

CASE STUDY

"VALDASO AGRI-ENVIRONMENTAL AGREEMENT" (ITALY)

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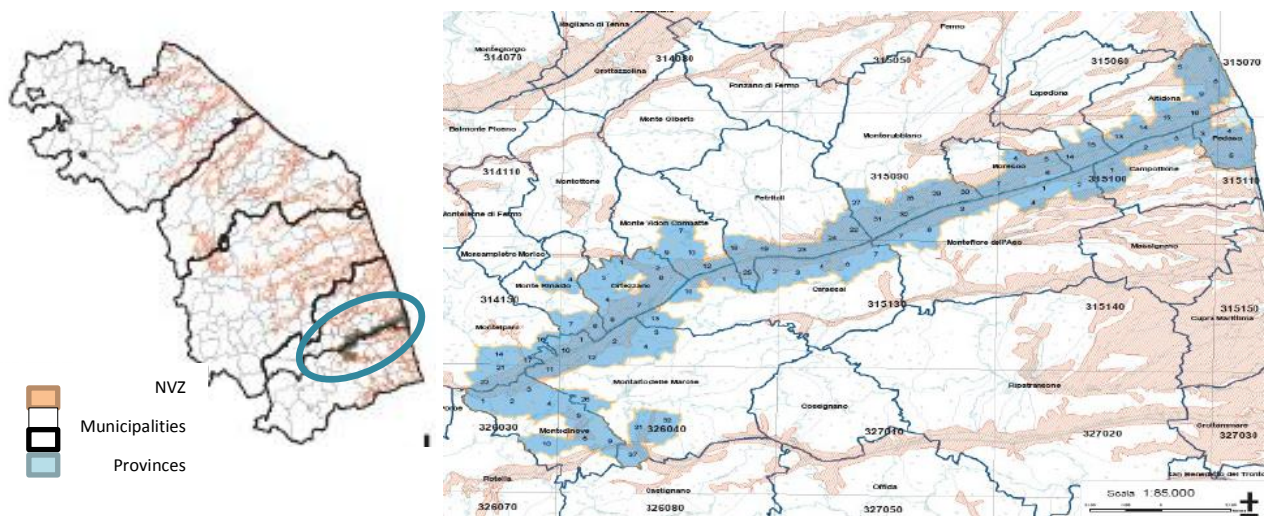


1 Introduction

Valdaso (i.e. Aso Valley) is a territory in Marche region (Central Italy), alongside the boundary between Ascoli Piceno and Fermo Provinces, which follows the path of Aso river (figure 1). Local agriculture is highly specialised in fruit production (peaches, plums, apples and pears) (table A1) and agriculture is the most important economic activity of the area.

The orchards in the valley have been traditionally cultivated with a high use of chemical inputs, with negative environmental effects such as water and air pollution and loss of soil fertility.

Figure 1: Marche Region and the area of the agreement



In order to reduce the negative impacts of the local farming systems on soil and water, in 2007 a small group of farmers (allied in a local farmers' association called Nuova Agricoltura i.e. "New Agriculture"-NA) started a grass root initiative to adopt integrated management techniques at territorial scale. This initiative has been supported by the regional and provincial governments, which settled a specific "agri-environmental agreement" (AEA), financed by the Regional Rural Development Programme (RDP) (Marche Region 2007).

According to Marche Region (2007) the AEA may be defined as a set of commitments for farmers in a limited area, supported through a mix of RDP measures, that can be activated to reach specific environmental goals. It established precise targets, to be achieved in a period from five to seven years, such as the reduction of 30% in macronutrients (nitrogen, phosphorus and potassium) used and the substitution of agri-chemical inputs, characterised by acute or chronic toxicity, respectively by 90% and 85%. To achieve these results, the AEA is structured as an integrated package of measures. The actions specifically implemented to reach environmental objectives are the following sub-measures of the agro-environmental schemes (214): integrated pest management (IPM) techniques, mating disruption (MD), organic farming and introduction of green cover (figure 2). Besides training activities and information actions was included into the agreement (measure 111) to establish a capacity building programme for farmers with specific training activities on IPM techniques (in-farms visits and workshops).



Figure 2: The tools used for IPM, MD and the green cover of an orchard



Source: Authors

The agreement involves both public institutions and local private actors to achieve common sustainable rural development goals, i.e. water and soil quality, cleaner farming practices and healthier products.

As about 80 per cent of farms in the project area is small (less than five hectares), the collective/territorial approach was thought to be essential to have a significant impact. One of the main characteristics of the agreement is a chain reaction that led to promotion by word-of-mouth, with a key role played by the Association *Nuova Agricoltura*. Thanks to the farmers of this association other farmers became interested in the AEA and joined the project, in a kind of bottom-up approach. In terms of engagement of farmers in the initiative, a crucial role was also played by the “project leader”, a technician of the local extension service agency, who is a local leader very well known in the area.

The most important ESBOs provided through the AEA are water quality and soil functionality. Besides all the interviewed declared that the AEA had also improved the air quality of the territory (and related operators’ health) as well as products’ quality and safety.

During the first year of the agreement (year 2009) 82 farms were involved, reaching about 100 in 2011, corresponding to over 550 ha cultivated with IPM techniques (table A2).

