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WHAT TOOLS FOR THE EUROPEAN AGRICULTURAL POLICY TO ENCOURAGE THE PROVISION OF PUBLIC GOODS?

STUDY

EN 2011

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This document was requested by the European Parliament's Committee on Agriculture and Rural Development.

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Abstract

Agriculture plays an important role in the provision of a wide range of public goods in Europe, particularly regarding the environment and rural vitality. Appropriate policies are required to secure adequate provision in future. The Common Agricultural Policy potentially has a key role. This report examines some of the issues involved in reorienting the CAP for this purpose and proposes how it could be modified to contribute to the provision of public goods more effectively in the future.

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LIST OF ABBREVIATIONS

6EAP	6th Environmental Action Plan
ADAS	Agricultural Development and Advisory Services
ADE	Analysis for Economic Decisions
AGRI	European Parliament Agriculture and Rural Development Committee
BBOP	Business and Biodiversity Offsets Programme
CA	Cooperative Agreement
CAP	Common Agricultural Policy
CH_4	Methane
CLA	Country Land and Business Association
CMEF	Common Monitoring and Evaluation Framework
CO_2	Carbon Dioxide
EBCC	European Bird Census Council
ECA	European Court of Auditors
EEA	European Environment Agency
EAFRD	European Agricultural Fund for Rural Development
EAGGF	European Agriculture Guidance and Guarantee Fund
ENRD	European Network for Rural Development
ERDF	European Regional Development Fund
EU	European Union
EU-27	All 27 Member States of the European Union
EU-15	The 15 Member States of the European Union prior to the 2004 enlargement
EU-12	The 12 Member States of the European Union which have joined since 2004
FADN	Farm Accountancy Data Network
FAS	Farm Advisory Service
GAEC	Good Agriculture and Environmental Condition
GHG	Greenhouse Gas (emissions)
HNV	High Nature Value
IACS	Integrated Administration and Control System
IAMO	Institute for Agricultural Development in mid and eastern Europe

ILUC	Indirect Land Use Change
IRENA	Indicator Reporting on the Integration of Environmental Concerns into Agricultural Policy
JRC	Joint Research Council
LAG	Local Action Group
LFA	Less Favoured Area
LIFE+	EU Financial Instrument for the Environment
LUC	Land Use Change
MFF	Multi-annual Financial Framework
OECD	Organisation for Economic Cooperation and Development
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
RED	Renewable Energy Directive
RDP	Rural Development Programme
RSPB	Royal Society for the Protection of Birds
SAC	Scottish Agricultural College
SAPS	Single Area Payment Scheme
SEBI	Streamlining European 2010 Biodiversity Indicators
SER	Social and Economic Council of the Netherlands
SFP	Single Farm Payment
SMR	Statutory Management Requirement
TEEB	The Economics of Ecosystems and Biodiversity
TSG	Traditional Speciality Guaranteed
UNFCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive
WTO	World Trade Organization

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EXECUTIVE SUMMARY

Background and context

Agriculture has an important role in the provision of a wide range of public goods in Europe. This is recognised both in the 'Lyon Report' on the future of the CAP after 2013 and the 'Dess Report' currently being debated in the European Parliament.

The European Commission's Communication of November 2010 'The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future' (COM (2010) 672 final) sets out three key objectives for the CAP to 2020: viable food production, sustainable management of natural resources and climate action, and balanced territorial development. All three objectives relate to the provision of public goods by land managers in one form or another.

The theme was elaborated in an unprecedented joint letter dated 11 March 2011, from Commissioners Cioloş (agriculture), Potočnik (environment) and Hedegaard (climate). They highlight that 'the CAP is an effective tool which the EU has at its disposal for steering towards more sustainable management of natural resources', that it 'should be a tool to help Member States to reach environmental and climate change targets, notably in relation to biodiversity, water and soil', and that 'to deliver environmental public goods, agriculture must be a viable and competitive sector.'

However, the proposals for converting these general propositions into more specific policies and tools that could be applied within the CAP remain rather vague. This report, at the request of the European Parliament, sets out to examine some of the issues involved in moving towards a more public goods oriented CAP and puts forward recommendations on how the CAP might be restructured over time to deliver public goods more effectively.

Public goods associated with agriculture

The principal public goods associated with agriculture in Europe can be summarised as:

- Environmental, notably farmland biodiversity, water quality and availability, soil functionality, air quality, climate stability (reducing greenhouse gas emissions and increasing carbon storage), resilience to flooding and fire.
- Culturally valued agricultural landscapes.
- Rural vitality (the social, economic and cultural viability and vigour of rural societies).
- Farm animal welfare.
- Food security (particularly the capacity to produce food sustainably in future).

Developing objectives and guidelines for delivering public goods associated with agriculture

Policy measures have been in place under the CAP to promote the provision of environmental public goods since 1985. Further greenings of the CAP took place with the

1992 MacSharry reform, Agenda 2000 and the Fischler reforms of 2003–2004, as well as with the Health Check of 2008.

The debate that has taken place so far both within the EU institutions and key interest groups indicates that the delivery of public goods will become more important as an objective of the CAP and thus a further greening of the CAP can be anticipated as part of the next reform, although substantial differences of opinion exist as to how and how far this should be done.

The delivery of public goods as a strategic objective of future policy would be an innovation within the CAP. To embed it alongside other CAP objectives, like a competitive agri-food sector, it must be specified in the principal CAP regulations. These would need to list explicitly the full range of environmental and other public goods being pursued. Setting out in one place the various targets and goals applicable to the rural environment that have been established in European legislation (with their timetables for implementation) would also be helpful. A mechanism would be required to translate broad Community level objectives into more specific ones applicable at Member State level.

Such a new approach requires a coherent European framework. It should cover not only the CAP, but also the interaction with other EU policy objectives impacting (positively or negatively) on the competitiveness and sustainability of agriculture and on rural development. They include policies on the environment, climate change, energy, regional development, research and development, health and consumer affairs, fiscal matters and different sources of funding (especially EU and national). A coherent European framework must include consideration of the international dimension of achieving such objectives.

As proposed by a group of Commissioners, an overarching set of Strategic Guidelines applicable to all the principal EU funds is likely to be drawn up for the next multi-annual financial framework (MFF) from 2014. These guidelines would be an opportunity to spell out public goods objectives and their relevance to the different funds within an integrated structure. They should refer to the different public goods and the types of land management required to deliver them, and be linked to performance indicators, and advisory, monitoring and evaluation systems. On this foundation Members State's could be required to draw up broad delivery strategies for the individual public goods. These strategies would for example indicate the contribution that the agriculture/forestry sector was expected to make to biodiversity and climate change objectives.

Introducing and running this new approach will be neither simple nor uncontroversial. Tensions and conflicts may arise, notably between public good provision and competitiveness and between different forms of public goods. One example is the EU target of producing ten per cent of all transport fuels from renewable sources of energy by 2020. Most are currently biofuels derived from agricultural crops. Increasingly the data suggest that this is an ineffective means of reducing greenhouse gas emissions. Due to the indirect land use change (ILUC) arising as a result of increased planting of 'first generation' crops, such as maize and oilseed rape, greenhouse gas emissions are unlikely to be reduced to the extent required under the Renewable Energy Directive (RED) and may even increase. The demand to grow additional crops for energy supply purposes is likely to cause the conversion of grassland or other uncropped land into arable production.

There will be policy drivers outside the CAP that also contribute to public good provision, such as investment in research and technology. For example, any meaningful climate change mitigation strategy must acknowledge the extent of methane emissions as a by-

product of livestock production and come up with frameworks to reduce them over time. Research will play a leading role in reducing emissions from livestock digestion, and finding ways to use organic waste to replace inorganic fertilisers and /or produce biogas efficiently. Incentives to promote such a virtuous cycle of improved waste management and energy savings can be devised in a combination of agricultural, climate and rural development policies. Similarly, regional employment and social policies can contribute to the provision of rural vitality at a number of different scales.

Developing a range of policy tools

A range of policies and supporting safeguards will be required at a European level to ensure that public goods provision is given sufficient prominence and is not swamped by other objectives. These will include different but complementary approaches such as cross compliance, earmarking a proportion of EU funds for public goods, introducing dedicated new measures, such as ecological set-aside in all Member States, and tightening the relevant regulations at the EU and Member State levels.

Since conditions and priorities vary greatly in Europe, Member States and regions will take different approaches to the delivery of public goods. This is appropriate up to a point but needs to be balanced by effective reporting and oversight by the Commission of Member State plans and measures, especially for incentive payments. This is needed to ensure that measures are effective and compatible with EU law but also to maintain a level playing field and to balance public good provision with other strategic objectives. EU objectives will have to be balanced with national and local aspirations, respecting territorial cohesion. Governments in their turn will need to work with farmers and be sensitive to their economic viability and professional aspirations.

The effectiveness and efficiency of policy measures in delivering public goods depends on many factors such as policy design and focus, targeting, administrative capacity, data, the provision of advice, monitoring and evaluation, as well as the adequacy of budgetary resources. A combination of regulatory and incentive measures is required. One needs a strong regulatory baseline, applying to all farms, as well as some management standards which are attached as conditions to CAP payments, such as the standards of Good Agricultural and Environmental Condition (GAEC). Three categories of support under the CAP are required for farmers or other land managers contributing effort over this baseline. They are: area based payments, which are fundamental for the future delivery of environmental public goods; investment aid for capital infrastructure; and extension services, advice and capacity building. Such measures need to provide enough support to encourage appropriate environmental management and must be designed in such a way as to encourage uptake, while good advice is often critical to success.

Fundamental to all CAP funding should be the principle that for measures designed for other purposes than encouraging the delivery of public goods, their impact on public goods has to be taken into account and environmental damage has to be avoided wherever possible, in line with Article 11 of the Treaty on the Functioning of the European Union. This particularly holds at the programme level with more stringent safeguards put in place for protected or High Nature Value (HNV) land. However, perhaps the biggest challenge is to assess the net effect on the environment when greater public goods production is accompanied by less intensive forms of agriculture in some areas, but by more intensive agriculture in others. Climate change measures should not lead to carbon leakage whereby production (of cattle for example) moves abroad in order to avoid EU legislation. This can happen via European entrepreneurs in search of higher competitiveness outside the EU or

via foreign farmers or companies supplanting European suppliers. This does not lead to a fall in global emissions and can put pressure on habitats of EU relevance such as grasslands or forests.

Measures supporting the commodification of specific characteristics of private goods can help to create markets for these characteristics and thus to overcome market failures. For example the EU schemes known as PDO (protected designation of origin), PGI (protected geographical indication) and TSG (traditional speciality guaranteed) can support 'rural vitality' in the specific regions concerned. An animal welfare label which is under discussion in the EU could provide farmers producing under animal-friendly conditions with higher prices for their products and thus incentivise the delivery of animal welfare.

Synergies and conflicts between public goods will need to be managed. For example, actions to reduce net emissions of Greenhouse Gases (GHG) per kilogramme of meat or milk produced often require high yields per hectare, short production cycles and sometimes greater use of new technology and genetics, which can be incompatible with the provision of high levels of biodiversity.

In general, the greater the degree of tailoring and targeting of management actions to specific locations where they are needed, the greater the environmental outcomes achieved will be. Experience also suggests that, in some circumstances, the costs of targeting can be compensated for by cost savings, for example resulting from reductions in the area of land that needs to be managed to achieve the environmental objective (such as the conservation of declining farmland species). However, certain actions may achieve public goods outcomes without needing such specificity in design and targeting, and many environmental public goods can be delivered more effectively if action is taken on a large number of farms. Moreover, precise targeting may be difficult in some cases and can be quite costly in terms of data requirements, administrative effort and transaction costs. Impacts on farmers will vary but can be higher in some cases. Consequently there is a case for a combination of simple, lightly targeted measures that are horizontally applied over large areas, alongside the more precise and tailored interventions – provided both these are effective in achieving the results.

There are several policy design questions that influence the results that can be achieved on the ground. These include whether policies are mandatory or voluntary for land managers, whether they involve contractual agreements, whether the requirements of incentive measures are annual or multiannual, as well as the way in which measures are designed to operate. Currently, the only mandatory environmental measures in place in the CAP are the GAEC standards within cross compliance. They are undertaken at the cost of the land manager. Within Pillar 2 of the CAP, voluntary agri-environmental schemes are the most important measure for providing environmental public goods, but there are others as well, including aid for forestry. These voluntary payments often are not taken up by farmers in a way that secures sufficient coverage, partly due to insufficient regionally relevant environmental expertise and lack of appropriate socio-economic incentives, training, promotion and confidence about the durability of societal support.

There are several eligibility issues concerning CAP payments that need straightening out to improve the current position regarding public goods. The current 'definition of eligible agricultural area' lacks clarity, thus causing substantial differences of interpretation between the relevant Council regulation, and among the auditors and the Member States as regards the eligibility of significant areas of farmland of environmental value which consequently may be excluded from direct payments. Two further eligibility issues now on

the table are the definition of 'active farmers' and the proposed 'capping' of direct payments beyond a certain size threshold. From an environmental perspective, support should be commensurate with public goods delivered, irrespective of the degree of farmer activity and farm size. The definition of active farmer under current regulations and the lack of any requirement for capping the Single Farm Payment currently allows for that.

Budgetary/financing issues

The scale of funding required for delivery of public goods on a scale suggested by many EU targets reaches well beyond the current allocation in the CAP budget. Studies suggest that a serious commitment to improving the quality of the environment in Europe relying primarily on incentive payments could require devoting as much as €30–€40 billion per annum to that purpose.

Public good provision on European farms could be enhanced by a distribution of Pillar 1 and Pillar 2 funds both between Member States and between farms that matched public goods ambitions and corresponding requirements on the ground. The present distribution logic takes no account of public good provision because of its foundations in historic expenditure. Allocations under the future CAP need to reflect public good provision much more explicitly. The division of the CAP budget between Pillar 1 and Pillar 2 also needs to be amended to reflect public goods priorities. The current reform is an opportunity to move in this direction, even if this process needs to be undertaken in stages to prevent too much disruption and political resistance. New allocation criteria need to be established to reflect the multiple roles of agriculture and land management.

For many land managers the basis of payment is critical to their income and willingness to supply public goods. The current agri-environment formula is that payments should be based on the additional costs incurred and income foregone by the farmer for complying with the relevant measures (in line with the WTO Green Box rules). It is important that there are sufficient incentives for farmers to participate in voluntary measures particularly if agricultural commodity prices rise. For example, more account may need to be taken of fixed costs in some cases. Given the challenges involved in establishing the right levels of payment to secure the desired level of participation over time, it would be helpful if the Commission set guidelines for devising effective incentive measures.

In theory, those who benefit from the public goods should broadly correspond to those who bear the costs as taxpayers, in keeping with the principle of fiscal equivalence and the spirit of subsidiarity. In practice, distinguishing local from regional, national and European public goods and also identifying their beneficiaries is a major challenge. Co-financing of Pillar 2 measures by Member States is a way of operationalising this principle at present, but it encourages governments to prefer to adopt measures in Pillar 1, which is wholly EU funded, as evidenced by the low use of Pillar 2 environmental measures in some Member States such as Greece, Spain and others. Co-funding rules can therefore distort the use of the most efficient policies for delivering public goods and need to be considered carefully.

Improved policy structures and tools for public good delivery

Public goods associated with agriculture are not supplied on a sufficient scale at present and the EU is failing to meet targets. Current CAP measures to deliver public goods are constrained by factors such as lack of targeting and budgetary limits. To meet societal demand for public goods requires a strategy of keeping a strong environmental legislative baseline, making some changes to the current policy structure and the tools available. The

priorities include more tailoring and targeting, greater technical support, strengthened monitoring and enforcement, as well as allocating greater budgetary resources for the delivery of public goods and sufficient resources to meet the public transaction costs. Those Member States which have made greater use of Pillar 2 measures for this purpose in the past and now have relatively ambitious schemes should not be disadvantaged; any restructuring needs to deliver net benefits for the environment both at the EU and Member State level.

Decoupled direct payments under Pillar 1 currently do not provide an effective incentive to produce public goods and should be reduced step by step over time. However, given that the two pillar structure of the CAP almost certainly is set to remain, at least for 2014–2020, our proposals in this study are based on this structure, whatever its drawbacks. The principal policy provisions proposed for the CAP in this report, as summarised in Chapter 4, are:

- The confirmation of a regulatory baseline with improved implementation and enforcement.
- The continuation of cross compliance as a mechanism attached to Pillar 1 as well as land-based Pillar 2 payments.
- GAEC conditions should be streamlined with a core suite applicable across the whole EU, with sufficient flexibility to take account of the specific circumstances in different regions and avoiding any perverse environmental effects. GAEC will need to be adjusted if a substantial greening of Pillar 1 occurs.
- More focus on public good provision in both Pillars of the CAP, assuming they are retained and direct payments are not phased out.
- A small number of new environmental measures with attached payments to be introduced into Pillar 1 without targeting, so applying throughout the EU, for example, maintaining landscape features, the maintenance of permanent pasture and organic farming.
- A second set of new provisions would be introduced which would apply throughout the EU but would need some tailoring to local conditions to make sure that the outcome was as beneficial for the environment as possible. These would include, for example, ecological set-aside, soil cover, the protection of semi-natural habitats including grassland and the introduction of greenhouse gas emission accounting/plans. In these cases, local rules could add greatly to the impact of a measure adopted at a European scale with relatively modest administrative costs.
- These provisions (Group 2 measures in the report) could be introduced in one of two ways. On the one hand they could be introduced in association with top up payments within Pillar 1, broadly along the lines proposed for the Commission for greening Pillar 1 in the November Communication, but allowing for some Member State flexibility in their design and delivery, requiring Commission approval and subject to monitoring and evaluation requirements. Another option would be to retain or introduce them in Pillar 2 (where many of them already sit as part of agri-environment schemes). However, farmers would be required to participate in these basic agri-environmental measures to be eligible for receipt of direct payments. In this way there would be a link between Pillar 1 direct payments and these measures (sometimes known as orange ticket cross compliance). Sufficient funding would need to be transferred from the Pillar 1 budget to allow for widespread uptake of these measures and there may be a case for them to be 100 per cent EU funded if they are focused on EU strategic priorities. Fundamental to both these approaches is the need to have sufficient flexibility to undertake some local adaptation.

- Targeted measures within Pillar 2 would be more closely targeted on public goods than at present so that more value added could be obtained from this element of the budget. Measures would be guided by national plans with clearer targets than at present, for example to reduce greenhouse gas emissions from farms or to deliver specific biodiversity needs.
- There would be enhanced support for advice and training for farmers, with funding provided through the CAP, and this would need to be complemented by stronger extension services in many Member States.
- Small farms would be subject to a new simplified CAP instrument with a public goods element to avoid them being burdened with disproportionate costs.
- In terms of measures to deliver rural vitality beyond agriculture, a key role would be played by rural development measures which follow a territorial rather than a sectoral approach. Since the social, economic and demographic conditions in rural areas differ significantly across the EU a high degree of flexibility is necessary to allow the Member States to programme and implement appropriate measures.

One has to recognise that administering targeted payments requires well equipped and efficient administrations utilising accurate and accessible data and efficient systems. They need to work in harness with effective extension services as well as good monitoring and evaluation procedures. These are all critical to the delivery of public goods. Member States often will be reluctant to strengthen these services, in particular farm advisory services, and incur the public transaction costs relevant to the delivery of targeted public goods payments, and need an incentive to do so.

Admittedly, buttressing public goods on farms will complicate farm management and increase bureaucracy in contradiction with the simplification objective. If farmers are to satisfy societal demands they need, not just financial incentives and advice, but also a reduction in unnecessary red tape wherever possible. One way to achieve this is to avoid multiple visits to a farm by a range of agencies involved in different forms of inspection and introduce periodical combined or joint inspection visits covering both Pillar 1 and Pillar 2 measures. These could become less frequent when farmers had proved their competence, following a risk based approach. Indeed, there needs to be an increased recognition that public good delivery is not always straightforward and may require trade offs and compromises at the farm level, while giving farmers consistent messages. Inspection regimes will need to find ways of reflecting this over time, without creating loopholes. Improved relationships between inspectors and advisers, perhaps supported by shared training, and more shared information will help in this regard.

Non-CAP measures for the delivery of public goods

There are no one-size-fits-all measures which can optimise the delivery of different public goods throughout the EU. Different responses are required, which often have to take account of local or regional circumstances. Relying on regulation and public spending alone, without the participation of the private sector and market may not be sufficient to address the pervasive market failures that have led to the undersupply of public goods. There are a number of ways in which market measures can help contribute to stimulate the delivery of environmental benefits on agricultural land. We have highlighted two specific examples, habitat banking and contracts for services, in particular provision of clean water.

The 2013 CAP reform: an opportunity to meet societal demands

The report shows that there is no easy policy solution for the provision of public goods. Pervasive air, soil and water pollution in agriculture, declines in farmland biodiversity and

reducing greenhouse gas emissions cannot be effectively tackled simply by strengthening the regulatory framework and incentive measures need to be well designed and delivered and made attractive to farmers. However, it is clear that business as usual will not deliver and the upcoming CAP reform offers the opportunity to overhaul the policy and introduce a much stronger focus on meeting societal demands for public good provision. This requires major changes which should be decided soon and implemented stepwise during the 2013–2020 period and beyond.

This study offers suggestions for a realistic policy structure for the CAP post 2013 to deliver public goods, taking into account agricultural, administrative and political feasibility considerations as well as the other objectives which will be pursued by the CAP. This will entail new ways of supporting farmers and will require a change in culture. A cultural shift is needed so that agricultural policy is looked at from new perspectives. In effect, a new social contract is needed between farmers and society which sees the delivery of public goods as part of a modern approach to agriculture where food, fibre and fuel are supplied in ways that are resource efficient, help address climate change and deliver high levels of biodiversity and farm animal welfare, within the context of diverse and vibrant rural areas.

The European Parliament, with its newly enhanced responsibility, has an important role to play in ensuring that the final outcomes of the forthcoming CAP reform deliver improved outcomes for public goods for the benefit of farmers and society alike.

The study concludes that, although there may be no magic bullets in terms of how to restructure the CAP to ensure greater provision of public goods, there are practical ways forward that can be taken now as part of a longer-term transition. The status quo is no longer tenable politically as it will not deliver what is being demanded by society and would send the wrong signal both to farmers and to civil society about the role of agriculture in the 21st century. Decisions made about the focus of the CAP in this reform need to ensure that a future CAP has the delivery of public goods at its core and set the tone for the long-term future of a sustainable and competitive agricultural sector.

1. BACKGROUND AND CONTEXT

The rationale and configuration of the CAP post 2013 is subject to considerable scrutiny at present, with the purpose, design and efficiency of the current system of support being placed increasingly under the spotlight. As part of this debate, consensus is emerging about the concept of public goods as a clear and economically justifiable rationale for the provision of public support to land managers through the CAP in future.

Agriculture plays an important role in the provision of a wide range of public goods in Europe. While there are many variations in the pattern of agriculture in Europe, its impacts on the ground and the preferences of local people, a core set of public goods can be identified which have a long-term association with agriculture in the EU. These include environmental public goods such as farmland biodiversity and cultural landscapes, as well as others such as rural vitality. However, there is still a considerable way to go to meet the targets and objectives that have been set for the EU in relation to many of these public goods. Furthermore, there are likely to be increased pressures on the agricultural sector in the future to help meet the challenges of climate change, as highlighted, for example, in the Commission's Communication setting out 'A Roadmap for moving to a competitive low carbon economy in 2050' (European Commission, 2011a). Although a number of policy tools already exist within the CAP with the potential to deliver public goods, the current policy framework has not achieved the level of outcomes that are needed on the scale required.

Forestry in Europe also plays an important role in the provision of public goods and the CAP is one of the main funding mechanisms to support appropriate forestry. It is not considered further here only because it falls outside the report's terms of reference.

The important role that agriculture has to play in delivering public goods in Europe is recognised in the European Commission's Communication of November 2010 'The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future' (European Commission, 2010b). This sets out three key objectives for the CAP to 2020: viable food production, sustainable management of natural resources and climate action, and balanced territorial development, all three of which relate to the provision of environmental and other public goods by land managers. The theme was elaborated in a rather exceptional joint letter dated 11 March 2011, from Commissioners Cioloş (agriculture), Potočnik (environment) and Hedegaard (climate), in which they stress that 'the CAP is an effective tool which the EU has at its disposal for steering towards more sustainable management of natural resources', that it 'should be a tool to help Member States to reach environmental and climate change targets, notably in relation to biodiversity, water and soil', and that 'to deliver environmental public goods, agriculture must be a viable and competitive sector.'

The role of the CAP in providing support to land managers to deliver sufficient levels of public goods in line with societal demand has also been recognised by the European Parliament, both in the 'Lyon Report' on the future of the Common Agricultural Policy (CAP) after 2013 (European Parliament, 2010) and the 'Dess Report' currently being debated (European Parliament, 2011a). Its critical role in helping meet the EU's biodiversity targets has also been highlighted in the recently published Biodiversity Strategy (European Commission, 2011b)

The value attached to the provision of public goods by many stakeholders, and civil society more generally, has been emphasised in a number of papers from different parts of Europe. Indeed, it was one of the key messages coming out of the two Commission consultations on the subject and the conference on the future of the CAP post 2013, held in summer 2010.

However, despite this convergence of views on the importance of agriculture and the CAP in delivering public goods, the proposals for converting these general propositions into more specific policies and tools that could be applied within the CAP remain rather vague. This report, at the request of the European Parliament, sets out to examine some of the issues involved and put forward recommendations on how the structure and design of the CAP could be modified to contribute to the provision of public goods more directly.

2. PUBLIC GOODS ASSOCIATED WITH AGRICULTURE

KEY FINDINGS

- There is a wide range of public goods associated with agriculture, including environmental public goods, culturally valued agricultural landscapes, rural vitality, farm animal welfare and aspects of food security.
- There is clear evidence of an undersupply of these public goods and the EU is failing to meet many of its environmental targets.
- Many measures within the current CAP have the potential to help secure the delivery of public goods in Europe.
- The current CAP policy framework has not achieved improvements on the scale that is required.

