



Deliverable 3.8: First set of Practice Abstracts

**Accelerating Innovative practices for
Spraying Equipment, Training and
Advising in European agriculture.**



THIS PROJECT HAS RECEIVED FUNDING FROM THE
EUROPEAN UNION'S HORIZON 2020 RESEARCH AND
INNOVATION PROGRAMME UNDER GRANT
AGREEMENT NO.773864

Document Summary

Deliverable number: 3.8

Deliverable Title: First set of Practice abstracts

Type: Report

Version: 1.0

Deliverable Lead: UPC

Related Work package: WP3

Author(s): Emilio Gil

Communication level: PU (Public Report)

Date: 31 October 2019

Grant Agreement Number: 773864

Project name: INNOSETA

Start date of Project: 01-05-2018

Duration: 36 months

Project coordinator: Emilio Gil (UPC)



Abstract

This document contains the resume and contents of the 25 practice abstracts already developed under the project activity



Table of Contents

Introduction	1
1. Summary practice abstracts.....	2
2. Description of practice abstracts.....	3
2.1 INNOSETA Project – Everything you should know for an adequate management of Plant Protection Products (PPP) in a platform designed for you and in your own language.	3
2.2 Official launch of INNOSETA website – Everything related to spray application at a “click”	4
2.3 Farmers’ most important sources of information regarding spraying equipment and machinery and PPP	4
2.4 Non-adopters’ needs and interests concerning innovative spraying equipment.....	5
2.5 Differences between adopters and non-adopters of innovative spraying technologies.....	5
2.6 Farmer’s demand, needs and interests regarding innovative spraying equipment.	6
2.7 Experts’ opinions on novel spraying equipment and their adoption	6
2.8 AKIS/ innovation platform in the branch of innovative spraying equipment	7
2.9 Double fan injector nozzles – a SETA for improved coverage while reducing drift.	7
2.10 Dropleg – a SETA principle that can improve deposit on plants in row crops	8
2.11 Bandspraying – a SETA that improves deposit in row crops	8
2.12 Possibilities to use of drift reducing sprayers in orchards in Sweden	9
2.13 Training of sprayer operators on SETA – some INNOSETA interview results in Sweden.....	9
2.14 Technical day about wine spraying June 18 th 2019, Montpellier	10
2.15 Optimizing spray quality and application accuracy in viticulture	10
2.16 Reducing drift in viticulture.....	11
2.17 Prevention of contamination by proper filling and cleaning of sprayers in viticulture.....	12
2.18 News technologies and new ways of applying plant protection products in viticulture.....	12
2.19 Official launch of Innoseta newsletter	13
2.20 Innoseta news publication and website section	13

2.21	Official Innoseta social media pages.....	14
2.22	Innoseta visual identity and materials.....	14
2.23	Training materials in Innoseta platform.....	14
2.24	An open access inventory of scientific and technical papers for farmers and scientists.....	15
2.25	First regional workshop in Spain -Viticulture.....	15



Introduction

The European Innovation Partnership for Agricultural productivity and Sustainability (EIP-AGRI) was launched in 2012 to contribute to the European Union's strategy 'Europe 2020' for smart, sustainable and inclusive growth. This strategy sets the strengthening of research and innovation as one of its five main objectives and supports a new interactive approach to innovation: European Innovation Partnerships¹.

EIP-AGRI integrates all practice-orientated projects funded by the EU (with different funding streams) related to farming and forestry. In this context, INNOSETA is one of these projects and has to be included in the EIP-AGRI repository².

EIP-AGRI have a common format to gather the information about the several EU initiative and projects. More specific information about EIP-AGRI common format can be found at ³. One of the elements of the EIP-AGRI is the "Practice abstracts". The Practice Abstracts reflects the evolving content/output of the project and it is used to disseminate/communicate the project to the end-users.

The elements of each Practice Abstract are:

- 1) Short and easily understandable title (in English) (maximum 150 characters)
- 2) Short summaries in easily understandable language in English (maximum 1500 characters)
 - a. What problem will the knowledge generated solve for the end- user? What will be the main benefits to the practitioner?
 - b. Main outcome/recommendation

INNOSETA is a thematic network and has to be included in the EIP-AGRI repository and it is expected to produce 50 practice abstracts. At this point, close to the mid-term of the project, 25 PA have been created and correctly uploaded to EIP-AGRI repository. Here enclosed is presented a summary of all PA created and a description of their contents.

