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# Case studies on Remuneration of Positive Externalities (RPE)/ Payments for Environmental Services (PES)

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*Operation Pollinator is an international biodiversity program designed to boost the number of pollinating insects on commercial farms.*

*It helps farmers to implement targeted semi-natural habitats and to achieve environmental gains alongside productive agriculture that are remunerated by public PES schemes in Europe.*

*The initiative illustrates the importance of public-private partnerships in making PES more practical and effective for farmers and, at the same time, making use of PES to create markets for environmental goods.*



## OperationPollinator®

Multifunctional Landscapes

### Overview

Agriculture and biodiversity are intimately linked. Most of our crops depend on various pollinators as well as beneficial insects and a fertile healthy soil structure which has multitudes of microorganisms. At least 40% of the world's economy is derived from biological resources, says the United Nations Environment Program (UNEP). Preserving biodiversity therefore makes economic sense and generates economic opportunities.

The EU made a strong commitment in its Europe 2020 strategy to protect biodiversity and to halt biodiversity loss. Proactive management of farmland biodiversity will be essential for meeting future EU biodiversity targets. And, with CAP2013, the EU is proposing to reward farmers for the implementation of greening measures. The three main measures are: a) creating ecological focus areas, b) crop diversification, and c) the maintenance of permanent pastures. The remuneration of these measures on-farm will represent a third of future direct payments to farmers.

Syngenta has developed the Operation Pollinator program in collaboration with partners in, academia, NGOs and government to assist farmers in their efforts to maintain productivity while also enhancing on-farm biodiversity. Being part of Operation Pollinator also enables farmers to become eligible for payments for environmental services on the different levels of governance in Europe. The rapid expansion of the program in Europe indicates that farmers recognize the value of Operation Pollinator and may be willing to pay for the products and services provided through the program.

### Operation Pollinator helps to improve viability and effectiveness of Payments for Environmental Services (PES)

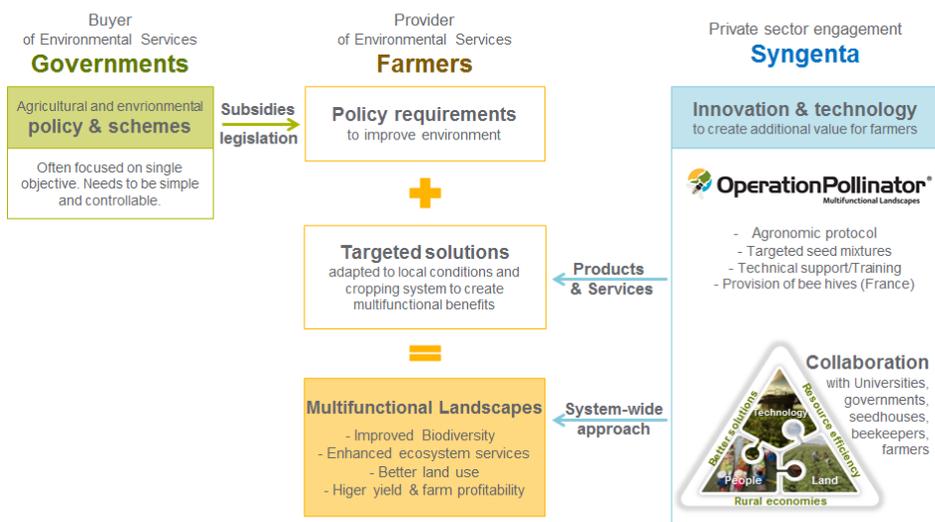


Figure 1. Illustration of the Operation Pollinator model and the market for the provision of environmental services.

## Introduction

*Operation Pollinator demonstrates that environmental sustainability and modern farming can coexist and benefit from each other, which is critical for doubling global food production by 2050.*

*The program has already had a positive impact on the farming community. It is internationally recognized as a good example of how the private sector actually contributes to the generation of positive externalities in agriculture – benefiting both rural societies and the environment.*



Syngenta's ambition is to help growers deliver valuable ecological areas alongside productive agriculture in order to meet growing food demand in an environmentally sustainable way. That calls for a step change in productivity and resource efficiency. Syngenta aims to contribute to this change through a system-wide approach that links people, land and technology. These are the foundations for a sustainable production system that enables farmers to increase productivity and resource efficiency in sustainable rural economies while also protecting the environment.

The value of Operation Pollinator and how it works on the provincial scale is illustrated in the later described case of the Umbria region in Italy. A first pilot to test the commercial viability, meaning the ability to charge farmers a fee for the services provided by Operation Pollinator is currently being undertaken in France. If it succeeds it will be one of the first examples of a public PES scheme (CAP2013) that serves as a vehicle to create a market for environmental goods that does not just generate revenues for private stakeholders but also positive externalities for society and the environment at large.