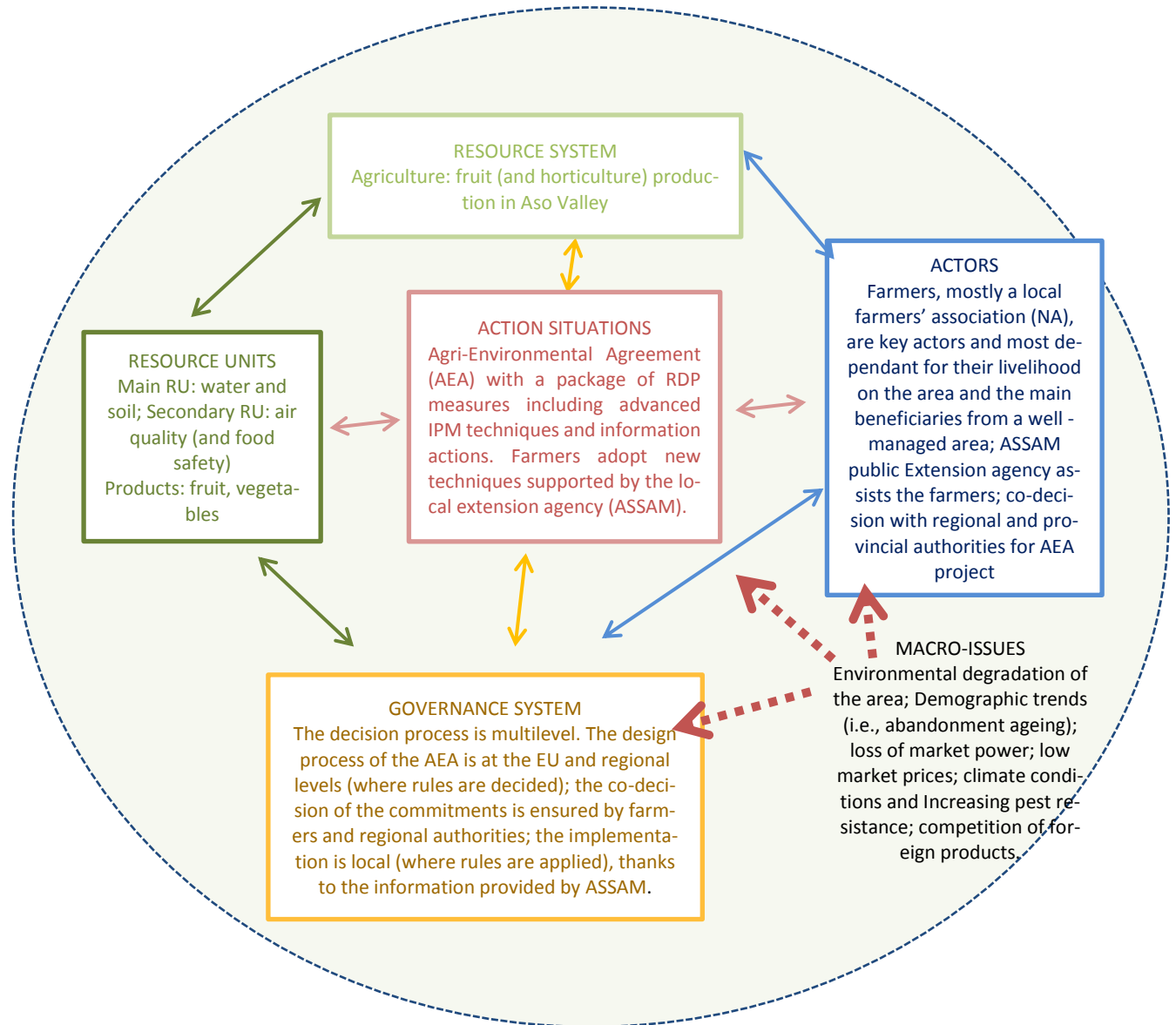
Since August 2012, the AEA became also part of the regional strategy for food labelling: the “QM-*Qualità garantita dalle Marche*” (Guaranteed quality of Marche Region). Through this label local farmers have the opportunity to obtain higher prices on the markets and to communicate to consumers their collective commitment to sustainability, increasing the reputation and trust of local communities towards their production practices.

The positive results of the AEA were achieved because of two main conditions: (1) tailored and targeted policy tools with learning opportunities for farmers and (2) effective coordination and governance due to harmonised and complementary efforts of several stakeholders (from local public authorities, to private actors and farmers).

Nowadays, the farmers are applying for the new AEA tender under the 2014-2020 RDP (Marche Region, 2015).

2 Definition of the social-ecological system (SES) studied

2.1 Figure of the SES, using the SES Framework



2.2 Short characterisation of key drivers/motivations

As described in previous studies (Vanni and Coderoni, 2013 and 2015), the key factors that have determined the success of Valdaso AEA are: (1) the characteristics of the local farming system, (2) the proactive engagement of farmers in the definition and implementation of the agreement, and (3) effective institutional support for the farmers' collective action.

The characteristics of the local farming system (1) have been very important because the agreement was implemented in a delimited geographic area characterized by well-defined and homogeneous characteristics of the agricultural sector: intensive farming, medium-size farms, and specialization in fruit production. These prerequisites have facilitated both the



interaction among local farmers who were experiencing similar problems and the widespread adoption of the advanced IPM techniques, by ensuring their effectiveness.

In terms of engagement of farmers in the agreement (2), it is necessary to highlight the important role of the small group of highly motivated farmers (associated in *Nuova Agricoltura*) and the crucial role of the project leader, who ensured the required bridge between farmers and local institutions, by setting both the technical and administrative requirements for the collective adoption of agri-environmental schemes. The most reluctant farmers were persuaded by the most motivated farmers of *Nuova Agricoltura*, but also by the efficacy of the new farming practices adopted, since in many cases local farmers were already looking for alternative methods of cultivation, having observed increasing resistance of pathogens to conventional crop protection products, resulting in higher crop losses.

The farmers interviewed seemed very motivated to take part into the AEA, but they showed different level of engagement with the environmental purposes of the agreement itself. The payment received by the RDP (table A2) was recognised as very important incentive to adhere to the AEA and to test innovative farming practices. Besides, farmers' interviewed, declared that they also experimented a cost reduction (labour, crop protection products, fuel) due to the adoption of the techniques introduced. These economic drivers were more important for the less motivated farmers that believed they would gain from participation, both by obtaining the payments of the RDP and by reducing production costs. Instead, the most motivated farmers, that was the bulk of the farmers involved, were more driven by the willingness to preserve the natural environment, the land they cultivated, to reduce their health risks and also to increase the tourist attractiveness of the area. In fact, tourism in the area has become a rather important economic activity over the next years (LAG Piceno and LAG Fermano, 2015).

As a farmer declared:

“We have understood that we may contribute to save the valley. It is clear that farmers can make a lot for the local environment. There is an increasing number of tourists here, they want to stay in agri-tourisms and they want a beautiful landscape and a safe and unpolluted environment. Houses have recently been renovated, new camps have been opened, and farmers must contribute to this transition, by producing in a different way, and all together” (Interview with farmer).

