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# Conservation and efficient use of natural resources through Payments for Ecosystem Services: the role of CAP in supporting a collective approach

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## Abstract

The debate about public intervention through CAP is mainly based on the role – social and environmental – of agriculture. “The CAP towards 2020: meeting the food, natural resource and territorial challenges of the future” have marked a new start. The greening component of Pillar I (30% of direct payments - crop diversification, maintenance of permanent pasture, establishment of ecological focus areas) will probably have less impact on sustainability than expected, but a new model based on extended role of public intervention will be applied. According to Cooper et al. (2009) there are three types of EU policy measures in order to support the provision of environmental public goods (PG): those with a direct focus on public goods (agri-environmental measures, cross-compliance...), those with a partial focus on public goods (modernization, infrastructures, Less favored Areas, Natura 2000 Areas...) and those with no direct focus on public goods (Direct payments and Rural Development measures, diversification tourism...). The challenge is to improve sustainability by focusing attention on the environment and the delivery of PG. The actions needed to achieve an appropriate provision of PG depend on several issues, such as: the type of PG itself, the capacity of government in financing the capacity-building measure, subsidies and direct payments. At EU level, recent studies aim to integrate issues related to the demand side approach (supply vision/demand vision and the implicit treatment of externalities) facing new institutional priorities related to rural areas - not only landscape, sustainable water management, biodiversity; but also tourism, energy and food (organic products, quality schemes...). Public intervention will focus preferably on a collective dimension in order to implement more effective territorial policies, supporting bottom-up initiatives, public-private partnership or other mixed solutions. This innovative institutional approach aims at involving several stakeholders. The most important determinants in a successful collective experiences seem to be, on the one hand an active (pro-active) engagement of farmers, and on the other side an innovative coordination of collective actions (Learning and Innovation). The role of social capital remains crucial as well as the role of formal and informal organization that contribute to the development of local networks and groups. Although it may seem paradoxical to use market instruments for a situation of market failure, sometimes the use of these tools appears to provide a suitable solution. The market-based instruments include direct payments, used to maintain or restore the supply of ecosystem services, and PES, which is constituted by a payment for the provision of an ecosystem service (or use of the soil which allows the service to be produced). According to a revised, broader definition PES is a transparent system for the additional provision of environmental services through conditional payments to voluntary providers. Although PES originated as a market solution for the sustainable management of ecosystem services with the specific goal of creating an alternative to public management, the role of government in developing PES could be decisive. In particular, its role in reducing transaction costs related to the nature of the traded goods is relevant. The government may take part in a PES scheme in order to remove barriers that could prevent or cause difficulties in starting a market between suppliers and users of ecosystem services. In fact, there are some situations that could prevent its development, among which, high transaction costs related to the implementation of a PES scheme and relative negotiation of agreements. The key role that the government can play is that of bringing together buyers and sellers or stimulating the market mechanism by providing appropriate information, training and awareness in the community. In this study, after a literature review, we analyzed the content of a number of Italian Draft Regional Rural Development Programmes 2014-2020 submitted to EU Commission for approval and pointed out the presence of tools to support collective approach among priorities. Our findings revealed that institutional intervention is still mainly not so strong as it should be in order to promote successful collective experiences in providing PG, like for example PES.

## Introduction

The aim of this paper is to provide a discussion about Public Goods (PG) and Ecosystem Services (ES) starting from a literature review and analysing a specific area of CAP tools: those where collective actions could be employed in support of public goods and ecosystem services. Networking could turn into an important success factor for the rural policy programming 2014-2020, increasing the chances of access to public funds and providing common socio-economic-environmental goods. The EU gives priority to aggregation/integration of multiple actors operating in the same or in different sectors for the implementation of the Rural Development Programmes (RDP), not only in a perspective of enhancing the production chain, but also as regards the environmental challenge to improve sustainability (Cisilino et al. 2010, 2011). The role that government can play is analysed in relation to market solution for sustainable management of ecosystem services (barriers, transaction costs, negotiation of agreements) in particular as regards the use of Payments for Ecosystem Services (PES) comparing the Coasean approach and the Pigouvian scheme. Then the analysis focus on the second Pillar of CAP: after a review of the object of interest within the Reg. EU 1305/2013, the financial plans of Italian RDPs 2014-2020 (regional level) so far approved<sup>1</sup> by the European Commission are taken into account in order to highlight the allocation of funds. This allows some initial remarks, revealing the strategy of the regions as regards the collective approach aimed at encouraging the development of PG and ES. Farmers have a significant role in conserving natural resources. Moreover, sustainable agricultural activities can provide a large number of services relating to social, economic and environmental aspects and sustainability.

The idea that farmers can simultaneously produce both marketable goods and Public Goods is broadly acknowledged in literature as joint production. According to Palm et al. (2014) provision of food is a primary function and key ecosystem service of agriculture, nevertheless farmers are also able to provide regulating, supporting, cultural and recreational ES. In addition, they are also dependent on ES that support their agricultural activity. Although society benefits from agricultural production of ES, present market often fails to provide the desired or optimal level of PG or are expected to fail in the near future. Consequently, various policy interventions may ensure a better provision.

According to the literature, the institutional intervention can use different tools, like Command and Control instruments or economic/financial incentives to support the provision of ecosystem services from the conservation of natural resources. But while the first type of instruments prove often to be unable to counteract the loss of ecosystem services (i.e. losses resulting from the abandonment of a natural resource especially in rural areas), the second ones seem to be able to act better. Although it may seem paradoxical to use market instruments for a situation of market failure, sometimes the use of these tools appears to provide a suitable solution (Farley and Costanza, 2010). Financial incentives act with the intention to secure the provision of public goods (i.e. ecosystem services) using different types of schemes. The market-based instruments gather direct payments used to maintain or restore the supply of ecosystem services and includes Payments for ecosystem services (PES), which is constituted by a payment for the provision of an ecosystem service.