¹ More detailed definition at: <https://ec.europa.eu/eip/agriculture/en/about>

² <https://ec.europa.eu/eip/>

³ EC. 2015. EIP-AGRI Common format for interactive innovation projects. [ONLINE] Available at: https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip_common_format_-_14_oct_2015.pdf. [Accessed 24 January 2019].

1. Summary practice abstracts

Number	Language	Partner	Title
1	English Spanish	UPC	INNOSETA Project - Everything you should know for an adequate management of Plant Protection Products (PPP) in a platform designed for you and in your own language.
2	English Spanish	UPC	Official launch of INNOSETA website - Everything related to spray application at a "click".
3	English Greek	AUA	Farmers' most important sources of information regarding spraying equipment and machinery and PPP.
4	English Greek	AUA	Non-adopters' needs and interests concerning innovative spraying equipment.
5	English Greek	AUA	Differences between adopters and non-adopters of innovative spraying technology.
6	English Greek	AUA	Farmers' demand, needs and interests regarding innovative spraying equipment.
7	English Greek	AUA	Experts' opinions on novel spraying equipment and their adoption.
8	English Greek	AUA	AKIS/ innovation platform in the branch of innovative spraying equipment.
9	English Swedish	VISAVI	Double fan injector nozzles - a SETA for improved coverage while reducing drift
10	English Swedish	VISAVI	Dropleg - a SETA principle that can improve deposit on plants in row crops.
11	English Swedish	VISAVI	Bandspraying - a SETA that improves deposit in row crops.
12	English Swedish	VISAVI	Possibilities to use of drift reducing sprayers in orchards in Sweden.
13	English Swedish	VISAVI	Training of sprayer operators on SETA - some INNOSETA interview results in Sweden.
14	English French	IFV	Technical day about wine spraying June 18th 2019, Montpellier.
15	English French	IFV	Optimizing spray quality and application accuracy in viticulture.
16	English French	IFV	Reducing drift in viticulture.

17	English French	IFV	Prevention of contamination by proper filling and cleaning of sprayers in viticulture.
18	English French	IFV	New technologies and new ways of applying plant protection products in viticulture.
19	English Greek	AUA	Official launch of InnoSeta newsletter.
20	English Greek	AUA	InnoSeta news publication and website section.
21	English Greek	AUA	Official InnoSeta social media pages.
22	English Greek	AUA	InnoSeta visual identity and materials.
23	English Spanish	UPC	Training materials in InnoSeta platform.
24	English Italian	UNITO	An open access inventory of scientific and technical papers for farmers and scientists.
25	English Spanish	UPC	First regional workshop in Spain, 25th of October.

2. Description of practice abstracts

2.1 INNOSETA Project – Everything you should know for an adequate management of Plant Protection Products (PPP) in a platform designed for you and in your own language.

INNOSETA project started with the main objective to facilitate the final users (farmers and advisors) an easy and profitable access to all the materials, developments, software... already available for a better and more safe and sustainable use of pesticides. From a new developed nozzle to a tutorial about how to determine the optimal volume rate. From a research latest news about drift reduction to the simplest training leaflet in your own language.

INNOSETA consortium has been built trying to include all the involved agents: researchers, advisors, manufacturers (sprayers and pesticides), advisors and farmers, all of them have an active participation in the project.

INNOSETA will develop a European platform where most of the already available interesting materials will be available for the end-users just within a “click”. Interesting research developments generated after EU and local projects, most valuable technical and scientific articles, the latest developments launched by manufacturers (new nozzles, software, new devices, APPs...) and the most useful training material (focused on farmers and advisors mainly) will be collected, classified and uploaded into the platform, sorted in a easy and logical way.

By working together with the final users, INNOSETA community will be able to identify the most interesting and demanded materials, the actual needs for end-users, the existing gaps concerning information and training.