In the first phase of the agreement, the most reluctant farmers were persuaded by the most motivated ones (usually associated to *Nuova Agricoltura*) but, as they have highlighted, the efficacy of the new farming practices adopted played a significant role. In fact, in many cases local farmers were already looking for alternative methods of cultivation, since they had observed increasing resistance of pathogens to the conventional crop protection products, resulting in higher crop losses. In addition, the EU legislative framework, in particular the Directive on Sustainable Use of Pesticides 2009/128/EC influenced farmers in adhering to the AEA.

Finally, (3) local institutions ensured effective support to collective action through an innovative strategy aimed at pursuing multiple objectives: an integrated suite of measures was implemented to increase the ESBOs provision but also for reframing farmers' behaviour, at-



titudes, and knowledge through a set of capacity-building initiatives and learning opportunities. Thus farmers were motivated by the possibility, of being involved - through the AEA - in a local network of farmers (increasing learning opportunities and lobbying power) in a territory with scarce cooperation among producers.

2.3 Description of other important variables chosen

Variable chosen are reported in Annex 1, Table A.3

2.4 Discussion of the SES

In Valdaso area the development of the collective strategy is mainly due to the Association *Nuova Agricoltura* and to the project promoter (a technician working for ASSAM – The Agricultural Service Agency of Marche region) who assisted the first small group of farmers who had spontaneously adopted the techniques in their farms. In fact, she ensured the required bridge between farmers and local institutions: on one side she was able to sensitize local institution to the needs of local farmers and, on the other side, she coordinated the collective to carry out the administrative tasks required by the local authorities.

As noted by the regional authorities:

“There was a good harmony, she knew all, she had worked in a cooperative, was technically very prepared and knew a lot of people.”

Besides this important bottom-up starting phase, the success of the project is due to the multilevel governance, that involved local institutions and organisations that have played a crucial role in the settlement and the implementation of the AEA.

The Regional and Provincial authorities, in particular, aware of the inefficacy of an approach focused on individual farms, were able to institutionalise the agreement giving support to specific needs of local farmers related to agricultural practices and public goods protection. The bottom-up approach has been then supported and coordinated by the local institutions, in order to design and implement a mix of RDP measures targeted to the local needs.

Valdaso AEA was facilitated from some kind of “devolution” to local institutions to elaborate integrated strategies for their territories. Indeed, as suggested by the experiences in other countries (ENRD, 2011), the creation of an attractive mix of measures (with training, technical assistance, compensations) in a project for farmers, is vital to promote participation.

The territorial approach experimented in the area, although at the beginning was mainly due to the association *Nuova Agricoltura*, is based on a broad involvement of local actors, not only during the development of the agreement, but also in managing the technical and administrative tasks of the project. These actors have operated in the territory with quite clearly distinct roles, defined also by the policy framework. Table 1 summarizes all the actors that, at different levels and for different tasks, have been involved in the design, implementation and management of Valdaso AEA.

The initial role of the Province of Ascoli Piceno, the promoting and managing authority of the AEA, has been very important to build the partnership of farmers and institutions to work together as well as to address the long term needs of local farmers. In particular, the Province organized the first meetings with the farmers and helped them to fulfil the administra-



tive requirements, set by the RDP, to join the agreement. The support provided by the Regional administration was also crucial, especially in the design of the AEA, by setting the environmental goals to be achieved and the specific package of measures into the RDP. The cooperation between the province and regional authorities has been very important in the initial stage. In fact, in the regional RDP the possibility of conducting AEA was already foreseen but there was no knowledge on interested farmers. To this respect the role of the project leader and the province have been very important as intermediary institutions, because, they could represent a bridge between the plans of the Managing Authority and local farmers. So, as provincial governments came with the request for a AEA, the regional administration has managed to embed this request in a viable agreement, by setting operational rules in the RDP, after the approval of the EU.

Table 1: The actors involved in Valdaso AEA and their role

EU and national level	
European Commission	Approval and design of Rural Development Programme for Marche region
Regional government	Introduction of the AEA into the regional RDP
District level	
Ascoli Provincial Administration	Promoting and managing authority of the AEA
Fermo Provincial Administration	Managing authority (with Ascoli provincial authority) since 2009
ASSAM	Technical assistance, chemical analysis, information system
Crop protection products companies	Technical assistance
Farmers' organisations	Administrative assistance
Local level	
Nuova Agricoltura	Development of the initiative, involvement of local farmers
Project leader (ASSAM technician)	Development of the local network of farmers, bridge with the local institutions
Local farmers	Experimentation of techniques and adoption at territorial scale

Source: Coderoni (2014)

However, during the years of the agreement, there were many problems with the provincial authorities, due to conflicting national law intervention in this field. Firstly, in 2009, the province Ascoli Piceno was divided in two provinces, for the creation of Fermo province. Then, in 2014, provinces were abolished, but the administrative authorities of the second level into which they were turned into, remained the project coordinator.

The Provincial governments involved (both Ascoli Piceno and Fermo) have been very important to building the local partnership of farmers and institutions and, above all, in translating the general guidelines of the regional RDP into local strategies and in coordinating the AEA at territorial level. The coordinated strategy of *Nuova Agricoltura* and the local provincial governments resulted in an inclusive decision-making system, where the farmers could also participate in the definition of the technical requirements of the measures to be applied.

At the beginning the provincial government was involved in the project by the farmers' association and by the ASSAM 'project promoter', since this institutional level was considered the most appropriate to deal with the effective local needs and the most suitable institution to translate these needs into an agreement funded by the regional RDP. Respondents argued



that the problems that emerged during the implementation of the AEA was due to the lack of formalisation of the role of the Provincial governments, since these institutions in Marche region are not anymore the deleted institutions for the agricultural sector.

Finally, a very important actor is played by the External Agricultural Service Agency of Marche region (ASSAM) especially during the implementation of the AEA at farm level. ASSAM technicians gave advice about IPM techniques, following regional disciplinary of production, and for the development and transmission of new knowledge among farmers. Both farmers and technicians have emphasised that the success of the Valdaso AEA was strongly related to the presence of this public - free of interest - advisory service.