PES are emerging worldwide as important mechanisms to align investments in human and environmental well-being according to the sustainable development principles. PES schemes are often defined as voluntary transactions where well-defined ecosystem services (or land uses likely to secure those services) are bought by a minimum of one service buyer, from a minimum of one service provider, if and only if the service provider continuously secures service provision (conditionality) (Wunder, 2015). Further criteria of PES definition include limiting additional objectives and ensuring that payments reward behaviors that would otherwise not occur

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<sup>1</sup> So far approved: September 2015.

(additionality). According to a revised, broader definition, PES is a transparent system for the additional provision of environmental services through conditional payments to voluntary providers.

PES is an innovative, still emerging tool, that rapidly changes and spreads out across countries and institutions (Gutman and Davidson, 2007). Ecosystem Marketplace (2013) has been trying to map the main PES schemes around the world considering their main sub-categories and key characteristics. Although information on these markets is, in most cases, very limited and constantly changing, the result of the mapping is a matrix that describes markets and market-like instruments for ecosystem services. This matrix considers ecological commodities and puts attention also on bundled services. Payments for bundled services make certain all or a combination of ecological commodities, i.e. carbon, water and biodiversity services. These payments include also certified agricultural production, in which payments for ecosystem service payments are part of the price of the product. These particular PES schemes could provide both a basis for premium price and more stable agri-food supply chain relationships for certified producers (Lockie, 2013). The opportunities to develop these PES schemes are consistent both in developing and developed countries. In fact, while markets for certified and labelled agricultural products are still small in developing countries, in several developed countries local demand is rapidly increasing and local supply it is not always able to provide for.

Several actors could participate to a PES scheme. For example, acting as buyers for these schemes may be exporters, traders, processors and manufacturers, while small-to large-scale producers are mainly sellers of services. Furthermore, regulators or standard setters, policy makers, advocates, associations, multi-bilateral development agencies may be market shapers, while acting as market service providers may be traditional agricultural or philanthropic investors, major consultants or brokerages, land management service providers, technical service providers (legal, monitoring, verification), financial service providers, academics, information providers. While opportunities to develop these PES schemes really exist, often countries face many challenges in fully participating mainly due to high compliance or transition costs. A cooperative approach to coordinate the actions of involved economic agents seems to be relevant in the case of a PES scheme creation, in particular as it often allows a reduction of the transaction costs. Moreover, it seems to be worthwhile to point out that an increase of these PES schemes benefits at the same time both environmental biodiversity and agri-food value chain. A larger demand and production of biodiversity-friendly agricultural and agri-industrial products may benefit habitat, species, soil, rural landscape and water protection with an increase of positive environmental externalities and support better perform of agri-food value chain by integrating the principles of sustainable development and increase the incomes.

### **Policy intervention through CAP: Public Goods and collective approach**

The debate about public intervention through CAP is mainly based on the role – social and environmental – of agriculture. The CAP towards 2020: meeting the food, natural resource and territorial challenges of the future have marked a new start. Even if the greening component of Pillar I (30% of direct payments - crop diversification, maintenance of permanent pasture, establishment of ecological focus areas) will probably have less impact on sustainability than expected, a new model based on extended role of public intervention will be applied. One of the challenge is to improve sustainability focusing attention on environment and the delivery of PG. These latter are defined as non-excludable and non-rival at varying degrees. The first characteristic is related to the possibility that everyone can enjoy benefits coming from a good even if it provided to specific target. The second one is related to the consumption of a good and this does not reduce the benefit available to others. At EU level, recent studies aims to integrate issues related to the demand side approach (supply vision/demand vision and the implicit treatment of externalities) facing new institutional priorities related to rural areas: not only landscape, sustainable water

management, biodiversity (first order benefits), but also tourism, energy and food - organic products, quality schemes – (second order benefits) (Cooper et al., 2009). The CAP will have a great potential in the delivery of public goods because of the huge amount of financial resources for land management, together with additional funds made available from other EU Programmes, Structural Funds and a range of possibilities at local level (Member States and Regions).

One of the major innovation of the 2014-2020 programming is the collective approaches: as well as increasing the chances of access to funding, this could be the most significant key for European agriculture's development process. Farmers can take advantage from a collective approach because they can adopt environmentally friendly farming practices on a larger scale and provide PG more effectively since their neighbouring farmers do the same (OECD, 2013). Three are the main types of participants in collective actions: farmers (providing labour), non-farmers (providing expertise), Governments (providing policy measures - funds). Government actually could act as a participants or non-participants. In this latter case it provides policy measure, while as participant provides a direct assistance to the development of the collective action. The government could also be the collective action's leader when market does not ensure a sufficient provision of PG. One of the main benefits deriving from collective approaches is the geographical scale because this approach allow a tailored answer to well-known local specific needs (landscape, biodiversity). But there is also a reduction of costs as those related to the implementation of farm practices, or costs arising from the management of a complex task as irrigation. Furthermore, the sharing of skills and information enhance farmers' capacity and involve in this developing process different stakeholder and institution (increasing the chance for innovation).

### ***Institutional role in developing collective approaches of PES scheme***

Although PES has been originated as a market solution for the sustainable management of natural resources, with the specific goal of creating an alternative to public management, the role of government in developing PES could be decisive.