Only an accurate, precise and sustainable use of PPP will lead into an important benefit. Less amount of PPP can be guaranteed through an accurate sprayer adjustment, while maintaining the pest/disease control. And for that, training is still a key player. Enjoy INNOSETA and improve your skills.

2.2 Official launch of INNOSETA website – Everything related to spray application at a “click”

INNOSETA website has been already launched. Continuing with the improvements and information about the development of the EU platform to help farmers in their daily use of plant protection products (PPP), the new INNOSETA WEBSITE (www.innoseta.eu) is already available in 8 different languages (English, Spanish, French, Italian, Greek, Belgian, Dutch and Polish). INNOSETA website has been developed following a clear and useful structure, allowing an easy access to the most important information about partners, project and other related EU and local projects. INNOSETA website will host the INNOSETA platform, that will be officially launched next May 1st 2019.

From INNOSETA website you will have an easily accessible way to partner’s information. Clear and useful information about the seven “hubs” selected in the project is also included.

INNOSETA website allocates also direct links to the most important and related EU projects on the topic of crop protection in general, and spray application more specifically. INNOSETA website also allocates the newsletter section and the possibility to free joint the INNOSETA community, allowing the end-users to be updated with the latest technologies, developments and project improvements related with the topic of crop protection and plant protection product's uses.

2.3 Farmers’ most important sources of information regarding spraying equipment and machinery and PPP

According to the results of INNOSETA survey, farmers’ most important source of knowledge/know-how on the use and operation of their spraying equipment is their own experience followed by information/advice from equipment manufacturers and dealers, the Internet and advisors (private and public/cooperative). Some differentiations are observed between countries; in Spain and Italy manufacturers/dealers come in first place, while in France, Greece, Poland and Sweden ‘own experience’ predominates. Adopters tend to rely more on industry (sprayers’ manufacturers/dealers) followed by farmer’s own experience, other farmers and private advisors.

The most important source of information non-adopters would trust before deciding to purchase innovative spraying equipment are demonstrations followed by other farmers using the equipment, a cost-benefit analysis tailored to their farm as well as personal trial or conversation with advisor.

Farmers’ most recent source in which they sought out information in relation to innovative spraying equipment are exhibitions/trade fairs, the Internet and professional press. Nevertheless, in Greece and Sweden, Internet comes in first place.

Furthermore, the most important sources of knowledge/know-how with regard to PPP application (when, how much, precautionary measures, etc.) are PPP dealers, farmers' experience and private advisors. Nevertheless, in France own experience and public service/extension service come first, followed by private advisors.

2.4 Non-adopters' needs and interests concerning innovative spraying equipment

Despite the plethora of available technologies on innovative spraying equipment and machinery which are already available in the market, their adoption rate is still low.

The INNOSETA survey results indicate that farmers' most important reasons for not adopting are that their land is too small or the equipment is not affordable. Other less reported reasons were that they do not see future benefit out of their use, uncertainty about equipment's long-term efficiency or lack of technical support (especially in the case of greenhouses), non-compatibility with existing farm technology, or the complexity to understand its use/to work with it.

Non-adopters' most powerful incentives for investing in something new are primarily the expectation for increased profit (or justified cost/benefit ratio; reduction of production costs), depreciation of existing equipment and spray efficacy.

On the other hand, non-adopters said that they would renew their farm equipment if they got a subsidy and/or relevant training.

2.5 Differences between adopters and non-adopters of innovative spraying technologies

According to the INNOSETA farmers' survey, adopters and non-adopters of innovative spraying equipment show quite a few differences.

Adopters are more likely to be full-time farmers, to be more satisfied from farming and to be located in plain areas. Regarding training, they are more likely to have attended a training course in spraying machinery. They tend to rely more on industry (sprayers' and PPP manufacturers/dealers) than own experience as source of information regarding their spraying equipment. Adopters tend to visit agricultural fairs, field days/demonstrations or exhibitions more often than non-adopters. They are more likely to be the first in their social circle of friends and relatives to know about and buy new machinery/technology and overall, they are stronger believers in technology.

On the other hand, non-adopters are more likely to be involved in farming due to family tradition or to be less dependent on agriculture in terms of income. They tend to rely more in their own experience and they have different attitudes towards technology than adopters. Non-adopters tend to wait to buy new things, until they know others have positive experiences with them and prefer to have some experience with something before they buy it as compared to adopters.