Pollinating insects are crucial for many natural habitats and the production of a majority of food crops. More than 80% of crop types depend directly on them, including many fruits and vegetables. The number of native pollinating insects has declined significantly across Europe in recent years, mainly because of a loss of feeding sites and loss of breeding areas<sup>1</sup>. Operation Pollinator is a tool to create favorable habitats for pollinators, which will provide valuable food sources throughout the whole flying season. This is especially important as there usually is a lack of pollen and nectar in the second half of the season, as most flowers have already faded.

The program is based on independent scientific research. It started in 2001 with Syngenta co-sponsoring a pilot study ([Buzz project led by the Centre of Hydrology and Ecology in the UK](#)<sup>2</sup>). The aim was to compare the effectiveness of new and existing agri-environmental schemes targeted at enhancing biodiversity on arable land. Additionally, it aimed to demonstrate the best means of establishing and managing these best practices to the farming community.

In 2005, Syngenta UK launched Operation Bumblebee with the purpose of translating the scientific findings of the Buzz project into concrete products and services for farmers. In collaboration with DEFRA (UK Department for Environment, Food and Rural Affairs), Sainsbury's, the NFU (National Farmers Union), Co-Op Farms and Natural England (a government advisor on the natural environment), Syngenta trained 570 UK farmers, who implemented more than 1000 ha of habitat designed for pollinators.

Building on this success, Syngenta started the international roll-out of Operation Pollinator in 2009. Through collaboration with Universities, NGOs, governmental bodies and farmers, the concept was adapted to many different local socioeconomic and agro-ecological conditions. To date, the Operation Pollinator initiative has been implemented in 15 European countries as well as in the US. Syngenta has so far invested more than \$1 million in Operation Pollinator, and also invested in R&D, demo sites and training as well as the development of partnerships with universities.

In 2012 Syngenta moved the discussion from the measurement of single indicators in the field to an overall assessment of the landscape, and from single-function to multifunctional benefits. Building on the success of Operation Pollinator to enhance biodiversity, the concept of Multifunctional Landscapes integrates the protection of natural resources and the enhancement of ecosystem-services. In 2013 Syngenta France launched a first commercial offer for Oilseed Rape, by offering farmers a pollination service to improve both yield and biodiversity.

1. e.g. Tapper & Barnes 1986; Sutcliffe & Kay 2000; Donald 2001; Robinson & Sutherland 2002; Steffan-Dewenter *et al.* 2005
2. VV.AA., *Comparison of new and existing agri-environment scheme options for biodiversity enhancement on arable*, DEFRA Report, 2007, Project Nr. BD1624 ([Buzz project led by CEH](#))

## The market for the provision of environmental services

Operation Pollinator aims to provide the essential habitat to boost numbers of crucially important pollinating insects on farmland to:

- Protect and enhance overall biodiversity
- Improve crop pollination and yields
- Secure an economically viable agriculture and environmental balance

Aligning with this overall purpose it has developed, with its local partners, targeted seed mixtures and agronomic protocols that enable growers to cultivate pollen- and nectar-rich field margins in a practical, cost-effective and profitable way. The optimal seed mixture is subsequently produced by local multipliers. Farmers are provided with tailored seed mixtures, an agronomic protocol and environmental training, and they learn how to optimize land use of low productive land and field margins to improve the environmental balance whilst retaining farm profitability. To deliver environmental value at large scale and low cost, Operation Pollinator gives practical advice for agronomic management. This includes crop protection to manage arable weeds and farm machinery for efficiency.

In addition to enhancing biodiversity within the concept of Multifunctional Landscapes, Operation Pollinator also proves how ecological compensation areas can be designed to improve crop pollination, pest control, soil structure and fertility, as well as nutrient cycling and hydrology services. It therefore contributes substantially to the restoration of agricultural ecosystem services.

All these services are currently provided to farmers as part of a comprehensive package that enables them to be productive and sustainable. However, Operation Pollinator also shows how such private sector activities can generate positive environmental externalities in agriculture through the development of new goods and services with a positive benefit for the management of public goods. It shows that a proactive corporate response to agri-environmental challenges and policies may lead to the creation of markets for environmental goods that generate income and employment for rural areas. Such markets result from increased investments in the creation of new practical tools, products and services that make it easier for farmers to comply with 'ecopayment' conditionality, and at the same time retain farm productivity.

For that purpose, the protocols of multifunctional field margins are adapted to local conditions and cropping systems in collaboration with local partners. This ensures a successful adoption and implementation of the new tools.