According to Sattler and Matzdorf (2013), the PES idea is closely linked to the Coase theorem, which is based on the assumption that, given certain conditions, the problems of external effects can be overcome through private negotiation directly between the affected parties regardless of the initial allocation of property rights (Engel et al., 2008). Nevertheless, besides this Coasean approach, that is strictly following the purely market-based solution, the PES concept was widened also to certain types of government interventions. This approach of PES is more in line with the works of Pigou, who promoted institutional intervention (e.g. environmental taxation and subsidization) for the correction of negative externalities. Consequently, while in Coasean approach PES, the beneficiary directly pays the service provider with private money on a purely voluntary basis which is the result of a private transaction, in the Pigouvian scheme PES the government intervenes and either pays itself spending public money to benefit collectivity or makes others pay on behalf of the direct beneficiaries to obtain service provision making third parties pay to offset environmental degrading activities for society. In this latter case, the agreement could not be completely voluntarily, as it can be driven by compliance regulation.

### ***Common Agricultural Policy and PES***

A well-known example for a PES in the pure Coasean sense is the Vittel PES in north-eastern France, where a private water bottling company (Nestlé waters) reached an agreement with local farmers to prevent nitrate contamination in aquifers caused by agricultural intensification. The company paid the farmers in the catchment to change their farming practices. In this scheme the transaction is on both sides voluntary and financing takes place by the direct beneficiary, the water bottling company.

As regards the Pigouvian PES scheme, an example is the European Union intervention through the Common Agricultural Policy (CAP). Among institutional measures it is possible to identify the presence of market incentive based instruments in favor of sustainable management of natural resources. In detail, the documents created to support rural development, i.e. Rural Development Programmes, contain a number of financial measures created to improve natural resources quality.

A number of PES in the sense of Pigou are mainly present in the priorities devoted to environmental intervention and more precisely in the so-called agri-environmental measures (Baylis et al., 2008). These market incentive based tools engage farmers for a minimum period of five years to adopt a sustainable practice that goes beyond usual good-farming practices concerning rural landscape and environmental resources. Farmers get payments for more environmentally-friendly land management practices (e.g. switching to organic farming). Participation for farmers is voluntary in principle. The financial incentive compensates contractors for additional costs and income losses resulting from the commitment. As agri-environmental programs are financed through public funds, payment is not given by the direct beneficiaries of the ecosystem service benefits, but the government on behalf of those.

### **Policy measures with a focus on Public Goods: the Rural Development Programmes**

The collective implementation of CAP measures is mentioned both in Reg. EU 1307/2013 (First Pillar) and Reg. EU 1305/2013 (Second Pillar). Both Regulations highlight the importance of collective approach that could provide a larger answer by potential beneficiaries and ensure environmental effects on a regional scale (Chiodo and Vanni, 2014). Our attention will focus on the rural development tools.

#### First Pillar

Art. 46, 6 of the Reg. EU 1307/2013 is dedicated to Ecological Focus Area (EFA). There is the possibility for collective implementation of EFA for holdings in close proximity (EFA has to be contiguous). Single Member States may define specific areas for collective approach (limited to 10 farmers maximum and at least 50% of the EFA should be located on each participating holding).

Art. 47 (3) is dedicated to Delegated Act for Direct Payments. In this case collective implementation is possible for fallow land, landscape feature, buffer strips and afforested areas.

#### Second Pillar

The greening architecture of the CAP 2014-2020 is based on three main structures: Rural Development, Green Direct Payments and Cross Compliance. Rural Development Policy offers a range of measures to support the provision of PG as payments for land management practices, investments for sustainable agriculture, technological and environmental innovation, new opportunities in rural areas, development of training, advice and capacity building. These actions have to be underpinned by direct payments in combination with cross compliance in order to maintain a basic level of PG. Reading the RD EU Reg. 1305/2013 it is possible to find guidance for all of the most relevant PG provided by agriculture: Landscape, Natural Resources, Biodiversity, Ecological Infrastructures, Water quality and availability, Soil functionality, Climate stability – carbon storage, reducing gas emissions, Air quality, resilience to fire and flooding, Rural Vitality, Food security, Animal welfare. These different PG have different objectives and answer to different needs, among which environmental and social needs and have different ties with agricultural production (in a narrow sense).

Considering the Second Pillar, the Policy Measures (Box 1) with a direct focus on PG are: agri-environment-climate measures and non-productive investments measures. Those with a partial focus are farm modernization, infrastructures, Less Favoured Areas, Natura 2000 Areas, Training and advice measures. The third type of EU policy measures are those with no direct focus on PG as

adding value to agricultural products, quality schemes, diversification, tourism, basic services in rural villages.

### Box 1: RDP Measures

Measures (M)	Reg (EU) 1305/2013	Description
1	art. 14	Knowledge transfer and information actions
2	art. 15	Advisory services, farm management and farm relief services
3	art. 16	Quality schemes for agricultural products, and foodstuffs
4	art. 17	Investments in physical assets
5	art. 18	Restoring agricultural production potential damaged by natural disasters [...]
6	art. 19	Farm and business development
7	art. 20	Basic services and village renewal in rural areas
8	art. 21-26	Investments in forest area development and improvement of the viability of forests
9	art. 27	Setting -up of producer groups and organisations
10	art. 28	Agri-environment-climate
11	art. 29	Organic farming
12	art. 30	Natura 2000 and Water Framework Directive payments
13	art. 31	Payments to areas facing natural or other specific constraints
14	art. 33	Animal welfare
15	art. 34	Forest-environmental and climate services and forest conservation
16	art. 35	Co-operation
19	art. 42	LEADER local action groups

Source: Reg. EU 1305/2013

As far as the collective approach is concerned it is possible to identify the following measures provided by the EAFRD (European Agricultural Fund for Rural Development), Reg. EU 1305/2013 that will be the focus of this study:

#### Measure 10 Agri-environment-climate measures (art. 28)

The main form of intervention to stimulate the provision of environmental PG in agriculture is represented by agri-environment-climate measures which promote environmental services and the use of sustainable agricultural practices. The most important characteristic is flexibility and ability to be designed according to local needs.