With respect to the criteria for buying/choosing spraying equipment, economic considerations are more important for non-adopters, while the reduction of PPP inputs and environmental protection seem to be less important.

2.6 Farmer's demand, needs and interests regarding innovative spraying equipment

According to the farmers interviewed in INNOSETA, the characteristics that would make innovative spraying equipment more relevant to their needs are primarily ease of use, long term reliability and operator safety followed by availability of technical support, compatibility with the existing machinery, reduction of environmental hazards, and price. Easiness to install the equipment, economic benefits are also important equipment characteristics for the majority of the farmers.

With reference to incentives that farmers would like to see in future policies to facilitate the acquisition of innovative spraying equipment, financial incentives predominate with financial support, mostly in the principle of subsidization, asked by 2/3 of farmers. Other financial incentives include tax reductions, reduced equipment prices and higher/fair prices for their produces. Some ask increased support for small-scale farms, support to certified and/or high precision equipment as well as the reduction of bureaucracy. Training, especially demonstrations, is also quite frequently mentioned as a prerequisite for the adoption of innovative technologies.

Quite a few farmers claim that the change of regulations, more strict inspections, the compulsory use of Low Drift Nozzles and the like could also be a good incentive as well.

Attention also should be given on farmers' demand for the better balance between environmental and agronomic performance of new technologies (spraying machinery and PPP).

2.7 Experts' opinions on novel spraying equipment and their adoption

Besides INNOSETA farmers' survey, in order to assess farmers' needs and interests and to better understand the factors that affect novel spraying equipment adoption, expert interviews were conducted too. Expert groups comprise representatives from Research, Industry, Advisory Services and Farmers' groups.

Experts are in favor of innovative spraying equipment due to specific characteristics such as efficiency, environmental and economic benefits, safety and comfort of the operator and ease-of-use. On the other hand, they underline the high initial (purchase) costs of such equipment as well as their complexity, thus the need to provide farmers with continuous training and technical support. The technical limitations/ vulnerability of such advanced, complex technology is also noticed.

To facilitate adoption, experts support targeted subsidization of certified machinery and best management practices (possibly favoring smaller family farms). However, for experts, subsidies should not be the sole measure taken; stricter legislation and its enforcement, information campaigns, farmers' training and technical support by independent extension/advisory services are deemed equally important.

2.8 AKIS/ innovation platform in the branch of innovative spraying equipment

The adoption of innovative spraying technologies can be facilitated if the end users (farmers) participate in their co-creation and assessment. In this respect, a well-functioning AKIS/ innovation platform fostering collaborations and synergies among stakeholders is of paramount importance.

The experts interviewed in INNOSETA agree on the lack of a functional AKIS/ innovation platform regarding innovative spraying equipment and the difficulty of bringing relevant stakeholders together. Policy's excessive slowness in decision-making along with bureaucratic inefficiency as well as the fact that decision-makers rarely consult farmers when they take measures on farming are underlined.

Moreover, even if there is interaction between farmers and industry, manufacturers are found to interact with a very small group which is rather not representative of the heterogeneity in farming.

It is also noted that there are many gaps between research (not interested in practical applications), industry (have their own objectives), farmers (rarely consulted) and policy-makers (making legislation without knowing/considering the realities of the sector/ in the field). Experts maintain that even if the rest of the actors somehow cooperate, farmers are usually left out.

According to the interviewee's extension/advisory services are in the best position (as compared to the other actors) to play an intermediation role among AKIS actors.

2.9 Double fan injector nozzles – a SETA for improved coverage while reducing drift

In a Swedish research project, made by RISE and VISAVI, on application of biological plant protection products in field grown vegetables and berries was studied qualitative deposit in crops and quantitative deposits in laboratory by using water sensitive papers and collectors placed on a standardized holder, representing the structure and leaf orientation on plants, horizontal upper and undersides of leaves and vertical, front/back, left/right.