2.1. Public goods associated with agriculture

The public goods concept is long established in economic theory[1]. It helps to provide clarity in the aims of agricultural policy and in distinguishing whether or not there might be a case for state intervention in the provision of certain goods and services. While private goods can be secured through the market, this is not the case for public goods for which markets cannot function properly in terms of balancing supply and demand. This often results in the undersupply of public goods (Samuelson, 1954; 1955; Peston, 1972; Cornes and Sandler, 1992). In some situations a sufficient level of public goods to meet societal demand are delivered alongside economically viable agricultural activities. However, in many cases, given the absence of functioning markets, intervention is needed to secure a desirable level of provision. Where the actions entailed go beyond legislative requirements (and society does not wish to regulate further), economic incentives usually will need to be provided principally to encourage farmers to reallocate their factors of production away from the production of solely agricultural commodities in order to provide public goods (Bromley and Hodge, 1990; Hodge, 2008). However, not all public goods associated with agriculture are best provided by support for agricultural activity or for farmers.

The concept of public goods and the role of agricultural land management, and the CAP, in their provision has been explored in some depth in a number of recent publications (see, for example Cooper *et al*, 2009; RISE Foundation, 2009; ENRD, 2010). These studies identified a wide range of environmental and other public goods that can be provided through appropriate agricultural practices, many of which are highly valued by society, for example cultural landscapes, farmland biodiversity, good quality water, well functioning soils, rural vitality, animal welfare and aspects of food security.

[1] Public Goods are defined as having two main characteristics. First, they are 'non-rival' which means that if the good is consumed by one person, it does not reduce the benefit available to others. Second, they are 'non-excludable', meaning that if the good is available to one person, others cannot be excluded from enjoying its benefits.

The suite of public goods identified in these studies, as set out in Table 1, is taken by this study as its broad focus.

However, although environmental public goods are fairly well defined and documented in the literature, this is not the case for other public goods, most notably rural vitality. Rural vitality is included in many accounts of non-commodity outputs of multifunctional agriculture and it is one of the public goods under scrutiny in the current debate on the CAP post-2013. However, it is one of the public goods associated with agriculture (and other rural sectors) which is most difficult to specify and define, since it includes a wide spectrum of goods and services with numerous and interlinked cultural, social and economic dimensions. The main factors that are cited as relevant in determining the social, economic and cultural vitality of rural areas include: the demographic balance, the accessibility of the area (including the availability of local transport), rural-urban linkages, the functioning of labour markets, sufficient social and economic diversity and infrastructure, access to education and social services and the vigour of local or rural identity.

There are considerable variations within Europe in the critical issues; for example in many central and eastern European countries the legacy of collectivisation and centralised economic structures has given rise to specific concerns about rural unemployment and poverty, unbalanced farm structures, barriers to investment and disrupted social networks. Specific concerns vary between regions; rural depopulation is now only a concern in specific parts of Europe. However, there are a number of common threads and themes.

According to Randall (2007), the values associated with the vitality of rural communities should be confined to aesthetic values associated with settlement patterns in order to avoid falling into the trap of confusing economic impacts with economic welfare. He also argues that: (i) the rural vitality argument does not fit well into the market-failure/public-goods model (Ollikainen and Lankoski, 2005 in Randall, 2007) and (ii) a non-market valuation literature for rural vitality has not emerged. Rather, the literature on this issue tends to focus on the types of approaches needed to improve the vitality in rural areas through a consideration of the broader social, economic and environmental dimensions of local development in rural areas. The adoption of territorial approaches is seen as particularly important in this regard. The academic studies following this approach, which are mainly rooted in geography and sociology, usually conceive rural vitality as the result of social relations and interactions in rural areas, including social isolation and exclusion, embeddedness, human, social and political capital, inter-local networks, individual and collective actions, local quality of life and new income opportunities through the provision of social services or public goods etc.

Further work in relating these issues to agriculture and agricultural policy would be helpful, but it is not possible to address them in detail within the context of this study.

Table 1: The main public goods associated with agriculture

Climate stability – increasing carbon storage and reducing greenhouse gas emissions: Removing some of the accumulated CO_2 from the atmosphere is important for stabilising the world's climate. Plants accumulate CO_2 very effectively, and farming methods which maintain permanent vegetation cover and return plant waste to the soil are a good way of mopping up carbon. In fact, permanent grasslands store nearly as much carbon as forests. As well as improving storage of carbon, agriculture can also play an important role in reducing the emissions of greenhouse gases that are responsible for global warming – not only CO_2, but also methane and nitrous oxide.

Farmland biodiversity: Historically, many wild plants and animals have coexisted alongside food production. However, as agriculture has intensified, today farmland biodiversity depends heavily on areas of low-intensity management, or on unfarmed features around the farm, such as uncultivated strips between crops, walls or hedges, farm tracks, ditches and ponds. These places provide food, shelter and breeding sites for birds, mammals and insects and the conditions for native flowers and other plants to grow. Farmland biodiversity also includes the rich genetic diversity of local breeds of farm animals and varieties of crops, many of them well adapted to the soils, vegetation and climate of their region.

Water quality and availability: Stable supplies of clean water are of benefit for human health and ecological stability. The use of fertilisers, herbicides and pesticides to enhance agricultural production is commonplace, and can have a major impact on the quality of both surface and ground water. Methods of reducing the quantity of nitrates, phosphates and agro-chemicals that end up in rivers and aquifers, protects drinking water sources and contributes to the biodiversity of rivers and wetlands. As agriculture is a major user of water, especially for irrigating crops, it is at the centre of efforts to ensure more efficient and sustainable water use.

Soil functionality: Soil is the basis of most food production. Well-functioning soil has good structure, sufficient organic matter, and is resilient to erosion by wind or water. Most agricultural practices impact upon soil functionality in some way, but soil functionality can be preserved through the use of appropriate farming methods.

Air Quality: Air that is free from pollutants is of benefit to human health and to the functioning of ecosystems. Agriculture is a source of a number of emissions of reactive gases that can reduce air quality, such as ammonia and particulate matter. The adoption of specific land management practices can help to minimise loss of quality.

Resilience to flooding and fire: In central and southern Member States in particular, sufficiently grazed vegetation can be an important barrier to the spread of forest fires, and reduce the fire risk in permanent crops such as olive groves. The capacity of farmland to absorb excess rainfall and store floodwater will be increasingly important as climate change increases the risk of flooding in urban areas.

Culturally valued agricultural landscapes: Farming has shaped the distinctive rural landscapes of Europe for thousands of years and continues to do so. These range from alpine pastures to terraced landscapes, dehesas, orchards and flood plains, and mosaic landscapes of mixed arable and grass fields. Many cherished patterns of land use and locally distinctive landscape features are no longer essential to modern farming methods, but still need management if these kinds of cultural landscapes are to be maintained. The continued management of agricultural landscapes can play a key role in safeguarding the attractiveness of rural areas as a place to live in or for tourism.

Rural Vitality: Rural areas in Europe exhibit significant differences in land use, population, prosperity, language, cultural heritage and traditions. Rural vitality is understood in various ways, as discussed above, but generally refers to the availability of a certain level of economic opportunity, a minimum level of services and infrastructure as well as human capacity and functioning social networks to sustain the long-term viability and attractiveness of rural areas as places to live, work and visit. The land, the character of the landscape, climate and other natural factors all serve to shape the customs, traditions and identity of rural areas. Agriculture can help to sustain rural vitality through the role that the farming population and associated rural activities and traditions play in rural areas. Linkages work both ways. Where rural areas remain economically and socially vibrant, this can also help to support the continuation of economic activities such as agriculture and forestry, which in turn are important in providing environmental public goods upon which some economic sectors – such as rural tourism and recreation – depend.

Farm Animal Welfare: While farm animal welfare is to some extent a private good because it is associated with healthy livestock and their products, more broadly, society demands higher standards than those that are in the private interest. Avoiding unnecessary suffering or injury and taking account of the physiological and behavioural needs of animals are core to these concerns.

Food Security: While food is a private good, food security is a public good as markets do not ensure the availability of food at any time in any place. Deliberate action is needed, therefore, to secure sufficient food supply in the long term at the European and global level. To achieve this, various actions are needed, including investments in agricultural research and infrastructure in developing countries and the creation of sufficient stock. In terms of land management, retaining the capacity to produce food sustainably into the future through appropriate husbandry of land and other resources and the maintenance of the necessary skills, will also be a priority in Europe.

Source: Adapted and expanded from ENRD, 2010

2.2. Evidence of the undersupply of public goods

There is a considerable body of evidence concerning the ongoing challenges facing the provision of almost all the environmental public goods associated with agriculture. Although estimates of the current scale of public goods provision through European agriculture are notoriously difficult to derive, there is evidence of an undersupply of many environmental public goods when compared to public demand, as articulated through formal EU environmental targets, objectives and goals (Cooper *et al*, 2009; RISE Foundation, 2009; ENRD, 2010). Data from a range of environmental indicators (for example EEA, 2005; EEA, 2009b; OECD, 2008) and other literature show a continued large-scale deterioration in the state of many environmental media that are affected by EU agriculture. On the other hand there is a group where improvements are being achieved, notably in some aspects of air quality, some regional improvements in soil functionality and water quality, as well as reductions in greenhouse gas emissions from agriculture, partly due to a falling number of livestock (EEA, 2010).

In the past, agricultural production and the provision of many public goods were delivered alongside one another fairly readily. However, over time, technological, market and policy developments have led to more intensive uses of agricultural land in many parts of the EU-27. This has been accompanied by significant structural changes in pursuit of greater efficiencies of scale and higher productivity together with marginalisation or abandonment of land use in certain less productive areas. Both these trends have led to declines in species numbers and habitat values, the homogenisation of the agricultural landscape, increasing water scarcity in many regions, significant problems with soil erosion and soil organic matter. In recent years, some of the strongest intensification trends have taken place in the less-intensively farmed regions, which can have a negative impact on High Nature Value farmland. In addition, many more remote areas have experienced outmigration of people from rural areas to towns and cities, leaving many parts of rural Europe depopulated and/or with ageing and unbalanced populations, with knock on impacts on the availability of local services and infrastructure, the vibrancy of rural communities and associated local cultural heritage and traditions.

Further evidence of the undersupply of public goods can be found in Annex 1.

2.2.1. Evidence of the state of public goods

Indicators on the state of Europe's environment have been developed under a number of exercises, including, for example, the IRENA operation (EEA, 2005), the SEBI 2010 process (EEA, 2009b), by the OECD (OECD, 2008), as well as through the Common Monitoring and Evaluation Framework (CMEF). A set of 28 agri-environment indicators, selected on the basis of the outputs of the IRENA exercise, are currently under development to cover the EU-27 Member States (European Commission, 2006). However, there continues to be a lack of indicators, and therefore quantified evidence on the state of some public goods at a European level, most notably agricultural landscapes, rural vitality, and animal welfare. Information on the level of supply of environmental public goods at a European scale is provided below.

Climate Stability: The recently published State of the Environment Report (EEA, 2010) highlights that, although the EU is on track to meet its Kyoto targets, this will not be sufficient to keep temperature increases below 2°C. To do this, emission cuts of 25–40 per cent will be needed by 2020, which will require greater efforts to mitigate greenhouse gas emissions and an increased focused on adaptation measures. The agricultural sector has

already achieved a significant decrease in GHG emissions (more than 20 per cent since 1990) but will inevitably have a significant role to play in achieving further reductions to 2020 (European Commission, 2011a). The main sources of GHG emissions from agriculture include: the emissions of CO_2 from soils, resulting from land use change, particularly the drainage of organic soils, notably peatland, and have been estimated to amount to 20–40 tonnes of CO_2 per hectare per year in the EU (Alterra *et al*, 2008); emissions of N_2O from soils; CH_4 emissions from enteric fermentation; N_2O and CH_4 emissions from manure management and CH_4 emissions from rice cultivation (UNFCC, 2008).

Farmland Biodiversity: although the European Common Farmland Bird indicator suggests that declines of farmland birds have levelled off since 1990 (EBCC/RSPB/BirdLife/Statistics Netherlands, in EEA, 2009b), an assessment in 2004 found that EU (and pan-European) farmland birds populations continue to decline and the status of rarer threatened farmland bird species continues to be of considerable concern (BirdLife International, 2004). However, declines in farmland birds appear to be less severe than those in some other more sensitive species groups, for example, data on grassland butterflies show declines of more than 50 per cent since 1990. In addition, reports from EU Member States on the conservation status of those species and habitats of "Community Interest" (i.e. those targeted by the Habitats Directive) indicate that habitats associated with agricultural activity, particularly grassland habitats are in a very poor condition. Less than 10 per cent of grassland habitats of Community Interest had a favourable conservation status in 2008 and overall only seven per cent of habitats linked to agro-ecosystems have a favourable conservation status, compared to 17 per cent for habitat types not related to agro-ecosystems. The reasons given for this include the combination of shifts towards more intensive agriculture in some parts of the EU, and towards reduced management in other areas and, at the most extreme, outright agricultural abandonment.

Water Quality: The agricultural nutrient balance for nitrogen and phosphorous has improved in recent years for many Member States, although nitrogen loads for the agricultural sector are predicted to remain high in the short term. Indeed, a study of those draft River Basin Management Plans that had been published before 2009 showed that diffuse and/or point source pollution by nitrogen is reported in 124 out of 137 River Basins, phosphorous in 123 cases and pesticides in 95 cases (Dworak *et al*, 2010).[2] The main sources of nitrogen and phosphates are inorganic fertilisers, organic manures and slurries, livestock feed and silage effluent. Indeed, the EEA has recently stated that 'a significant number of water bodies face a high risk of not achieving good ecological status by 2015' (EEA, 2010).

Water Availability: The agricultural sector exerts significant pressure on the quantity of EU water resources. It is one of the largest consumers of water in the EU, utilising a combination of natural precipitation, water abstracted from aquifers and surface sources, and that stored in tanks and reservoirs, for irrigation and use by livestock. On average the sector accounts for 24 per cent of total water abstraction within the EU. However agricultural water use is distributed unevenly and, in some southern European regions, it accounts for up to 80 per cent of water extraction. In the context of climate change the problem of water scarcity is of growing concern, and the number of Member States experiencing seasonal or long-term droughts has increased over the years.

[2] The preparation of such plans is required under the Water Framework Directive.

Soil Functionality: Although soil degradation processes vary considerably from region to region, with the principal threats having different degrees of severity, soil degradation remains an issue all over the EU. An estimated 115 million hectares or 12 per cent of Europe's total land area are subject to water erosion, and 42 million hectares are affected by wind erosion (EEA, 2005). However, more recent estimates using the 'Pesera' model provide more precise estimates, relating to the area of agricultural land in Europe at risk of soil erosion. The outputs from this model indicate that approximately 57.7 million hectares of agricultural land are at risk of erosion of more than 1 tonne/ha/yr and that 47.2 million hectares are at risk of soil erosion of more than 2 tonnes/ha/yr, with the Mediterranean Member States particularly affected. An estimated 45 per cent of European soils have low organic matter content (i.e. have below 3.4 per cent soil organic matter or 2 per cent soil organic carbon), although this varies considerably between Member States. In southern Europe, approximately 75 per cent of soils have low organic matter content, partly reflecting the nature of the soils, the bioclimatic environment and the extended cultivation periods in these countries. Soils in certain areas of France, the UK and Germany also suffer from low soil organic matter content. Attempts to model the potential risk to soil organic matter from climate change indicate that without changes to management, soil organic matter is at risk on the majority of arable soils across Europe. Compaction from regular cultivation and heavy equipment is also widespread, although data on the scale of the problem are difficult to obtain.

Air Quality: The principal threats to air quality arising from agriculture are ammonia and particulate matter. Atmospheric nitrogen deposition continues to be a significant problem, with over 40 per cent of terrestrial and freshwater ecosystems currently subject to atmospheric nitrogen deposition beyond their critical loads (EEA, 2010). Of the total EU NH_3 emissions, 94 per cent come from agriculture (EEA, 2010). Although emissions of ammonia to the atmosphere have decreased substantially (by 24 per cent between 1990 and 2008), further reductions are needed to avoid the harmful acidic deposition and eutrophication that continue to be problematic across the EU. Ammonia also significantly contributes to the formation of airborne particulate matter (fine dust).

Resilience to Flooding: Data on this public good are limited. The evidence suggests that the occurrence of flood events in Europe may increase, although there are no EU level data on the contribution of farmland management to flood risk.

Resilience to Fire: There are few data on the resilience of agricultural habitats to fire. However, data show that in Portugal, Spain, France, Italy and Greece a total of 14 million hectares of forest burnt from 1980 to 2008 (JRC, 2009), and the risk of forest fire is expected to increase significantly as a result of climate change.

Culturally Valued Agricultural Landscapes: Agricultural landscapes are defined and influenced by the interaction of a range of factors, including cropping and stocking patterns, the intensity of land use, parcel sizes and boundaries, unfarmed features, cultural aspects and both contemporary and historic buildings and infrastructure. There is no single indicator that can act as a proxy for these factors in combination and reflect the complexity and multiple functions of the EU's agricultural landscapes (EEA, 2005). For this reason, trends in agricultural landscapes have to be inferred from a selection of indicators, such as crop area, livestock density, land cover, and the occurrence and distribution of farmland features.

The grazing of livestock has created the landscape and habitat diversity characteristic of extensive pastoral systems in Europe particularly prevalent in marginal and mountainous

areas. Declines in livestock can lead to a loss of this distinctive landscape character. The proportion of permanent grassland in the EU, and the density of livestock per hectare have both declined in the past decade (by 11 per cent from 2001 to 2009 and 1.1 per cent per annum between 2000 and 2005 respectively). Cattle had the highest share of the total livestock population in many regions in 2000, but declined by more than 10 per cent in many cattle-dominated areas (EEA, 2005). There are no EU wide data on the state or condition of farmland features. Evidence from surveys and case studies in individual Member States shows different trends, with both increases and decreases in the quantity of landscape features in different Member States, as a result of a range of pressures and policy drivers (Farmer *et al*, 2008).

Rural Vitality: As a result of its multi-faceted nature, rural vitality is difficult to measure. However, some indications can be inferred from observed socio-economic trends in Europe, varied though these are at the regional level. There is some evidence that rural areas, particularly the more remote ones, are still being depleted in relation to both population and economic activity (Mandl *et al*, 2007). A recent study by Copus *et al* (2011) stresses the diversity of rural areas in the EU, but argues that 'there is a tendency for the Agrarian regions to be relatively low performers, showing many of the characteristics of the process of socio-economic 'depletion''. A report on rural areas in the new Member States, completed just before accession in 2004, found a tendency for migration away from peripheral regions to the capital regions, especially by young people (IAMO, 2004). Rural regions in the eastern Member States and at the southern and northern borders of the EU are distinctly more marked by population decrease than those in Western Europe. The demographic shift towards an ageing society is comparatively more significant in rural areas. Downward demographic and economic trends in many disadvantaged rural areas have led to declines in the provision of public services and infrastructure: roads, public transport, facilities for childcare, health and education, leisure and recreation can all be affected, with impacts on employment opportunities as well as a loss of many local traditions and other elements of the cultural heritage (European Foundation for the Improvement of Living and Working Conditions, 2006).

2.2.2. Evidence of the demand for public goods

Assessing the scale of demand in Europe for the public goods provided through agriculture is difficult. The very characteristics of public goods – their non-rivalry and non-excludability – means that there are no markets for them, and therefore there are few formal mechanisms outside the political process through which consumers as 'citizens' can express their demand for a given public good. One source of evidence is individual preferences or attitudes towards the environment, which provide an indication of the existence of demand – as captured through behavioural indicators (such as visitor numbers to national parks, membership of environmental organisations), attitudinal surveys and through contingent valuation studies. Aggregating these individual preferences into a common articulation of the scale of demand for the 'common' public good, however, is extremely problematic. Policy objectives and targets, which are determined through the political decision-making process can be used as a proxy of the collective demands of society, and as such can be used to identify the socially desirable or socially optimal level of provision of public goods.

Table 2: EU legislative and Policy Objectives relating to public goods

Environmental Public Good	Legislative / Policy Objectives
Climate Stability	To contribute to the reduction of EU greenhouse gas emissions by at least 20% below 1990 levels by 2020 (EU Climate and Energy Package, 2008). There are no sector specific quantitative targets for agriculture at EU level.
Biodiversity	To halt the loss of biodiversity ... in the EU by 2020 [and] restore them in so far as feasible… (Decision of the European Council, 15 March 2010).
Water Quality	To enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands ... reduce water pollution and to achieve good ecological status of all water bodies by 2015 (Water Framework Directive 2000/60/EC).
Water Availability	To promote the sustainable use of water and to mitigate the effect of droughts (Water Framework Directive 2000/60/EC).
Soil Functionality	No formal EU objective. Derived objective: To protect and ensure the sustainable use of soil by preventing further soil degradation, including erosion, deterioration, contamination and desertification (from Thematic Strategy for Soil Protection COM (2006) 231 Final and 6EAP 1600/2002/EC).
Air Quality	Adherence to the limits set for each Member State for total emissions in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution (sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia) (National Emissions Ceiling Directive 2001/81/EC). To protect the environment as a whole by preventing or minimising emissions to all media (air, land and water) (Industrial Emissions Directive 2010/75/EU)
Resilience to Flooding and Fire	To reduce the probability of flooding and its potential consequences (Floods Directive 2007/60/EC).
Culturally valued agricultural landscapes	No formal EU objectives. Derived objective: to protect and enhance the EU's traditional agricultural landscapes, to maintain landscape features and to conserve and appropriately restore areas of significant landscape value (from 6EAP 1600/2002/EC).
Rural Vitality	To strengthen economic, social and territorial cohesion and to reduce disparities between the levels of development of the various regions and the backwardness of the least favoured regions. Among the regions concerned, particular attention shall be paid to rural areas … (Art. 174 of the consolidated version of the Treaty on the Functioning of the European Union)
Farm Animal Welfare	No formal EU objective other than Article 13 of the TEU (Lisbon Treaty) which requires the EU and Member States to "pay full regard to the welfare requirements of animals", referring, inter alia, to agriculture policy. Derived objective: To achieve a level of protection in line with citizen's concerns with respect to farm animal welfare (draft strategy on Animal Welfare). Specific legal requirements exist for pigs, calves and laying hens.
Food Security	No formal EU objective: Derived objective: To maintain a robust resource base for sustainable food production in the future

The nature of the relevant objectives and targets – set at both the EU and national levels – is variable. They comprise both explicit and implicit targets, as well as legally binding targets and certain targets which are not legally enforceable. Explicit targets are often contained within international and EU level agreements and conventions, which are set out in the EU's formal environmental commitments, and within certain pieces of EU and/or national legislation. Explicit EU targets have been set predominantly in relation to biodiversity, water quality, greenhouse gas emissions and air quality, and in many cases prescribe specific and quantified goals, in certain cases to be met within a specified timeframe.

As noted above, there has been some progress in relation to air quality, water quality and greenhouse gas emissions from agriculture, but there is still a long way to go to meet European targets for climate change, biodiversity and water quality.

2.3. Current policy measures delivering public goods

2.3.1. The role of regulations and incentive-based measures in delivering public goods

Where there is an undersupply of public goods, different policy responses can be chosen. At the simplest level, either existing regulations can be strengthened or new ones introduced. In the case of non-compliance with existing regulations, enforcement can be improved. Alternatively, an economic payment can be provided to incentivise the desired behaviour. Each of these options has different impacts on public resources. Regulations restrict the property rights of farmers or landowners and require them to bear the costs of compliance, whereas with incentive-based measures taxpayers have to bear the costs. In practice, the decision about whether or not stricter regulations are justified is a matter of societal and political preferences and decisions. In specific situations, where the distributional effect of strengthened regulations is seen as imposing an unfair burden on the farmer, then compensation for these restrictions can be provided by society either for a limited period or indefinitely. This is not common in the EU, but Natura 2000 payments are one such example, where farmers may be explicitly paid for the actions needed to comply with the restrictions in management they face on their land as a result of the Birds and Habitats directives.

Regulations (legislative requirements or other binding standards) are important for the provision of public goods for two reasons. Firstly, they seek to control human behaviour by forbidding societally undesirable actions or prescribing desirable actions. Secondly, they define the 'reference level', i.e. the dividing line between the level of environmental provision that farmers are expected to deliver at their own expense, and an enhanced level of environmental quality for which farmers may be paid to deliver, for example through agri-environment schemes (OECD, 1998; Scheele, 1999; Kristensen and Primdahl, 2006). Therefore any policy that offers payments for delivering specific objectives needs a clear baseline for establishing where payments are justified. In line with the Polluter Pays Principle, no payments should be provided to land mangers merely for complying with legislative requirements or other binding standards, with exceptions noted above. Only where action is needed that goes beyond that required in the legislative baseline, is remuneration needed to encourage land management practices and other investments that would otherwise not make economic sense to the farmer.

2.3.2. Current CAP policy measures

Policy measures have been in place under the CAP to promote the provision of environmental public goods since 1985. However, it was the 1992 MacSharry reforms that signalled the start of significant efforts to integrate environmental considerations into the CAP, making the agri-environment measure compulsory for Member States to implement. Since this date other changes have also been made to the CAP through the Agenda 2000 reform in 1999, the Fischler reforms in 2003 and 2004, and the Healthcheck in 2008, all of which have aimed to improve the sustainability of agricultural practices, enhance delivery of environmental public goods and reduce environmental damage (Baldock *et al*, 2002; OECD, forthcoming). A focus on rural vitality was introduced formally within the CAP as part of the Agenda 2000 reforms, with the introduction of policy measures that went beyond the agricultural sector. More recently, farm animal welfare has also become a specific focus, not only under cross-compliance requirements, but also in Pillar 2 measures.

The degree to which these aspirations have been achieved in practice is variable. Many public goods continue to be undersupplied despite the contribution that has been made by policy interventions up to now. Further action will be necessary if the delivery of public goods is to meet European targets and objectives.

Experience with the design and delivery of policy measures focused on the delivery of public goods through the CAP over the past 20 years has demonstrated that a wide range of factors influence their effectiveness. These include the design and focus of a suitable range of policy measures, clarity of their objectives, the way in which they are implemented (particularly the degree of tailoring and targeting), the availability of advice and training for farmers, the administrative capacity of the relevant agencies, as well as investment in data collection, monitoring and evaluation. The adequacy of budgetary resources relative to requirements also exerts a significant influence on the eventual outcome of the measures.