Even it is still possible to get RDP contribution through single measures, the European Union strongly supports farmers' co-operation and collective actions both for farmers belonging to the same or different sector. As far as agri-environment-climate measure the beneficiaries could be farmers, groups of farmers, other land managers or groups of farmers and other land managers, or groups of other land managers. The baseline is represented by greening measures (crop diversification, ecological focus areas, permanent grassland), cross-compliance and relevant minimum requirements for fertilizers and pesticides and other national mandatory requirements. The level of rural development agri-environment-climate payments is defined by income forgone and cost incurred due to commitments and transaction costs. In this last case the implementation mechanism is then voluntary with compensation, while for green payments is mandatory with financial support and for cross compliance the mechanism is regulatory (Buckwell, 2014). The general objectives are aimed at avoiding land abandonment, improving environment and the countryside, promoting sustainable agriculture and improving competitiveness of agriculture and forestry sectors.



Some of the major action which could contribute to provide PG could be:

- Integrated management of arable crops, vegetable crops, orchards and vineyards;
- Conservative management arable land and crops;
- Permanent grassing orchards and vineyards;
- Crop diversification to reduce environmental impact;
- Protection of biodiversity of meadows and permanent meadows;
- Sustainable management of pastures for climate protection;
- Conservation of natural spaces and natural seeds of the agricultural landscape;
- Animal breeds threatened with extinction.

#### **Measure 11 Organic farming (art. 29 - 1, 4)**

In 2014-2020 RDPs there is a measure dedicated to organic farming which provides granting of payments also to groups of farmers. The level of transaction costs paid may rise to a maximum of 30% of the payment instead of 20% when a group of farmers is applying for subsidies.

“Support under this measure shall be granted, per hectare of agricultural area, to farmers or groups of farmers who undertake, on a voluntary basis, to convert to or maintain organic farming practices and methods as defined in Regulation (EC) No 834/2007 and who are active farmers within the meaning of Article 9 of Regulation (EU) No 1307/2013” [...]

“Payments shall be granted annually and shall compensate beneficiaries for all or part of the additional costs and income foregone resulting from the commitments made. Where necessary they may also cover transaction costs to a value of up to 20 % of the premium paid for the commitments. Where commitments are undertaken by groups of farmers, the maximum level shall be 30 %”.

Some of the major action which could contribute to provide PG:

- to convert to or maintain organic farming practices and methods

#### **Measure 4 Investments in physical assets – 4.4 Non-productive investments linked to the achievement of the objectives agr-environment-climate, including the enhancement of the public amenity value of Natura 2000 areas or other systems of high nature value (HNV) (art. 17 – 3).**

The maximum support for investments in physical assets may increase if collective investments are made (maximum combined support rate may not exceed 90%).

“Support under points (a) and (b) of paragraph 1 shall be limited to the maximum support rates laid down in Annex II. Those maximum rates may be increased for young farmers, for collective investments, including those linked to a merger of Producer Organizations, and for integrated projects involving support under more than one measure, for investments in areas facing natural and other specific constraints as referred to in Article 32, for investments linked to operations under Articles 28 and 29 and for operations supported in the framework of the EIP for agricultural productivity and sustainability in accordance with the support rates laid down in Annex II. However, the maximum combined support rate may not exceed 90 %”.

Some of the major actions which could contribute to provide PG:

- realization or recovery of borders of trees, ecological infrastructures and paths;
- realization of mixed environmentally crops;
- realization of small lakes, ponds, buffer strips, dry stone walls, recovery of unexploited lawns/meadows, small woods;
- Flooded and collective networks for water distribution;
- Investments for the reduction of greenhouse gases and ammonia;
- Countering nitrates;
- Natural and environmental recovery and re-landscaping of open spaces mountain/hill abandoned/degraded.

## **Measure 16 Co-operation (art. 35 - 2 g)**

“Support under this measure shall be granted in order to promote forms of co-operation involving at least two entities and in particular: a) co-operation approaches among different actors...; b) the creation of clusters and networks (newly formed or new activity) c) the establishment and operation of operational groups of the EIP for agricultural productivity and sustainability [...].

Co-operation approaches among different actors in the Union agriculture sector, forestry sector and food chain and other actors that contribute to achieving the objectives and priorities of rural development policy, including producer groups, cooperatives and inter-branch shall relate, in particular, to the following:

- g) joint approaches to environmental projects and ongoing environmental practices, including efficient water management, the use of renewable energy and the preservation of agricultural landscapes;

Support shall be limited to a maximum period of seven years except for collective environmental action in duly justified cases.

Co-operation under this measure may be combined with funds other than the EAFRD (but double funding has to be avoided).

Some of the major action which could contribute to provide PG:

- enhancing co-operative relationships between different stakeholder belonging to agricultural/forestry sector, food chain and other actors that contribute to the same objectives and priorities of rural development policy - including groups, co-operatives and other public/private organizations;
- promoting the creation of clusters and networks;
- specific agri-environment-climate collective approaches;
- facilitate the establishment of operational groups of the EIP (European Innovation Partnership) in the field of productivity and sustainability aimed at the co-production of innovation;
- promoting co-ordinated actions for mitigation and adaptation to climate change and for the production of other public goods;
- supporting forms of co-operation for an integrated development of local development at regional and sub-regional level;

A brief mention also deserves the LEADER and CLLD approach, although they are not further discussed in this paper. These tools have the purpose to lead the local development and to promote or revitalize/boost the economy of rural areas through bottom-up projects (local productions, environment, services...) carried out by institutions in charge (Local Action Groups).

The RDP analyzed shown that regions highlight the need to develop synergies in the provision of environmental services through coordinated actions implemented by a number of different subjects, such as farmers, group of farmers, land managers, but also public bodies. The territorial dimension of environmental public goods, in fact, requires the adoption of collective approaches in the design and implementation of measures aimed at optimizing the production of environmental benefits like the adaptation to climate change and its mitigation, conservation and enhancement of the landscape, biodiversity preservation, sustainable management of water resources and soil protection, the rational use of renewable resources, with more effective results and consistent with those that can be achieved by operating individually.