2.5 Common aims, conflicting interests and goals

The local farming system has very homogeneous characteristics: farms in Valdaso are small, highly specialised in fruit production, with quite intensive farming management. This brings the farmers to face and try to solve the same problems both in terms of economic (farm income) and environmental sustainability (problems of water quality, air quality and soil fertility).

In spite of this common features of local agriculture and the successful coordination experienced, in this collective action some conflicting interests and goals could also be observed.

The main conflicting interests derive from the presence of opportunistic behaviour of farmers who joined the AEA only to receive the RDP payments and did not fully comply to the rules (e.g. they did not use the dispenser). As a representative of the provincial government pointed out, in this regard the role of social control was important, since the farmers themselves, who know each other, indicated the possible free riders also because they were damaged by these opportunistic behaviours.

This social control was due to the relationships of trust and reciprocity which were created within the local farmers' community: many farmers have emphasised that one of the most positive effects of the AEA was the fact that they learnt to collaborate and cooperate to achieve common goals.¹ As one farmer has pointed out, the possibility to extend the agreement to other farmers - that could join the AEA after 2009 (until 2011)² - has helped to increase these relationships in the CS area between farmers facing the same agro-ecological problems:

“There are new [farmers] that are closer to me and have become part of the agreement; this is also good for me, because I can have an exchange with farmers in my area who have problems other than the valley.” (Interview with farmer)

Another conflicting interest highlighted with the interviews is what we can define the “Scale mismatch” between ecological and administrative dimension of the ESBO to be provided. In fact, according to the RDP, the area of the AEA should belong at least at 51% to a Nitrate

¹ Indeed, as emphasized by the literature, IPM requires stronger analytical skills and deeper understanding of agro-ecological principles as well as a higher cooperation between farmers, and these aspects may result in the creation of social and human capital (Pretty and Ward, 2001).

² The minimum years of commitment set by the regulation was 5 years, thus, farmers could join the AEA only until 2011 (last year of commitment 2015).



Vulnerable Zone (NVZ)³, but this has been recognised as a partial and unsatisfactory solution because NVZ are defined by cadastral sheet and they do not overlap with the catchment area. Instead, all the catchment area should be interested by the changing in farming practices to have wider environmental effects.

Another issue that could bring to conflict goals between the ESBO provision and the AEA design are the higher transaction costs associated to this collective strategy, mainly related to the financing of the initial capacity building process as well as funding for the coordination, management and group activities.

Finally, the problems such as the division of the area of the agreement into two different provinces and the lack of authority of provincial administrations on agriculture, resulted in poor communication and valorisation of the results, and some farmers participating in the agreement did not feel adequately supported and informed by the local institutions.

Although the presence of such conflicts highlighted by some farmers, there is general agreement that the AEA helped increasing the relationships of trust and reciprocity among farmers, with the need to exchange views and problems with the new IPM techniques.

As result of the AEA local farmers also felt the need to develop collective market strategies, in order further strengthen the approach experimented with the agreement.

Thus, in 2012 the AEA became also part of the regional strategy for food labelling: the “QM- Qualità garantita dalle Marche” (Guaranteed quality of Marche Region) (Figure 3).

Figure 3: The QM label: Guaranteed Quality of Marche Region



The product certified as QM is only “peaches from Valdaso” (though the QM can certify also other fruits). This label has helped to overcome one of the main initial limitations of the project, due to the lack of communication to consumers of the local collective’s commitment to the environment. While in the first phase this strategy seemed a crucial tool for local

³ As declared by the project leader, as the project was designed to reduce chemical inputs, it was proposed in a pest vulnerable area, that, in Marche Region, overlap with NVZ. Then, the EU, when evaluating the project, required that the area of the agreement should belong at least at 51% to a NVZ.

farmers to enhance and valorise the innovation of the agreement in the supply chain, since 2014 farmers have declared to have many problems with the big retailers which commercialise the fruit with the QM label. One of the main problems encountered was related to the unsatisfactory conservation conditions (too long refrigeration period for fresh products) and this is making the majority of farmers keen to modify this commercialisation strategy.

2.6 Other issues arising from SES analysis and context/case study specific aspects/issues

This agreement has certainly provided a good opportunity to increase capacity building within local institutions, since it allowed them to experiment a new approach in designing and delivering rural development strategies. This could facilitate the approval of other six new agreements for biodiversity conservation in Natura 2000 sites. Moreover, within the 2014-2020 programming period, many other farmers - out of the Valdaso area, are applying for AEA in RDP, which is a very important result according to regional authorities, that demonstrates that AEA past experiences (mostly the Valdaso one) had a role in influencing farmers' attitude towards collective approaches.

3 Status of the SES and potentials

3.1 Description of the SES

In Valdaso area the “virtuous circle” between advanced IPM and collective action was the key synergy observed that led to environmental and socio-economic benefits. In fact, through it, a bundle of ESBOs were produced. The main ESBO related to the project are in fact water and soil quality, but the adoption of the advanced IPM techniques by the farmers of the valley - and the technical advice brought by ASSAM - produced also: higher air quality, improved food safety (healthier products), more economic sustainability, trust and reciprocity among farmers, capacity building at regional level for collective action approach and, since 2012, also product valorisation in the market.

As pointed out by a local farmer involved in the AEA by interviews:

“I think that this project will go ahead in the future even without the payments, even if we have to carry out it at our own expenses, because I think that people understood that it is possible to obtain important results by cooperating and collaborating”.

However, some tensions also emerged. At micro level, they were linked to free-riding problems and transaction costs uncovered by RDP funds (see section 2.5), and at macro level, they are mainly linked to administrative burdens and lack of coordination with other projects in the CS area (see section 3.5).

3.2 Relationships between farming and forestry, and the quantity and quality of ESBOs

In this case study the relations between farming and the selected ESBOs are mainly due to farming practices adopted as results of the AEA. While intensive fruit production may affect negatively water and soil quality, the adoption of advanced integrated pest management (IPM) techniques such as mating disruption (MD) allowed farmers reducing to a significant extent the use of pesticides.