In principle, all types of farming can provide some public goods if the land is managed appropriately. However there are significant differences in the type and amount of public goods that can be provided by different types of farms and farming systems in Europe. Some of the farming practices needed for the continued provision of public goods are found throughout Europe, others are more associated with particular regions or localities. Many of these management practices provide several environmental public goods simultaneously. The range of beneficial farming practices undoubtedly will change over time as emerging technologies provide new possibilities for enhancing the environmental value of farming and land management operations, for example, by improving energy efficiency.

Extensively managed livestock farms, mixed systems with both livestock and crops, permanent crops employing more traditional forms of management and organic farms tend to deliver the greatest range of public goods, with some exceptions such as methane emissions. This is because they tend to be managed using lower levels of fertiliser and pesticides or with lower livestock densities, the land involved retains a high proportion of semi-natural vegetation and landscape features and the farmed area is often intermixed with a diversity of different types of land cover such as scrub or woodland. However, more productive types of farming can also provide public goods, for example through the use of new technologies to improve soil and water management and to reduce greenhouse gas emissions or through the introduction of farming practices that support biodiversity in more intensive agricultural landscapes.

In recent decades, the economic importance of agriculture within national, but also rural economies has declined. As a result, in most regions of the EU, agriculture now is no longer the economic backbone, and rural vitality increasingly relies on non-agricultural activities. Nevertheless, since agriculture is – besides forestry – the most important land use in nearly all rural regions, it will remain important with respect to environmental and landscape aspects.

In relation to farm animal welfare, EU regulations establish only a baseline that reflects current perceptions of the minimum acceptable standards rather than maximising animal welfare. Measures that encourage enhanced levels of welfare therefore may include desisting from certain practices, providing space for animals to express more natural forms of behaviour or additional extended lifespans with less intensive fattening regimes.

Policy measures under both Pillar 1 and Pillar 2 of the CAP have the potential to deliver public goods associated with agriculture, albeit to differing degrees. These have been rehearsed in a number of recent studies (for example: Cooper *et al*, 2009; ENRD, 2010), although the impacts of these measures in practice on the ground in different parts of Europe is more difficult to ascertain.

Under Pillar 1, the main policy tools with public good objectives include the various elements of cross compliance, and certain of the provisions under Article 68 for providing farmers with 'special support' for various purposes. However, it is rural development policy, funded through the European Agricultural Fund for Rural Development (EAFRD), which is the main policy instrument with the potential actively to encourage the provision of public goods associated with agriculture in Europe. Over the 2007–13 programming period, €151 billion is allocated to Pillar 2 (including national co-financing), although only a proportion of this is focused currently on the delivery of public goods.

Decoupled Direct Payments

The main focus of decoupled direct payments under Pillar 1 of the CAP is to provide income support to farmers. They are not, therefore, designed to provide public goods directly. However, they can contribute indirectly to environmental public good delivery in some circumstances. For example, where direct payments make a critical contribution to the economic viability of farms they help to keep farming activity in place, and in so doing provide a foundation for the application of more targeted measures, for example through Pillar 2 measures. This is less the case for other public goods, such as rural vitality or farm animal welfare, since the current historic model for payment calculations means that the majority of the payments are concentrated in the areas of most productive agriculture, many of which enjoy relatively high incomes. In Italy, for example, Sotte (2011) recently has showed that there is a clear concentration of CAP expenditure in the areas of the Po Valley, where the richest and the most highly productive agriculture is concentrated, characterised by the largest farm sizes and the most up-to-date technology. In contrast, the CAP payments are significantly lower over the whole Alpine and Apennines areas, where farms almost certainly merit high levels of support from a rural vitality perspective since they contribute to social and cultural benefits while generally producing lower economic returns because of the climatic and physical constraints they experience.

Cross compliance

The current system of mandatory cross compliance was introduced in 2005, formally with two main purposes. The first was to promote more sustainable agriculture, and the second was to act as a flanking measure to address undesirable side-effects of the introduction of

decoupled direct payments, most notably the cessation of the active management of farmland and the risk of land abandonment (Hart *et al*, forthcoming).

There are two elements of cross compliance that have the potential to help improve the delivery of public goods associated with agriculture. Farmers must comply with both elements if they are to receive the full amount of their direct payments. The first element relates to the suite of Statutory Management Requirements (SMRs), which require adherence with specific obligations in a range of current EU legislation which applies at the farm level. This legislation relates to the environment, animal welfare as well as public, animal and plant health. The SMRs consist of legislative requirement adherence with which is required of all farmers even if CAP support is not received.

The second element of cross compliance comprises the GAEC standards. These consist of a suite of additional requirements set out in Annex III of Council Regulation 73/2009, the detail of which is determined at the Member State level. In principle this is to allow the standards to be adapted to national circumstances and 'take into account the specific characteristics of the areas concerned, including soil and climatic conditions, existing farming systems, land use, crop rotation, farming practices and farm structures' (Article 6). GAEC standards can be based on existing national legislation or may require the introduction of additional standards. Some standards are focused on the provision of public goods more directly than others. There is a particular focus within GAEC standards on soil management, for which there is no overarching regulatory framework at the EU level, as well as a number of standards relating to the maintenance of habitats and landscape features and water management.

In theory, if applied appropriately and compliance is assured, these can help to secure a basic level of environmental management on farms and so form a foundation on which more targeted incentives under rural development policy can build. In practice, there is considerable variation in the way that GAEC standards are implemented in different Member States going beyond that which could be attributed to varying local conditions. In addition, levels of compliance and enforcement are very variable and the lack of monitoring and evaluation requirements makes it difficult to assess the impact of these measures in practice (ECA, 2008). On the other hand, vigorous pursuit of good agricultural condition can be detrimental to public good provision. The GAEC standard for 'avoiding the encroachment of unwanted vegetation on agricultural land' in particular appears to be being so strictly interpreted in some Member States as to lead to perverse environmental impacts, for example where farmers have been required to cut trees, and remove natural vegetation in field corners and other landscape elements which are important from an environmental perspective. Some revisions to the relevant EU regulations and/or guidelines on their interpretation may be needed.

Article 68 measures for 'specific support'

Article 68 of Council Regulation 73/2009 currently gives Member States some flexibility in the way they spend the national budget allocated to them for direct payments by allowing them to divert up to 10 per cent of the national ceiling of into national "envelopes", which can be used for a variety of authorised purposes, one of which is the provision of certain public goods. The authorised purposes include: protecting the environment, improving the quality and marketing of products or animal welfare; payments for disadvantages faced by specific sectors in economically vulnerable or environmentally sensitive areas as well as for economically vulnerable types of farming; top-ups to existing entitlements in areas where

land abandonment is a threat; support for risk assurance in the form of contributions to crop insurance premia; and contributions to mutual funds for animal and plant diseases.[3]

The provisions under Article 68 (1)(a)(i) and (v) are specifically focused on the provision of environmental benefits. Measures being implemented to support 'activities entailing additional agri-environmental benefits' include support for extensive grazing practices, crop rotations as well as more demanding options such as conversion to organic farming. On the other hand, the measures being used by Member States to support 'specific types of farming which are important for the protection of the environment' appear more variable in terms of their likely environmental impacts, with the focus ranging from supporting protein and oilseed crops and the establishment of perennial energy crops to maintaining livestock grazing in environmentally protected areas and supporting traditional breeds of livestock. In some countries, other articles have been used to introduce environmentally beneficial management. For example, Romania has notified the national measure to support organic farming under Article 68 (1)(a)(ii). Relevant Article 68 measures are set out in Table 3.

Table 3: Member State use of Article 68 for environmental purposes

Member State	Article 68 (1)(a)(i) 'specific types of farming which are important for the protection of the environment'	Article 68 (1)(a)(v) 'specific agricultural activities entailing additional agri-environment benefits'
Denmark	- Support for the establishment of perennial energy crops	- Support for extensive farming and for the maintenance of permanent pastures
Finland	- Premiums for protein and oilseed crops - Support for starch potato crop	
France	- Support for protein crops	- Maintenance of organic farming - Support for diversification of crop rotation - Conversion to organic farming
Ireland	- Support to farming livestock systems in beef/dairy/sheep located in Burren area	
Italy		- Crop rotation
Netherlands	- Support for farmland which can be reached only by water	
Poland	- Support for farmers cultivating pulses and herbage legumes	
Portugal	- Support for maintaining extensive handling systems for autochtonous breeds	- Protection of olive oil patrimony - Support for extensive grazing
Spain		- Crop rotation in non-irrigated areas

Source: European Commission, 2010b

[3] Articles 68(1) (a) (b) (c) (d) (e) of Council Regulation (EC) No 73/2009.

In relation to other public goods, payments to land managers who are practising enhanced animal welfare standards are permissible under Article 68 (1)(a)(iv). However, to date only the Netherlands is making use of this provision.

Article 68 (1)(b) allows Member States to provide 'special support to address specific disadvantages affecting farmers in the dairy, beef, veal, sheepmeat and goatmeat and rice sectors in economically vulnerable or environmentally sensitive areas, or in the same sectors, for economically vulnerable types of farming'. In addition, Article 68 (1)(c) allows support to be provided 'in areas subject to restructuring and /or development programmes in order to ensure against land being abandoned and /or to address specific disadvantages for farmers in those areas'. Maintaining certain types of farming in areas where they might otherwise have struggled to remain economically viable may have some impact on rural vitality by keeping farmers on the land. The majority of Member States (21) have used the first of these two measures. The main focus of support is on dairy farming (15 Member States), with four Member States supporting the beef sector and five Member States using support to help sheep producers. In contrast, only three Member States have taken advantage of the opportunity to provide restructuring support (Greece – in LFA mountain areas; Hungary – for fresh fruit and vegetables and tobacco; and Slovenia – preserving animal rearing on farms with permanent pasture).

The absence of any reporting or monitoring requirements for Article 68 support, however, means that it is not possible to assess the extent to which such support delivers public good outcomes in practice. This is far from self evident from the objectives summarised in the table.

Rural Development

Pillar 2 of the CAP offers Member States a great degree of freedom with respect to the measures which they adopt and prioritise and the weight given to the different axes in their rural development programmes. Consequently, the 88 Rural Development Programmes in the EU differ considerably. The degree to which the RDPs deliver public goods is very dependent on the way in which Member States design them, the actions that they choose to prioritise, the eligibility criteria they use, the way that measures are designed and targeted and the way in which schemes are delivered on the ground.

The rural development measures that are most used for pursuing the provision of environmental and social public goods can be divided into three broad categories:

- Area based payments that provide incentives to farmers to carry out beneficial land management practices, for example the agri-environment measure, natural handicap measures and the Natura 2000 measures;
- Investment aid that provides assistance with the costs of physical capital investment, for example, the farm modernisation and infrastructure development measures under Axis 1 and the grants for funding activities in rural areas more generally, such as maintaining and promoting the natural heritage, supporting farm diversification, or tourism activities in Axis 3; and
- Measures that provide advice, training and capacity building to improve human capital, for example, in the training and advice measures in Axis 1 and 3.

The most significant measures used for the provision of environmental and other public goods, such as rural vitality and farm animal welfare are listed in Table 4. However, it should be stressed that not all these measures are focused directly on the provision of public goods. For example, the main purpose of the majority of measures to support capital

investments is to improve the competitiveness of the agricultural and forestry sector. Nonetheless, this form of investment can be used in pursuit of public goods, directly or indirectly, as in cases where new equipment or buildings are required to reduce greenhouse gas emissions or maintain the viability of HNV farms and the necessary resources cannot be generated from the farm business.

Table 4: Pillar 2 measures which can contribute to the provision of public goods

	Type of support	Rural Development Measures
ENVIRONMENTAL PUBLIC GOODS	Area based land management payments	• Agri-Environment measure • Natural Handicap Measures • Natura 2000 measure
	Capital investment in physical infrastructure	• Non-Productive Investments • Farm Modernisation • Infrastructure development • Semi-subsistence farming • Conservation and upgrading of the rural heritage • Adding value to agricultural products • Diversification
	Advice, Training and Capacity Building to improve human capital	• Advice and training measures
OTHER PUBLIC GOODS	Area based land management payments	• Natural Handicap Measures • Agri-Environment measure
	Capital investment in physical infrastructure	• Infrastructure development • Semi-subsistence farming • Animal Welfare measure • Farm Diversification • Encouragement of tourism activities • Basic services for the economy and rural population • Village renewal • Leader approach
	Advice, Training and Capacity Building to improve human capital	• Training and Information • Leader approach

Source: Adapted from ENRD, 2010

As noted above, although a wide range of measures have the potential to encourage the provision of both environmental and social public goods through agriculture, and other rural activities whether or not they do so in practice depends on a number of factors. Some of these relate to the selection of locally appropriate measures within RDPs. Others relate to the design and targeting of measures and the funds available. Despite progress made in relation to the design, targeting and delivery of rural development schemes, there is still significant room for improvement. The present suite of measures being implemented comprises some that are tightly targeted and tailored to specific outcomes whilst other lack precision in this regard. This can lead to unsatisfactory results and an inefficient use of resources. Objectives need to be specified precisely, and efforts are needed to target the use of measures on specific public good outcomes while taking into account possible positive or negative side-effects. Appropriate tailoring and targeting, which leaves sufficient discretion to the judgement of farmers and those applying policy on the ground, is essential to secure reliable outcomes.

With respect to the implementation of programmes and schemes, the degree of administrative and technical capacity within national administrations, extension services, research bodies and paying agencies, along with the provision level of advice and training for farmers also has a significant effect on public goods outcomes. Effective monitoring and evaluation of policy measures is critical to assessing outcomes and informing improvements in both measure and scheme design.

Appropriate engagement with farming and environmental organisations can help to establish well designed programmes and to elicit a sense of co-operative effort. Finally, the successful delivery of environmental public goods such as cultural landscapes can be reinforced and enhanced if there are tangible effects on the local economy and vitality of rural areas from increased tourism for example.

The analysis carried out for the ENRD on the way in which Member States have approached the delivery of public goods through their RDPs for the 2007–13 programming period provides some lessons of relevance to improving the delivery of public goods in the next programming period. Some of the key findings of this and other similar reviews are as follows:

- Recognition that the delivery of environmental public goods and rural vitality involves long-term commitment and that positive results will often only become apparent over time. The design and implementation of measures is an ongoing process in which schemes should evolve and improve in a succession of stages.

- The need to take an integrated approach in determining the most effective and efficient means of delivering public goods. This requires consideration of the synergies that exist between different public goods so as to find ways of supporting measures or packages of measures that maximise the provision of multiple public goods and minimise any potential conflicts.

- In most regions of the EU, rural vitality might be supported best by following a territorial rather than a sectoral approach focusing solely on the agricultural sector.

- Improvements need to be made in the way that measures are targeted and their impacts measured. Clear objectives need to be set for all measures and schemes implemented in RDPs, with their intended outcomes specified in advance. The current suite of impact indicators under the Common Monitoring and Evaluation Framework (CMEF) should be checked for each measure and the programme as a whole to see whether they can be improved. This might be extending the indicators for some measures to cover environmental public goods currently omitted (for example in relation to water quality, carbon storage, soil functionality and landscape as well as developing indicators that can measure impacts on rural vitality) or by removing those indicators which have proved to be unhelpful in evaluation terms.

- Investment is needed in building institutional capacity in relation to the design and delivery of rural development measures. This is critical for the effective and efficient delivery of scheme objectives. The value of building the necessary skills, knowledge and technical resources should be recognised as an essential component of successful and efficient scheme delivery.

- Investment is also needed in collecting empirical information at the programme level to demonstrate the outcomes of schemes, both in relation to environmental and

socio-economic data. In addition, given the varied local contexts, issues and needs in the EU-27 and the multiplicity of responses to them in different regions, enhanced exchange of good practice and lessons learned between Member States and regions would be helpful.

- Further innovation is required in tackling both new and well charted challenges. Climate change has yet to be addressed very substantially in many RDPs. There also remain difficulties in operating schemes in areas with very small farms or there are large areas of common land. There is a need to explore different ways of achieving best value for money in relation to scheme delivery, for example through tendering or awarding collective contracts. Pilot programmes, not widely used at present, could play a valuable role in promoting innovation.

3. DEVELOPING POLICY TOOLS FOR DELIVERING PUBLIC GOODS ASSOCIATED WITH AGRICULTURE

KEY FINDINGS

- There is a range of ways in which the CAP could be structured and designed to deliver public good outcomes and there may be no one 'ideal' solution.
- The transition towards a more public goods focused CAP inevitably will need to take place in stages, with the 2014–2020 period being the next step along this path.
- The delivery of public goods needs to be set as a strategic objective of the future CAP which then is articulated within a coherent EU framework setting out the range of EU policy objectives.
- The effectiveness and efficiency of policy measures in delivering public goods depends significantly on the level of resources expended and the pattern of incentives offered to farmers, but the importance of other factors such as design and focus, targeting, administrative capacity etc must be emphasised.
- The scale of funding required for a meaningful delivery of public goods reaches well beyond the current size of the CAP budget.

This chapter elaborates proposals for the architecture and measures that could be adopted within the CAP to deliver public goods associated with agriculture. Other CAP objectives, for example improving the competitiveness of the agri-food sector or agricultural incomes whilst important are not considered. In considering the options that could be deployed within the CAP the aim has been to combine an analytical approach with an appreciation of political as well as policy realities.

There are a number of different ways in which the CAP could be structured and designed to deliver public good outcomes and there may be no one 'ideal' solution. Given the other objectives in play, varying priorities between governments and between different parts of Europe (with specific and valid concerns about socio-economic development in many new Member States for example) and the complex politics of the CAP, what may be optimal for delivering environmental and other public goods may not be politically or financially realistic in practice, at least in the short term. The proposals developed here are intended to be ambitious, yet operationally practical and are based mainly on the management of land and other resources, investments in physical and social capital and other measures that are needed to deliver the full range of public goods under consideration.

However, the political parameters and sensitivities of the debate cannot be ignored and a transition towards a more public goods focused CAP inevitably will need to take place in stages, with the 2014–2020 period being the next step along this path. This needs to be taken into account alongside the November 2010 proposals from the Commission and the views of the European Parliament which clearly will be important influences on the next manifestation of the CAP.

In this chapter, we first consider some existing proposals for progressing the CAP and then seek to identify and discuss a series of factors that are prerequisites for the successful delivery of public goods within the CAP. These measures are then developed in Chapter 4 together with a commentary on some of the implications and on where certain limitations or constraints (both practical and political) to implementation might lie. Given the political and economic context and the changes in the architecture and nature of support that will be needed to improve the provision of public goods, we also consider the potential for a gradual phasing in of different options over time.

The focus of the discussion is on environmental public goods predominantly, given that this is the area where, arguably, the objectives are clearest, undersupply is greatest and where the link to agriculture is generally close and action can be taken to improve supply within the CAP. Issues of rural vitality are of importance and merit greater attention than they have received to date. Given the variety of conditions within Europe it appears as if action within the CAP would need to be combined with policy in a variety of other domains (e.g. ERDF, employment policy, health, education and welfare policies etc) to bring about the required outcomes. The analysis required would go beyond the objective and resources of the present study. For this reason the policy needs relating to other public goods, such as rural vitality, are addressed, therefore, in less depth in this report.

3.1. Existing proposals for the CAP post 2013

In November 2010, the Commission published its proposals for the 'The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future' (European Commission, 2010c). On many aspects, this Communication remains rather vague, not only because it does not include any figures, but also since it contains inconsistencies. The Communication sets out three key objectives for the CAP to 2020 ('viable food production', 'sustainable production', 'sustainable management of natural resources and climate action', 'balanced action', 'balanced territorial development') and three options for its future structure. All three of these objectives relate to the provision of public goods in one form or another.

In relation to the provision of environmental public goods, the most significant element of the proposals is the suggestion that, alongside Pillar 2, certain environmental public goods should be delivered through a 'greening' of Pillar 1. This is understood as paying farmers to undertake certain environmentally beneficial management actions but making such management mandatory if direct payments are claimed. In relation to rural vitality, the proposals do not provide a clear picture. Although the Communication states that 'a growing number of rural areas have become increasingly driven by factors outside agriculture', there is no signal that rural development should follow a territorial rather than a sectoral approach. The description of the three broad policy options seems to suggest that the focus of rural development should move towards environmental public goods and not to rural vitality. Regarding Pillar I, the pressures facing small farms as well as farms in more marginal parts of the EU are recognised, with proposals to include support to farmers within areas facing handicaps within Pillar 1 as well as to simplify the system of support for 'small' farmers (although what is meant by the term 'small' is not defined).

A range of political actors and independent commentators on the CAP have put forward proposals on how it should be revised in terms of its rationale and structure. Some are

fairly detailed in nature. These include proposals from the European Parliament[4], environmental, farming and other NGOs[5] as well as research institutes and academics[6]. Some of these pre-date the Commission Communication, others have been developed in response to these proposals. They propose a variety of solutions. Of those proposals that focus on the provision of public goods as a core objective of the future CAP, the emphasis tends to be on environmental public goods. Much less is written on the policy needs relating to the other public goods.

The proposals for delivering more for public goods tend to be variations around a theme. They all tend to favour a tiered approach to payment measures to ensure that the majority of farms in the EU-27 undertake a certain amount of environmental management. The tier comprises payments for simpler land management actions that are available throughout the farmed countryside, in productive and less productive farming systems. Higher tiers comprise a more targeted suite of measures that incentivise specific forms of management to deliver environmental outcomes that need more focused and sometimes demanding management requirements. It is generally proposed that the majority of the land management that is sought, beyond that required by regulation, cross compliance and codes of good agricultural practice, would be paid for out of the public purse. In many proposals, the need for measures to support investments in sustainable technology and capital are highlighted as well as the essential role of advice and training for land managers.

Opinions differ about issues such as the mode of delivery – i.e. whether or not the outcomes required can be secured under a system of simple, annual payments, or whether the programming approach of Pillar 2 is a prerequisite for the successful delivery of environmental outcomes. Other differences of view include whether or not the continuation of direct payments under Pillar 1 is necessary to underpin the provision of public goods from farmland in the future and if so, the optimal level of these.

The debate on the other public goods is less nuanced, with 'maintaining the productive capacity of the land' seen as sitting firmly within the domain of Pillar 1 and the discussion on the role of the CAP to deliver rural vitality much less developed and therefore featuring much less frequently within this literature. In addition, discussions on rural vitality are most often agriculture centred, focusing on the importance of retaining farmers in rural areas, rather than considering the issue of rural vitality in a more holistic manner.

Taking account of these proposals and the analysis they offer, we have sought to develop a framework largely from first principles, with the focus centred on the delivery of the environmental and other public goods identified in Chapter 1.

3.2. Issues under consideration and assumptions

Amongst the considerations to be addressed in farming appropriate policies within the CAP are the nature of the support provided, allocation of the budget, levels of co-financing and the degree of subsidiarity given to Member States in terms of the design, targeting, financing and distribution of measures. In addition, the general approach and specific policy

[4] European Parliament, 2010; European Parliament, 2011a.
[5] BirdLife *et al*, 2009; Beaufoy and Marsden, 2010.
[6] Bureau and Mahé, 2008; SER, 2008; RISE Foundation, 2009; Baldock *et al*, 2010; Cooper *et al*, 2010; Hart *et al*, 2010; Scientific Advisory Board on Agricultural Policy, 2010; Bureau and Witzke *et al*, 2010; Tangermann, 2011.

tools will need to be relevant for a wide range of biophysical and agricultural conditions in Europe, be capable of being monitored effectively and not create an excessive administrative burden associated with their implementation at the EU, Member State or beneficiary level in the course of implementation.

3.2.1. Key assumptions

A number of assumptions have been made that set the context for the subsequent proposals. These concern the regulatory framework relating to the environment, the future of direct payments and the nature of the beneficiaries of CAP support in the future.

***Regulatory Framework*:**
For the purposes of this study, we have not assumed any increase in EU environmental regulation up to 2020, apart for that which is already agreed and due to come into force over this timeframe. The assumption is, therefore, that full implementation of EU environmental legislation of relevance to agriculture, including the Water Framework Directive, the Directive on the Sustainable Use of Pesticides and the Habitats Directive, takes place within the Member States on the timescale envisaged in the respective measures. The implication of this is that there will be an upward shift in the regulatory baseline level applying to farmers, for example in relation to diffuse water pollution and the use of integrated pest management. Of course this may not occur in practice, as experience shows us that the track record of compliance with environmental legislation in the EU-27 is very uneven.

Direct payments:
The future level and distribution of the current direct payments is not within the scope of this study and views vary considerably on the degree to which such payments are needed in the future to underpin the provision of public goods or to pursue other CAP objectives (Swinnen, 2009; Tangermann, 2011). Proposals range from a phasing-out of the current direct payments to an unchanged continuation. It seems certain, however, that some level of direct payments will continue in the 2014–2020 programming period. However, it should be recognised that the results of the political debate on direct payments are likely to have significant impacts on the policy tools to be implemented to achieve public good objectives.

Nonetheless, for the purposes of this study, we assume the continuation of direct payments in the next programming period, albeit with the understanding that the amount received per hectare is likely to change, given the move towards flat rate area payments, and most likely in a downwards trajectory in the majority of the Member States.

Beneficiaries:
From the perspective of public good provision, all land managers that produce public goods should be potentially eligible for support under the CAP. The current definition of a 'farmer' should allow for this, as specified in Article 2 of Council Regulation 73/2009, provided that land managers such as nature conservation trusts, foundations or NGOs managing cultural landscapes are not excluded from CAP support. From the perspective of the provision of public goods there is no need to restrict support to 'active farmers', as called for in the Commission's Communication. With regard to rural vitality, there is no reason why support should focus only on a specific sector; all those contributing most to relevant forms of rural vitality should be eligible in principle.

3.3. Clarity on strategic objectives of the future CAP

3.3.1. The delivery of public goods as a strategic objective

As discussed in Chapter 1, a range of public goods can be delivered effectively by agriculture activities in the European countryside. The role of the CAP should be to assist the provision of these public goods and to do so within a coherent European framework. This should identify the key environmental and other public goods that are required over the relevant period of time and indicate in broad terms the role of agriculture and other sectors, especially forestry, in providing them. In doing so, account must be taken of the role of other EU and national sources of funding. These include the European Regional Development Fund (ERDF), which makes a substantial contribution in some spheres, including the provision of clean water, climate change mitigation and adaptation, biodiversity and rural vitality and also LIFE+ is a much smaller fund but also contributes to biodiversity and climate objectives. From 2014 onwards, the roles and remit of other EU funds may change and their objectives with respect to environmental and other public goods might be extended, particularly to reflect the priorities set out in the EU2020 strategy in which resource efficiency is a theme. Such developments would need to be taken into account within new regulations setting out the operation of the CAP from 2014 onwards.