A collective approach instead of individual initiatives could allow/facilitate the achievement of specific territorial needs by : a) furthering the concertation between actors; b) involving a larger number of beneficiaries which could produce a higher added value to the provision of environmental services; c) implementing local co-operation agreement.

Proposals of collective projects can provide environmental services on a regional scale related to:

- infrastructure for agro-ecological actions: climate, water and soil;

- integrated management of water and soil;
  - recovery and enhancement of rural landscape;
  - Measures for the protection of biodiversity needed to prevent and mitigate the reduction of habitats and species of Community interest, including the restoration of habitats and habitats of species;
  - supply of biomass for energy production from renewable sources;
- and further benefits related to:
- promotion of rural tourism through the establishment or improvement of local integrated tourist products, improvement in hospitality creating networks and facilities;
  - enhancement of natural resources, environment and cultural issues of a territory through conservation measures, recovery and rehabilitation of sites with the aim of enjoyment of the same area in a sustainable and responsible, awareness-raising, communicated and promoted planning;
  - enhancement of typical and productive potential of territories through the creation or/and development of markets and promotional activities at local level;
  - socio-economic integration of the territory and social inclusion, through the promotion of multi-functionality of farmers, start-up of social activities in agriculture, the animation and the activation of basic services, promotion and implementation of social services by farms in agreement with public authorities, education and environmental education.

Collective projects will be presented by a number of farmers and other stakeholder who sign a collective agreement and identify a leader or establish in a partnership with legal personality. The collective agreement should have a long term period in accordance with the deadline of the common project. It should also clarify the roles of the participants and co-ordinate the implementation of interventions, attributing responsibility to the different actors participating in the project.

## Results

The achievement of Rural Development’s objectives, which contribute to the Europe 2020 strategy for smart, sustainable and inclusive growth, will be pursued through six Union Priorities for Rural Development (Box 2). All those Priorities will also contribute to the cross-cutting objectives of Innovation, Environment and Climate change mitigation and adaptation.

All the RDP measures (M) are then linked to those Priorities (P1, P2, P4, P5, P6) and their related Focus Area (FA 1A, FA 1B...)<sup>2</sup>.

### Box 2: Priorities and related Focus Area for Rural Development.

<b>P1 Knowledge and Innovation</b>	
<i>Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas with a focus on the following areas:</i>	
FA 1A	fostering innovation, cooperation, and the development of the knowledge base in rural areas
FA 1B	strengthening the links between agriculture, food production and forestry and research and innovation, including for the purpose of improved environmental management and performance
FA 1C	fostering lifelong learning and vocational training in the agricultural and forestry sectors
<b>P2 Competitiveness</b>	
<i>Enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and the sustainable management of forests, with a focus on the following areas:</i>	
FA 2A	improving the economic performance of all farms and facilitating farm restructuring and modernization, notably with a view to increasing market participation and orientation as well as agricultural diversification

<sup>2</sup> RDP measures also shall answer to specific Needs, based in their turn both on Swot analysis and on the results arising from stakeholder’s reference/consultation.

FA 2B	facilitating the entry of adequately skilled farmers into the agricultural sector and, in particular, generational renewal
<b>P3 Food Chain</b>	
<i>Promoting food chain organization, including processing and marketing of agricultural products, animal welfare and risk management in agriculture, with a focus on the following areas:</i>	
FA 3A	improving competitiveness of primary producers by better integrating them into the agri-food chain through quality schemes, adding value to agricultural products, promotion in local markets and short supply circuits, producer groups and organizations and inter-branch organizations
FA 3B	supporting farm risk prevention and management
<b>P4 Agri-environment-climate-biodiversity-landscape-water-soil</b>	
<i>Restoring, preserving and enhancing ecosystems related to agriculture and forestry, with a focus on the following areas</i>	
FA 4A	restoring, preserving and enhancing biodiversity, including in Natura 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes
FA 4B	improving water management, including fertilizer and pesticide management
FA 4C	preventing soil erosion and improving soil management
<b>P5 Resource efficiency-bio economy</b>	
<i>Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors, with a focus on the following areas</i>	
FA 5A	increasing efficiency in water use by agriculture
FA 5B	increasing efficiency in energy use in agriculture and food processing
FA 5C	facilitating the supply and use of renewable sources of energy, of by-products, wastes and residues and of other non food raw material, for the purposes of the bio- economy
FA 5D	reducing green house gas and ammonia emissions from agriculture
FA 5E	fostering carbon conservation and sequestration in agriculture and forestry
<b>P6 Local development-poverty reduction-services for rural areas</b>	
<i>Promoting social inclusion, poverty reduction and economic development in rural areas, with a focus on the following areas</i>	
FA 6A	facilitating diversification, creation and development of small enterprises, as well as job creation
FA 6B	fostering local development in rural areas
FA 6C	enhancing the accessibility, use and quality of information and communication technologies (ICT) in rural areas

Source: Reg. EU 1305/2013

This work takes into account the Italian RDP (data currently available) in order to evaluate the role played (in terms of financial consistency) by the measures previously presented, leaving to a later stage any other assessment (as impact). Table 1 shows the amount of Public expenditure by measure and Italian Region (available data). Looking at measure 10 Agri-environment-climate, Lombardia and Bolzano grant more than 20% of total financial resources to this measure, followed by Umbria, Emilia-Romagna and Veneto with 16%, 15% and 14% respectively. These Regions then strongly address their RDP to environmental friendly interventions, while others such as Marche, Toscana and Molise place on that about 6% of funds.