One objective was to optimize the deposit depending on location of diseases on the plants. Laboratory tests were done at JKI, Germany using a test track with a spray boom running over the collectors, varying forward speeds, nozzle types, pressures and water rates. A tracer was used in the spray liquid to be able to analyze and quantify deposits on the different targets. Water rates between 300 l/ha and 1200 l/ha were tested, relevant practices among farmers for these crops. There were no found differences on deposited amount between flat fan nozzles and air injection nozzles; neither on horizontal nor vertical targets. Increased water rates gave corresponding increase of deposited amount. Double fan air injection nozzles compared to flat fan nozzles increased total deposit, relative numbers 143-160%. On vertical targets, mainly backside, deposits increased to relative numbers 243 - 299. On horizontal underside surfaces, no deposits were found using nozzles directed downwards.

General advice is to air injection nozzles to reduce drift from boom sprayers.

To get higher deposits and the plant protection products placed on relevant places of plants, double fan air injection nozzles should be used.

2.10 Dropleg – a SETA principle that can improve deposit on plants in row crops

Diseases on plants can be placed on areas that are difficult or impossible to reach by using traditional boom sprayers. Especially leaf undersides, where e.g. larvae often are located are a problem.

A Swedish research project, made by RISE and VISAVI, on application of biological plant protection products in field grown vegetables and berries studied qualitative deposit in crops and quantitative deposits in laboratory by using water sensitive papers and collectors placed on a standardized holder, representing the structure and leaf orientation on plants, horizontal upper and undersides of leaves and vertical, front/back, left/right. One objective was to optimize the deposit depending on location of diseases on the plants. Laboratory tests were done at JKI, Germany using a test track with a spray boom running over the collectors, varying forward speeds, nozzle types, pressures and water rates. A tracer was used in the spray liquid to be able to analyze and quantify deposits on the different targets. Two types of the principle for droplegs were studied, with different nozzle types and nozzle orientation. Dropleg have nozzles placed on the end of vertical pipes mounted on the boom, lowered down into the crop.

Droplegs with nozzles spraying horizontally and upwards generally increased deposits on plants.

To get deposit on underside of leaves it is necessary to lower the nozzle to be located under the lowest leaves and have the spray directed upwards. In order to optimize this air injection off center nozzles were mounted with the spray jet orientated horizontal and upwards to avoid losing spray liquid to the ground.

2.11 Bandspraying – a SETA that improves deposit in row crops

Diseases on plants can be placed on areas that are difficult or impossible to reach by using traditional boom sprayers. Especially leaf undersides, where e.g. larvae often are located are a problem.

A Swedish research project, made by RISE and VISAVI, on application of biological plant protection products in field grown vegetables and berries studied qualitative deposit in crops and quantitative deposits in laboratory by using water sensitive papers and collectors placed on a standardized holder, representing the structure and leaf orientation on plants, horizontal upper and undersides of leaves and vertical, front/back, left/right. One objective was to optimize the deposit depending on location of diseases on the plants.

Band spraying over the crop rows were tested for single rows and double row beds.

For single row deposit on plants were increased compared to boom spraying by spraying with two nozzles spraying the row from 45-degree angle. To cover also the undersides of the leaves the nozzles should be placed close to the ground directed horizontally and upwards plus one nozzle over the row. For double rows using six nozzles placed angled and over the rows improve deposits however not enough in the middle between the rows. To get coverage on both rows it is necessary to place nozzles between the rows, like a droplet.

For deposit on undersides it is necessary to place nozzles directed horizontally, located under the lowest leaves and have the spray directed upwards. It is needed to have some kind of support to keep the nozzle height constant over the ground, to avoid nozzle damage of nozzles and assure correct application.

2.12 Possibilities to use of drift reducing sprayers in orchards in Sweden

A Swedish project made by RISE and Visavi made a pre-study about possibilities to use drift reducing sprayer with different settings in Swedish orchards. Studies of deposits were made by placing water sensitive papers on standardized holders on each 50 cm from ground to 1 m over the top of the apple trees. Tests were done in early season, no leaves and late season, after flowering. The training system was espalier. Tests were done at three different farms with their own sprayers; one axial fan sprayer, one crossflow sprayer and one three row crossflow sprayer. Tests were done with nozzles and settings of the sprayers according to Swedish approval, the same as JKI, Germany. Tests were done with the highest reduction class the sprayer could reach, 25 % for the axial fan sprayer and 95% for the other two sprayers.