The general effect of MD is to confuse the male insects by masking the natural pheromones, emitted by female insects. These natural pheromones are detected by the males, assisting them in locating unfertilized females for mating. Pheromones of many species have been identified and are synthetically produced for use in IPM programs to mimic the sex pheromone produced by the female insect. Consequently, the male population experiences a reduced probability of successfully locating and mating with females, which leads to the eventual cessation of breeding and collapse of the insect infestation (figure 4).

In the AEA the IPM techniques are usually introduced in combination with green cover (see section 2.5).

Figure 4: IPM insect traps and MD dispenser



Source: Authors

Especially farmers have emphasised how, by the adoption of the AEA, they have increasingly perceived the need of minimising the negative impact of local agriculture on the river's water and air quality, soil functionality and, above all, people health and food safety.

These techniques radically changed farmers' attitude towards defence and innovation. As declared by a farmer:

“Now I feel that I can decide for myself, the type of strategy to adopt for the crop protection in my farm. Before it was not like that, the sellers of chemical products decided everything” (Interview).

Farmers declared that, after the first years of implementation, during which ASSAM technical assistance has proved to be fundamental, technical problems were almost solved. Now they are facing some resistance problems, but they are overcoming the problem with the help of ASSAM and are also looking at what other regions do (e.g. Emilia Romagna) by exchanging views with other farmers.

The agreement has also been a good opportunity to enhance the relationship of trust and reciprocity among the farmers. In fact, as declared by farmers,

“During the meeting organized by the provincial authority we had the possibility of meeting several people who I did know before and that I met because I have joined the agreement. This has very good for me, because I had the opportunity to increase the interactions and the exchanges with other farmers of my area. Thus, we can confront each other about the main problems related to the new techniques and the new farming practices” (Interview with farmer).



3.3 Key motivational, institutional and socio-economic factors

As already stated (see section 2.2), the key factors that have determined the success of Val-daso AEA are: (1) the characteristics of the local farming system, (2) the proactive engagement of farmers in the definition and implementation of the agreement, and (3) the effective institutional support for the farmers' collective action.

With regard to the effective institutional and policy support, table 2 describes the multilevel governance working in the area determined by the multilevel policy framework, made up of different level of governance (EU, national/regional and local level) and divided into three categories: regulatory, with direct and indirect focus the main ESBO provided.

Table 2: Policies and multi-level institutional governance

Policy frame impacting on water and soil	Level of governance		
	EU	State/Region	Local area
Regulatory framework	Water Framework Directive	Regional Water Protection Plan	
	Nitrates Directive	National Environmental Legislative Decree 152/2006	Nitrate Vulnerable Zones (NVZs)
		Regional Environmental Action Plan	
	Groundwater Directive	Regional Action Programme on Nitrates from agricultural sources	
	Directive on Sustainable Use of Pesticides 2009/128/EC	National Action Plan for plant protection products sustainable use	Regional disciplinary of production and definition of Pest vulnerable area
		Integrated agricultural practices guidelines	
	Fruit and vegetable CMO	Cross-compliance guidelines	
Rural Development Regulation			
Policies with direct focus		Agro-environment climatic measures (regional RDP)	Technical advice by ASSAM
		Information and advice (regional RDP)	
		Regional Technical services	
Policies with indirect focus		ASSAM agrochemical centre. Projects for analysis on residues	
		QM label	

In the case of Valdaso AEA, information exchanges and learning processes were central to the success of this collective action to many extents: from the adoption of the IPM techniques, to the dissemination of such techniques to other farmers.

Moreover, as MD is more successful when it is used in a large and continuous area and, since in the CS area the average size of farms is quite small, a collective approach was needed to make the technique effective. Thus, in Valdaso area a “virtuous circle” between IPM and collective action was observed: the effectiveness of IPM was enhanced by the collective action, but at the same time the adoption of IPM techniques encouraged farmers to aggregate themselves to get effective results. In this mechanism both environmental and socio-economic benefits were produced. In fact, the farmers’ sense of belonging to their own community and trust relationships were developed as response to IPM, but also to the collective approach to agri-environmental measures experimented by the local institutions.

As IPM techniques, and especially the MD, are knowledge-intensive techniques - for producers who have always used conventional methods - mainly in the first years, the role of the ASSAM technicians has been fundamental to help farmers to use the new methods and also for dissemination of information is the weekly “bulletin” sent to farms (by emails or fax) or put in the noticeboards of municipalities involved in the AEA (figure 5). The bulletin is divided in agro-climatic zones and indicates to farmers whether they have to make the chemical treatments or not; what problems may arise and how they can overcome them. Besides, ASSAM technical staff regularly visit farms involved in the AEA and monitored them to obtain information about the eventual problems with the IPM.

Figure 5: Meeting with the farmers and the ASSAM bulletin



Looking at how changes in these characteristics in the long run, could potentially affect the ESBO provision is not an easy task, also because of the influence of some external drivers.

Among these, if we refer to the local farming system, aging and emigration in the area in general, and in its agricultural sector in particular, could represent a serious issue of concern for future initiatives. In fact, many farms since the ‘80s closed down because of scarce profit opportunities and some farmers that have joined the AEA declared lack of successors as one of the main problems in future environmental commitment in the valley. Also the fundamental role of farmers’ engagement with the AEA is linked to the issue of the lack of potential successors. To this respect, however, the possibility for the farmers to be involved in projects with other farmers, increasing learning and market opportunities, could represent an interesting way to deal with the generalized decline of agriculture in the area.



From the policy perspective, continuing the effective institutional support provided by the multilevel governance described above is fundamental. However, as the institutional framework has changed, there will need to be much more attention to effective adherence to new RDP requirements avoiding that the enlargement of farmers that join collective AEA initiative in Marche Region, brings with it less attention of the institution to each single agreement (see Section 3.5).

For what concerns the QM label, some farmers have declared not to be satisfied with the commercialisation strategies adopted by local retailers and there are looking to alternative or complementary strategies to bring their products jointly to the market, also valorising their environmental commitment. Founding a new cooperative was not though to a be a solution as many farmers in the valley have experimented negative cooperation involvements in the past. Direct commercialization, on the other side, has been tested by more and more farmers, but it cannot help commercializing all the fruit produced and, most of all, does not help producers to gain market power.

