UAA is prone to desertification. Forest and wooded lands cover >50% of Greek territory. The incidence rate of forest fires is high with 1670 forest fires between 2000 to 2010 and almost 0.5 mil ha burnt, which has an immediate impact on soil erosion and carbon sequestration (through the removal of trees and exposure of soils). Forest fires also impact water availability due to increase water runoff and reduced absorption by the groundwater table. 86% of water use relates to agriculture - Greek agriculture is the 2nd biggest water consumer in the EU. The overuse of water for irrigation is a major problem. 19.8% of the UAA is irrigated, but the irrigation infrastructure is inadequate.

Hungary

General context: 80% of the territory of the country is suitable for agriculture or forestry (agricultural land covers 57% of the territory). The area of arable land in proportion to total agricultural land is higher than the EU average (81%). 2.4% of total agricultural area is irrigated. Average farm size is smaller than the EU average with nearly 90% of farms covering only approximately 5 hectares. 21.4% of the territory is NATURA2000 - higher than the EU

average of 17.9% (inland NATURA 2000 territories). Areas of natural constraints constitute 4.25% of the territory of the country. Grasslands territory has been decreasing over recent years.

Soils and water: 25% of the soils in the country are 'good' or 'very good' in terms of soil quality. In terms of phosphorus supply >60% of soils are 'good' or 'very good'. Soil degradation / erosion affects a significant part of the territory. GHG emissions from agriculture amounts to 12.1% of the total GHG emissions of Hungary forests in Hungary capable of sequestering 13% of domestic carbon emissions. Hungary is characterised by a richness of surface water resources, but only 25% utilisation rate of surface water resources. Diffuse pollution of surface and subsurface waters from agriculture has been decreasing (mostly nitrogen, phosphorus, herbicides). Nitrate loads of subsurface waters is significant - inappropriate use and treatment of manure and herbicides is a contributing factor (primary source - industrial animal husbandry).

Lower Saxony / Germany

General context: 82% of total territory is rural with a decreasing and ageing population. 60% of total territory is agricultural area (2.6 m ha) out of which approximately 73% is arable cropland. The tendency is that the number of farms is decreasing while the number of large-scale specialised farms is increasing. The average farm size is 65.2 ha. Intensive animal husbandry, especially poultry farming with 44% of Germany's poultry production in Lower Saxony.

Soils and water: The North is characterised by wetlands with moors and marshes along the coast with soils with high carbon content, in the west soils are less fertile and sandy. Fertile plains are in the south-southeast of the region. Erosion is an important environmental pressure (by wind and water). 170 000 ha are currently threatened by water erosion and another 500 ha by wind erosion. Water quantity is less of a concern than water quality. 29% of groundwater tables indicate a downward trend / depletion and groundwater is polluted. High amount of farm manure impacts water quality.

3. Addressing resource efficiency in the RDPs

3.1 RDP priorities

The total allocation of budget to priorities and focus areas relevant to resource efficiency (Priority 4; Priority 5 - Focus area 5A, Focus Area 5E) in % of the total public expenditure programmed in the RDPs ranges from 25% in Flanders/Belgium to almost 70% in Finland). This overall result includes some interesting findings. Two 'outliers' that exceed the EU average values considerably, include Finland – with 69.2% of the RDP budget allocated to Priority 4, and Greece where the budget allocated to Focus Area 5A (11.9% of the RDP budget) clearly indicates the importance attributed to improving the efficiency of water use in agriculture. Notably, there are three case study RDPs that have not allocated budget to Focus area 5A (Finland, Flanders / Belgium, Lower Saxony / Germany).

Percentage of RDP total public expenditure allocated to P4 and Focus Areas 5A and 5E[1]

	Emilia-Romagna / Italy	Finland	Flanders / Belgium	Greece	Hungary	Lower Saxony / Germany	EU-28
Priority 4	37.9%	69.2%	24.4%	43.2%	29.5%	28.1%	**45.6%**

[2] Based on the the ENRD Priority and Focus Area Summaries http://enrd.ec.europa.eu/policy-in-action/rural-development-policy-figures/priority-focus-area-summaries_en

Focus area 5A: Increasing efficiency in water use by agriculture	2.0%	0%	0%	11.9%	1.0%	0%	**2.1%**
Focus area 5E: Fostering carbon conservation and sequestration in agriculture and forestry	1.7%	0.1%	0.9%	3.2%	3.8%	1.0%	**2.5%**

3.2 The RDP measure 'packages'

Case study RDPs apply combinations of measures to achieve the objectives of the focus areas that relate to resource efficiency. M01, M02, and M16 feature in almost all the case study RDPs (except for Lower Saxony not including M02 in its measure mix) as measures indirectly contributing to resource efficiency objectives.