For spraying in early season, no leaf, the both crossflow sprayers showed better coverage with the fan shut off than with air, also in case the fan speed was reduced. The axial fan did not get enough coverage with air shut off.

When spraying in late season, after flowering with full leaf on the trees, the sprayers showed not enough coverage without fan. The three row cross flow sprayers showed not enough coverage with reduced fan revolutions, due to low fan capacity but sufficient coverage when using settings with normal airflow, which had a lower drift reduction class.

The tests were preliminary looking at just qualitative deposits. Further tests are needed for quantitative measurements of deposits and studies of biological effect on diseases.

2.13 Training of sprayer operators on SETA – some INNOSETA interview results in Sweden

A part of the INNOSETA project has been to perform interviews of 50 farmers in each of the participating seven countries. The Swedish partner VISAVI made interviews among farmers with field crops, open field vegetables and orchards, 25 adopters and 25 non-adopters of innovative spraying techniques.

The non-adopters often had no interest in innovative spraying technique but those who had claimed they had to little knowledge in the technology to trust it.

The adopters all had an interest and trust in technology as a background for investment. Sweden has no own manufacturer of innovative spraying technology and famers are depending on importers or dealers to get information, service or training. Dealers have workshops but the staff also have to have competence in all other agricultural machinery. They had all experienced some kind of problems with their equipment, some that could have been solved by themselves, if they had been trained. Instead equipment could have been forced to stand still for several days. Some

reported about malfunction of equipment because of lack of knowledge that the equipment must be recalibrated e.g. when driving speed had changed or when another tractor was used.

Adopters who had got training by e.g. sprayer manufacturer after purchase or by supplier of GPS, auto boom height control or boom section shut off were more satisfied and confident with their innovative technology. Both categories reported lack of competence and needed training on innovative spraying technology among trainers, advisors and dealers.

2.14 Technical day about wine spraying June 18th 2019, Montpellier

The first regional workshop organized as part of the European INNOSETA project (H2020 thematic network on spraying) took place in Montpellier on June 18th 2019. The event was organized as part of a full technical day devoted to improving application techniques in viticulture. The day began with the presentation of the LabelPulvé (IFV-IRSTEA-Chambres d'Agriculture-CIVC), the new system for labelling wine-growing sprayers according to their performance.

In a second step, the EoleDrift project (IFV-IRSTEA) was presented. The objective of this project is to develop a new method to measure spray drift under controlled conditions and to acquire references on the drift levels generated by the main types of sprayers. The new drift measurement method is based on the use of a fan wall (5m*5m) which produces a steady wind over the experimental area. A demonstration of drift measurement tests was also carried out on the EvaSprayViti artificial vine using the fan wall.

The afternoon was then devoted to INNOSETA exchange workshop on innovation in wine-growing spraying techniques and technologies. The objective of this workshop is to bring together the different actors of viticulture in France (sprayer manufacturers, PPP manufacturers and suppliers, authorities, technical advisors, farmers, farmers' unions, media, researchers, etc.) in order to address issues related to innovation in pesticide application and identify the keys to its appropriation by farmers in the field. To encourage exchanges, participants were divided into four thematic groups: Group 1. Spray quality and application precision; Group 2. Spray drift reduction; Group 3. Sprayer filling and cleaning - Contamination prevention; Group 4. New technologies for spraying.

2.15 Optimizing spray quality and application accuracy in viticulture

The first regional Workshop organized as part of the INNOSETA project took place in Montpellier (France) on June 18th, 2019. The objective of this Workshop was to bring together different stakeholders involved in viticulture in France. In order to share knowledge and address issues related to innovation in the field of pesticide application and its appropriation by farmers, participants were divided into 4 thematic groups. One group worked specifically on "Spray quality and precision spraying".

During the workshop, participants selected the innovations that they felt were the most important to promote to farmers:

- Real-time application parameters monitoring device

- Sprayer setting assistance by advisers;
- Spray quality assessment tools at farm level

The most important point that emerged from the discussions was the need for winegrowers to be better informed of the importance of sprayer settings and their major influence on both the effectiveness of protection and the risks of contamination (health and environment). Since there is a lack of information and know-how on the part of winegrowers for the adjustment of equipment, it seems necessary to offer training courses covering very practical aspects. Moreover, it was agreed that innovation is more about teaching farmers to use their sprayers correctly than about introducing the latest technologies on farms.