The principal regulations for the new CAP will need to make clear references to public good provision as a core objective. This objective needs to sit alongside other objectives of the CAP which are adopted, such as those outlined in the Commission's November Communication (eg, a competitive agri-food sector and balanced territorial development). Reference would need to be made specifically to the range of environmental public goods, to relevant aspects of food security (such as maintaining the productive capacity of the land) and to other public goods, for example rural vitality and farm animal welfare.

A certain degree of precision is required in formulating such objectives. In particular, it would be helpful to bring together the various targets and goals applicable to the rural environment that have been established in European legislation, with reference to the timetables where these have been established (see, for example, Table 2 in Chapter 2). Some of these objectives may change over time and this should be allowed for. For example, agriculture and forestry may be required to make a greater contribution to reductions in EU greenhouse gas emissions, particularly if the EU adopts a target of a 30 per cent reduction in overall GHG emissions by 2020. Sectoral targets for agriculture may well be adopted and could result in the inclusion of emissions from agricultural land use or land use change in the political targets. This could be formalised through the burden-sharing Directive or by other means, such as sectoral obligations to be determined at Member State level.

A schedule of these targets and objectives could be included as an Annex to the CAP implementing regulations for example and the contribution that agricultural expenditure under the CAP is expected to make to meeting these objectives and to ensuring the sustainability of the sector made more explicit. Although such a table would not be feasible for rural vitality, some simple definitions could be attempted so that this concept did not become entirely open ended and meaningless. Alternatively, the duty of defining rural vitality or an equivalent formulation could be passed to Member States within some basic

European parameters, with a requirement on national governments to justify their proposals.

The introduction of such objectives would be an innovation within the CAP and would require interpretation above and beyond the texts of the regulations themselves. Furthermore, a mechanism would be needed to translate broad Community level objectives into more specific ones applicable at the Member State level. This would require the elaboration of public good objectives within the new Community Strategic Guidelines that the Commission is expected to prepare for expenditure under EAFRD and other funds for the 2014–2020 period. It would build upon the current Community Strategic Guidelines for rural development and extend them to cover the whole CAP.

At present there are Strategic Guidelines for the EAFRD and separate guidelines for certain other EU funds. However, it has been proposed by a group of Commissioners that one overarching set of Strategic Guidelines, applicable to all the principal funds, should be drawn up for the next multi-annual financial framework (MFF) so that the funds work within an integrated structure. If this occurs, it would be an opportunity to spell out public goods objectives and their relevance to the different funds in more detail, as long as they are articulated with sufficient precision so that they remain meaningful. This will be as important for environmental as for other public goods.

It is suggested that the nature of the different public goods and the types of land management required to deliver them could be elaborated in these Strategic Guidelines. Monitoring requirements under the different funds, including the indicators associated with them, would be made explicit. Building on this foundation, Member States could be required to draw up broad delivery strategies for the individual public goods for the period 2014 to 2020, reflecting the specific pressures and needs identified regionally or nationally. These strategies would indicate the contribution that the agriculture / forestry sector was expected to make to, say, biodiversity, climate change, water or rural vitality objectives and targets in the Member State or region concerned. This would in turn provide the overarching rationale and planning framework to inform the use of the range of available EU funded measures to assist the fulfilment of these goals. Such national targets and plans would be the structure around which EU funded interventions under the CAP (and other funding instruments) would be organised, rather than the four Axes in the EAFRD as it now stands. The measures used to deliver these objectives might include a combination of land management payments offered through agri-environment measures, various forms of investment aid, complementary forms of forest management, advice and training and related technical assistance. However, in order to move towards such an objective led approach, the rationale for the utilisation of different measures would need to be well developed, the anticipated outcomes identified clearly and the means of monitoring results agreed and put in place at the outset.

An approach of this kind, which is particularly suited to interventions under Pillar 2, has been hinted at in more general terms by the Commission on a number of occasions in recent years (including the November Communication). However, it could also be applied to more generic forms of farm support of the type found in Pillar 1 and would help the identification of objectives and anticipated outcomes for public good provision and their articulation for all farm-level support under the CAP. This would facilitate the consideration of synergies and trade offs between different public good objectives and other objectives of the CAP. Consequently, any public goods focused measures in Pillar 1 would also need to be planned, designed and justified at least partially at the Member State/regional level, providing one integrated plan rehearsing the full suite of supports and interventions

designed to deliver public good targets. This would need to be submitted for Commission approval at an early stage of the new CAP implementation cycle and reviewed over time. This would also bring greater transparency to CAP spending.

3.3.2. Synergies and conflicts with other CAP objectives

The CAP will continue to have a number of other strategic objectives in addition to public good provision and these will need to be balanced with the new priorities. However, in most respects the provision of public goods is broadly compatible with other longer-term objectives since a sustainable agriculture and forestry sector is essential for long-term security of food supply, for rural job security, for farm incomes and for the development of robust rural and regional economies.

Nonetheless, some tensions and conflicts will arise, particularly in the short term, for example between certain forms of public good provision and short-term agricultural competitiveness. As an illustration of this, one of the central proposals for addressing a group of public goods on farmland is the introduction of ecological set-aside in some form. This would reduce the area of land available for production and has opportunity costs for the individual farmer and for society as a whole. In some regions, these costs may be relatively modest as the land in question already may be devoted to environmental rather than production purposes on many farms and in others poor soils may be selected for this purpose. Therefore, where there is a loss of yields these may not be very great. In addition, taking land out of production may provide opportunities for new income sources, for example associated with recreation. However, the opportunity costs may be relatively high in more fertile regions and where agricultural returns are high.

Achieving consistency, not just between the objectives of funding instruments, but EU objectives more generally (for example those articulated in the EU2020 strategy, climate and energy policy etc) undoubtedly will raise challenges. At a broad level, the provision of environmental public goods is particularly associated with less intensive forms of agriculture, the maintenance of permanent grassland and more traditional permanent crops rather than more productive arable and permanent crop systems. One of the primary roles of agri-environment policy is to provide sufficient incentives for farmers to forego the economic advantages of utilising more intensive practices. Clearly there will be limitations to the willingness of farmers to adopt or continue with less intensive systems even with generous incentives. These limitations may become more severe if the global food markets remain tight and the prices of key commodities in Europe remain on an upward trajectory.

However, perhaps an even greater challenge is to assess the net effect on the environment when greater public good production is accompanied by less intensive forms of agriculture in some areas, but by more intensive agriculture in others. For example, there are questions about how far it is legitimate to maintain a large proportion of the European agricultural area under more extensive systems, especially if this triggers environmentally damaging practices elsewhere in the world, such as the expansion of arable farming into forests and other natural habitats and the unsustainable intensification of less robust agricultural ecosystems. Climate change measures should not lead to carbon leakage whereby production (of cattle for example) moves abroad in order to avoid EU legislation. This can happen via European entrepreneurs in search of greater competitiveness outside the EU or via foreign farmers or companies supplanting European suppliers. This does not lead to a fall in global emissions and can put pressure on more natural habitats such as grasslands or forests. Some balance will need to be struck between a larger-scale provision of environmental public goods, including more stable and healthy soils in Europe and a

more parsimonious use of water, and the continued production of a proportionate share of global food supplies in Europe.

These pressures will be exacerbated by a range of issues. Arguably one of the most pressing is the requirement to generate a larger proportion of energy from biological sources both within Europe and in the world as a whole. At present the EU has a target of producing ten per cent of all transport fuels from renewable sources of energy, a considerable proportion of which will be biofuels, by 2020. Increasingly data is indicating that this is an ineffective means of reducing greenhouse gas emissions. Due to the indirect land use change (ILUC) consequences of first generation feedstock crops, such as maize and oil seed rape, biofuels are unlikely to save greenhouse gas emissions to the extent required under the Renewable Energy Directive (RED) and may even lead to increased emissions.

If there is no diminution in demand for food crops, the demand to grow additional crops for energy supply purposes is likely to cause the conversion of grassland or other uncropped land into arable production, even if it is at a location remote from the feedstock production itself (Bowyer, 2010). This is because there is a tendency at a global scale to augment production more through increased land area than by higher yields under present conditions. Over time this pressure will increase because of demand for other forms of bioenergy as well. For example, analysis of the national plans prepared by Member States under the Renewable Energy Directive suggests that they are expecting more than half of their target level of renewable energy supply to be met from bioenergy sources by 2020 (Atanasiu, 2010). While appropriate forms of bioenergy feedstocks should have benefits in terms of replacing fossil fuels and reducing greenhouse gas emissions, they will still generate pressures on limited land resources as well as the landscape, both within Europe and globally.

Indeed, any meaningful climate change mitigation strategy at the EU level should acknowledge the extent of the methane issue as a by-product of livestock production and develop frameworks to reduce these emissions in the long term, combining research, technological development, regulatory and financial incentives as appropriate. In parallel there is a need to consider the refocusing of research, strategies and investments to scale up the production of renewable energies that do not affect food security adversely or have a negative impact on biodiversity and that instead can make a positive socio-economic contribution to European energy production while also reducing GHG emissions from agriculture. One example of how this might be applied to biogas production from organic waste is set out in the Box 1 below.

Beyond the climate agenda, the farming sector also has an important role to play in increasing the efficiency of resource use and this relates to the sector's use of nutrients, energy, water, feed and forage. Strategies will need to be developed for this purpose that aim also to maintain or enhance overall productivity, thus avoiding indirect land use change (ILUC) effects. Such an approach is fully compatible with the green growth objectives of the EU 2020 strategy. In most cases, increased resource use efficiency helps to avoid pollution or other environmental damage, and it contributes to a reduction in the ecologic footprint per unit of agricultural output. Potential measures for improving resource efficiency at the farm level include support for ecological audits, technical advice, investment aid and environmental land management.

For such reasons, a public goods agenda for agriculture is likely to mean both a clear role for improving the sustainable delivery of public goods from intensive production systems

(including those producing bioenergy and industrial feedstocks) and a long-term role for extensive farming practices delivering multiple public goods.

New synergies and trade offs will emerge over time and the complexities involved will require appropriate knowledge and expertise both in public administrations and in the other stakeholders involved in policy formation and delivery. At the same time administrative costs need to be kept under control within an increasingly sophisticated policy environment. This is no small challenge.

Box 1: Integrated approaches to incentivise the production of biogas from animal waste

In the EU, 9.1 per cent of total GHG emissions come from livestock production, rising to 12.8 per cent when land use change (LUC) is accounted for. Of these, beef and milk production from cows are responsible for the highest share of CO_2 and equivalent gas emissions (29 per cent each), followed by pork production (25 per cent). Manure management alone is responsible for 19 per cent of agricultural emissions (two-thirds of which are methane) (JRC, 2010).

Biogas production through anaerobic digestion of organic waste is one way of reducing GHG emissions from agriculture while providing a certain level of renewable energy output. Without evaluating the merits of this particular technology as a means of reducing greenhouse gas emissions, it illustrates the mitigation potential of new technologies and the necessity of sound regulatory and financial incentives.

Biogas production sits at the interface between waste, energy and agricultural policy, offering farmers and local industries the opportunity to supplement their income, deal efficiently with waste products and reduce emissions, while also producing energy and heat which can be either used on the farm and by local communities or sold to the grid. However, creating the conditions for biogas production to succeed requires, in most EU Member States, the removal of certain regulatory and economic barriers and the creation of financial incentives.

Several European countries have made investment aids available for biogas infrastructure under CAP Pillar 2 measures which has significantly advanced the development of the industry. However, even with aid of up to €100,000 in Germany, where biogas technology and development is by far the most advanced, it is the high feed-in tariffs for electricity from biomass which account for 90 per cent of the subsidy value for renewable electricity from biogas (Osterburg *et al*, 2008). This illustrates the importance of policy instruments outside the CAP to stimulate investment, biogas production from organic waste and the same is true for several other renewable energy sources. However, the German example also shows that subsidies for using energy crops for biogas production cause similar problems to those promoting liquid biofuels. Between 2004 and 2010, the silage maize area in Germany increased by more than half a million hectares due to biogas support. The basis of biogas production should be livestock manure and farm wastes, and storage capacities should be gas-tight in order to avoid leaking of methane.

Non CAP measures which can be deployed to incentivise the building of biogas plants include, in the short term, introducing feed-in tariffs to support the electricity price which can help offset the initial capital investment in the plant and connections to the national grid. Favourable planning policies and market support measures such as green certificates for electricity which is produced from biogas are also used in some countries.

Subsidies for building biogas plants and infrastructure including axis 1 and 3 measures, have added value but should be set within a coordinated framework for biomass which creates synergies between economic, environmental and energy policies.

To some degree, Member States will choose their own distinctive approaches to synergies and trade offs between achieving different objectives, as is quite legitimate. However, safeguards will be required at a European level to ensure that public good provision is given sufficient prominence in all regions of the EU-27 and is not swamped by other objectives. This can be achieved through a number of different means and several of these will be

required. Requiring a basic level of environmental management on all farmland in the EU through the application of mandatory conditions on farmers in receipt of public money, such as those required under cross compliance, is one approach. Another is to earmark a proportion of EU CAP funding specifically for public good provision. This could be achieved through requiring that a certain proportion of EU funding is devoted to measures with a clear public goods focus, such as agri-environment. For example, the present requirement that at least 25 per cent of Pillar 2 expenditure is devoted to Axis 2 measures could be converted to a new formula whereby a minimum percentage (say 30 per cent) of a new CAP envelope is devoted to a combination of agri-environment, agro-forestry, Natura 2000, forest-environment and linked environmental land management measures. A third approach might be to introduce a suite of core measures which all Member States must apply, such as the ecological set-aside mechanism, which would be compulsory for all those in receipt of direct payments, but for which payments would be received, as proposed by the Commission. A fourth approach would be to make less use of incentives and to rely more on regulatory measures, which could be advanced either at the EU or national level. As an important, non-obligatory, flanking measure the EU could adapt co-financing rates according to the contribution of different measures to defined (and preferably quantified) strategic EU targets, such as Natura 2000 and Water Framework Directive (WFD) programmes.

At the same time, sustainability should be at the heart of all actions funded with EU money. Safeguards will be required to ensure that if measures are introduced for other purposes than encouraging the delivery of public goods, for example to improve competitiveness, then they do not undermine public good objectives beyond a certain level, for example by accelerating inappropriate intensification or through undesirable changes in land use. Their impact on public goods would need to be taken into account and environmental damage avoided wherever possible. This particularly holds at the programme level and it could be expected that more stringent safeguards would be put in place for protected areas and land of High Nature Value (HNV).

3.4. Effectiveness and efficiency in achieving outcomes

The lessons learned from the operation of CAP over the past 20 years need to be taken into account in the design of future policy measures. Some of the key issues are discussed in the sections that follow.

3.4.1. Range and type of measures required for the delivery of land-based public goods

In order to achieve an adequate supply of the full range of public goods, a variety of policy measures are needed which can be used to varying degrees in different regions of the EU-27 to address local circumstances and priorities. As a prerequisite to measures funded through the CAP, there is a need for a robust regulatory baseline, clearly setting out those actions which all land managers (and other rural actors) must undertake at their own cost, whether or not they are in receipt of payments under the CAP. In addition to such regulatory requirements, it may also be appropriate to apply a set of 'good land management' standards which have to be adhered to as a condition for the receipt of any payments. This can help to establish a basic level of public good provision applicable on all EU farmland. Currently a suite of such standards for agricultural land is applied through the requirement to keep farmland in 'Good Agricultural and Environmental Condition' as part of cross compliance.

Beyond those actions that farmers are required to carry out at their own cost, financial support is needed to encourage a range of voluntary measures. These can be divided into three categories as follows: (NB there are no parallel cross compliance measures for forested land).

- Area based payments to encourage farmers to carry out beneficial land management practices;
- support for investments, particularly to improve the environmental sustainability of agricultural enterprises, by facilitating improvements in farm infrastructure, the introduction of new technologies and the facilitation of diversification opportunities that improve land managers' ability to deliver environmental and other public good outcomes; and
- support for extension and training services to allow adequate provision of advice, training and capacity building so that land managers are kept up to date with current best practice in relation to sustainable land management and introduced to relevant new technologies.

All three of these types of actions need to be supported in combination, often within the same farm, to deliver the public goods that form the focus of the study.

Area based land management measures: Area based payments arguably would be the most significant element of any future CAP for the delivery of environmental public goods. Currently there is a range of measures in place that encourage farmers to adopt environmentally beneficial management (see Chapter 2). There are four main roles that such measures need to play:

1. Secure the maintenance of the existing environmental resource through supporting beneficial management practices, where these are under threat, often as a result of either marginalisation/abandonment or intensification;
2. support appropriate management and restoration of specific habitats or species of Community interest[7], especially within Natura 2000 sites, in order to maintain or restore them to Favourable Conservation Status;
3. protect and encourage improvements in management on environmentally important areas within the wider countryside (e.g. such as HNV farmland, or within areas defined as important for water protection purposes);
4. encourage the incorporation of appropriately tailored environmentally sustainable management within more productive agricultural systems (including environmental audits and benchmark processes, technical advice, and environmental management actions).

These can be designed and structured in a variety of different ways, for example:

- Payments to individual or groups of land managers for continuing or introducing management practices that increase public goods and achieving specified outcomes (particular plant species, numbers of nesting birds etc);
- payments to compensate for regulatory restrictions on management within areas designated for environmental reasons (for example Natura 2000 sites);
- Payments to the majority of farmers within certain defined areas where natural constraints mean that sustainable farming systems normally deliver high levels of public goods.

[7] I.e. those listed in Annex 1 of the Birds Directive, and Annexes I and II of the Habitats Directive.

Investments in capital infrastructure: In many cases changes in land management will also require changes in physical infrastructure to help deliver public goods, for example the upgrading or building of livestock housing to allow stock to be taken off the land over winter or improved slurry storage facilities. In addition, the introduction of new technologies, such as the installation of anaerobic digesters, solar panels, drip irrigation etc are all important to address future environmental challenges, as long as these are supported in situations where there is a clear need. These types of investments are particularly important for climate change mitigation, reducing demand for water and minimising its waste, as well as improving water and soil quality and farm animal welfare.

Extension Services, Training, Advice and Capacity Building: The role of advice should not be overlooked. Too often, the provision of advice in relation to the environment (encapsulating extension services, training, setting up demonstration farms etc) has been viewed as an administrative cost rather than a long-term investment as a critical component of improving the sustainability of agriculture (see for example Foresight, 2011).

With regard to the future outlook for the CAP post 2013, the role of advice and training in delivering environmental public goods through farming needs to be enhanced in order to increase the effectiveness of the CAP in the achievement of sustainability goals and delivery of public goods, for example through the extension of the Farm Advisory Service (FAS) (ADE, 2009; European Commission, 2010a). Indeed, advice and training is crucial to spreading innovation and increasing the adaptation of farmers to the changing policy framework and the FAS could play an important role in demonstrating how market competitiveness and sustainability goals can be achieved in tandem. This may be particularly important in the Member States and regions with shorter histories of environmental integration into agriculture, a track record of low environmental performance, or those with specific environmental problems (eg areas of structural water deficit).

3.4.2. Establishing an appropriate environmental baseline

For the purposes of this study, we have assumed no change in the current suite of EU environmental regulation or the timescale for its full implementation. Where EU environmental Directives impose direct requirements on land managers, it is argued that adherence with these should continue to be a condition for the receipt of any form of public support under the CAP. So cross compliance would continue to form part of the baseline.

Some suggest that cross compliance is only useful for measures like the current direct payments which are not a reward for the provision of clearly defined public goods but are paid for other reasons (income support, compensation for price cuts in the past etc) and that such conditions should not be applied to measures that are focused on the delivery of public goods directly, such as the agri-environment measure.

However, it is important that the reference level for the receipt of land-based support, whether under Pillar 1 or Pillar 2, is the same and any changes to cross-compliance requirements may serve to confuse this issue rather than simplify. In addition, although in principle each EU regulation and its national implementation should include sanctions and be enforced such that no additional sanctions via the withdrawal of CAP support is necessary, in practice this is not yet the case. Indeed, anecdotal evidence suggests that the introduction of cross compliance has improved compliance with EU legislation (Alliance Environnement, 2007).

In addition to this form of cross compliance, there are additional standards not embodied in EU regulation, but yet are widely accepted as good land management practice, and which it is deemed appropriate for farmers to undertake at their own cost, and which should be complied with if support is received under the CAP in order to ensure the sustainable management of land as a productive resource into the future. The sorts of management that are relevant here include the conservation of natural resources, such as soil and water, as well as the retention of habitats and landscape features, such as those currently identified as standards of Good Agricultural and Environmental Condition (GAEC) under cross compliance. The current suite of GAEC standards needs to be reviewed to ensure that the standards are streamlined and do not unintentionally have perverse effects.

These basic management requirements should underpin the receipt of all financial support under the CAP and provide a solid foundation on which more specific and focused management actions to deliver public goods can build.

3.4.3. Targeting and Tailoring

Critical to the successful and efficient delivery of public good outcomes is the effective targeting of the policy measures towards the identified objectives as well as the appropriate design and implementation of measures at the local level. This involves taking an integrated approach, recognising the synergies and potential conflicts between achieving different objectives and ensuring that management options are located in the appropriate place and at the appropriate scale to maximise the public good outcomes delivered from a given budget.

The design and delivery of environmental measures needs to ensure that there is a sufficient balance between support provided to encourage environmental management in the more sensitive areas and that focussed on more productive farmed areas. The measures need to be designed in such a way as to encourage uptake of the optimum mix of management actions required, and delivered at the right scale. Support for capital investments and advice should be provided where necessary as part of an integrated approach. With regard to rural vitality, support should be targeted to those regions where the outcome per Euro of support is greatest.

In addition, if environmental outcomes are to be achieved, then sustainability assessments need to be introduced for all measures and appropriate conditions and safeguards put in place and effectively enforced. When measures are introduced for purposes other than encouraging the delivery of public goods, their impact on public goods should be taken into account, avoiding environmental damage wherever possible (ENRD, 2010; Bocaccio *et al.*, 2009; Beaufoy and Marsden, 2010).

In addition to this, management actions themselves need to be appropriately designed to ensure that they are fit for purpose for delivering specific environmental public goods. The degree of specificity needed in targeting particular measures and management actions varies according to environmental objective. In some situations, conflicts and tensions may arise in relation to the delivery of multiple public goods through broad-brush management actions. Evidence suggests that the greater the specificity of the measure to the particular environmental outcome required, usually the better the results achieved (Vickery *et al.*, 2008; Winspear *et al.*, 2010; Wilson *et al.*, 2009). For example, actions to reduce the net emissions of GHG per kilogramme of meat generally require high crop yields per hectare, short production cycles and effective use of technology, animal and crop genetics, which

are not necessarily compatible with the provision of high levels of biodiversity (Frelih-Larsen *et al*, 2008; Grayson, 2008; JRC, 2010). Equally, actions to improve water quality, for example through reducing fertiliser inputs on fields or creating buffer strips, are unlikely to be sufficient on their own to provide the conditions required to deliver significant improvements in farmland biodiversity. In practice, however, where synergies do exist, these need to be maximised wherever possible, and where conflicts may occur, these need to be identified and a decision made about the trade-offs that will be necessary if an appropriate balance of different objectives is to be achieved.

In general, the more management actions are tailored to specific environmental needs and targeted at the geographical areas and locations where they are needed, the greater will be their cost-effectiveness. Transaction costs for both public administrations and farmers are greater with targeted payments, as they do require more planning at the farm level and the provision of expert advice or guidance on the optimum siting of management options. However, despite this, the payments themselves are generally more cost-effective, since a smaller overall area of farmland maybe needed under the specific type of management. This means that there is less risk of using public money or reducing the productivity of farmland unnecessarily. Assuming similar per hectare payment rates, i.e. that payments are based on the income foregone and additional costs formula, then the costs of a targeted approach would be likely to be less than the additional costs associated with applying management options in a non-targeted manner across the wider farmed countryside (Winspear *et al*, 2010; Fährmann and Grajewski, 2011; Hart *et al*, 2011). This is difficult to quantify with any degree of precision and will clearly depend on the payment rates per hectare offered under different modes of delivery.

Based on the available evidence, a 'hierarchy' of targeting emerges as follows:

1) outcomes that require tailored management, that is targeted at specific locations, habitats or species;
2) outcomes that require management to be carried out on multiple farm units over a relatively large area of the farmed landscape, but which need to be tailored to local conditions, i.e. in terms of the location and appropriate mix of management actions;
3) outcomes that need to be achieved through activities applied throughout the countryside but need no tailoring to local circumstances.

It has long been recognised that tailored management delivered through a targeted approach is essential where specific environmental management is required in particular locations. Examples include the conservation of scarce species, such as the Corn Bunting in the UK (Perkins *et al*, 2011), the restoration of specific habitats, for example peatlands, or the conservation of vulnerable soils and scarce water supplies.

However, the importance of tailoring the management needed to local conditions is becoming increasingly evident in relation to maximising the benefits achieved for other environmental priorities as well. These include water quality, soil functionality and climate stability. This is because the impact of management practices can differ from region to region and even farm-to-farm as a result of varying soil, climatic conditions or interaction with different ecological and economic processes (Ohl *et al.*, 2008; National Trust, 2011).

Box 2: Examples illustrating the importance of tailoring and targeting management to deliver environmental outcomes

Biodiversity: Research undertaken on the needs of farmland biodiversity highlights the importance of targeted and specifically designed management to achieve the specific ecological requirements for the particular habitats or species in question, even where this relates to common rather than specialist farmland species (Evans *et al*, 2002; Butler *et al*, 2009; Perkins *et al*, 2011). Research in the UK has examined the ecological requirements of a broad range of taxonomic groupings and looked at the effect of different patterns of land management actions under agri-environment schemes. The evidence shows that, the higher proportion of appropriate in-field management, the better the outcomes for all types of biodiversity considered (farmland birds, bumblebees, arable broadleaf plants, mammals and butterflies), demonstrating that the field edge options can only deliver a proportion of farmland biodiversity needs and that in-field management is critical for reversing declines in biodiversity (Butler *et al*, 2009).