The most frequently applied measures with a direct contribution to resource efficiency through supporting investments and farm interventions include M04, M10, M11, M12, and M13.

The 'top-3' measures in terms of % of budget allocation within the RDP – to Priority 4, Focus Area 5A, 5E - are M10 (first in Flanders, Hungary, Lower Saxony), M11 (2nd rank in Hungary, 3rd rank in all other case study RDPs), and M13 (1st rank in Finland and Greece, ranking 2nd in Lower Saxony).

The table below presents the budget allocations within the case study RDPs to the relevant measures in P4, FA5A, and FA5E with a comparison of EU averages. The second table describes the 'measure mix' applied in each case study RDP.

Percentage of RDP total public expenditure allocated to key measures in P4 and Focus Areas 5A and 5E[2]

	Emilia-Romagna / Italy	Finland	Flanders / Belgium	Greece	Hungary	Lower Saxony / Germany	EU-28
M01 - Knowledge transfer and information actions	0.9%	0.2%	0.7%	0.7%	0.4%	3.3%	**0.4%**
M02 - Advisory services	0.3%	0.3%	1.3%	2.6%	0.3%		**0.3%**
M04 - investments in physical assets	2.2%	0.1%	0.5%	12.1%	1.5%	1.5%	**3.8%**
M10 - agri-environment-climate	15.0%	19.4%	18.8%	7.7%	15.7%	10.9%	**16.6%**
M11 - organic farming	8.5%	4.0%	1.1%	9.1%	5.1%	4.3%	**6.2%**
M12 - Natura2000 and WFD payments	0.7%			0.2%	4.1%		**0.5%**
M13 - payments to areas facing natural or other specific constraints	7.7%	45.6%		19.2%	1.9%	4.4%	**16.9%**
M16 – cooperation	1.9%	0.2%	0.1%	1.1%	0.4%	0.5%	**0.4%**

[2] Based on the the ENRD Priority and Focus Area Summaries http://enrd.ec.europa.eu/policy-in-action/rural-development-policy-figures/priority-focus-area-summaries_en

Measures relevant to resource efficiency in case study RDPs:

	Priority 4[3]		Priority 5	
	focus area 4B	focus area 4c	focus area 5A	focus area 5E
Emilia-Romagna / Italy	M01, M02, M04, M10, M11, M16	M01, M02, M04, M10, M13, M16	M01, M02, M04, M16	M01, M02, M08, M16
Finland	M01, M02, M04, M10, M11, M13, M16	M01, M02, M04, M10, M11, M13, M16	M02, M11, M16	M01, M02, M16
Flanders / Belgium	M01, M02, M04, M07, M08, M10, M11, M16		not applicable	M08
Greece	M01, M02, M04, M07, M08, M10, M11, M12, M13, M16		M01, M02, M04, M16	M01, M02, M04, M08, M10, M16
Hungary	M01, M02, M04, M10, M11, M12, M13, M16		M04	M01, M02, M16
Lower Saxony / Germany	M07, M10	M11, M13, M16	not applicable	M04

4. Summary of findings – the knowledge, the motivation, and the policy gaps

4.1 'Gaps' in the implementation of resource efficiency actions in RDP areas

The six case studies identified several gaps related to knowledge, motivation, and the policy applied in the relevant regions or countries. First, the more common factors contributing to these gaps are summarised, followed by a more detailed summary of the relevant gaps in each case study territory.

Knowledge gap: In several EU MSs (e.g. ERR-IT, HU), the knowledge gap is linked to availability of relevant data - both environmental, e.g. soil quality data, and data related to the implementation of various interventions and the measuring of their impacts. The knowledge gap concerning knowledge of resource efficiency issues on the side of farmers can also be the result of the regional variation of the quality of advisory services provided in the Member States (e.g. FI, HU). The lack of knowledge/awareness of environmental issues can contribute to farmers' perception of agri-environment-climate payments - a key measure related to resource efficiency - as income support (FI, HU). Limited understanding of the RDP context can also lead to limited knowledge of the potentials of the measures (Lower Saxony/DE).