*Figure 2: (above) Operation Pollinator in Ittre, Belgium: Environmental gains alongside productive agriculture*

*Figure 3. (centre) Derbyshire, UK: Multifunctional field margin to improve biodiversity and OSR yield.*

*Figure 4. (below) Crete, Greece: Biological monitoring allows to determine the impact and effectiveness of PES.*

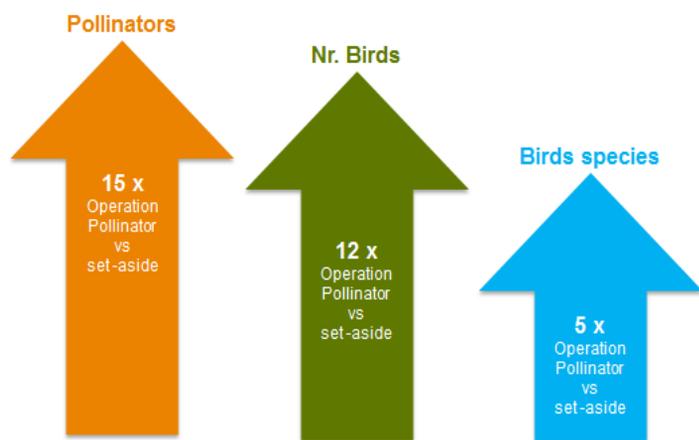
## The case of Operation Pollinator in Italy

Operation Pollinator started in Italy in 2007. The objective there was to explore how favorably managed farming systems can provide a source of biodiversity for entomofauna and wild fauna. The project had the technical/scientific support of University of Perugia and additional sponsorship from the Umbrian Regional Agency for Farming Development and Innovation (A.R.U.S.I.A) based in Perugia.

Since the beginning of the project, different scientific partners have collaborated with Syngenta to develop the Italian Operation Pollinator protocol and to demonstrate benefits for fauna and entomofauna. These partners include Università degli Studi di Perugia, Università degli Studi di Pisa, Università degli Studi di Foggia, Università degli Studi di Torino, Università Cattolica del Sacro Cuore di Piacenza, and Università degli Studi della Basilicata.

The Italian protocol involves the use of a mix of leguminous (alfalfa, clover, cockshead, bird's foot trefoil) and oil seed rape, in order to guarantee constant flowering from May to October. The implementation of the protocol has led to the establishment of new habitats for pollinating insects that are tailored to local conditions. Monitoring carried out by the scientific partners proved that the number of pollinators has increased up to 15-fold and the number of birds up to 12-fold within three years<sup>3</sup>. Sampling showed that several wild pollinators are visiting the sown plants. They include *Bombus hortorum*, *Bombus lapidarius*, *Bombus pratorum* and *Bombus terrestris*, in addition to diptera, wasps and *Apis mellifera*.

Another important factor was the involvement of local authorities. Operation Pollinator has been included in the rural development plan of the Umbria Region and since 2010, farmers have been able to obtain direct payments for implementing the Operation Pollinator protocol. Per 10 ha of crop with 1 ha of Operation Pollinator farmers can earn € 1270 in annual agri-environmental payments (e.g. 18ha of wheat + 2 ha of Operation Pollinator pays € 2540). The overall objective in Italy is to significantly increase the populations of wild pollinators through the creation of strips of land that serve as biodiversity habitats in agriculture. Operation Pollinator therefore guarantees the protection and valorization of the insects in many areas of the Italian peninsula.



Pollinators: Bees, Megachile, Bombus, Sirphidae

Figure 5. Gardi T., results from trials in Umbria Italy

3. Gardi T., *Risultati della sperimentazione triennale in Umbria per l'incremento della biodiversità*, Atti del Convegno "La sfida della biodiversità nell'agricoltura moderna", 2009

## Commercial pilot in France

Syngenta France created an add-on service offer in oilseed rape to help farmers improve both yield and biodiversity. The Syngenta pollination service was co-developed with a number of research institutes and agronomic schools. They helped to establish a protocol and run trials to confirm that the pollination service increases oilseed rape yields significantly.

For the commercial roll-out Syngenta collaborates with distributors, local seed suppliers and beekeepers. Farmers can buy this innovative service from their input supplier together with commercial seeds and crop protection products. The offer includes an Operation Pollinator seed mixture to create a flower margin, as well as the provision of bee hives during flowering and training. The training covers how to implement and manage dedicated habitat, raises awareness about the importance of pollinators for the production of oilseed rape, and provides best management practices to drive up oilseed rape yields sustainably. It has been implemented along 900 ha of oilseed rape fields, and 1860 bee hives have been provided to farmers, driving up yields through better pollination. This commercial pilot was very well received by farmers and created a lot of interest in the market place as it is a win-win situation for all partners.