3.4 Levels of provision, trends and determinants

The adoption of crop protection strategies based on natural pheromones in place of chemical products by a large number of local farmers, reduced to a large extent the sources of pollution for both soils and water by local agriculture. Besides, it also contributed to increase air quality in the area, as many interviewed witnessed. The territorial scale of action is by large the main aspect of the success of the AEA. In fact, it can provide a higher level of public goods provision which otherwise would not be possible to reach by individual farmers, and which is particularly relevant in cases of some environmental objectives such as improving water quality (ENRD, 2011).

Unfortunately, these impacts have not been measured yet, since the AEA did not provide specific funds for that scope⁴. Indeed, the methodologies currently used are largely inefficient in measuring the environmental effects of RDP measures, and this is particularly true when more complex strategies are implemented where several interlinked effects are provided, which in many cases are multidimensional (environmental effects as well as social and cultural effects). As declared by a representative of the regional government:

"[...] the environmental effects can be measured only in the long period; it does not make sense measuring the performance of a farm that started this approach one year ago, so they are projects that have begun in the 2007-2013 maybe will have results in the next RDP [2014-2020]" [...] "we have identified the points to be sampled between companies that benefit from the RDP and companies do not benefit to try to do the analysis of the counterfactual and we are still trying to understand what actions it makes more sense to go for monitoring, since it is considered that so far the bulk of the interventions are punctual and then spread on the territory."

On the other hand, the monitoring of the AEA in terms of health risks brought about significant impacts. Indeed, the ASSAM agro-chemical centre carried out chemical analysis of some samples of fruits cultivated with both conventional and IPM techniques. The results demonstrated that the fruits produced by farmers adhering to the AEA had much lower residues of

⁴ Monitoring costs can be financed in the new programming period via measure on cooperation.



pesticides than the fruits produced on farms that did not participate in this agreement. These results were presented in open meetings, which were very successful because it showed farmers the good results obtained with IPM techniques, making farmers aware of the substantial results of their commitment. The importance of this meeting has been twofold: on the one hand, it improved farmers' awareness and understanding of the effects of the practice adopted and, on the other hand, it showed farmers (and citizens) who did not participate in the agreement the important results obtained with the changed techniques, in terms of both crop losses and residues.

"It was very important to see that here have been some concrete results. Because the ultimate goal of the agreement is having also healthier products and the results of ASSAM show that this is the case. In the fruits that I have harvested last year there were no residues at all; in my neighbour's fruits the residues of pesticides were ten times below the conventional fruits. This is very encouraging" (Interview with farmer).

Together with these environmental effects, also "knowledge effects" have been very important in the valley. During the first year of the agreement (year 2009) 82 farms were involved, corresponding to 251 ha cultivated with IPM techniques; 182 ha with MD and 194 ha of green cover. In 2012, about 100 farmers were involved, corresponding to over 550 ha cultivated with IPM techniques, 295 ha with advanced IPM and to 270 hectares of orchards with green cover (table A2). As noticed by the project leader:

"The main benefits of this project are related to its territorial approach, where the action is not addressed to individual farmers but to an entire area which can benefit both environmentally that in terms of knowledge; can you imagine the amount of knowledge that has been transferred to this area? A wide group of farmers in few years has moved to a new technique. I think it is great!"

3.5 Relevant governance arrangements and institutional frameworks

With regard to the main governance arrangements that allowed supporting and institutionalising this collective action, it is worth to emphasise the role of effective co-management of the local different actors (see section 2.4), as well as the presence of a tradition of cooperation in the areas.

Policy framework has changed with the new Rural Development Policy schemes and farmers are nowadays applying for funds within the Marche Region 2014-2020 RDP (first deadline in June 2016).

There are some innovations introduced to overcome some problems with the past AEA. In particular, we can signal:

- The extension of the AEA area, both in terms of surface (no more linked to the NVZ, but to the catchment area) and of crops included (also cereals and not only fruits);
- The change in the project promoter in the municipality of Altidona (a municipality of the Aso valley), that should ensure the continuity of the project coordination (with respect to the provinces); this municipality is also part of broader river contract (LAG Piceno and LAG Fermano, 2015) that should help integrating the Valdaso approach with larger environmental objectives;



- The introduction of a formal contract among farmers with specific actions and practices to be undertaken during the AEA, to ensure a certain coverage of the area, even if some farms exit the agreement during the commitment period;
- The necessity to certify the IPM process with third part certification;
- The possibility to cover monitoring and transaction costs with funds through the measure on cooperation.
- No more funds for green cover payments.

The new requirements (mostly the IPM certification) seem to create several administrative problems to Valdaso farmers that are in some cases even thinking not to apply to RDP funds.

However, on aggregate, as preliminary declared by Managing Authorities, the number of farmers applying for potential AEA seems to be grown significantly, with new AEA proposals also from other areas. This could represent an issue of concern, if brings with it a less attention of the institution to each single agreement.

Finally, the Valdaso AEA is going to be part of a wider territorial approach, the “River Contract” that should result in more coordinated activities at local level to preserve the river environment and should help overcome previous problems of lack of coordination at territorial level.

4 Conclusions derived from analysis in Steps 1 and 2

4.1 Key findings on the particular SES and its potentials

Main factor of success of the Valdaso AEA were related to both social and policy issues. From a social perspective, the ownership and willingness of the farmers was crucial, mainly the one of the small original group of farmers adhering to NA. Besides also the presence of the ASSAM project leader and of prepared and collaborative institutions, was fundamental. To this respect, the second factor of success was, from a policy perspective, the innovation related to the package of RDP measures involved, that was then transformed in a territorial agreement, co-decided with farmers, which could take into account the technical requirements for integrated agriculture but also the main necessities of the local farmers in terms of advisory, learning and networking.

Farmers’ have declared to be very proud of what they were doing for their territory, but maybe there is the need to understand to what extent opportunistic behaviour still exist and how can be overcome.