Motivation gap: The motivation gap - on behalf of farmers - can relate to many factors, including the generally conservative attitude of 'old' farmers to farming practices, the view of RDP support as additional income and not as a tool for improving environmental performance. This explains farmers' preference for tried and tested ways of farming that provide 'reliable' source of income, or for sub-measures with a relatively high rate of support per hectare that makes farmers prefer interventions that represent higher income. The fact that a farmer may only be a 'tenant' on – and not the owner of - the land he/she farms on also affects decisions related to resource efficiency interventions that usually require longer term commitment (5 years maintenance period). Bureaucracy, a too broad 'menu' of possible interventions under the AEC measure, or complicated application procedures may also prevent farmers from making full use of the RDP tools to support resource efficiency.

Policy gap: A broad range of factors can contribute to the policy gap related to resource efficiency. In some cases, the targeting of the relevant RDP measures has either been too broad (FI) or too fragmented (FL-BE). In other cases, ex ante conditionalities related to river basin management plans represent a factor that may cause delays in the full implementation of resource efficiency measures (ERR-IT, EL). The resource allocated to certain measures may also be too limited to satisfy

[3] The case studies for Flanders, Greece, Hungary have not provided Focus Area specific information about the Measure 'packages' applied.

demand by beneficiaries (HU – M10, EL – M11). Limited IT capacity for processing of applications, or the controllability requirements related to the introduction of measures may limit their result orientation and performance. Bureaucracy and the 'conservative' nature of the RDP have also been mentioned as factors constituting policy gaps.

The detailed summary of factors contributing to the three types of gaps is presented by case study territory below:

Emilia Romagna (IT)	
Knowledge gap	▪ information and data is available, but fragmented among regional, national and EU level ▪ synthesis and integration of data for supporting policy and 'bridge' motivation gaps is missing
Motivation gap	▪ bureaucracy connected with RDP implementation
Policy gap	▪ the *ex-ante* conditionality of WFD is not implemented at regional level which delays the start of relevant measures to improve water infrastructures in farming ▪ bureaucracy
Finland	
Knowledge gap	▪ AEC payments are viewed partly as income support ▪ several projects focused on promoting resource efficiency in soils and waters exist, but the impact of these projects has not been evaluated ▪ changes in water quality are slow and the full impact of measures will be seen over a longer period ▪ quality of supporting advisory services varies in different parts of the country ▪ not enough knowledge as to how to increase carbon sequestration and which measures are the most efficient in reducing nutrient load
Motivation gap	▪ AEC payments are viewed partly as income support ▪ the administration steered the planning of the RDP towards generally applicable measures in the whole territory of Finland – there was not enough motivation to discuss more specific targeting ▪ environmental commitments are broad and exhaustive, bureaucratic for some farmers - some measure requirements are difficult to understand ▪ environmental payment from RDP viewed as income support ▪ advisory services too focused on technical details to ensure compliance instead of effective measure implementation practice
Policy gap	▪ measures do not support the increase in self-reliance on nutrients ▪ controllability and verifiability had too much influence on the design of measures - the measures should be based more on objectives they are trying to reach ▪ targeted areas are too large –the measures should be based on regional level water data ▪ the linkage between the RDP and the RBMP is not clear ▪ The RDP is "conservative" - does not offer tools to support structural change in agriculture ▪ not enough measures to promote cooperation between livestock farms and crop farms
Flanders	
Knowledge gap	▪ some farmers lack a long-term vision - they do not perceive degrading soil quality as a current problem
Motivation gap	▪ the 'manure policy' in Flanders limits farmers' motivation to participate in soil protection measures under AEC ▪ farmers' 'fear' of permanent grassland status if arable land is converted to grassland management ▪ land under lease agreement can be an uncertainty, because the lessor may see the conversion to lower value crops or grassland as devaluation of land and not agree ▪ if the plot is used for high-value crops, the motivation for conversion is low
Policy gap	▪ the 'manure policy' in Flanders - to reduce nutrient load of soil, manure cover is not allowed (manure must be processed or transported away) ▪ the additional impact of RDP measures is limited due to the already strict national policies in place ▪ the Flemish RDP has "many different measures resulting in many small impacts" - the RDP could be more focused on certain focus areas to strengthen impact