However, simply understanding the ecological requirements of common farmland birds is not sufficient. The extent to which the implementation of actions required result in increasing the number of the target species is very dependent on the quality of the habitat provided and the extent to which the area over which the management is practiced is matched to the spatial distribution of the species. Therefore, if the appropriate management actions are not targeted and sparsely implemented across the farmed landscape then there will be a low chance of farmland birds benefitting from the measures and they will ultimately be ineffective. If the same options are untargeted but widely implemented across the countryside, there is a greater likelihood of common farmland birds benefitting from the options, but it is not the most efficient means of achieving the objectives. Spatial targeting of the management, on the other hand, increases the certainty of achieving the desired outcomes, as well as being a more cost-effective means of achieving them (Winspear *et al*, 2010; Merckx *et al*,2009).

Water quality: It has been shown that vegetated buffer strips to control the pollution of water courses need to be in the right location, of the right width and managed appropriately (i.e. tall, dense swards are better for catching sediment runoff) to maximise their benefits. Indeed, the evidence suggests that a combination of measures are often needed to deliver benefits to water quality and in-field actions, such as soil management techniques to prevent sediment runoff or changing crop drill direction may be needed alongside the use of buffer strips, and may even have greater benefits in some situations (Leeds-Harrison *et al*, 1999; Yang *et al*, 2005; ADAS, forthcoming).

Soil erosion and losses of soil organic matter: Evidence shows that management to address these issues need to be targeted at areas of risk and then appropriately sited if benefits are to be maximised (ADAS, forthcoming; Kuikman *et al*, 2008; Kuhlman, 2010; Van-Camp *et al*, 2004).

Increasing levels of soil carbon: Recent research in the UK has shown that carbon levels are linked to a combination of soil type, climatic conditions and land use history, meaning that similar land management practices being carried out in different fields, with different soil types and under different climatic conditions, will have different impacts on soil carbon levels. The conclusion is, therefore, that, to be most effective, any management to stabilise or increase soil carbon levels needs to be tailored to the specific circumstances in relation to all three of these factors at the farm level and that a more generalised approach, focused on just one of these factors, will have a much more limited impact.

For the most part, CAP measures are delivered currently at the individual holding scale. However, many environmental public goods would benefit from management taking place at the landscape scale, involving multiple farm holdings within a coherent geographic area (ENRD, 2010; Merckx *et al*, 2009; Franks and McGloin, 2006). Landscape scale approaches will become increasingly essential to address the challenges of climate change (for example through ecosystem-based approaches to mitigation and adaptation), tackling habitat fragmentation, increasing the resilience of agricultural land to fire and flooding, as well as

tackling issues such as maintaining high Nature Value Farming systems, and improving water quality, particularly through tackling diffuse pollution. There are a number of good examples that have been introduced in Member States, such as the Netherlands, where local organisations of farmers and non farmers work in close collaboration with each other and with local, regional and national agencies to integrate nature management into farming practices (IEEP, 2009). Consideration needs to be given to how these sorts of examples and other ideas might be implemented in other situations in other regions, for example through providing bonuses to neighbouring farmers who enter into joint agreements to achieve specific objectives over a contiguous area of land.

In addition, the use of a range of policy measures in synergy can help to achieve more effective results, for example by combining voluntary agri-environment measures with support for investments in environmentally sustainable technologies, to improve the physical infrastructure on the farm, to diversify by introducing new enterprises onto the farm or by adding value to agricultural products.

Integrated approaches of this nature, which could be adopted as part of a territorial approach, also help to deliver other public goods, most notably rural vitality. The territorial approach has been highlighted by the OECD in its publication on the 'new rural paradigm' (OECD, 2006) and this is a model with increasing influence in Europe. Mantino (2011) emphasises that, while this approach is very often associated with the Leader programme, there is scope for a wider range of EU policies and funding programmes – including Rural Development Programmes – to adopt a territorial approach, which may be also relevant to the implementation of strategies aimed at supporting the provision of public goods and services within an integrated vision of all place-based resources. By providing several case studies, Mantino (2011) shows how this approach could play a crucial role in a CAP more oriented towards the provision of public goods, since it potentially promotes an improvement in policy effectiveness and policy targeting. Indeed, a place-based approach strongly relies on the capacity of public intervention to promote (in target areas) a process of eliciting the knowledge and initiatives of local actors, facilitating innovative actors and new ideas, and projects for the provision of public goods and services (Redman, 2010).

These sorts of approaches not only require a coordinated approach to scheme design, but also to their delivery, including scheme administration and advice. More consideration of how to facilitate the use of measures in this way is needed to maximise these sorts of opportunities, building on examples of territorial approaches adopted in Member States such as Italy and Portugal.

It has to be recognised, therefore, that any approach to delivering environmentally beneficial management which is not adapted to local conditions, or where the right balance of different management actions is not achieved, will be less effective in achieving the desired outcomes. This is not to say that no benefit will be delivered, simply that overall the outcomes per unit of land managed are likely to be lower than if a more sophisticated approach were taken. However, precision in defining target areas, particularly in fragmented and dispersed ecosystems such as the farmed landscape, may be difficult in some cases and can carry relatively high costs in terms of data requirements and administrative effort as well as increased transaction costs for farmers. There is clearly a trade off to be made between the higher administrative costs associated with more targeted approaches and the additional benefits that might be achieved. One of the main constraints to effective targeting is often quoted as being the lack of data on which to base decisions. In practice, however, geographically specific data often do exist, but have not yet been combined into compatible formats or integrated information systems.

Box 3: Examples of territorial approaches to the delivery of public goods in Italy

The Aso Valley Project – An agri-environment experience for small farms
The Aso Valley project (Marche region, Italy) is a 'territorial' agri-environment agreement to protect water and soils from pesticide and nitrate pollution, using advanced Integrated Management techniques. It involves both public institutions and local private actors to achieve common sustainable rural development goals. The project represents an innovative multi-sectoral and participative methodology to pursue multiple agri-environmental objectives through an integrated suite of measures addressing water and soil quality, cleaner farming practices and healthier products.

It involves some 24 municipalities, which cover half of the region's designated Nitrate Vulnerable Zones. By November 2009, 110 farms (65% of the target area) applied to participate, 25% of which are run by young farmers. The main quantitative targets, to be achieved in five years, are: the reduction of the use of N, P and K in the territory by 30% and the substitution of agri-chemical inputs characterised by acute or chronic toxicity by 90% and 85% respectively. So far the project has already achieved an average 70% reduction in the chemical inputs.

About 80 per cent of farms in the project area are small (less than five hectares), so the collective approach was thought to be essential to have a significant impact. A capacity building programme was established to disseminate the technical guidelines on environmentally sensitive approaches and the associated economic benefits amongst local farmers. One of the main characteristics of the agreement is a chain reaction that led to promotion by word-of-mouth, with other farmers becoming interested and joining the project in a kind of bottom-up approach.

The initial role of the two Provinces involved (Ascoli Piceno and Fermo) has been fundamental to build the partnership of farmers and institutions to work together to address the long-term needs of local farmers and environmental goals. The support provided by the Regional administration in making this project happen through the RDP has also been crucial. The experience of the Aso Valley project will be replicated in other areas of Marche Region due to the good level of uptake, the positive reaction of small farmers and the potential to take advantage of this fact through a new quality branding and marketing initiative. (Source: European Network for Rural Development (2010)).

The example of **LAG DELTA 2000** in Italy (see Mantino, 2011) is an interesting example of an integrated territorial project which combined both environmental and rural vitality objectives. This project, operating in the delta of the Po (Emilia-Romagna region) promoted eco-tourism by combining landscape care, accessibility to parks and waterways, biodiversity conservation, cultural traditions and support to local products. Measures from the Rural Development Programme were the most relevant, but additional funding and strategies were also involved, including regional incentives, funding from the European Social Fund within EQUAL, cooperation programmes, the EU youth programme and Cultura 2000, etc.

Despite these issues, appropriate targeting is essential to secure public good outcomes and make most effective use of CAP payments and the choice, design and delivery mechanisms of policy measures needed to reflect both the degree of targeting necessary to achieve the public good outcome as well as the spatial extent over which the actions are required. The land parcel identification system, based on GIS, provides an excellent basis for improved spatial targeting, which should be further developed and used at a larger scale throughout the EU Member States.

3.4.4. Nature of the policy tools

Outcomes clearly are affected by the nature of the policy measures (for example whether they are mandatory, voluntary or comprise conditions placed on the receipt of other public support), their design, whether requirements are annual or multi-annual as well as the way in which the measures are applied on the ground.

The nature of the public goods being pursued means that action is needed over a wide spatial extent. However, the measures themselves may only need to be applied in particular locations and in many cases need to be tailored to the environmental outcomes required.

Securing a certain level of environmental management across the majority of agricultural land in the EU-27, in productive and extensive farming systems alike is difficult – although not impossible – to achieve through voluntary measures alone. Instead, some degree of coercion is required if high uptake is to be assured. Currently, the only mandatory environmental measures in place are those set through environmental regulation. In addition, a basic suite of environmental measures exists that is mandatory for farmers to undertake at their own cost if they wish to receive public support from the CAP. These are the GAEC standards under cross compliance discussed above. However, from an environmental perspective, there is a case for making certain environmental management actions that are more demanding than current GAEC standards mandatory for land managers who receive CAP direct payments, to pay for complying with such obligations. This is the model currently set out under the Commission's 'greening Pillar 1' proposals. However, it is worth noting that these sorts of 'conditions' on the receipt of direct payments only deliver if, firstly farmers perceive it is worthwhile to continue to claim the payments in light of the additional burden placed upon them, and secondly if Member States implement the requirements appropriately. While the management required needs to reflect local conditions, experience with the implementation of GAEC shows that there are significant differences in the type of standards and the level at which they are applied both between and within Member States, and that this is not just a reflection of differing local conditions (Alliance Environnement, 2007; Nitsch and Osterburg, 2007; ECA, 2008; Bocaccio *et al.*, 2009).

The downsides of a quasi-mandatory approach from an environmental point of view largely relate to the nature of the management that can be required of farmers. The sorts of measures tend to be fairly simple and broad brush in nature, applicable over the whole farmed landscape, with little differentiation to local circumstances and as a result may not deliver the level of environmental benefits that might be associated with a more targeted approach. It should also be noted that management required under a quasi-mandatory approach effectively raises the bar in terms of the nature of management that can legitimately be paid for under voluntary agri-environment schemes. The (voluntary) compliance with stricter rules (GAEC) is quasi-mandatory in the sense that it is a pre-condition for receiving Pillar 1 income support which is unrelated to the costs of compliance both in principle and in practice. However, if there is over-compensation (as at present) and if the provision of environmental public goods were to become the main justification for direct payments, it is very likely that such a measure would not be efficient.

It remains to be seen how far a quasi-mandatory approach can go without jeopardising farmers' competitiveness vis-à-vis third countries and the economic and social

sustainability of farms, and without weakening the farmers' initiative, entrepreneurial spirit and commitment to farm and landscape.

Voluntary payments, on the other hand, such as those most commonly operated through agri-environment schemes, confer the choice of whether or not to undertake environmental management actions above the reference level on the land manager. Broad coverage can still be achieved under voluntary schemes, such as those developed under the agri-environment measure, but their uptake and effectiveness is very much dependent on the attractiveness of the schemes and their payment rates. Many Member States have introduced agri-environment schemes for which the majority of farmers are eligible and which encourage simple management across the whole farm, specifically to try and ensure broad coverage and high uptake of basic management actions. One of the key benefits of agri-environment type measures is their multi-annual contractual nature. Environmental outcomes often require the relevant management actions to be carried out over a significant period of time for the benefits to be realised. It may also be the case that there is greater commitment from land managers to deliver the environmental management required if they have signed up to it voluntarily rather than having been coerced into it (see for example Morris *et al.*, 2000).

However, voluntary schemes are often not taken up by farmers in a way that secures sufficient coverage of the range of management actions needed across the farmed landscape, with experience showing that farmers are often most likely to choose agri-environment options that require least additional effort or cause least disruption to the business. There are a range of factors influencing farmers' decisions on whether or not to opt into agri-environment agreements.

Some resistance may be linked to attitudes in relation to the 'professional' status of higher yielding as opposed to more extensive farming systems where there may be resistance to measures which involve scaling back from high yielding practices, or there is an aversion to any form of agreement which constrains management choices. In other cases the reasons may be socio-historical in nature, associated with differing experiences of environmental integration in the EU-27, and with agri-environment in particular. There may also be socio-cultural factors linked to different cultural preferences regarding ways to incentivise best practice, which appears to lead to divergent values being put on voluntary action in countries historically leaning toward institutions built on liberal attitudes in comparison with countries leaning toward institutions built on hierarchically transmitted and received norms. Factors of legal history play a role too, leading to differing perceptions in the EU-15 and EU-12 in relation to the opportunity they have for self-determination and the level of perceived dependence on external factors including markets, prices, seed and fertiliser provision, and governmental decisions.

Other difficulties with achieving sufficient uptake of voluntary measures relate to the attractiveness of payment rates. In productive systems, the opportunities offered by voluntary agri-environment contracts tend to be overlooked when the payments are not perceived as sufficient in terms of outweighing the opportunity cost, particularly at times of high commodity prices. In extensive systems, the opportunities offered by voluntary agri-environment contracts may remain unused when the provision of advice, training, and promotion of relevant policy measures is not sufficient to convince land managers not only of the value of environmental assets in less productive farming practices, but also the longevity of the societal commitment to support these assets. The latter is considered to be a critical factor for convincing farmers in extensive systems to continue managing the land in circumstances when the opportunity cost of continuing farming may be equal to the

cessation of farming practice and uptake of other employment (Redman, 2010). Other factors constraining uptake may be related to relationships with landlords, partners, or contractors which prevent them from meeting the eligibility requirements of agri-environmental measures.

Some of the current barriers to voluntary measures might be reduced if Pillar 1 payments were to fall in value, become more targeted or be eliminated altogether, suggesting that steps to "green" Pillar 1 may be a move in the right direction.

For the improvement of rural vitality beyond the agricultural sector, all relevant Pillar 2 measures are voluntary by nature and a quasi-mandatory approach does not, and should not, play a role.

3.4.5. Eligibility Issues

There are a number of issues in relation to the eligibility of farmers for receipt of CAP support that currently can be counterproductive in relation to the delivery of public goods. This means that there are areas of agricultural land in a number of Member States (for example Romania, Bulgaria, Latvia, Germany, Ireland and the UK) which is of environmental value but falls outside the CAP system. In many cases this is largely due to an overly strict interpretation of the definition of 'eligible agricultural area' under Article 2 of Council Regulation 73/2009, either by Member States or by auditors. These issues relate to the lack of clarity as to whether or not non-productive features, such as field boundaries, can be counted within the eligible area as well as the proportion of scrub or woodland that is permissible. These issues of eligibility mean that significant areas of environmental value risk being ineligible for support under the CAP, whereas this is precisely the sort of land that is a priority in terms of its potential for delivering environmental benefits. For example, a recent study in Germany (DVL and NABU, 2009) showed that areas of heathland with less than 50 per cent of grass cover are ineligible for decoupled payments. In addition, in a number of new Member States large areas of actively managed land with low grazing intensities have been deemed ineligible for payments. In Estonia, for example, 25 per cent of total agricultural land is not registered under the Single Area Payment Scheme (SAPS) and in Bulgaria only a third of the 1.6mha of HNV farmland is eligible for SAPS (BirdLife, 2011). This leaves a proportion of farms within High Nature Value farming systems even more fragile economically than they might otherwise be, leading to a greater risk of losing the environmental benefits that they generate.

The Commission's proposals for the future CAP propose that direct payments should be restricted to 'active farmers' and capped beyond a certain size threshold. From an environmental perspective all those who deliver public goods associated with agriculture should be eligible for relevant payments irrespective of whether they are an 'active farmer', an 'inactive farmer' or no farmer at all. For payments which are focused on the delivery of environmental outcomes, there is no rationale for capping. Indeed, there is no evidence to show that environmental outcomes decrease as the area managed for the provision of public goods increases (see, for example Potter and Lobley, 1993; Voigtländer *et al.*, 2001) and therefore payments to ensure the provision of public goods should be commensurate with the public goods delivered rather than related to any other criteria.

The Commission's Communication also proposes the introduction of special rules for small farms. If this results in simplifying the rules and reducing the administrative burden for small farms and national administrations, it is beneficial providing that appropriate choices

are made. Rules that particularly favoured small farmers would be difficult to justify when considering the direct provision of environmental public goods. However maintaining a diversity of farm sizes, including small farms, may be important for achieving rural vitality objectives in some regions, recognising the role that small, semi-subsistence and part-time farmers play within a rural economy and society. However, Member States should carefully consider possible trade-offs with other CAP objectives. In some cases, maintaining these farms may enable some land currently providing multiple public goods (but not high levels of produce for the market) to continue to provide public goods.

However the definition of small farms is not straightforward, and questions arise as to whether the definition should be based on area or economic size unit. Defining the size of farms only in terms of UAA would favour the concentration of the payments in certain farming systems and in many cases there is not a direct link with the provision of public goods.

3.4.6. Monitoring and Evaluation

Effective monitoring and evaluation is critical to assess the effectiveness and efficiency of measures in delivering their objectives and to allow schemes and management practices to be adapted and refined over time. Of particular importance is gaining an understanding of the factors that have contributed to the relative success or failure in achieving the stated environmental and other objectives, so that this can inform improvements in both measure and scheme design. A number of considerations need to be taken into account when evaluating the success of a scheme. For example management which was effective under experimental conditions does not always have the same results when implemented on the farm, or can lead to unanticipated adverse effects (Kleijn *et al*, 2001 quoted in Ohl *et al*, 2008). Other factors to consider might include whether sufficient time has elapsed for the scheme prescriptions to take effect, whether the monitoring programme has sufficient power to detect effects; and whether the measures of success are appropriate (Scotland Rural Development Programme, 2009). Recognition of these issues should help to design means of overcoming them in future monitoring programmes. Piloting particular management options prior to their potential inclusion within agri-environment programmes and their roll out to all farmers is a particularly useful way of testing the attractiveness of different management actions, as well as ironing out any teething problems with implementation and delivery.

Indicators are a useful evaluation tool with which to measure progress, but are of value only if they relate directly to clearly defined objectives. The Common Monitoring and Evaluation Framework (CMEF) indicators, used to assess the success of Pillar 2 rural development policy, provide a good foundation on which to build, although improvements are still needed to develop a suite of suitable impact indicators that cover the full suite of public goods – for example, currently there are no available impact indicators to measure the impact of policy measures on water availability, soil functionality and landscape character (Terres *et al*, 2010).

Some of these limitations are due to the difficulty in developing robust indicators to measure change where complex interactions need to be measured. In other cases the issue is related to the limitations of data availability at the national or regional level. In the case of Pillar 1 support measures, the lack of any requirements to monitor the impacts of the measures is a major constraint on determining their effectiveness.

Increased investment in the monitoring of the impacts of policy measures on the supply of public goods is therefore critical to ensure that future support payments are able to deliver against their objectives in the most cost effective manner possible. This is important irrespective of the 'Pillar' under which the measures sit and whether they are annual or multi-annual payments and will be critical to secure public support for such support to farmers in the long term.

3.5. Budgetary/financing issues

3.5.1. Basis of Payments

If farmers and other land managers are to deliver public goods on a voluntary basis the level of incentives needs to be sufficiently high and the broader character of the incentive measures, including the conditions attached to them, has to be sufficiently attractive to achieve the level of uptake needed. In this section we focus particularly on the basis of payments and the extent to which different approaches might allow a higher level of public good delivery whilst using public funds efficiently. As highlighted in section 3.4.3, farmers are influenced by factors other than payment level and scheme design in deciding whether to participate in voluntary measures. Nonetheless, for a very sizeable number of farmers, scheme design and payment rates are a critical concern and will have a major impact on participation. In some Member States, such as Austria and Finland, uptake figures show that very high levels of participation by farmers in conventional agri-environmental schemes can be achieved if the incentives are sufficiently attractive.

Under the EAFRD, agri-environment measures in the Member States have to comply with a standard EU formula for calibrating the level of payments offered to farmers under an approved scheme. This does not refer to environmental public goods per se but can be taken as the default formula for calculating payment for the supply of such goods. However, there is no parallel for the provision of social public goods, such as rural vitality, where support tends to be offered in the form of a payment commensurate with the proportion of the costs of the investment/activity being carried out.

The standard EU formula states that environmental payments should be based on the additional costs incurred and income foregone by the farmer in doing so, relative to a baseline practice. In addition, the transaction costs incurred by the farmer can be incorporated within the payment (transaction costs accruing to public administrations are not eligible for reimbursement from EAFRD).

This broadly reflects the WTO Green Box rules for payments under environmental programmes, set out in paragraph 12 of Annex 2 of the Agreement on Agriculture (World Trade Organisation, 2008). In 2007 the European Commission published for the first time a general framework methodology to guide Member States in devising their payment rates (European Commission, 2007). This followed requests from Member States and the Court of Auditors for greater clarity. The Commission's methodology does not refer explicitly to the Green Box rules since they do not form, formally speaking, the 'legal basis' for the EAFRD Regulation in the sense of EU law. However, the Commission does emphasise that calculations must be based on verifiable elements, that the figures concerned must have been arrived at using appropriate expertise, drawing on empirical evidence, that payments are differentiated to take account of regional, or local site conditions and actual land use as appropriate. For example, soil quality, yield indices, local climate, accessibility and average plot size in a locality all could be relevant. However, the methodology proposes that

calculations normally should be based on variable costs and should not include fixed investment costs (i.e. new fixed costs) as these can be supported via the productive investments measures currently in Axis 1 of EAFRD. In some circumstances opportunity costs can be included in the calculation, but Member States must then provide evidence for a real risk of conversion of land to a less environmentally friendly use of the region concerned. There is no allowance for incentive payments to induce farmers to participate as was permitted in the previous programming period. Transaction costs must be 'related to letting the transaction take place and not directly attributable to the implementation cost of the commitment it relates to'.

Various questions arise about the EU formula and its suitability for securing the delivery of public goods on a more ambitious scale, particularly if there was a diminution in the level of Pillar 1 payments supporting farm incomes. Some of these relate to the formula itself and ways in which it might be amended or interpreted. Others relate to alternative approaches to calculating payments.

The alternative most often put forward for establishing payments is one in which payments reflect the value to society of the good or service being provided by the land manager. In this model, influenced by the concept of ecosystem services, the value of a public good would be calculated, either at a regional or more site specific level using an appropriate evaluation method, including benefit transfer, where needed. This value would form the foundation of a payment calculation which would be applied through a menu approach, a competitive bidding process or some other method. Activities of a higher value to society would be stimulated and it is often assumed that farmers would be eligible for larger per hectare payments under this approach, although this would not necessarily be the case if competitive bidding processes were introduced.

Certainly it is clear that payments to farmers should not exceed the value of the service being delivered, if this can be determined, so valuation exercises are useful. However, there are difficulties in determining values, for example through willingness to pay methodologies and they are less precise than data about the actual costs of undertaking the management required. Furthermore, to be cost effective, payments should be set at the level where they incentivise the practices being sought at the minimum long-term cost to society. This applies to agriculture as well as other forms of public good provision and is not the same as the value of a public good to society. Nonetheless, there may be a case for paying more than would be required in the short term in order to encourage the changes needed and to facilitate an increase in the provision of public goods over time. Where farmers are critical to the delivery of public goods, their continued presence in agriculture and capacity to take forward the types of management required will be a condition for secure supply.

For this reason there is a debate about the way in which opportunity costs should be treated within the EU payment formula. For example, in the UK a recent report has proposed to the government that income foregone should be calculated to 'include the full costs of the farmer staying in business' (Commission for Rural Communities, 2010) or, in the uplands, as income from the best alternative, which generally might be 'an occupation away from upland farming' (CLA, 2010). It is argued that the current formula is biased towards situations where relatively marginal changes in farm practice are required and the overall viability of the farm and its capacity to offer future services is not considered. Given the potential scale of economic pressures on some categories of farmers, including upland grazing livestock farmers, this argument carries force. The recognition and reflection of full production costs in payment rates (in marginal areas particularly) would help to secure

longer-term viability and hence rural public good provision (SAC *et al*, forthcoming). Revised guidelines from the Commission with appropriate methodological procedures would be helpful as part of an array of measures to pursue public good goals within the CAP.

There are also more technical questions of whether appropriate data for calculating profit foregone and costs can be obtained in all parts of the Union and whether Member States are investing enough in obtaining data and reliable expert judgement and are applying the rules in a consistent way. For example, in Italy a national approach has been developed by the Ministry of Agriculture with two methodological paths for calculating payments: a) the balance sheet approach, most appropriate where the whole farming system is affected and b) the more narrowly focused practices approach, suitable where only one or a few practices are subject to an agreement (Italian Rural Network, 2010). A study by Hecht *et al* (2008) of the 21 Italian RDPs reveal, however, a huge variety of applied methods and data sources, with heavy use of FADN data and expert opinions, with different results in terms of payments levels (Italian Rural Network, 2010). Such variations would become a larger cause of concern if measures to deliver public goods represented a larger proportion of the CAP and if the EU financed a larger share of the payments and more investment in transparency, accountability and Commission scrutiny would be needed.

3.5.2. Scale of funding required

The scale of funding required depends on the choice of objectives and the timescale for their attainment and the balance between different instruments used for the purpose. Strategies that rely largely on the use of dedicated incentive schemes and make little reliance on regulatory measures will be more expensive in terms of the CAP budget than those which rely more on regulatory and market measures. However, external factors, such as commodity and land prices, also have a major impact on funding requirements.

The literature on anticipated costs of policies to deliver all agricultural public goods either in specific Member States or throughout the EU-27 is not large (see for example Cao *et al* 2009, Hart *et al*, 2011). A number of studies have attempted to estimate the costs of meeting individual environmental targets associated with agriculture, ranging from fairly detailed estimates in relation to specific areas, such as the costs for achieving favourable conservation status on Natura 2000 sites to more generic costs associated with maintaining HNV farming across the farmed landscape or addressing soil erosion and declines in soil organic matter. However, only two have looked at the costs associated with delivering multiple public goods and both of these have focused solely on environmental public goods.

A study for the UK estimated that the total cost of meeting the country's future environmental land management requirements relating to biodiversity, landscape, climate change mitigation, flood risk management, farmland historic environment, soil quality, water quality, resource protection and public access was in the region of €2.5 billion per year, not including the costs of advice – almost three times the current annual agri-environment budget.