**Table 1: Public Expenditure by measure: Regional Rural Development Programmes 2014-2020 (Italy) 2015**

M	Friuli Venezia Giulia		Bolzano		Emilia-Romagna		Lombardia		Marche		Molise		Toscana		Umbria		Veneto	
	EAFRD (€)	%	EAFRD (€)	%	EAFRD (€)	%	EAFRD (€)	%	EAFRD (€)	%	EAFRD (€)	%	EAFRD (€)	%	EAFRD (€)	%	EAFRD (€)	%
1	2,156,002	1.7	603,680	0.4	9,376,827	1.8	4,204,200	0.8	4,570,720	2.0	2,880,000	2.9	3,449,600	0.8	4,441,360	1.2	10,000,000	2.0
2	2,975,280	2.3			3,637,952	0.7	17,592,960	3.5	2,156,000	0.9	3,840,000	3.8	16,385,600	4.0	8,322,160	2.2	15,900,000	3.1
3	1,466,080	1.1			3,477,960	0.7	2,479,400	0.5	4,743,200	2.0	960,000	1.0	1,724,800	0.4	3,104,640	0.8	7,700,000	1.5
<b>4</b>	<b>40,575,920</b>	<b>31.6</b>	<b>20,700,412</b>	<b>13.1</b>	<b>149,501,757</b>	<b>29.1</b>	<b>176,360,800</b>	<b>35.3</b>	<b>52,735,760</b>	<b>22.7</b>	<b>26,400,000</b>	<b>26.1</b>	<b>122,115,840</b>	<b>29.4</b>	<b>87,619,840</b>	<b>23.2</b>	<b>192,700,000</b>	<b>37.7</b>
5					17,180,095	3.3			5,605,600	2.4			12,936,000	3.1	7,761,600	2.1	3,500,000	0.7
6	9,270,800	7.2	11,090,850	7.0	45,167,676	8.8	29,537,200	5.9	19,231,520	8.3	4,800,000	4.8	46,569,600	11.2	15,092,000	4.0	56,800,000	11.1
7	7,865,720	6.1	8,097,550	5.1	29,887,395	5.8	22,638,000	4.5	12,504,800	5.4	14,400,000	14.3	18,024,160	4.3	44,437,900	11.8	22,300,000	4.4
8	10,348,800	8.1	9,486,400	6.0	22,055,017	4.3	44,521,400	8.9	15,954,400	6.9	5,760,000	5.7	61,661,600	14.9	34,668,480	9.2	18,300,000	3.6
9	431,200	0.3							862,400	0.4								
<b>10</b>	<b>12,504,800</b>	<b>9.7</b>	<b>43,120,000</b>	<b>27.3</b>	<b>75,858,448</b>	<b>14.8</b>	<b>103,617,360</b>	<b>20.8</b>	<b>11,987,360</b>	<b>5.2</b>	<b>6,720,000</b>	<b>6.7</b>	<b>25,440,800</b>	<b>6.1</b>	<b>61,014,800</b>	<b>16.1</b>	<b>71,700,000</b>	<b>14.0</b>
<b>11</b>	<b>3,018,400</b>	<b>2.4</b>	<b>3,880,800</b>	<b>2.5</b>	<b>43,361,187</b>	<b>8.5</b>	<b>16,385,600</b>	<b>3.3</b>	<b>34,496,000</b>	<b>14.9</b>	<b>8,640,000</b>	<b>8.6</b>	<b>55,624,800</b>	<b>13.4</b>	<b>14,703,920</b>	<b>3.9</b>	<b>9,400,000</b>	<b>1.8</b>
12	646,800	0.5			3,603,346	0.7	1,422,960	0.3	1,940,400	0.8					3,449,600	0.9		
13	17,248,000	13.4	50,450,400	31.9	38,752,969	7.6	33,633,600	6.7	18,541,600	8.0	11,424,000	11.3	4,312,000	1.0	27,165,600	7.2	51,800,000	10.1
14	431,200	0.3			4,527,600	0.9			2,156,000	0.9					2,328,480	0.6	500,000	0.1
15									431,200	0.2			169,030	0.0	2,156,000	0.6	0	
<b>16</b>	<b>6,166,160</b>	<b>4.8</b>	<b>776,160</b>	<b>0.5</b>	<b>27,255,139</b>	<b>5.3</b>	<b>7,438,200</b>	<b>1.5</b>	<b>11,470,568</b>	<b>4.9</b>	<b>5,280,000</b>	<b>5.2</b>	<b>15,092,000</b>	<b>3.6</b>	<b>29,450,960</b>	<b>7.8</b>	<b>12,000,000</b>	<b>2.3</b>
19	8,813,728	6.9	8,752,868	5.5	28,630,731	5.6	28,459,200	5.7	26,113,472	11.3	5,616,000	5.6	25,009,600	6.0	20,956,320	5.5	30,800,000	6.0
20	4,373,112	3.4	1,034,880,00	0.7	10,715,901	2.1	10,886,120	2.2	6,468,000	2.8	3,360,000	3.3	5,626,890	1.4	11,338,340	3.0	7,279,000	1.4
	128,292,002	100.0	157,994,000	100.0	512,990,000	100.0	499,177,000	100.0	231,969,000	100.0	101,025,000	100.0	414,746,000	100.0	378,012,000	100.0	510,679,000	100.0

Source: Italian RDP 2014-2020 (so far approved September 2015). Note: M = Measure

Focusing the attention on Priority 4 and considering all the measure together - measure 4<sup>3</sup>, 10, 11, 16 expressing a link with a collective approach – we analyzed how much it is representative within the different measures. Then we process data including Priorities 5 and 6 and then also Priorities 2 and 3. The results are shown in table 2: it is clear that restoring, preserving and enhancing ecosystems related to agriculture and forestry is a goal which weighs around 20% for all the RDPs. But if we broaden the range including the other Priorities to which these measures may engage, then the share rises to over 50%, as in the case of Priorities 2 and 3 involvement (in addition to P4, P5 and P6).