This experience, being the first of the 2007-2013 programming period, provided an opportunity for the Region to develop capacity building for this kind of approach, that is in fact been implemented by 2014-2020 RDP. In particular, analysing the new regional RDP (Marche region, 2015) and see how farmers’ application and project design is going on, is very important to understand how this kind of approach will evolve, to what extent it could be replicated and how awareness and provision of ESBO can be increased in this and in other areas.

ESBOs provision has improved through the AEA, but is difficult to say how it will evolve in the future. A very positive signal comes once more from farmers who have declared that they want to continue using this advanced IPM techniques even without the policy support and want to obtain fruit with “zero chemical residues”.



A possible issue of concern, linked to the trade-offs for ESBOs provision due to the higher levels of water quantity needed the green cover, seems to be overcome by the new RDP regulation that does not foresee payment for green cover commitment.

4.2 Governance arrangements and institutional frameworks

Governance arrangements experienced in Valdaso have demonstrated to be successful for two main reasons: (1) the adoption of tailored and targeted RDP tools with agri-environmental measures co-designed with farmers, with a higher adaptation to the local farming system and (2) the learning opportunities for the farmers involved in a territorial strategy, which has an important collective dimension in its design and implementation.

Besides the CS shows effective coordination and governance, due to complementary efforts of several stakeholders (from local public authorities, to private actors and farmers).

The main difficulties were related to the institutional level of the agreement. The problems such as the division of the area of the agreement into two different provinces and the lack of authority of provincial administrations on agriculture, resulted in poor communication and valorisation of the results. Thus, Managing Authorities were reflecting about the opportunity to refer to other institutional arrangements as Project Leader; e.g. in territorial agreements for biodiversity conservation, managing authorities of Natura 2000 sites were identified as AEAs coordinators.

Other problems were related to the presence of uncovered transaction costs; the opportunistic behaviour of farmers who joined the AEA only to receive the payment and, mostly in the first years of the agreement, the lack of the valorisation of the products obtained with more sustainable techniques. This latter was partially overcome with the QM label introduced in 2012, but now farmers complain about the commercialisation strategies adopted by local retailers and it seems that the QM is no longer an efficient strategy to valorise the AEA through market mechanisms.

Policy framework widely changed during the last year, for the introduction of the new RDP scheme. Farmers are nowadays applying for a new AEA following Marche Region (2015) requirements. Even if it is still early to understand the real consequences of this new policy framework, interviews with both farmers and the Managing Authorities have underlined some problems in dealing with the new requirements (mostly the IPM certification) that in some cases, even made farmers doubtful about the eventuality to apply for the financial resources available through the AEA.

4.3 Reflections on the case study methodology used and potential improvements

Preliminary analysis, following the guidance for STEP 1, was crucial to select the most relevant AEA. In fact, through the preliminary interviews, we realized that AEAs for biodiversity were at a very initial stage and that were not so relevant and interesting as expected, for the purposes of the research.

For what concerns the Valdaso AEA, information related to the first part of the AEA (from 2007 to 2011) were already collected in the context of other research projects, while the information collected on the first year of the implementation of the new AEA are not exhaustive since the application process has not been completed yet. It should be noticed that for this new AEA it has been more difficult to involve all the relevant stakeholders, because



of the deadline of the new RDP application and also because they do not show the same level of interest as in the past AEA. Since, they are all looking for future positive developments, all the interviewees were more focused on the future RDP programme and its main problems, rather than in the past AEA and its' consequences.

However, both institutions and farmers showed to be very interested in presenting the work they are doing to preserve the environmental quality of the valley through collective initiatives.

Semi-structured interviews with local stakeholders have proved to be a useful and maybe unique way to come into contact with the main actors of the AEA and collect information on the ground. Indeed, interviews were fundamental also because we found few (or no) information through other (more formalised) channels (book, journal articles, official documents, etc.).

The SES framework has proven to be useful in analysing in detail the “micro-level” operational mechanism within the AEA. However, it somehow fails to explain a broader system like the multi-level approach that led to Valdaso CS success, as it would be difficult to describe all the variables (table A3) that characterise the wider system, their relationships and dynamics.

More in detail, the main limitations of the SES, with respect to the specific CS analysed, are:

- Scale of analysis. To allow a better understanding of the operational level mechanisms that led to Valdaso success, the SES boundaries have been defined as those defined by the administrative requirements of the AEA. With this choice it was possible to analyse more in depth the different SES components and the synergies that led to ESBOs production, but we could not fully explore the broader system and the multi-level governance that the system involved (that are actually presented as relevant variables analysed in table A3).
- Resource units/ESBOs: as the case study shows mechanisms relevant to reduce the negative environmental effects, it would be necessary to better clarify the relations between benefits and reduction of negative effects.

5 Research and action mandate for Steps 3 and 4

5.1 Agreed objectives of activities to be undertaken with initiative/stakeholders

The period of commitment of the AEA is almost finished and now farmers are applying to the new AEA in the context of the new RDP framework; to this extent action mandate for step 3 and 4 should be to investigate both potentials and barriers of the new approach, also showing best practices from other countries. Besides, relations between public policies and market mechanisms, should be more explored as a way to make this kind of agreement work without policy intervention and support.

Moreover, it could be useful to interview the citizens of the valley and some representative of the local touristic sector to have a clearer idea of what is the level of appreciation of the AEAs in order to better cover the demand side of ESBO provision.



5.2 Innovations, impact, transferability, potential risks and research bias

Local stakeholders showed high interest in continuing valorising their environmental commitment with the valley, mostly by including more profitable market opportunities. Both institution and farmers interviewed show high interest in knowing how other European country deal with RDP experiences supporting collective approach.

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7 ANNEX

7.1 Documentation of research and action progress

The first part of the project (2007-2011) project has been largely analysed through the use of interview made within a prior research project with the same research objective (Coderoni 2014; Vanni 2014; Vanni and Coderoni, 2013 and 2015). Further and more updated information, from project development since 2011 to date, have been collected via additional interviews (both by phone and in presence) of farmers belonging to Nuova Agricoltura association and Regional authorities.

7.2 Supporting data and statistics

Table A1: Valdaso and Marche region agricultural descriptive statistics

Variable	Valdaso	Marche Region
Population	30,936	1540,688
Agricultural holdings (n.)	2,800	44,866
UAA (ha)	25,940	471,828
Farm average size (ha)	9.2	10.5
% farm specialised in permanent crops	17.99	7.92

Source: Agricultural Census 2010 and LAG Piceno and LAG Fermano (2015).