Greece	
Knowledge gap	▪ nearly 97% of all farmers and 83% of young farmers in Greece have only empirical training ▪ the belief of farmers that there is little more to be learnt about the way the manage their land ▪ lack of awareness of farmers on the environmental benefits of measures which might be also due to the need for better targeted measures.
Motivation gap	▪ the attitude of older farmers towards new knowledge ▪ the MA promotes new methods, while the farmers "want to do things the way they used to and get paid for it" ▪ farmers tend to avoid trying new methods even if they can be beneficial financially
Policy gap	▪ coordination with other policies (environmental) - the ongoing update of RBMPs is an ex ante conditionality for launching projects under Focus Area 5A - delays the implementation of certain measures (e.g. Investments in more efficient irrigation infrastructure). ▪ introducing selection criteria for prioritising interventions to protected areas when the budget for a call is exceeded (organic farming). ▪ introducing RDP modifications is challenging - only one modification per year is allowed and this makes the coordination required by the MA cumbersome.
Hungary	
Knowledge gap	▪ the quality of training and advice varies in different regions ▪ environmental monitoring systems are not satisfactory, not fully suited to measuring the impact of CAP payments on public goods ▪ institutional linkages - and thus linkages between databases at various territorial/administrative levels (local, regional, national) - are weak among stakeholders collecting environmental data (e.g. no integrated soil database of the country's soils) ▪ nutrient management plans are not used for investment planning ▪ soil samples are not always properly taken which may result in 'misinformed' soil protection and nutrient management plans
Motivation gap	▪ farmers motivated more by income support, rather than awareness of environmental benefits ▪ farm size matters - direct connection with the farm by the owner is limited, actual farming is done by employees ▪ RDP support is considered as 'additional income' and not as instruments for better ecological performance ▪ traditional land use patterns prevail - partly due to high average age of farmers ▪ farmers are not motivated to 'go beyond' minimum levels of compliance with measure requirements; complex measure requirements represent a risk of sanctions ▪ agri-business provides consultancy services to farmers which does not always lead to optimum results in terms of ecological performance
Policy gap	▪ from a farmer's perspective controls and bureaucracy are still excessive ▪ applications – and interventions - are farm-based (AEC) and delinked from a more territorial, community-base ▪ large farms with good quality soils are also awarded support ▪ AEC can cover only about 10% of the UAA ▪ AEC does not define any criteria in respect of soil preservation and carbon sequestration ▪ the RDP prefers extending the territory under irrigation instead of promoting methods based on water retention ▪ difficulty in defining controllable and quantifiable criteria for soil protection, soil nutrients, water use efficiency and carbon sequestration, the requirements selected are more `visible` and easier to control (extensive grassland management, farming on arable land with requirements for the protection of the Great Bustard, integrated cropland, etc.)

Lower Saxony (DE)	
Knowledge gap	▪ missing know-how of nutrient management ▪ farmers do not feel well informed about the RDP (focus is usually on one or two relevant measures) ▪ most farmers know about the AEC measures, but not fully aware of the RDP context of it
Motivation gap	▪ resource efficiency has a minor role for farmers as it is not economically feasible ▪ "if compensation is too low, effort is not made" ▪ increasing leasehold prices and shorter lease periods limit the motivation for starting resource efficiency measures with long commitments ▪ the less change required in farming practices, the more likely farmers are willing to participate ▪ participation increases with more extensive agricultural practices
Policy gap	▪ high administrative 'costs' for all beneficiaries and complicated application processes ▪ controllability requirements do not allow for measures that may be important for resource efficiency

4.2 Possible approaches to 'closing the gaps'

The summary of case study recommendations is provided below.