This means that:

- restoring, preserving and enhancing biodiversity, including in Natura 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes;
- improving water management, including fertilizer and pesticide management;
- preventing soil erosion and improving soil management

but also

- increasing efficiency in water use by agriculture
- increasing efficiency in energy use in agriculture and food processing
- facilitating the supply and use of renewable sources of energy, of by-products, wastes and residues and of other non food raw material, for the purposes of the bio- economy
- reducing green house gas and ammonia emissions from agriculture
- fostering carbon conservation and sequestration in agriculture and forestry
- facilitating diversification
- fostering local development in rural areas
- enhancing the accessibility, use and quality of information and communication technologies (ICT) in rural areas

and

- improving the economic performance of all farms and facilitating farm restructuring and modernization, notably with a view to increasing market participation and orientation as well as agricultural diversification
- facilitating the entry of adequately skilled farmers into the agricultural sector and, in particular, generational renewal
- improving competitiveness of primary producers by better integrating them into the agri-food chain through quality schemes, adding value to agricultural products, promotion in local markets and short supply circuits, producer groups and organizations and inter-branch organizations will take half of RDPs funds. This then means that collective actions that might arise within these measures will enjoy a remarkable support.

**Table 2: Public Expenditure related to Measure 4, 10, 11, 16 by Priorities**

Expenditure related to Measure 4, 10, 11, 16 by Priority 4, 5, 6, 2, 3						
Regions	P4	%	P4, P5, P6	%	P4, P5, P6, P2, P3	%
Friuli Venezia Giulia	16,601,200	16.5	21,689,360	21.6	62,265,280	61.9
Bolzano	31,908,800	21.4	48,510,000	32.6	68,477,372	46.0
Emilia-Romagna	129,065,839	22.5	148,680,153	25.9	295,976,531	51.6

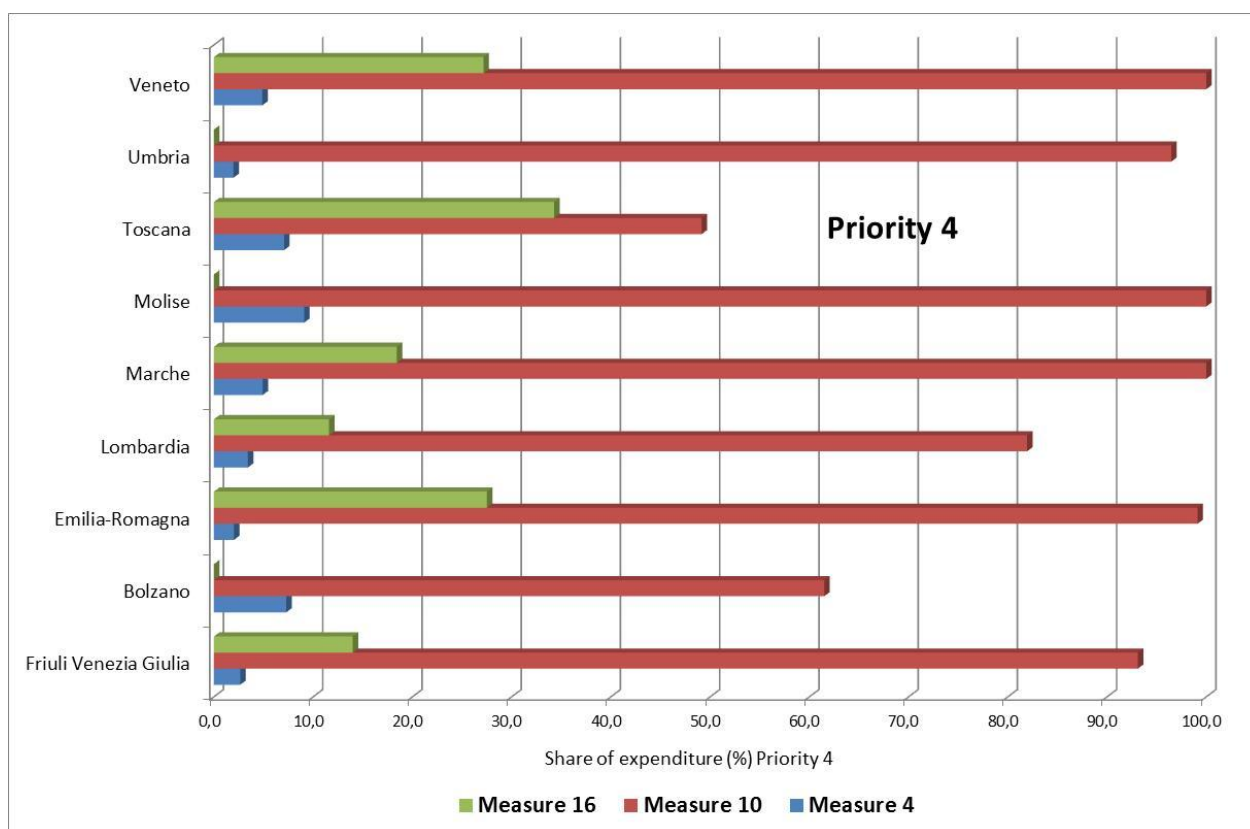
<sup>3</sup> Measure 4 is here considered only for the non-productive investments component (4.4), while in table 1 is considered as a whole.