A detailed estimate of the costs of addressing the different environmental priorities through incentives for largely voluntary agricultural and forestry management in the EU-27 as a whole was undertaken recently. This suggested that the costs of undertaking environmentally beneficial land management on agricultural and forested land in 2020, were calculated to be in the region of €34 billion/year (of which €3.5 billion was for forested land), with an additional €9 billion/year estimated to be needed for environmentally

focused investment aid, support for advice provision and payments in Less Favoured Areas. It was estimated that of this total figure of €43 billion, approximately €27 billion needed to be sourced from the EU budget (Hart *et al*, 2011). The calculations did not take into account any changes to the current CAP structure of support and therefore the continuation of Pillar 1 direct payments at their current rate. No introduction of 'greening' options was assumed.

Although the cost estimates are varied and focus on different sets of public goods, all these studies are consistent in suggesting that total expenditure would be significantly larger than the resources currently dedicated to agri-environment if EU targets and aspirations for the environment were pursued seriously.

3.5.3. Allocation criteria

At present, funds under the CAP are distributed to Member States for a Budget period using allocation criteria developed by the Commission. The allocation is conducted separately for Pillar 1 and Pillar 2 funds with different criteria being applied at the EU level. The allocations between Member States are highly variable. For example, the direct payments per hectare are distributed very unevenly, with farmers in Latvia receiving less than €100 per hectare on average while in Greece the figure is above €500 per hectare. The allocations are subject to criticism both for this level of inequality and the lack of consistent criteria for determining allocations. Historic factors play a large role in determining the distribution rather than criteria that relate to primary CAP objectives. So allocation is not related to public good provision.

Conversely, if the allocation criteria for CAP monies are changed, as appears likely by 2014, this in turn will have impacts on public good provision. If public good objectives are to play a larger role in CAP objectives this should be reflected in the allocation criteria. Ideally, allocations would be distributed between Member States more according to their efforts in providing public goods, which potentially would change over time and require a more flexible approach as well as a different distribution of receipts. Given the political impediments to an allocation based on public goods, it is perhaps more realistic in this coming round of CAP reform to assume that fixed allocations between Member States will continue and that change will involve a more even distribution of direct payments between Member States than at present. Various possible allocation criteria for distributing Pillar 1 direct payments between Member States have been explored in a recent study by the European Parliament (European Parliament, 2011b).

Studies show that relatively few criteria are both capable of representing a good proxy for potential public good provision and can be supported by reliable and consistent data. This narrows the range of criteria proposed as relevant to public good provision to a small core which includes the total UAA in a Member State, the area of HNV farmland (variations on the EU definition), the percentage of UAA in LFAs and the total UAA under Natura 2000. These can be weighted in different ways and added to other criteria to provide an allocation key (e.g. EU soil database maps[8], land cover maps) (see for example, Zahrnt, 2009; LUPG, 2010; Cao *et al*, 2011; European Parliament, 2011b).

However, using such criteria to distribute the existing funds available within Pillar 1 leads to a significant redistribution of support, including both significant decreases in some Member

States (for example Greece) and significant increases in others (for example Latvia and Spain). In contrast, a scenario whereby average direct payments were subject to minimal variability and each Member State received at least 80 per cent of the current average direct payments favours new Member States quite distinctively. This may not provide sufficient flexibility to allocate funding according to public good priorities and the goal is in tension with the basic aim of targeting CAP payments to specific objectives as much as possible.

However, whether criteria for allocating the Pillar I budget should favour public good provision and other CAP objectives also depends on the design of Pillar I measures. If the measures provide only little incentive for the provision of public goods (as is the case for the current direct payment scheme), an allocation according to public goods criteria would reward those Member States with, for example, a high share of High Nature Value farmland, but would not directly incentivise the delivery of public goods by land managers. The current reform is an opportunity to shift the allocation of funds for both Pillar 1 and Pillar 2 to reflect public good provision more clearly. However, this process undoubtedly will need to be undertaken in stages to prevent too much disruption and political resistance.

The allocation of the Pillar 2 budget should be more aligned with public good provision as well. The present criteria for the EU-12 and EU-15 are different, none have a strong public goods basis and the system is far from transparent. At present, Pillar 2 receipts are extended by modulation. A new funding formula would be preferable to this, sustaining a sufficient flow of resources into Pillar 2.

3.5.4. Co-financing issues

For decision making in multi-level governance systems on public goods, the principle of fiscal equivalence (and of subsidiarity) provides a useful yardstick to assess the efficiency of particular arrangements. This states that the boundaries of government decisions on the provision and financing of a public good should coincide with the boundaries of the consumers of that public good, so that those who benefit from the public good match those who bear the costs as taxpayers (Olson, 1969). The 'boundaries of the consumers', i.e. the spatial dimension of the spill overs of public goods depend on the specific public good (and also on the importance of option or existence values) and these boundaries only coincide with the boundaries of administrative units by chance. For example, the reduction of greenhouse gas emissions, biodiversity and water quality (where catchments span national boundaries) are global public goods, whereas agricultural landscapes, resilience to flooding and fire or water quality of a sub-national local water catchment area could be a regional or national public good. The smaller the geographical size of a country the more likely it is that a public good has supra-national spill overs. To make it even more complicated, one has to bear in mind that often a measure promoting the provision of a specific public good by agriculture also impacts public goods with differing spatial ranges. For example, a measure promoting the more efficient use of nitrogen in order to improve the water quality of a local water catchment is likely to contribute also to the global public goods of 'farmland biodiversity' and 'climate mitigation'.

Against this background, the principle of fiscal equivalence provides some hints about how the public financing of measures promoting the provision of public goods within the CAP could be split between the budgets of the EU and Member States. However, it does not

[8] http://eusoils.jrc.ec.europa.eu/library/maps/maps.html

provide a means of determining this at the measure level. In theory, the more a measure contributes to a public good of European scale the higher the EU contribution to its financing should be. Considering other EU objectives, e.g. cohesion, the financing scheme could also include higher EU co-financing rates in lagging regions. Assuming that there is a trade-off between the number of different financing schemes and transaction costs, there are good reasons for restricting the different schemes to only a few.

The current financing scheme – EU share of 100 per cent for Pillar I measures and up to 50 to 90 per cent for Pillar 2 measures – clearly fails to satisfy the principle of fiscal equivalence described above and has some other drawbacks. A number of commentators have stated that it 'encourages agriculture ministers to develop a strong political preference for the first CAP pillar because they obtain EU funding here without having to contribute additional funds from their national budgets. This bias in favour of the first pillar hampers the development of an agricultural policy that is more target-orientated and creative.' (Scientific Advisory Board on Agricultural Policy at the German Federal Ministry of Food, Agriculture and Consumer Protection, 2010; Zahrnt, 2011; Tangermann, 2011). The Scientific Advisory Board on Agricultural Policy (2010) continues: 'The more the direct payments under the first pillar are justified on the grounds of rewarding farmers for the services they provide to society, the more questionable the current distinction between a non-co-financed first pillar and a co-financed second pillar becomes.'

Referring to the 'greening component' of the direct payments proposed by the Commission, Tangermann (2011) points to a disadvantage of a fully EU financed CAP: 'From a political economy perspective, an attempt at pursuing environmental policy through a measure that is financed at the EU level is likely to run into an additional problem. Given some degree of territorial differentiation that will be needed for any environmental policy, the 'greening' component would probably be implemented such that a 'menu' of actions qualifying for this form of support will be established at the EU level. Member States can then choose those actions from the menu which they consider most appropriate for their territory. As the payments under the 'greening' component will be financed out of the EU budget, without any national co-financing, Member State governments will feel under strong political pressure from their farm groups to make sure the 'money from Brussels' actually flows to them and provides the highest conceivable benefits. This may mean that the choice of actions chosen from the 'menu' for implementation of the 'greening' component in the individual Member States is not primarily based on considerations regarding the most needed and effective agri-environmental policy, but on what promises the largest benefits to domestic farmers.' However, although it is the view of many experts that national co-financing is an important tool that encourages the delivery of outcomes that provide added value, not all would agree that this is the case in practice. If monitoring and evaluation requirements were improved over time, then perhaps the argument for co-financing as a means of delivering value-added diminishes somewhat.

The strength of the farming lobby in some Member States and potential shortfalls in the availability of national and regional co-funding have tended to increase the political pressure for justifying Pillar 1, currently 100 per cent funded from EAGGF, with the delivery of public goods. However, this should not obscure the advantages of the more closely targeted programming approach and subsequent monitoring of actions in Pillar 2. The Pillar 2 model remains effective for delivering a sizeable range of public good objectives and should have the most prominent place in the spectrum of CAP measures adopted to secure public goods in future.

4. IMPROVED POLICY STRUCTURE AND TOOLS FOR THE DELIVERY OF PUBLIC GOODS

KEY FINDINGS

- A step change in the level of public goods provision is needed if the EU's targets for public goods are to be met.
- For the environment this means that environmental management needs to be carried out over a far greater proportion of farms and more targeted interventions required in selected locations.
- Maintaining a strong environmental legislative baseline remains essential.
- GAEC standards need to be streamlined and those that are causing perverse environmental effects revised or removed.
- Payments to farmers to deliver public goods can be broken down into three main groups – those that need high uptake but that do not require any significant degree of tailoring to local conditions; those that need high uptake, but that require some reflection of local conditions to ensure their effectiveness; and those that are much more targeted in nature.
- There are pros and cons as to where these payments are situated within the overall CAP structure, with arguments both for and against the inclusion of basic environmental management within Pillar 1.
- Administrative practicability is a key consideration and there is a need for well designed but relatively simple policy interventions.
- Policy measures need to be backed up by the availability of good quality advice and suitably resourced extension services.
- Investing in effective monitoring and evaluation is also critical to ensure transparency, accountability and to allow measures to be improved over time.
- The proposals set out in this report represent the first stage in a transition towards a public goods oriented CAP, including a step-by-step reduction of unspecific direct payments.

Taking account of the various factors considered in the preceding chapter, several key points emerge which would appear to be critical to effective public good delivery and that need to be taken into account when considering the most appropriate design of the CAP's future structure and tools. The acceptance of the CAP by taxpayers and citizens will increase if the 'public money for public goods' rule is followed more strictly. Thus, direct payments should be reduced over time. This would free up money which could be spent on measures which deliver environmental or other public goods more effectively and

efficiently. However, the transition to a public goods focused policy will not be achievable overnight and is likely to take place in stages.

The approach in this section, therefore, is to propose a first stage in this transition, to consider ways in which the key elements critical to public goods delivery could be incorporated within the CAP with effect from 2014 so as to increase public goods delivery over the next programming period. Account is therefore taken of practical and political feasibility considerations as well as other objectives which will be pursued by the CAP, rather than seeking to elaborate an ideal but unrealistic policy structure. For this reason, given that the two pillar structure of the CAP almost certainly is set to remain until 2020, we have based our proposals around a two pillar structure and used the Commission's proposals as a starting point.

It is clear from Chapter 1 that environmental public goods associated with agriculture face significant levels of undersupply, although this varies between regions. Declines in rural vitality are also a widespread concern, particularly in peripheral rural regions affected by a declining and ageing population (Mandl *et al*, 2007, Copus *et al*, 2011). However, in most regions the link between agriculture and environmental public goods is much closer than for rural vitality since other sectors of the rural economy have become more important in employment provision. The analysis here focuses more on environmental public good provision for this reason, although the role of the CAP in addressing rural vitality concerns is touched upon.

To date, CAP policy measures for environmental public goods tend to have been used by Member States to maintain the existing environmental resource rather than focus on delivering environmental improvements. For example, efforts are focused on maintaining current landscape features and structures, and low intensity farming systems, particularly extensive grazing and permanent crop systems, as well as the introduction of integrated farm management techniques on more intensively management arable land and permanent crops. However, the current mix of measures has not delivered public goods in the quantity and location in which they are needed to meet the EU's targets and societal demand. To achieve these goals requires a step change in the level of environmental management carried out to cover a far greater proportion of farms and more focused attention in selected locations. In particular, there needs to be:

- significant improvement in the environmental outcomes achieved on the most environmentally important areas in the EU (for example in protected areas or areas of high environmental value, such as HNV land);
- significant environmental improvements within more productive agricultural systems and greater uptake of organic methods in order to improve soil and water quality, carbon efficiency, and to reverse biodiversity declines; and
- more targeted specific actions to achieve *inter alia* reduced methane and nitrous oxide emissions, better carbon management for peat soils, the restoration of degraded habitats, the recreation of habitats where these have disappeared, more sustainable abstraction of ground water etc.

To achieve this, several changes to the current policy structure and tools are needed. Existing incentive measures need to be expanded and extended to ensure that there is high enough uptake of basic good environmental management throughout the farmed landscape, while ensuring that sufficient emphasis continues to be placed on more demanding environmental management, with programmes of support designed and targeted in a way that ensures that the right measures are implemented in the right places.

Since local conditions are often important for good environmental management, regional and sometimes farm level specificity is needed to tailor the management required to varying local situations.

Environmental policy measures can often entail the adoption of new approaches and techniques by farmers and need to be backed up by the availability of good quality advice and suitably resourced extension services. Public authorities need to collaborate with land managers to establish good data on which to base effective monitoring systems. A strong environmental legislative baseline also needs to remain in place and be adequately enforced as a foundation on which such measures can build. In addition, safeguards need to be introduced to ensure that, if measures are introduced for other purposes than encouraging the delivery of public goods, their impact on public goods has to be taken into account, avoiding environmental damage wherever possible.

However, this is a more sophisticated and complex task for public administrations to adopt. It can be demanding for public authorities not all of which have sufficient administrative capacity to design and deliver the types of measures and requirements needed at a much greater scale than at present. Therefore, there is a need to make as much use as possible of well designed but relatively simple policy interventions with low transaction costs for both public administrations and farmers. These can sit alongside more targeted interventions to balance effectiveness with administrative practicability.

Alongside the issues of administrative capacity, current CAP measures are constrained in the extent to which they deliver public goods by budget constraints, limits on payment rates that reduce uptake rates of voluntary measures, inappropriate design of practical management measures and lack of targeting.

However, changes in policy tools alone are unlikely to achieve the changes sought on the ground. There also needs to be a change in attitude so that the delivery of public goods through agriculture is viewed as a modern 21st century approach to agriculture, whereby management is based on the latest environmental research, combined with land managers' ability to use their knowledge and insights into the interaction of natural resources, habitats and production systems so as to produce the outcomes required. Higher standards would become part of the expectations of the whole supply chain from input manufacturers to consumers and retailers. This would help to transform the sector away from thinking that such environmental practices are 'backward' towards a recognition that they are part of the 21st century challenge, requiring significant expertise and knowledge to deliver effectively.

4.1.1. Identifying key suites of measures for a future CAP

Building on the factors set out above leads to the conclusion that, for the delivery of **environmental** public goods through the CAP, the management required can be broken down into three main groupings of measures above the regulatory baseline as follows.

Group 1: Measures which need high uptake but that do not require any significant degree of tailoring to local conditions. The costs for farmers will vary but often will not be very large. These sorts of measures include:

a. **Maintenance of existing landscape features** (in contrast to the requirement to retain landscape features under GAEC);
b. **Maintenance of permanent pasture** at the farm level to avoid large scale conversion to arable and provide soil carbon benefits; and
c. **Maintenance of organic farming**, which has a range of environmental benefits and can be applied nearly everywhere in the EU.

Group 2: Measures which need high uptake, but that require some reflection of local conditions through varied but not extensively elaborated rules to ensure their effectiveness. These sorts of measure include:

a. The establishment of a minimum percentage of **ecological set-aside** on the majority of farms, to include fallow land, buffer strips, beetle banks, skylark plots, grass margins, field corners etc, ensuring a mix of in-field and field edge management, with Member States having the flexibility to specify the range and mix of options to be included;
b. Requiring **soil cover** for a minimum number of weeks in the year, to include all types of natural cover (including mulch) to ensure applicability in arid areas;
c. Maintaining **semi-natural habitats**, for example grassland, heathland, moorland, woody pastures etc;
d. Undertaking and implementing **farm level greenhouse gas emission accounting/plans –** to be introduced on a pilot basis initially for a selection of farms covering key farm types over a certain size threshold to explore best practice for minimising GHG emissions and to maximise carbon sequestration and storage.

Group 3: Measures which are much more targeted in nature, including more demanding location specific environmental land management, investment aid, and territorial approaches to address rural vitality and environmental objectives in an integrated way. These measures are akin to most of the current suite of measures available under Pillar 2.

In addition, it may also be appropriate to provide a basic payment to farmers in Natura 2000 areas to compensate for restrictions placed on permitted management activities as a result of land having been designated as part of the Natura 2000 network. To ensure that payments are only made to those who do face restrictions, in practice payments should only be made where farmers are subject to management prescriptions or conditions that have been determined under relevant legislation in order to maintain or bring the site into favourable conservation status, through management plans or other regulatory means. This payment has not been included in the groups of measures above as it would be an 'entitlement' if certain conditions were met, rather than a payment for undertaking specific management practices.

All measures within these three groups need to be underpinned by environmental regulation which is effectively enforced as well as complemented by adherence with 'good

land management practice' standards, similar to those currently elaborated as GAEC standards, not all of which will be specified in national legislation.

Greater emphasis and availability of advice provision and effective extension services will be essential as neither incentive nor regulatory measures on their own will be sufficient to deliver the outcomes required. This will require extending the Farm Advisory Service (FAS) beyond cross compliance, greater use of the advisory measures within Pillar 2, greater use of nationally funded extension services or a combination of all three. In addition there may be some merit in developing guidance for Member States on how to optimise the use of the different types of measures for the environment. This could be produced through the European Network for Rural Development, building on examples where Member States have achieved beneficial outcomes for public goods through the use of different types of measures.

Transparency and accountability are essential in this policy domain. To improve the quality of delivery throughout the EU-27, it is suggested that all actions to deliver public goods (whether through cross compliance, Pillar 1 or Pillar 2) are subject to approval by the European Commission and subject to monitoring and evaluation requirements. All payments should also be subject to a robust system of compliance checking and penalties to ensure that the management being supported is being delivered on the ground.

In terms of measures to deliver rural vitality, a variety of strategies may be appropriate. These include:

- specifically targeted measures in Pillar 2, preferably organised on a territorial scale in many cases and not focusing on a specific sector;
- policies which contribute to the long term sustainability of agriculture in social, economic and environmental terms;
- simplification of support for small farms while allowing appropriate levels of structural change;
- active implementation of environmental measures, many of which contribute significantly to rural vitality.

A key role would be played by rural development measures which are much more targeted and region specific and which should follow a territorial rather than a sectoral approach. In some regions a simplified support for small farmers could contribute to rural vitality. The development of more territorial approaches to delivery may be the most suitable approach for enhancing the vitality of rural areas in the future in order to address the multiple dimensions of this public good. Since the social, economic and demographic conditions in rural areas differ significantly across the EU, a high degree of flexibility is necessary to allow the Member States to programme and implement appropriate measures. The value of the Leader approach in this regard should not be forgotten.

However, it is important to re-emphasise the fact that rural vitality objectives cannot be achieved exclusively by the implementation of polices centred on one sector and, since rural vitality is the result of a set of physical, historical, social and economic dimensions, the enhancement of this public good cannot be delivered through a single policy (i.e. the second pillar of the CAP) but requires the integration and coordination of a set of different policies (for example, rural development, cohesion, regional and local policies, etc). Therefore, more attention needs to be given to the integration of rural development policy with other territorial policies and instruments if rural vitality issues are to be addressed effectively. In addition, measures supporting the commodification of specific characteristics

of private goods can help to create markets for these characteristics and thus to overcome market failures. For example, the EU schemes known as PDO (protected designation of origin), PGI (protected geographical indication) and TSG (traditional speciality guaranteed) can support the 'rural vitality' of the specific region. An animal welfare label, which is under discussion in the EU, could provide farmers producing under animal-friendly conditions higher prices for their products and thus incentivise the delivery of animal welfare.

To ensure joined up delivery of the full range of public goods through different parts of the CAP, clear objectives would need to be set at the strategic level, covering the whole of the CAP, to stress the importance of using measures from both Pillars to deliver public goods. These objectives, set within revised EU strategic guidelines, will need to demonstrate how public good objectives delivered through the CAP will link with other EU policy objectives for the CAP and beyond and with the funding provided through other EU funding streams.

4.1.2. Situating measures within the CAP structure

Once clear objectives for their provision are set and appropriate measures determined, the question remains as to where these should be situated within the CAP structure. In many respects the current two pillar structure of the CAP is somewhat unhelpful for a policy focused on the delivery of public goods and constrains the design of integrated policy tools, given rules about co-financing, the acceptability of multi-annual commitments in Pillar 1, differences in monitoring and evaluation requirements between the Pillars etc. However, given that the two pillar structure almost certainly is set to remain, at least in the short term, our proposals are based on this structure.

Group 3 measures

It is clear that the more locally targeted management measures, tailored to specific environmental and social needs, generally over a period of years should remain in Pillar 2, with improved implementation, monitoring and evaluation to ensure that the outcomes identified are achieved in practice. In relation to environmental public goods, the most significant measure is the agri-environment measure (supported by non-productive investment where necessary) and this should remain compulsory for all Member States to implement across their whole territory. This would reflect the key role of this measure in achieving environmental outcomes and ensure that Member States continue to allocate resources to the environment from within Pillar 2. Measures that can help to encourage activities that promote rural vitality should also remain within Pillar 2.

To ensure that these more targeted Group 3 measures can be effectively implemented, however, requires sufficient resources. It will be essential that the current balance of funding between Pillar 1 and Pillar 2 is at the very least maintained, taking account of the modulation funds that are transferred to Pillar 2. If the proportion of funds currently available to Pillar 2 were to shrink in the future, this would have serious implications for the ability of Member States to deliver public good outcomes.

More effective implementation and delivery of some of these measures could be secured by adopting landscape scale and territorial approaches to delivery, ensuring that the focus of action widens beyond the individual farm and individual issue to adopt a more integrated approach towards achieving sustainable solutions in rural areas. To recognise that Member States can incur higher public transaction costs in delivering targeted public goods payments, some form of financial support could be made available to incentivise them to make the necessary investments, for example through the use of technical assistance

funding to develop efficient delivery and monitoring systems. Investment in GIS might be eligible for such aid for example.

Group 1 and 2 measures

In relation to the two groups of more basic, less targeted and ideally high uptake measures, it is less clear cut where they should be situated within the CAP. Both technical and more political considerations will have a bearing on the judgements to be made.

Group 1 measures:

Those measures in Group 1 which require little or no tailoring to local conditions are most appropriate for treatment within Pillar 1 under the existing rules of the CAP. They represent relatively simple obligations which could be made quasi-mandatory in the sense that they would be obligatory for all farmers receiving Pillar 1 direct payments but would also attract a payment, along the lines of the annual green options proposed by the Commission in November.

In effect, the payment received would be a slice of the current allocation to farmers under Pillar 1 so there would be a compulsory earmarking of part of the current direct payment for environmental purposes. Furthermore, eligibility for the remaining element of the direct payment would be withdrawn in part or wholly if the Group 1 measures were not complied with by the farmer concerned. This effectively provides a considerable incentive to farmers to undertake the environmental actions required and rewards those farmers who are already undertaking these actions. Some farmers would be eligible for a greater number of the green payments from Pillar 1 than others, for example organic producers, and this would be a step towards a distributional pattern more favourable to those making the greatest contributions to public goods.

In determining which options might be appropriate to include under Pillar 1 of the CAP, a number of considerations need to be taken into account including the potential environmental benefits that could be delivered within one year, given that multi-annual commitments appear not to be feasible, agronomic practicability and applicability to a large range of farming systems in the EU-27, ease of control and enforcement as well as the cost to farmers and impacts on EU competitiveness.

The Group 1 measures proposed should continue to be underpinned through cross compliance GAEC standards. However, there is some overlap between these proposed annual green options and the current suite of GAEC standards particularly in some Member States with higher standards and this will have to be resolved. For example, the proposed measure to maintain landscape features would build on the requirement to 'retain' landscape features under GAEC, but provide a payment for their active maintenance to help prevent deterioration in quality. In some cases the measure may replace a current GAEC standard, for example the proposed permanent pasture option. The implications of these measures for GAEC are set out below.

Group 2 measures:

For Group 2 measures, two options are worth consideration. First, it would be possible to follow the same pattern as for Group 1 measures, incorporating them within a greening of Pillar 1 and associate them with a dedicated slice of the direct payments. However, they are less well suited to this approach than Group 1 measures in some respects because of:

a) the more complex requirements of the farmer;
b) the benefits to be derived from some variation in the rules of application to match local conditions; and

c) the fact that the environmental benefit of many of these measures requires a multi-annual commitment.

For example, maintaining semi-natural grassland requires some means of identifying semi-natural grassland, either through the use of existing survey data or by specifying simple eligibility conditions, such as livestock density limits or restrictions on input usage. However, this would entail keeping some data on livestock numbers and densities and establishing ceilings on densities at an appropriate, often regional level. Some Member State flexibility would be important to ensure that the management was best suited to local conditions. Equally in relation to ecological set-aside, to be most effective, farmers would need to choose a mixture of actions from a fixed list, both in-field and field edge options that in combination covered the specified percentage of the farmed area and the optimal mix of options will vary according to region.

Introducing some level of flexibility into these Group 2 measures could still be achieved within Pillar 1 far more simply than through a fully programmed approach, but nonetheless is rather different from the simple pan-European requirements characteristic of Group 1 measures. If a way could be found to incorporate some flexibility within Pillar 1, then the funding of Group 1 and 2 measures from this part of the CAP budget would free up money currently used to pay farmers for basic management actions under agri-environment schemes within Pillar 2 and allow this to be used this to fund more demanding environmental management. In some regions, this would require the development of new agri-environment schemes and management options to offer farmers, in others it will allow for the expansion and further development of existing schemes.

An alternative approach for Group 2 measures, however, could be to retain them in Pillar 2 (where many are already situated under current agri-environment schemes) or introduce them where this is not the case, as a package of green options that farmers would be required to adopt if they wished to continue to receive direct payments. This would need to be accompanied by an associated increase in the Pillar 2 budget to allow for their widespread delivery and it may be appropriate to allow these specific measures to be 100 per cent EU financed. These measures could continue to form part of an integrated agri-environment scheme (as many already do), forming a foundation for more demanding and targeted measures in Group 3. This would create a link between Pillar 1 direct payments and these basic agri-environment measures (sometimes known as orange ticket cross compliance).