Emilia Romagna / Italy	Policy design should make use of best practice examples not only at a regional, but also inter-regional level (examples in ERR include the Help Soil – Life project on an inter-regional dimension and SOS4LIFE – a demonstration project). The cooperation measure (M16) can be an effective tool in facilitating the integrated use of measures and other tools in achieving resource efficiency objectives. In ERR, such cooperation projects have been funded in ERR, and these projects build on the IRRINET system to improve irrigation practices and enhance towards 'ferti-irrigation' using data on soil nutrient demand.
Finland	The recommendations for closing the policy gap in Finland included promoting a more holistic RDP strategy which facilitates structural changes in agriculture. One of the outcomes of this proposed structural change would be a more integrated production on livestock farms and crop farms for a better use of recycled nutrients instead of mineral fertilisers. The structural change proposed also requires broad and open discussion relating to the objectives of agriculture in Finland. Improved targeting as well as integration of measures are also proposed. Better targeting is understood in the territorial sense as well as in terms of providing support for environmental commitments for the achievement of environmental benefits. For closing the knowledge and motivation gaps, better provision of information on the rationale of the RDP measures and their effectiveness, improvement of training to advisors, and making information available for farmers in an accessible form are proposed. Considering the motivation gap, the economic profitability and environmental sustainability issues of farms should be given equal consideration.
Flanders / Belgium	The case study on Flanders suggests that a more focused RDP instead of the current one that has „many different measures resulting in many small impacts" would improve resource efficiency performance. Awareness raising of farmers – especially for those who produce high-value crops – on soil carbon and erosion is also proposed. Extending the 'farm planners' approach to other measures in addition to M10. Finally, the issue of soil organic matter should be considered in the context of the RDP and the existing manure policy of Flanders. The case study proposes setting up an expert group for this purpose.
Greece	To address the lack of knowledge of farmers on resource efficiency, the case study suggests a strong information campaign to raise awareness and overcome old stereotypes on agricultural practice. More than one RDP modification per year would enable managing authorities to formulate more targeted responses to changing needs in relation to RDP implementation. Good coordination between Ministries and the different levels of the administration involved in the implementation is critical to ensure the timely realisation of the interventions.

Hungary	In relation to the policy gap, the case study suggests that during policy design and implementation (defining the 'measure mix') the possible synergies among measures for resource efficiency should be maximised. When considering farmers' choices in terms of utilisation of RDP support under various measures factors such as farm size, Pillar I payments and farmers' economic decisions and implementation experience should also be considered in the policy process. More effective, higher quality advisory services and training/knowledge transfer should be provided to improve farmers' understanding of the possibilities offered by RDP measures in ensuring environmental and economic sustainability of farming. A more integrated use of the data available at different levels (local, regional, national) would contribute to bridging the knowledge gap and facilitate better planning of target values for resource efficiency measures.
Lower Saxony / Germany	One suggested approach to bridging the policy gap is creating a better balance between voluntary measures and formal regulation. A re-targeting towards the parts of the farming community where most improvement is needed in resource efficiency is also proposed. Strengthening the dialogue between the rural population, farmers engaged in agriculture, and various organisations responsible for nature and environment protection could contribute to bridging the knowledge and motivation gaps.

5. Conclusions

The six case studies represent a broad variety of natural conditions and policy contexts. Despite this diversity there are a number of similarities in the challenges faced and measures proposed. One such similarity is that farmers' decisions on farming practices seem to be governed considerably by considerations related to economic and policy factors (e.g. profitability of crops, 'return' on resource efficiency investments, the existence of other regulatory mechanisms, and the level of subsidy accessible for the interventions) and to a lesser extent motivated by benefits to the environment. In all case study territories, the knowledge, the motivation and the policy gaps are intertwined. Farmers' awareness of the benefits achievable by resource efficiency interventions could be improved by improved advisory services and training which also demonstrate the long-term impacts and benefits achievable as well as the potential impact or benefit to their farm business. To demonstrate such positive impacts, a more effective and integrated collection and use of relevant soil and water data available at the local, regional, and national levels is needed. Such data can also contribute to improved monitoring of RDP implementation which in turn would allow for a more flexible, targeted approach to the implementation of measures and measure packages within the relevant focus areas (Focus Areas 4B, 4C, 5A, 5E). For improved targeting of relevant measures in terms of territory, specific farming sector, or intervention the responses RDPS provide could be formulated based on the consideration of the joint impact of RDP measures, other voluntary measures and regulatory regimes as well as the resource efficiency impact of other, non-EAFRD forms of support. A greater use of the cooperation measure (M16) to engage farmers within territories with similar natural conditions and resource efficiency challenges and to improve interaction between crop and livestock producers can also contribute to improved resource efficiency.