Lombardia	108,188,080	20.1	127,548,960	23.6	303,801,960	56.3
Marche	51,184,088	23.5	55,539,208	25.5	110,689,688	50.9
Molise	17,760,000	21.3	18,720,000	22.4	47,040,000	56.3
Toscana	81,928,000	20.2	105,644,000	26.0	218,273,440	53.8
Umbria	75,287,520	20.9	92,039,640	25.6	192,789,520	53.5
Veneto	93,760,000	19.2	109,460,000	22.4	285,800,000	58.4

Source: Source: own data processing on Italian RDP 2014-2020 data (so far approved September 2015).

Measure 11 Organic farming is 100% linked to Priority 4. Measure 10 Agri-environment-climate shows a strong connection with this Priority, too, while the other measures considered in this study have lower ratios, as shown in figure 1. It is interesting to highlight that as far as Toscana, Emilia-Romagna and Veneto Regions, measure 16 Co-operation shows a strong attendance towards interventions dedicated to the environment. Similar reasoning for Molise and Bolzano as regards measure 4 (non-productive investments).

**Figure 1: Share of Expenditure for Priority 4 by Measure and Region (%)**



Source: own data processing on Italian RDP 2014-2020 data (so far approved September 2015).

Note: Measure 11 for Priority 4 shows 100% in all the Regions.

## Conclusions

This study provides a number of insights about the decision makers' role in favour of the conservation and of an efficient use of natural resources drawing some relevant issues of the CAP in supporting collective approaches.

The analysis reveals that the role of government could be considerable not only in reducing transaction costs related to the nature of the traded goods, but also in supporting a collective approach. For example, the government may take part in the process in order to remove barriers that could prevent or cause difficulties (i.e, starting a market between suppliers and users). Moreover, the key role that the government can play is that of bringing together buyers and sellers or stimulating the market mechanism by providing appropriate information, training and awareness in the community to support the development of collective approaches. Due to the characteristics of some natural resources, it could be necessary to promote the sustainable action of several land managers or farmers in order to reach or to guarantee the conservation of a natural resource and the provision of a number of ecosystem services. In fact, joint decision making can lead to conservation projects that yield a range of benefits. Moreover, by pooling the efforts of several actors, public intervention can implement ecosystem service projects on a spatial scale beyond the scope of an individual PES project, thus capturing potential scale effects in service production. This could occur, for example, when one or more actors may invest in further sustainable actions that are linked to the results they seek or to the main action to have to carry out to achieve the result of the PES scheme, thus improving the performances of the PES. In these contexts public institutions can act as intermediaries to support the creation of a collective approach.

Public intervention is needed when demand is greater than the level of provision of PG, or rather when the supply is inadequate, but it is still to determine indicators or other measurable tools able to define and determine the status of PG provision (European level, local level...) <sup>4</sup>. Another point is that it is not possible to establish with a reliable degree of assurance that public intervention is better than market solution or when there is market failure (Harvey, 2003). However, policy incentives seem necessary in this historical phase in order to avoid the intensive exploitation of land in specific areas and the increasing marginalization of other less productive areas. This phenomenon, in fact, has caused a gradual, progressive depletion of exploited soils, environmental damages and depopulation of peripheral areas. Therefore it is possible to say that the delivery of PG and ES depends both from Policy and Market. Stakeholder demand for targeted policies, set-up groups of similar interests - involving local institutions public or/and private, farmers and other interested subjects - in order to better achieve results on the market and take advantages of available opportunities. The building of mixed networks (farmers, stakeholder) allows the reduction of transaction costs and brings with it economies of scale and scope (OECD, 2013).

The actions needed to get an appropriate provision of PG depend on several issues, such as the type of PG itself, the capacity of government in financing the capacity-building measure, subsidies and direct payments. Public intervention will focus preferably on a collective dimension in order to implement more effective territorial policies, supporting bottom-up initiatives, public-private partnership or other mixed solutions (Vanni, 2014). This innovative institutional approach aim at involving several stakeholders. The most important determinants in successful collective experiences seem to be on the one hand an active (pro-active) engagement of farmers and on the other side an innovative coordination of collective actions (Learning and Innovation). The role of social capital remains crucial as well as the role of formal and informal organization that contribute to the development of local networks and groups (Mantino, 2011). Defining policy instruments that best suit the provision of PG is a very difficult operation because of the complexity of agricultural sector itself. In fact, agricultural products and PG are often a joint production (multifunctionality) (Westhoek et al. 2013).

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<sup>4</sup> Only Agri-environment-climate indicators are available, but they are not able to give account about public goods.



The Italian RDPs data processed allow to assess that restoring, preserving and enhancing ecosystems related to agriculture and forestry might arise through a collective dimension in all the Regions taken into account. The Priority 4, measure 4 (non-productive investments), 10, 11, 16 expressing a link with a collective approach, has been considered as a benchmark in terms of funds: the results shows that about 20% of the total RDPs financial resources are there allocated, a percentage that grows till around the 50% when Priority 5, 6, 2, 3 with the same measures are included. Collective actions that might arise within these measures could enjoy a remarkable support and therefore the RDPs analysed follow the EU Regulation as far as the challenge to improve sustainability, focusing attention on environment and the delivery of PG through an integrating process of rural area's stakeholder. Furthermore, in brief it is possible to point out that:

- Financial support: the financial support in the CAP 2014-2020 has been strengthened;
- Process Implementation: co-operation is still difficult as well as governance at different levels (member state, regional, local - territorial);
- Benefits: production of goods with higher added value, development of new skills, greater capacity to attract investments on those rural areas, positive impacts on employment and on population level, maintenance and enhancement of the cultural identity.

Leaving the neoclassical theoretical framework and following a territorial model, which takes into account the social and cultural dimension in addition to pure economic factors, it will be interesting to measure the impact that the implementation of RDPs 2014-2020 will have on the enhancement of PG and PES. Furthermore, the next period will allow the monitoring of collective approaches and of territorial co-operation in a changed scenario which considers the delivery of PG both as an opportunity for environment and as an answer for socio-economic needs.

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