Whilst this would be a considerable departure from the current architecture of the CAP and would rearrange some of the present parameters of Pillar 2, it would allow a considerable uptake of public goods measures, while allowing more Member State flexibility in terms of their design and their delivery on a multi-annual basis. Given that many of these green options are already delivered as part of agri-environment schemes under Pillar 2 in many Member States, there may be a relatively low administrative impact associated with this approach. Within this model, this transfer of funds from the current direct payments into Pillar 2 to fund uptake of these measures could be phased in over a period of time within a strategy of transition, if this were felt to be necessary.

The advantages and disadvantages of these two approaches for Group 2 measures are set out in Table 5.

Table 5: Pros and cons of different approaches to delivering Group 2 measures

Pillar 1 'quasi-mandatory options'		Pillar 2 'quasi-mandatory options'	
Pros	**Cons**	**Pros**	**Cons**
Frees up funding that could be used to focus on more demanding environmental management in Pillar 2 (assuming funds freed up are not re-allocated to other objectives)	May require the dismantling and re-design of agri-environment schemes in many Member States; remaining residual payments for agri-environment actions might be critically low	Processes are already in place relating to Commission approval, monitoring, evaluation etc	Requires a transfer of funds from Pillar 1 to Pillar 2
Promotes high uptake of standardised management options across farmed landscape	Annual nature of payments would not necessarily provide a stable flow of public goods over time if the location of management changes year on year	Promotes high uptake of management options across farmed landscape Ensures multi-annual provision more appropriate to delivery of some environmental public goods	
Lower administrative burden as simple to administer, although this will depend on the level of local flexibility allowed	Unless considerable flexibility is given to Member States to design measures to reflect local conditions, the lack of tailored management may not deliver the environmental benefits desired	Allows some administrative processes to be simplified while also allowing for some tailoring of measures to local conditions	Currently Pillar 2 requires co-financing, although this requirement could be revised for certain management measures, at the cost of increased transaction costs and risks of 'cross-sanctions' in P1 and P2
		It is potentially simpler for some Member States to alter existing agri-environment schemes to incorporate the new requirements than incorporate them within Pillar 1	
	Does not follow the subsidiarity principle	More in line with the subsidiarity principle	

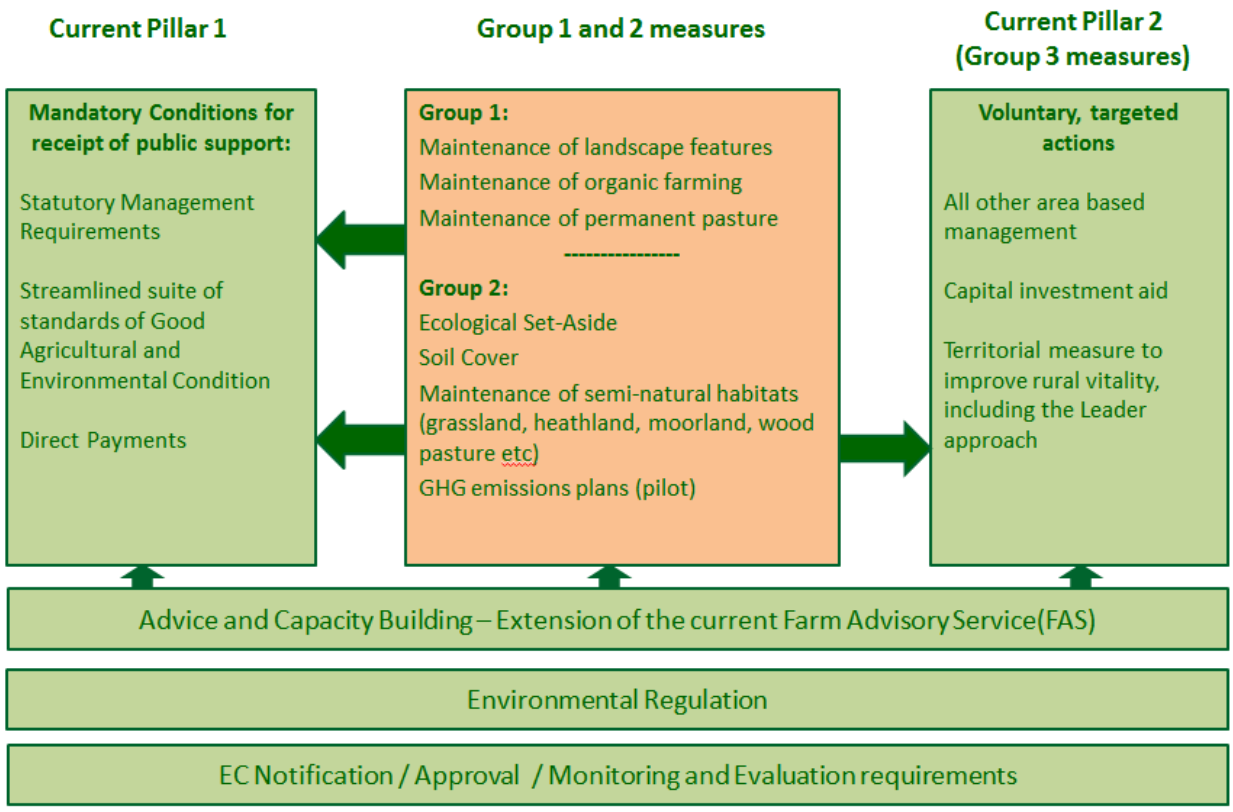
Articulating the benefits and drawbacks of these two possible approaches to achieving high uptake of desirable forms of management across the farmed countryside helps to illuminate the more strategic options and the trade offs that need to be made. The degree to which such measures are likely to deliver real improvements in the state of environment in the EU-27 will be sensitive to the overall architecture of the CAP as well as the design of the measures themselves.

The Commission's November proposals opt firmly for the greening of Pillar 1 but in very general terms without much discussion of the issues addressed here. The aim of increasing public good delivery on a large scale through Pillar 1, with a relatively simple approach clearly has its attractions but the potential to capture the necessary environmental value added through this model is not demonstrated and further work is needed.

This revised architecture of the CAP, as proposed in this study, is outlined in Figure 1 below. The measures in the central box are aimed at the provision of environmental public goods and need to be taken up on a large scale within Europe. The mechanisms for doing so could entail incorporation in Pillar 1 or Pillar 2, as outlined above, but in both cases 100 per cent EU funding would be desirable to ensure widespread uptake across the farmed countryside. Monitoring and evaluation would also be required.

It may be that it is not feasible to introduce all of the Group 2 measures immediately. This is likely to be the case for two options in particular – the maintenance of semi-natural habitats and the introduction of greenhouse gas emission accounting/plans. However, this should not exclude them from further consideration and development. In the case of the semi-natural habitat option, the problem relates to the issues of defining semi-natural grassland habitats in all parts of the EU-27 and the lack of a database of semi-natural habitats (particularly grassland) for all EU Member States to determine a baseline against which implementation could be monitored as well as enforced. While many inventories do exist at the national level, these are not currently in a common format. Although this could be overcome in the short term by including eligibility criteria relating to livestock densities, this is not considered to be WTO green box compatible. In the medium term, however, this could be overcome by investment in creating a common dataset and one-off surveys to fill any gaps in data that are found. In the meantime, a GAEC standard to protect semi-natural habitats could be introduced, which would allow these differences in data availability and accessibility to be taken into account. In the case of the option to develop greenhouse gas emission plans at the farm level, it is suggested that this could be piloted, prior to being rolled out for all farms above a certain size threshold. In the first instance it may be feasible to involve a sample of farmers, covering a range of farm types to develop and subsequently implement a GHG emissions reduction plan to test the best means of designing and subsequently implementing such plans. This option could then be extended to all farms at a later date, at which point it would become mandatory for farmers to undertake such plans if they wished to receive direct payments. Associated advice and training would be critical.

Figure 1: Potential siting of public good focused measures within the future CAP



Implications for GAEC and Cross Compliance

All measures should continue to be underpinned by a suite of basic land management standards, which go beyond environmental regulation, with which land managers should comply at their own cost. However, the introduction of payments for the Group 1 and 2 green measures would have implications for the suite of standards of Good Agricultural and Environmental Condition (GAEC) that are in place in Member States, as a number of these overlap either partially of wholly with a number of existing GAEC standards. This is particularly the case with the options relating to soil cover and permanent pasture as well as some of the management actions that may count towards ecological set-aside.

Where this is the case, it would make sense to remove these options from the list of GAEC standards on two conditions: first, that it is mandatory that all farms for whom the options are relevant undertake the required management if they wish to receive direct payments; and second, that the standards are not removed from the list of GAEC standards until the end of the political negotiations to ensure that an appropriate alternative option is formally confirmed as a paid green option. This would help to streamline and simplify GAEC standards and ensure that the management objectives being pushed at present were retained albeit by a modified route.

However, it should be noted that, should there be operational problems with introducing some of the Group 1 or Group 2 measures as payments, particularly in relation to allowing sufficient national flexibility in their operation or being able to control them easily at the EU

level, then serious consideration should be given to introducing them (or maintaining them) as compulsory GAEC standards. For example, should it be too difficult to introduce sufficient flexibility to allow the maintenance of the semi-natural habitats option to be implemented satisfactorily, then this could be introduced as a GAEC standard which can be designed and implemented at the Member State level. The same could be the case for the soil cover option as well as measures that have been promoted by the Commission but are not specifically recommended within this study, such as the crop rotation/diversity option. There is also a case for supplementing a streamlined suite of GAEC standards with additional standards that address climate issues as these are not covered sufficiently within the current list. One possibility would be the inclusion of a standard requiring farmers to maintain soils with high soil organic matter (i.e. peatlands).

To ensure that the environmental outcomes of GAEC standards are properly assessed, it would be helpful if they were subject to Commission approval and requirements put in place for evaluating their performance on a regular basis.

A table outlining which cross compliance requirements would become 'green payment options' and which would remain as GAEC, as well as potential new GAEC standards, is set out in Table 6.

Table 6: Potential revisions to current GAEC Standards

Current GAEC Standard C – compulsory O - optional	Retention as compulsory GAEC standard	Inclusion as quasi-mandatory green payment	Comments
Minimum soil cover (c)	X / √	√	Important to keep as either GAEC or quasi-mandatory measure
Protection of carbon rich soils	NEW		New requirement to maintain all carbon rich soils, such as peatlands
Minimum land management reflecting site specific conditions (c)	√		
Retain terraces (o)	X		To add to 'landscape features' requirement
Arable stubble management (c)	√	√ Include in soil cover payment	GAEC standard becomes 'prohibition of stubble burning'
Standards for crop rotations (o)	X / √	√	
Appropriate machinery use (o)	√		
Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated and field margins (c)	√		Add terraces to list
Avoiding the encroachment of unwanted vegetation on agricultural land (c)	X		Overzealous application has perverse environmental effects
Protection of permanent pasture (c)	√	√	Keep national/regional level restrictions and include farm level permanent pasture as green option, with particular emphasis on grassland with particular

			characteristics (e.g. organic soils, wetlands, flooding areas and river banks, slopes)
Protection of semi-natural habitats	**NEW**	√	Additional farm level requirement to maintain extensive, semi-natural grassland either as a payment OR as a GAEC requirement
Minimum livestock stocking rates or/and appropriate regimes (o)	**X**	√	To combine as part of measure to maintain extensive, semi-natural habitats
Establishment and/or retention of habitats (o)	**X / √**	√	To be part of the ecological set-aside requirement
Prohibition of the grubbing up of olive trees (o)	**X / √**		Too restrictive and narrow focus. Remove or extend to all fruit/nut trees
Maintenance of olive groves and vines in good vegetative conditions (o)	**X**		To incorporate within minimum land management standard
Establishment of buffer strips along water courses (c)	√	√	Keep a minimum width requirement in GAEC, with additional area to be part of the ecological set-aside requirement
Where use of water for irrigation is subject to authorisation, compliance with authorisations procedures (c)	√		

Key: **X = remove;** **√ = keep;** **X / √ =** remove if included as green payment or not modified, keep otherwise

4.2. Implications of the proposals

The proposals above would be designed to increase public good provision across the whole farmed landscape as well as in priority areas. For real environmental benefits to be assured, the final policy design and subsequent delivery of the CAP as a whole will need to demonstrate that an increase in environmental outcomes will be delivered both within individual Member States as well as across the EU as a whole. he scale of provision would depend partly on the funding available, the capacity of national and regional administrations to implement the requirements effectively and the willingness of farmers to participate in a positive spirit. This in turn would require a considerable investment in communication and information so that the substantial change in the orientation of the CAP became clear to the whole agricultural community.

Making the adoption of these green payment options mandatory for receipt of direct payments is a critical element of this revised package of measures for both environmental and administrative reasons. It ensures a minimum level of basic environmental management across the majority of the farmed landscape, rewarding those farmers who are already managing their land in environmentally beneficial ways and incentivising others to adopt more sustainable farming methods. In addition, it allows Member States to predetermine the allocation of their financial envelope between different farm types with some certainty on an annual basis as eligibility for different payments will be clear. Any

move to make these payments voluntary to opt into would not only significantly reduce the level of environmental benefit achieved, thereby bringing the value of this approach into question, but would also make the system more complicated to administer and control, particularly if these options are situated within Pillar 1.

However, any changes to the policy framework should not disadvantage those Member States and land managers who have already demonstrated a commitment to use Pillar 2 measures to deliver public goods. Particularly important will be to avoid reducing the environmental outcomes achieved through existing CAP policy measures. The introduction of green payments under Pillar 1 inevitably will have implications for what can be funded under environmental land management measures, such as the agri-environment measure under Pillar 2. In some regions, this will require the development of new agri-environment schemes and management options to offer farmers, in others it will allow for the expansion and further development of existing schemes.

This may mean that some flexibility is required to allow different approaches to be taken in different Member States and transitional arrangements may be needed to allow sufficient time to re-design schemes and help avoid abrupt distortions in the availability of support. In addition, any new policy structure must ensure that the introduction of a suite of basic measures that all farmers are required to adopt does not reduce the attractiveness or uptake of more demanding environmental management under agri-environment or other environmental measures under Pillar 2 (Group 3 measures). To allow this to happen, however, it will be essential that the budget available for Pillar 2 currently (including modulation funds) is maintained or increased from its current level. If the proportion of funds currently available to Pillar 2 for the implementation of Group 3 measures were to shrink in the future, this would have serious risks for the ability of Member States to deliver environmental outcomes.

It will be important also that clarity is provided in advance of the next programming period about how the transition from the current system to the new CAP structure will be organised and the budget available for the different pillars. This would allow sufficient time for Member States to plan the changes required in a systematic way.

As part of this it is worth emphasising that, in moving the CAP in this direction, the intention is to create a model of European policy which would endure over a considerable period of time, not just for one budgetary cycle. This requires CAP expenditure to be linked more closely to the delivery of public goods and increasingly adapted to the principles of subsidiarity and fiscal equivalence. Target-oriented, specific measures should gain importance in the CAP and unspecific direct payments which are only weakly related to the provision of public goods should be substantially reduced step-by-step. In effect farmers would be offered stability after a period of upheaval. Equally, public administrations would need to adapt to a new role and would be working with different sources of information and measures of output. This requires a considerable investment in cultural change as well as in administrative adjustment. New relationships would need to be forged between agricultural, environmental and forestry authorities and as a result it may be necessary to phase a number of these changes in over a period of time, as described above.

A number of more specific implications are signalled below.

4.2.1. Administrative burden and the Simplification Agenda

It is possible to simplify certain aspects of the CAP whilst pursuing a public goods agenda but because the objectives are more complex and varied and need to be pursued through publicly delivered measures rather than the market, some increase in administration is unavoidable. It is inevitable that delivering environmental outcomes will involve some form of administrative burden in terms of processing payments, checking compliance, ensuring adequate enforcement, negotiating agreements where necessary, providing advice and training for farmers and undertaking adequate monitoring and evaluation.

To ensure the effective delivery of public goods in practice requires a considerable amount of data to be recorded on IACS forms, entailing more checking and monitoring. But arguably this is central to securing public goods. However, an increase in compliance checking and enforcement need not bring about increased bureaucracy, at least at the farm level. One way to achieve this is to avoid multiple visits to a farm by a range of agencies involved in different forms of inspection and introduce periodical combined or joint inspection visits covering both Pillar 1 and Pillar 2 measures. These could become less frequent when farmers had proved their competence, following a risk based approach. In addition, technological developments, for example in remote sensing, mean that it is now much simpler to assess whether or not certain management options have been undertaken remotely and at quite a large scale.

Improved exchange of information regarding standards and how to comply with them could take place between those monitoring compliance and farm advisers, so that farmers receive consistent messages. Improved relationships between inspectors and advisers will help in this regard, although there should continue to be a clear separation between their respective roles. Indeed, there needs to be an increased recognition that public good delivery is not always straightforward and may require trade offs and compromises at the farm level. Inspection regimes will need to find ways of reflecting this over time, without creating loopholes. For example, requirements for the control of parcel sizes and the quantitative control of eligibility criteria such as the presence of 'unwanted vegetation' need to be relaxed to avoid perverse environmental effects e.g. the registration of an area slightly smaller than the real farm area should be allowed to avoid sanctions, and tolerance levels should be revised. For public goods delivery, it is not the last percentage of area under contract which is most relevant, but the compliance with management rules. Another means of simplification might be to relax the requirement to control the full range of cross-compliance requirements for which the respective authority is responsible. Instead, a selection of the most relevant requirements plus a random sample could be sufficient.

It should be recognised, nonetheless, that adhering to a purely minimalist approach would result in a failure to capture the public goods required. Ensuring that delivery is as simple and straightforward as possible is an important goal, but seeking simplification should not be at the expense of achieving environmental outcomes. In the approach outlined above, the question of administrative burden has been taken as a critical consideration and clearly there is an important role for simple measures and action outside the CAP entirely. However, it would be misleading to suggest that a stronger focus on public goods could be achieved without accepting some increase in complexity.

4.2.2. WTO considerations

As outlined earlier in the report, developments within the CAP will need to take account of international obligations including those under the WTO. This introduces a number of constraints, for example the need to avoid any reintroduction of payments linked to explicitly productive activities which would be a reversal of the move towards decoupling. This is partly a matter of technical policy design and partly a question of principle. If the effect of a policy measure is to provide an explicit incentive to increase production, it is far more likely to be challenged within the WTO than if it is clearly an environmentally inspired measure with no intention of significantly introducing trade distorting impacts (see, for example, Tangermann, 2011).

The purpose of the policy tools introduced, however, has a direct bearing on the way in which payments are calculated and subsequently notified under WTO Green Box rules. If they are defined as part of an 'environmental programme' under paragraph 12 of Annex 2 of the Agreement on Agriculture, then they will be limited to the 'extra costs or loss of income involved in complying with the government programme'. However if they are defined as 'decoupled income support' under paragraph 6, then the rules are different, and there are many more stipulations about eligibility criteria and factors to which payments must not be linked.

If measures in our Group 1 and 2 are situated within Pillar 1 there may be arguments for using either definition, and therefore either of the calculation methods, for payment rates. However, if the purpose of such measures is to be primarily the provision of environmental public goods, then it would seem more transparent to define them as such. Indeed it may be that there is more flexibility in what can be achieved by defining such measures as 'environmental'. Although there may be concerns that there would be considerable variability in per hectare payment rates, based on the use of the 'extra costs or loss of income' calculation and that this might lead to excessively high payment rates for management in more productive systems, in practice there is no requirement to reflect 100 per cent of the loss of income or extra costs in the payment calculation. In fact, this is the maximum payment allowable, but any proportion of this would still be compliant with the rules as long as it was attractive enough to farmers to ensure uptake.

A number of studies have noted that there is scope within the definition of the Green Box to design agri-environment payments in such a way as to take account of fixed as well as variable costs, which may allow the development of more attractive payment rates for those farmers in less productive areas, where farming suffers from poor profitability and yet is important from either an environmental or social point of view (see for example SAC *et al.*, forthcoming). This is an area which justifies further consideration.

5. NON CAP MEASURES FOR THE DELIVERY OF PUBLIC GOODS

KEY FINDINGS

- There are no one-size-fits-all measures which can optimise the delivery of different public goods.
- Relying on regulation and public spending alone may not be sufficient to address the pervasive market failures that have led to the undersupply of public goods.
- Participation of the private sector and market may help contribute to stimulating the delivery of environmental benefits on agricultural land.

There is no one-size-fits-all measure which can optimise the delivery of different public goods – whether environmental or other. Different public goods require different responses depending on their nature, which is affected by factors such as: the extent to which the public goods in question are localised or are more global in nature, the different costs and burdens that their delivery incurs on the provider (taking into account the levels of public demand for the service and the importance of the benefits derived), and the difficulty of calculating tangible costs and benefits of the public goods in question and of deciding who should pay.

While it is argued that many of the public goods which are part of this study should be remunerated through public payments from the CAP budget (if they are not provided as a side-product of a profitable private good), is has to be acknowledged that relying on public spending and regulation alone without the participation of the market and the private sector will fail to adequately address the pervasive market failures that have led to the undersupply of public goods.

In order to do that, there may be some merit in considering the use of other measures, for example market based measures, alongside general and targeted support via the CAP to stimulate public goods delivery on agricultural land. Two specific examples are highlighted below: habitat banking, and contracts for services, in particular water.

5.1. Habitat banking

Habitat banking is a promising innovative financial instrument, with the potential to mobilise private sector financing for biodiversity and ecosystem services. Habitat banking is 'a market where credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced in advance of, and without ex-ante links to, the debits they compensate for and stored over time' (Eftec, IEEP *et al*, 2010). Habitat banking is one method of delivering biodiversity

offsets[9], through turning offsets into assets that can be traded, effectively creating a market system for compensation liabilities.

This is not just a concept, but also a working model that can easily be expanded and adapted to local conditions. There are already 39 habitat banks operating world wide, and 25 more being planned, according to the British Ecological Institute. While habitat banking is perhaps most advanced in the US, where 'wetland mitigation banking' is already a significant market, there is increasing interest across the EU in the application of habitat banking.

For example, The Environment Bank Ltd.[10], which is active in the UK and expanding operations in the EU, incentivises developers to buy 'Conservation Credits' as indemnity for ecological damage from new development; it then uses these credits to finance investments by land owners, who are prepared to forego income from production activities in order to restore areas of land creating new wildlife habitats, wildlife corridors, wetlands, woodlands; providing flood mitigation and storing carbon, reconnecting fragmented habitats and so on.

The system must be designed in such a way as to provide benefits to all stakeholders involved: developers, landowners, planning authorities and the wider community. The performance of habitat banking is enhanced when the law requires compensation by developers for ecological damage, receptor sites for the relevant credits are chosen for their potential to deliver ecological gains, and land managers enter into legally binding multiannual management agreements, monitored by the habitat bank or local planning authorities as long as the credits last.

When appropriately regulated, and implemented as one strand of an appropriate mitigation strategy, the result can be win-win. Eco-system erosion from development projects gives rise to eco-system enhancement through compensating investment that would not otherwise take place. Developers are able to clarify the planning process, notably as regards sustainability aspects, limit costly delays, and improve their image. Land owners obtain the income necessary to provide more eco-system services to society, and their respect of regulatory obligations, such as the Habitats Directive and the Water Framework Directive, is enhanced. The Community benefits from a better overall environment than would be created otherwise.

While there are many issues to address in order to develop the habitat banking market in the EU – such as how to assure long-term ecological gains, avoiding displacement effects – much of the groundwork has already been done, albeit in the form of small pilots. The next step is to develop appropriate policy at EU level.

[9] Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity. (BBOP, 2009).

[10] www.environmentbank.com

Box 4: Examples of habitat banking in practice

CDC Biodiversity Project at Cossure, Provence-Alpes-Côte d'Azur
An area of land of 357ha was purchased by an ecological branch of the French bank 'Caisse de Dépots - CDC Biodiversité' partly because of laws regarding compensation for habitat loss. It was rented out to farmers, who agreed to devote at least three per cent of the area to predetermined measures, such as planting forage to maintain an insect habitat and attract five given species of birds, in order to improve biodiversity. Farmers actually doing so receive a credit through a habitat bank, whereas farmers who opt not to enter the scheme must purchase a credit for every 1 per cent of land not devoted to biodiversity improvement (Source: www.cdc-biodiversite.fr/nos-projets/cossure-reseve-d-actifs-naturels).

Groundwater recharge in Kunamoto, Japan
The 'recharge' ability of the Shirakawa River is expected to decrease over time due to a combination of reduced rice production and increasing groundwater extraction by manufacturers around the city of Kunamoto, in particular a Sony semiconductor plant. Sony pays farmers to flood 30ha of land from a nearby river in between cultivation periods. The consequent improvement of water availability just below the surface allows Sony to save money while providing farmers with additional income for producing the public good water (Source: TEEB, 2010).

Hof Haseman Foundation, Saxony, Germany.
The German Nature Conservation Act in 2002 was moderated to empower the German Länder to introduce habitat banking to remediate habitat damage caused by new urban developments. In Lower Saxony, a private landowner set up a private nature and heritage conservation foundation, 'Hof Haseman'. The territory of the Foundation is a designated habitat bank offering land for compensatory remediation measures in exchange for developments elsewhere. In co-operation with the local nature conservation authority a nature conservation development plan has been elaborated for the area. A nearby small town-municipality uses the Foundation's land for remediation of its construction activities elsewhere. The nearby municipality is the major contracting party to the Foundation. The assessment of the remediation potential of the area of Hof Hasemann resulted in 895,000 credit points of which the Municipality of Bramsche agreed to buy 450,000 credit points. The acquisition of these points will be completed after roughly ten years with a minimum annual acquisition of 45,000 credit points. As the habitat bank is managed by the Foundation, local authorities save on administrative costs. (Source: http://www.envliability.eu/docs/D12CaseStudies/D12_REMEDE_Habitat_Banking_Oct%2008.pdf)

5.2. Contracts for water services

So far, the cross-compliance requirements within the CAP, the applications of certain directives, such as the Water Framework Directive (WFD), alongside rural development measures, have proved insufficient to achieve a satisfactory improvement in water quality, use and saving. Water pricing policies (incentive pricing, cost recovery and the polluter-pays principle) can help act as an incentive for the sustainable use of water resources and ensure that the costs of water services, including environmental and resource costs, are recovered. Revenues generated by water-related green taxes and charges to specifically support adaptation measures in the agricultural sector can also help, as can rural development funding through the CAP. However, because of the limitation of public funds under the CAP, additional sources of funding have to be found.