The benefits for Syngenta and distributors are many. The launch of Operation Pollinator as an add-on service creates additional sales helps to differentiate in the market place and to improve customer loyalty. Beekeepers can not only capture value from the early honey production, but can also be assured that farmers apply best management practices to protect the environment including their bees. And, last but not least the value proposition for farmers is strong as it covers yield increase, knowledge transfer for sustainable land management and access to agri-environmental schemes. From a more general perspective this offer also promotes, in a simple and easy to understand way, the concept of sustainable intensive agriculture, which is important to value farm work and helps farmers increase their capability as stewards of land, water and biodiversity.

*This pilot demonstrates that it is possible to commercialize Operation Pollinator and create a market for environmental goods that is based on the investment of new products and services that benefit the environment and cropping, as well as helping farmers to comply with agri-environmental schemes at the same time.*



*Figure 6. Practical agronomic management is needed to deliver environmental value at large scale and low cost.*

*Syngenta develops in collaboration with multiple stakeholders practical tools for farmers to promote Sustainable Intensive Agriculture. Operation Pollinator helps farmers to identify and solve multifunctional landscape issues to improve biodiversity, agri-ecosystem services and land use. The proactive and targeted management of uncropped areas on commercial farms is one of the most important environmental assets agriculture can provide to take care of our unique natural capital and ecosystem services it provides.*

*The key lesson learned is the need to work in public-private partnerships to create practical solutions, which link people, technology and land. By collaborating and co-developing with many stakeholders Operation Pollinator has looked beyond single disciplines to create complete solutions that improve all pillars of sustainability including environmental, social and economic benefits.*

*Innovation and technology are key to achieving a Sustainable Intensification of Agriculture in order to meet the growing food demand in a sustainable way. They enable better solutions that allow farmers to increase productivity and resource efficiency in sustainable rural economies. Operation Pollinator is a practical tool based on scientific research and the experience of farmers. It importantly demonstrates that environmental performance and high crop yields can be achieved in the same field.*

## Lessons learned

Farmers are the custodians of the land. The success and effectiveness of PES is directly linked to the buy-in of the farming community. They are best informed about the economic and environmental challenges on their farm and they are interested in technologies that enable them to implement conservation measures in a cost-effective way, often leading to participation in cost-effective public PES schemes. There is a real demand for such goods and services and significant potential to create a market for environmental goods that can be upscaled and become financially sustainable.

The seed mixture and training that Syngenta and its local partners offer to the local farmer to enhance on-farm biodiversity also shows that the farmer does not need to do everything himself or herself to be sustainable. Division of labor does not just make things easier but also creates new local markets in rural areas that generate important off-farm employment. At the same time, this type of innovation helps to solve trade-offs between economic development and environmental protection in rural areas. Operation Pollinator proves that the private sector can play a crucial role not just as the usual buyer of environmental services in PES schemes but also as a contributor to the effective delivery of such services through new knowledge-based products and services.

The creation of an innovative local product such as a locally adapted seed mixture must, however, be based on research and experimentation. Scientific findings need then to be translated into simple and user-friendly tools that can easily be adapted to local conditions. The introduction of these new tools and practices needs to be accompanied with the training of farmers to manage field margins and low productive land more effectively in order to obtain the important gains for biodiversity and the restoration of ecosystem services. However, farmers need financial incentives and training to broaden their focus from the production of crops to managing additional requirements around the provision of public goods and services and that is where the EU's Common Agricultural Policy (CAP) plays a complementary role.

Depending on the generosity of agro-environmental policies, farmers are in a position to use part of the direct payments to pay for these goods and services (that also involves local multipliers who produce the tailor-made local biodiversity packages). These farmers contribute to a market for environmental goods that would not have been possible without the public PES scheme.

Agriculture depends on ecosystem services offered by a rich biodiversity. Without sustainable intensification, we will not be able to protect biodiversity for future generations and simultaneously meet the growing demand for food, feed, fiber and fuel in the emerging economies. To accomplish the task at hand, farmers and policy makers must coordinate efforts to protect and enhance biodiversity while also creating incentives to increase investment in agriculture and innovation.

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### Further references are available on request



*Syngenta is moving the discussion on biodiversity and protection of natural resources from the single measure per field to an assessment of the landscape, to multifunctional benefits.*

*Operation Pollinator is embedded in this concept of Multifunctional Landscapes, which are about growing a biodiversity crop and proactively managing the land rather than leaving land fallow and thus unproductive.*

### Contacts

Remuneration of Positive Externalities (RPE) / Payments for Environmental Services (PES) in the Agriculture and Food Sectors  
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