Table A2: Hectares financed for each measure in the first and last year of application

	IPM				MD	green cover
	fruit	wineyard	olive groves	horticulture	fruit	fruit
payment (€/ha)	450	400	250	300	650	120
Year 2009						
ha requesting contribution	116.17	75.79	14.86	44.93	181.57	194.11
Total funds to farmers	51,300.00	29,828.00	3,647.50	12,960.00	117,936.00	23,110.80
Year 2012						
ha requesting contribution	59.35	109.11	16.78	70.38	294.83	270.56
Total funds to farmers	26,708.445	43,643.76	4,196.85	21,115.59	191,642.425	32,467.76
Total funds of the AEA 2009	238,782.30					
Total funds of the AEA 2012	319,774.83					

Table A3: The most relevant variables considered in the case study

Type of variable	Short description
Social, economic, and political settings (S)	
S1 – Economic development	market drivers (e.g. urban growth-industrial pollution-in the past; fruit production) and constraints (lack of recognition within the mainstream system)



S2 – Demographic trends	Aging and emigration
S3 – Political stability	The political stability was not considered good (changing of representatives, abolishment of provinces, etc.). Property rights are clear.
S4 – Other governance systems	Collective approach to RDP, multi-stakeholder approach
S5 – Markets	Low prices, low market power; demand for quality and local products
S7 – Technology	New approach to innovation, relevance of public advisory system
Resource systems (RS)	
RS1 – Sector	Agriculture: fruit (and horticulture) production
RS2 – Clarity of system boundaries	System boundaries are quite clear as they refer to the Aso valley. They extend beyond the CS area, as there are farmers that are not included in the AEA.
RS3 – Size of resource system	Area within the CS area is the NVZ of the Aso valley. The area outside is the catchment area of Aso river
RS5 – Productivity of system	Farmers lament low economic viability in the area (low market prices and lobbying power) and problems due to pest resistance
RS6 – Equilibrium properties	The state of resource system was considered to be in decline, stable or improving enhanced. The change is slow because of the small area of the AEA compared to catchment area and also for the presence of other economic activities.
Governance systems (GS)	
GS1 – Government organizations	Regional and Provincial authorities Role of Nuova Agricoltura was fundamental to shape the AEA, though the space for manoeuvre is strongly limited by EU (RDP regulation) and national systems of governance
GS2 – Nongovernment organizations	Nuova Agricoltura is the most important non-governmental and non-profit organisations connected with the key ESBO, but it does not aggregate all the farmers. Farmers organisation were not central in the beginning of the AEA, but they have become more important during the years.
GS3 – Network structure	Farmers and ASSAM technicians are the core of the networks that engage with the key ESBO(s) and they are linked by a sense of community concerning the ESBO(s). The presence of a project promoter has been fundamental to start the project
GS5 – Operational-choice rules	the dominate operational rules in the governance system surrounding the ESBO, are defined by the AEA: in particular: Boundary rules: how to join AEA (ZVN); Authority rule: Region and Province; Aggregation rules: efficacy of techniques; Scope rules: reduction of N, P K input; Information rules: bollettino agrometeo; Payoff rules: premiums Transaction costs have not been covered
GS6 – Collective-choice rules	The scope of the AEA has been decided at “higher”-regional level with the co-decision of farmers (through the project promoter) and the regional authorities, but the operational level choices are made by farmers supported by ASSAM technicians.
Resource units (RU)	
RU1 – Resource unit mobility	key ESBO considered are water and soil quality.no mobility.
RU3 – Interaction among resource units	RU interact with other natural resources (air quality), but also with operators health and touristic attractiveness of the area and this is this well



	understood by actors. On the other hand, green cover increases the use of water.
RU7 – Spatial and temporal distribution	The declining of economic activities has had an impact on the declining of pollution of the area, but it also (in the case of farming) it brought with it less safeguard of the territory.
Actors (A)	
A1 – Number of relevant actors	Broad range of public and private stakeholders
A2 – Socioeconomic attributes	Stakeholders are linked by language and cultural background. There are relationship of proximity and reciprocity in the CS area
A3 – History or past experiences	orchards have been traditionally cultivated with a high use of chemical inputs, with negative environmental effects
A4 – Location	All of the users are located within the CS area.
A6 – Norms (trust-reciprocity)/social capital	Between farmers there are quite high levels of trust. Between farmers and institutions there is some distrust, but there were bridges between the different actors (i.e. the project leader and the ASSAM technicians.)
A7 – Knowledge of SES/mental models	Farmers showed a high level of awareness, knowledge and appreciation of the importance of ESBOs and recognise their role in providing them
A8 – Importance of resource (dependence)	Farmers are highly dependent on the ESBO(s) for the sustainability (both economic and environmental) of their activities
A9 – Technologies available	“Technology” used (IPM and MD) is not related to management and exploitation of the key ESBO(s), but has a direct impact on it.
Action situations: Interactions (I) → Outcomes (O)	
I1 – Harvesting	Orchards were cultivated in a quite intensive way.
I2 – Information sharing	The role of information sharing on the advanced IPM techniques by ASSAM technicians has been fundamental
I3 – Deliberation processes	Is based on the contents of the AEA and made operational by ASSAM bulletin
I8 – Networking activities	Farmers and ASSAM technicians are interlinked by bulletin information and on farm visits. Farmers are connect each other by their social life and neighbourhood relationships.
I9 – Monitoring activities	There were no monitoring activities except for fruit residues
O2 – Ecological performance measures	Unfortunately, there are no ecological measures that suggest the key ESBO(s) is in good health in terms of provision and use. The level of pest pressure has decreased thanks to the AEA, and problems of new pathogens are being solved.
O3 – Externalities to other SESs	AEA is linked to tourist system and this is well known and accepted within the CS area
Related ecosystems (ECO)	
ECO2 – Pollution patterns	Links between the ESBOs and air pollution are very clear to and recognised. The reduction of chemical inputs has had an important impact on air quality