The WFD recognises this and stipulates that, if the basic measures are not sufficient for achieving the environmental objectives, that supplementary measures shall be taken, including economic and fiscal instruments, negotiated environmental agreements, and codes of good practice.

Cooperative, bilateral, binding agreements between private or public water companies on the one hand, and farmers, foresters and other land managers on the other, in their catchment area can allow land to be managed in such a way as to reduce some costs of water treatment and save other costs by avoiding well closures and/or tapping remote water resources. This approach works if water companies as well as consumers are willing

to pay the costs of encouraging farmers to change their production methods, and companies find a cheaper way of dealing with the pollutant than the alternative of removing it during water treatment. Evidence suggests that the economic benefits of private contracts usually exceed their costs, especially in cases where remedial measures, such as pumping deeper aquifers, water treatment, and development of remote resources can be avoided. Contracts for services between water companies and farmers (Germany), or between Chambers of Agriculture and water companies (France), have actually been able to provide the necessary financial incentives to change farmers' behaviour, improve the ecological status of European waters, and offer the companies themselves a cheaper way to deal with pollutants. France, Germany and Denmark have been leaders in a number of cooperative agreements.

Compensation payments and other economic advantages of co-operative agreements are only one of the advantages of this kind of deal. Many rely on the non-economic advantages as incentives. In some cases, the threat of litigation, hand-in-hand with the polluter-pays principle, can provide sufficient incentives for farmers to reach an agreement with the authorities and/or water utilities.

The water authorities recognise that voluntary commitments to change farming practices, which are often more stringent than mandatory rules (but the respect of which is not compensated), can be more effective than compulsory rules in enforcing regulations. They are also aware that direct collaboration between water companies and farmers can tailor changes in farming practices to the site-specific conditions in water catchments, and that the monitoring systems installed by water companies can be more advanced than those used by public authorities. Water authorities are therefore interested in promoting such cooperative agreements, and advise farmers and water companies about seeking funding from agri-environment programmes, whereas water companies are keen to advise farmers on conversion to more sustainable farming practices.

The economic efficiency of such voluntary cooperation can be assessed by comparing the total expenditure on changing farming practices (including advisory programmes and monitoring services) with the costs saved, such as in water treatment and blending, piping in supplies from elsewhere and using mineral fertilisers and pesticides. The arrangement is economically efficient if the difference between saved costs and total expenditure is positive, i.e. the economic net benefit has a value greater than zero.

The environmental effect of these contracts for services can be enhanced if they underpin appropriate regulatory measures, whether water-based or not (e.g. measures regarding land-use activities), as well as relevant public support measures (e.g. single farm payment, crop insurance). However, the concrete results on the ground depend on farmers' capacity and/or willingness to pay the water prices set in terms of their effects on farm income and farmers' capacity to pay, as well as on their willingness and capacity to adapt.

Box 5: Examples of private contracts for water services

Cooperative agreement (CA) 'Stevertalsperre' – North Rhine-Westphalia.
The reason for the establishment (1989) of this CA was the pollution of surface waters with pesticides. In order to meet the limit of drinking water of 0.1mg/l, the water company installed treatment facilities, including infiltration by activated carbon, to eliminate pollutants. The objective of the CA was to achieve area-wide agricultural practices without yield and income losses, and to reduce water treatment costs in the long run. The principal focus of the CA was the provision of advisory services, financed by the water company. (Source: Heinz, 2007)

'Room for the River' – Rhine River, the Netherlands
After the evacuations of over 200,000 people during the 1993 and 1995 floods, cross-border cooperation was intensified to improve the management of the river basin comprising the Rhine, the Meuse, the Waal and the Ijssel. Farmers located alongside the tributaries of the Rhine River in the Netherlands were paid to set aside land for a flood plain and a side channel so as to allow the rivers to expand limiting the rise of their water level and thus offering greater flood protection. The total budget amounted to €2.3m. (Source: http://www.ruimtevoorderivier.nl/meta-navigatie/english.aspx)

6. CONCLUSIONS AND PRINCIPAL RECOMMENDATIONS

The growing awareness of the pressures facing farmland biodiversity as well as water supplies, water quality, soils and greenhouse gas emissions makes it clear that there is an urgent need for an increase in the provision of public goods through agriculture. This is critical if Europe is to meet its various targets and policy objectives related to the environment as well as address the pressures facing rural vitality and food security. Demand for such public goods will only become greater in the future, particularly as climate aspirations increase and the role agriculture can play in this regard is recognised increasingly.

The upcoming CAP reform affords the opportunity to amend the Common Agricultural Policy so that it is has a much stronger orientation towards the delivery of public goods, such that societal demands are met and more active support by civil society becomes likely. This requires major changes to the policy framework, which need to be agreed soon and implemented stepwise. However, the challenges of such restructuring are not insignificant, as the inevitable rebalancing of support between different policy mechanisms as well as between Member States are highly politicised issues. Nonetheless, such challenges also bring opportunities, for example to provide longer-term stability for farmers and clearer benefits for society.

These issues cannot be addressed through the CAP alone. An integrated approach is required, that has the CAP at its heart, but also involves other policies that impact on agriculture, such as climate change, competition, consumers, energy, environment, transport, land use planning, and so forth. Public good provision needs to be seen as a strategic objective that affects all such policies, so that they can work synergistically and avoid conflicting objectives as far as possible.

Developing a new public goods focused policy framework for the CAP has a number of implications. First, it requires agricultural policy to be looked at in new ways, from new perspectives. In trying to find a balance between farmers' immediate objectives to make a profit, let alone simply a living, and the long-term interest of their families, farming and the world, new ways of supporting farmers are needed and this will involve a change in culture. In effect, a new social contract is needed between farmers and society which sees the delivery of public goods as part of a modern approach to agriculture where food, fibre and fuel are supplied in ways that are resource efficient, help address climate change, deliver high levels of biodiversity and farm animal welfare, within the context of diverse and vibrant rural areas. Second, it brings with it a number of requirements, highlighted in the report. These are varied in nature.

At the most basic level there is a critical need for **appropriate data collection and recording mechanisms** to be put in place that are consistent in all Member States so that sufficient information is available to inform the design of suitable measures, to allow them to be implemented effectively and subsequently monitored and their impacts evaluated. For example, recording data as diverse as stocking rates and mapping the location of landscape features are central to effective scheme design and delivery in relation to environmental public goods. Technological developments mean that it is much easier to record and share location specific data than previously, which helps to make this process more effective and efficient.

Clarity of purpose and setting clear measurable objectives is also critical. Objectives should be set with reference to the various legal constraints and policy goals that have been articulated for different public goods. This should define the context for setting out the rationale for the use of different measures to meet these objectives, identifying the intended outcomes and the means of monitoring these.

In developing the new framework, there is a need to avoid unnecessary bureaucracy and red tape. However, it must be recognised that pursuing a public goods agenda involves the delivery of a more varied and sophisticated suite of objectives and therefore some increase in administration is unavoidable. This will be challenging for public authorities where there may be insufficient administrative and/or institutional capacity to design the types of schemes needed and deliver them at the scale required. Recognition of the need to invest in developing capacity in this area over time will be essential for the effective delivery of public goods in the long term. There may be a case for assisting Member States develop state of the art delivery and monitoring systems through use of Technical Assistance funds.

Securing **sufficient financial resources** will also be critical as will the design of appropriate payment formulae that are WTO Green Box compatible, but nonetheless are able to reflect the full opportunity costs of delivering public goods on farmland. Evidence suggests that a two to threefold increase in the CAP budget allocated currently to environmental measures would be needed just to deliver environmental needs associated with agriculture (Cao *et al*, 2010; Hart *et al*, 2011).

However, reorienting the CAP towards public goods requires a political willingness to proceed and this includes the acceptance of the need for a **redistribution of the CAP budget** to better reflect public good objectives, given that areas of high environmental value (i.e. Natura 2000 sites) or those requiring attention (such as erosion prone or carbon rich soils) are not evenly distributed between Member States. This redistribution will need to be between Member States and individual farms but also between Pillars 1 and 2. A willingness to re-consider the co-financing rules in line with the principles of fiscal equivalence and subsidiarity will also be necessary.

There are important implications for **policy design**. The report demonstrates the need for a mix of different policy tools, including regulation, incentives, investment aid and advice. It highlights the diversity of rural and environmental situations in the EU-27 and stresses the need for policy measures to be tailored and targeted to local conditions in order to maximise public goods outcomes. The critical nature of advice and extension services is particularly evident.

The report shows that there is no easy fix regarding resource productivity and ecosystem production. Pervasive air, soil and water pollution in agriculture, declines in farmland biodiversity and reducing greenhouse gas emissions cannot be effectively tackled simply by strengthening the regulatory framework, and incentive measures need to be made attractive to farmers.

Some CAP measures already exist that do deliver public goods, and some work relatively effectively. However there are many policy measures that are not focused primarily on the delivery of public goods and could be revised to do so. The extent to which CAP measures deliver public goods depends partly on the way in which the CAP framework is applied by Member States. Combining a new ambition and rigour with the creation of sufficient local flexibility and encouraging the tailoring and targeting of measures without creating an over-complex and bureaucratic CAP are two of the key challenges to be addressed. This raises

some interesting questions about what the future nature of incentives should be and where they should be located within the overall CAP framework. There are a number of options here.

The report identifies three key groups of measures that are needed to deliver public goods in a future CAP. First, there is a group of more focused measures that are highly tailored to delivering specific outcomes that currently sit within Pillar 2 and would need to remain there in order to deliver maximum added value (Group 3 measures in the report).

However, there are also measures that are simpler in nature and which could deliver considerable environmental benefits if adopted at a sufficiently broad scale in the EU. One of the key questions of the current debate concerns where these measures should be situated within the CAP framework. The report divides these types of measures into two groups. The first group includes measures which require no real local specificity and could therefore be attached to Pillar 1 decoupled payments without a problem. The second group are measures that require some tailoring to local conditions to make sure that the outcome is as beneficial for the environment as possible. These provisions (Group 2 measures in the report) could be introduced in one of two ways. On the one hand they could be introduced within Pillar 1, broadly along the lines proposed for the Commission for greening Pillar 1 in the November Communication, but allowing for some Member State flexibility in their design and delivery, requiring Commission approval and be subject to monitoring and evaluation requirements. On the other hand they could be retained in Pillar 2 (where many of them already sit as part of agri-environment schemes) or introduced there if this is not the case. Farmers would be required to participate in these core Europe-wide agri-environmental measures to be eligible for receipt of direct payments. In this way there would be a link between Pillar 1 direct payments and these public goods focused measures (sometimes known as orange ticket cross compliance). Sufficient funding would need to be transferred from the Pillar 1 budget to allow for widespread uptake of these measures and there may be a case for them to be 100 per cent EU funded although formally in Pillar 2.

The European Parliament, with its newly enhanced role, has an important role to play in ensuring that the outcomes of the forthcoming CAP reform do deliver improved outcomes for public goods for the benefit of farmers and society alike. A serious reform effort entails convincing all actors concerned that it is in their mutual interest, both in terms of social responsibility and good use of funds, that all are expected to contribute and to be treated fairly, that they will be provided with the necessary tools to respect regulations as well as to act voluntarily, and that all that will not be too complicated to understand and administer.

In addition, it is important to recognise the significant changes that such a reform will need to bring about in terms of scheme design and delivery as well as monitoring at the Member State/regional level. Unnecessary delays to agreeing a reform package should be avoided where possible to allow Member States sufficient time to operationalise new support systems (not just in relation to public goods), put in place the necessary administrative processes required, as well as go through the Commission approval process. For the transition period, rules should be defined beforehand, giving Member States flexibility in order to provide sufficient continuity, especially in relation to Pillar 2 support measures. Close consultation with all stakeholders at all stages, from legislation to implementation, is of the essence in order to achieve success on the ground. The European Parliament could be of great help in this through its hearing system. But consultations need to be pursued also at national and local levels.

This report has shown that, although there may be no magic bullets in terms of how to restructure the CAP to ensure greater provision of public goods, there are practical ways forward that can be taken now as part of a longer-term transition. The status quo is no longer tenable politically as it will not deliver what is being demanded by society and would send the wrong signal both to farmers and to civil society about the role of agriculture in the 21st century. Decisions made about the focus of the CAP in this reform need to ensure that a future CAP has the delivery of public goods at its core and set the tone for the long-term future of a sustainable and competitive agricultural sector.

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LIST OF COMMUNICATIONS, DIRECTIVES, REGULATIONS, STRATEGIES CITED IN THE REPORT

Communications:

- European Commission (2006a) Communication from the Commission to the Council and the European Parliament – *Development of agri-environmental indicators for monitoring the integration of environmental concerns into the Common Agricultural Policy*, COM(2006)508 Final.

- European Commission (2006b) Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – *Thematic Strategy for Soil Protection*, COM(2006) 231 Final.

- European Commission (2007) Communication from the Commission to the European Parliament and the Council – Addressing the challenge of water scarcity and droughts in the European Union, COM(2007) 0414 Final.

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- European Commission (2010) Communication from the Commission – *Europe 2020: A strategy for smart, sustainable and inclusive growth*, COM(2010)2020.

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- European Commission (2011) Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – *A Roadmap for moving to a competitive low carbon economy in 2050*, COM(2011) 112 Final.

- European Commission (2011) Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions – *Our life insurance, our natural capital: an EU biodiversity strategy to 2020*, COM(2011)244 Final.

Directives:

- Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (OJ L 103, 25.04.1979).

- Council Directive 80/68/EEC of 17 December 1979 on the protection of groundwater against pollution caused by certain dangerous substances (OJ L 020, 26.01.1980).

- Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (OJ L 181, 04.07.1986), amended by Directive 91/692/EEC (OJ L 377, 31.12.1991).

- Council Directive 91/976/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L 375, 31.12.1991), amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003).

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  - Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC, OJ L140/88, 05/06/09.

- Council Conclusions (Council of the European Union, DG Environment) 7536/10 of16 March 2010 on Biodiversity: Post-2010. EU and global vision and targets and international ABS regime.

ANNEX 1: EVIDENCE OF UNDERSUPPLY OF ENVIRONMENTAL PUBLIC GOODS

Climate Stability –Reduced GHG Emissions
Target: EU -8% overall reduction in greenhouse gas emissions below 1990 levels by 2012 (not just agriculture) (Kyoto Protocol; Reduce non-CO2 emissions by between 42 and 49 per cent by 2050 compared to 1990 (Carbon Roadmap – COM(2011) 112 final)
Reference Level: No EU or national legislative requirements.
Evidence of Undersupply: Of the 5 billion tonnes (Gt) of CO_2 equivalent emissions from the EU in 2008, agriculture accounted for 9.6%. However, agriculture accounts for 75 per cent of the EU's N_2O emissions and 49 per cent of the EU's CH_4emissions. Between 1990 and 2008 the emissions from agriculture have decreased significantly, by about 100 250 thousand tonnes CO_2 equivalent, including reductions in CH_4 and N_2O (EEA, 2010). The reductions in methane were largely due to reductions in livestock numbers, and the reductions in nitrous oxide were a result of decreased nitrogenous fertiliser use. Despite these improvements agriculture will need to continue to reduce its emissions to those required from the sector.

Climate Stability –Carbon Storage
Target: To ensure the sustainable use of soil (Soil Thematic Strategy) To protect soil as a carbon store (Kyoto Protocol)
Reference Level: No EU or national legislative requirements.
Evidence of Undersupply: There is growing realisation of the importance of soil and peat in particular as a store of carbon and its role in managing terrestrial fluxes of atmospheric CO_2. Soil organic carbon stocks in the EU27 are estimated to be around 75 billion tonnes of carbon, or which the majority (50%) is in Sweden, Finland and the United Kingdom because of their large areas of peatlands and forest soils (Schils *et al*, 2008). Peat soils contain the highest organic matter in all soils, but are currently under threat from unsustainable practices, such as drainage, clearance and extraction. Schils et al (2008) estimate that more than 20% (65 000 km^2) of all peatlands have been drained for agriculture, 28% (90 000 km^2) for forestry and 0.7% (2273 km^2) for peat extraction.

Farmland Biodiversity
Target: To halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss(Council of the European Union Press Release, 2011).
Reference Level: EU level: Designation of protected sites; Protection of listed species, their breeding sites and resting places (Birds and Habitats Directives); Various national legislation
Evidence of Undersupply: There is considerable evidence to indicate that changes in rural land use in Europe have had an impact on biodiversity. Declines in farmland bird populations are well documented, particularly in western Europe (Newton, 2004; O'Connor and Shrubb, 1986; Pain and Pienkowski, 1997; Tucker and Evans, 1997, Wilson *et al*, 2009; Stoate *et al*, 2009). Although the European Common Farmland Bird indicator suggests that declines have levelled off since 1990 (EBCC/RSPB/BirdLife/Statistics Netherlands, in EEA, 2009b), an assessment in 2004 of all farmland birds found that EU (and pan-European) farmland birds populations continue to decline (BirdLife International, 2004). The situation seems to be worse for grassland butterflies in Europe, where populations have fallen by 60% since 1990 without signs of levelling off (EEA, 2007; Swaay, 2006).

Reports on the conservation status of species and habitat types targeted by the Habitats Directive show consistent negative trends. Habitat types linked to agro-ecosystems generally have a relatively poor conservation status, with only 7% of assessments being favourable, compared to 17% for habitat types not related to agro-ecosystems (COM(2009) 358 final). This has generally resulted from intensification of more productive land or the abandonment or afforestation of less productive land, leading to the gradual disappearance of low-intensity high nature value farming systems.

Intensification has also lead to negative trends in livestock genetic diversity. Data are available only for a few countries but these indicate that many native cattle breeds are endangered and the situation for sheep is also problematic (EEA, 2009a).

Given the failure to meet the 2010 biodiversity target, major efforts will be needed to reach the new 2020 target, adopted in 2010, and agriculture will have an important role to play here, particularly with respect to farmland biodiversity.

Water Quality
Target: (a) Prevent further deterioration of, and achieve good ecological status in all water bodies by 2015 (Water Framework Directive 2000/60/EC); and (b) reduce water pollution caused by nitrates from agricultural sources (Nitrates Directive 91/676/EEC)
Reference Level: EU – Limit of 170 kg N/ha to agricultural land, and 0.1µg active substance/l ground water. National restrictions on applying inputs, and possible further restrictions via the Water Framework Directives implementation.
Evidence of Undersupply: High nitrate levels in water bodies from agricultural sources can cause eutrophication, lead to toxic algal blooms and declines in aquatic biota. For many Member States the agricultural nutrient balance for nitrogen and phosphorous has improved in recent years. However, atmospheric nitrogen deposition continues to be a significant problem, with over 40 per cent of terrestrial and freshwater ecosystems subject currently to atmospheric nitrogen deposition beyond their critical loads (EEA, 2010). Nitrogen loads for the agricultural sector are also predicted to remain high over the coming years as increases of 4 per cent in nitrogen fertiliser use are predicted for the EU to 2020 (EFMA, 2009). In addition, a study of draft River Basin Management Plans published before 2009 showed that diffuse and/or point source pollution by nitrogen is reported in 124 out of 137 River Basins, phosphorous in 123 cases and pesticides in 95 cases (Dworak *et al*, 2010). Indeed the EEA have recently stated that 'a significant number of water bodies face a high risk of not achieving good ecological status by 2015' (EEA, 2010).

Water Availability
Target: To promote the sustainable use of water and mitigate the effects of droughts (Water Framework Directive 2000/60/EC)
Reference Level: No EU legislative requirements. By 2013, mandatory controls on abstraction of ground and surface water under Water Framework Directive measures by 2013. Varying national authorisation procedures for use of water for irrigation.
Evidence of Undersupply: The over-abstraction of water from rivers and aquifers for agricultural use can cause aquifer exhaustion, reduced river flows, drying of wetland habitats and increase the risk of groundwater salinization. While water is generally abundant in much of Europe, large areas are affected by water scarcity and droughts — the south in particular suffers from a severe lack of and high demand for water. A

comparison of the impacts of droughts in the EU between 1976–1990 and 1991–2006 shows a doubling in both area and population affected (EEA, 2010). Climate change is projected to exacerbate these impacts, with more frequent and severe droughts projected for many parts of Europe.

In Europe as a whole agriculture is the second biggest consumer of freshwater (22 per cent) after energy production (45 per cent), but in southern Europe agriculture accounts for more than half of total national abstraction (EEA, 2010).

Looking at the Water Exploitation Index (WEI) which measures the percentage of the total freshwater abstracted annually compared to the total available renewable resource, Cyprus, Belgium, Spain, Italy and Malta have WEI values over the threshold 20%, indicating that the water resource is under stress (EEA, 2010).

Soil Functionality
Target: To ensure the sustainable use of soil by preventing further degradation and restoring degraded soils (Soil Thematic Strategy COM(2006) 231 Final)
Reference Level: EU –Restrictions on inputs to soil (Nitrates (91/676/EEC), Sewage Sludge 86/278/EEC, Groundwater Directives 80/68/EEC)
Evidence of Undersupply: Despite local variations soil degradation is an issue across the EU. The EU Soil Thematic Strategy (COM(2006)231) identified the following main threats to soil: a decline in organic matter, soil erosion, compaction, salinisation, inundation, landslides, contamination, acidification and sealing. An estimated 115 million hectares or 12 per cent of Europe's total land area are subject to water erosion, and 42 million hectares are affected by wind erosion (COM (2006) 231). Models suggest that a tolerable rate of soil erosion in Europe is around 1t/ha/yr. This would equate to approximately 57.7 million hectares of agricultural land in Europe being at risk of erosion. Levels of soil organic matter in EU soils (representing the quality of soils) are also sub optimal. It has been estimated that 45% of the EU agricultural area has soils of medium organic carbon content (2–6%) and 45% have low or very low organic carbon content (0–2%) (EEA 2010). Low levels are a problem particularly in the southern Member States (74% of the land is covered by soils that have less than 2% of organic carbon in the topsoil. Excess nitrogen in the soil from high fertilizer application rates and/or low plant uptake can cause an increase in mineralization of organic carbon, which in turn, leads to an increased loss of carbon from soils. Estimates suggest that 15% of land in the EU exhibits a surplus in excess of 40 kgN/ha (EEA 2010)

Air Quality
Target: Limits set for 2010 for total emissions of sulphur dioxide, nitrogen oxides, ammonia and volatile organic compounds by MS (National Emission Ceilings Directive 2001/81/EC)
Reference Level: EU – Emissions minimisation requirements under IPPC relate to intensive industrial agricultural units (mainly pigs and poultry)
Evidence of Undersupply: The principal threats to air quality arising from agriculture are ammonia emissions, as well as methane and nitrous oxide emissions mentioned in relation to climate stability. Ammonia emissions arise primarily as a result of volatilisation from livestock excretions, from livestock housing, manure or slurry storage, excretions in grazed pastures or after manure spreading on land. Ammonia contributes to acidic deposition on soils, aquatic ecosystems, with detrimental impacts on plants, freshwater diversity, buildings and human health. Of the total EU NH_3 emissions, 94% come from agriculture (EEA 2010). Although emissions of ammonia to the atmosphere have decreased substantially (by 24% between 1990 and 2008) further reductions are needed to avoid the harmful acidic deposition that continues to be problematic across the EU.

Resilience to Flooding
Target: To reduce the probability of flooding and its potential consequences (Flood Directive 2007/60/EC)
Reference Level: No EU legislative requirements. By 2015, mandatory measures to be introduced in MS to prevent and reduce the likelihood and impact of flooding (Flood Directive 2007/60/EC)
Evidence of Undersupply: Vegetation cover, soil infiltration capacity, and drainage systems on agricultural land all influence the rate of transfer of precipitation to main watercourses. Agricultural land can also provide upstream storage areas for floodwater to reduce the risk of urban flooding. There is only one indicator that currently exists that might serve as a proxy for this public good, namely the occurrence of flood event in Europe, an indicator that has been designed to measure the relationship between climate change and flooding. This indicator suggests that the frequency of flooding events is expected to increase; however there are no EU level data on the contribution of farmland to flood risk.

Resilience to Fire
Target: None identified
Reference Level: No EU legislative requirements.
Evidence of Undersupply: In areas susceptible to forest fires (within the Mediterranean Member States), grazing by livestock can play a significant role in lowering the risk of fire in forests and permanent crops, by preventing the accumulation of dry vegetation. Despite the clear relationship between agriculture and fire, there are no indicators which link resilience to fire with agricultural practices. However, we know that in Portugal, Spain, France, Italy and Greece a total of 14 million hectares of forest burnt from 1980 to 2008 (JRC, 2009b), and the risk of forest fire is expected to increase significantly as a result of climate change.

Agricultural Landscapes
Target: Encourage the integration of landscape into all relevant areas of policy – cultural, economic and social (ELC)
Reference Level: No EU baseline, varying national legislation –many in GAEC.
Evidence of Undersupply: Agricultural landscapes are defined and influenced by the interaction of a range of factors, including cropping and stocking patterns, the intensity of land use, parcel sizes and boundaries, unfarmed features and cultural aspects. There is no single indicator that currently exists that can act as a proxy for these factors in combination and that reflect the complexity and multiple functions of the EU's agricultural landscapes (EEA, 2005), and for this reason trends in agricultural landscapes have to be inferred from a selection of indicators, such as crop area, livestock density, land cover, and the occurrence and distribution of farmland features. Grazing livestock have created the landscape and habitat diversity characteristic of extensive pastoral systems in Europe particularly prevalent in marginal and mountainous areas. Declines in livestock can lead to a loss of this distinctive landscape character. The proportion of permanent grassland in the EU, and the density of livestock have both declined in the past decade (by 11% from 2001 to 2009 and 1.1% per annum between 2000 and 2005 respectively). Cattle had highest share of the total livestock population in many regions in 2000, but declined by more than 10% in many cattle-dominated areas (EEA, 2005). Over the period 1990–2000 the allocation of land between different land cover types changed in EEA countries, with artificial areas showed a net increase of 5.4% as a result or urban development, while the total area of semi-natural vegetation showed a net decline of about 1.8% (EEA, 2006). There is no EU wide data on the state or condition of farmland features. Evidence from surveys and case studies in individual Member States show different trends, with both increases and decreases in different landscape features in different Member States, resulting from different pressures and policy contexts (Farmer *et al*, 2008).

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NOTES

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