At the level of public policy priorities, participants underlined the need to encourage and promote the renewal of the sprayer fleet towards more efficient machines and to support this transition with purchase subsidies.

2.16 Reducing drift in viticulture

The first regional Workshop organized as part of the INNOSETA project took place in Montpellier (France) on June 18th, 2019. The objective of this Workshop was to bring together different stakeholders involved in viticulture in France. In order to share knowledge and address issues related to innovation in the field of pesticide application and its appropriation by farmers, participants were divided into 4 thematic groups. One group worked specifically on "Spray drift reduction".

Participants were asked to select the innovations they consider most important to promote to farmers:

- Air induction nozzles
- Classification of sprayers and practices according to drift risk using Eoledrift
- Recycling tunnel sprayers

Several participants underlined the need to better train farmers and advisors so that they can understand the conditions that promote drift. It is also necessary to promote the use of drift-reducing technologies by demonstrating their effectiveness. Except the air injection nozzles that can be installed on air-jet technology sprayers, the majority of participants highlighted the significant price gap between devices that significantly reduce drift and more traditional, less efficient devices, and therefore mentioned the need to subsidize the purchase of high-performance devices.

In terms of public policy, two main thoughts were expressed:

1. Make it mandatory to use high-performance validated sprayers and devices to reduce drift near sensitive areas (rivers, homes);
2. Raise awareness among farmers with mandatory trainings about the importance of the consequences of the drift phenomenon on health, environment, etc....

2.17 Prevention of contamination by proper filling and cleaning of sprayers in viticulture

The first regional Workshop organized as part of the INNOSETA project took place in Montpellier (France) on June 18th, 2019. The objective of this Workshop was to bring together different stakeholders involved in viticulture in France. In order to share knowledge and address issues related to innovation in the field of pesticide application and its appropriation by farmers, participants were divided into 4 thematic groups. One group worked specifically on "Correct filling and cleaning of sprayers – Prevention of contamination".

During the workshop, participants selected the innovations that they felt were the most important to promote to farmers:

- Annex tank for mixture preparation
- Closed-Transfer Systems
- Volumetric counter for sprayer filling
- Point sources pollution diagnosis tool OPTIPHYTO

As a conclusion to the discussions, it seems that the innovations on the market adequately address the challenges of protecting the environment and the health of operators; the problem is their adoption by winegrowers. It was also pointed out that personal protective equipment must be improved for greater comfort and ergonomics.

Furthermore, the subject of point sources pollution has been a long-standing concern in France. All attention is currently focused on drift and it seems that the problems related to point sources pollution are often misinterpreted as solved. It is therefore necessary to communicate on this issue and Certiphyto could be used by the authorities to communicate widely on point sources pollution.

Concerning public policies, one point that was highlighted is to set up a "mandatory and periodic pedagogical control" for each farm on good PPP management practices and ways to limit point sources pollution.

2.18 News technologies and new ways of applying plant protection products in viticulture

The first regional Workshop organized as part of the INNOSETA project took place in Montpellier (France) on June 18th, 2019. The objective of this Workshop was to bring together different stakeholders involved in viticulture in France. In order to share knowledge and address issues related to innovation in the field of pesticide application and its appropriation by farmers, participants were divided into 4 thematic groups. One group worked specifically on "New technologies for spraying".

During the workshop, participants were invited to select the innovations they consider most important to promote to farmers:

- Real-time application parameters control devices
- Direct injection systems

- Real-time dose adaptation using a recommendation map
- Development of autonomous sprayer

It is interesting to note that three selected innovations allow producers to be relieved of the task of adjusting the equipment / calibration / choice of dose to be applied. This choice underlines the need to develop autonomous spray systems that reduce the risk of errors and keep the operator out of this difficult task.

The discussions revealed that one of the main challenges remains not only to take advantage of the new technologies available but also to help winegrowers to use their sprayers correctly. Beyond this aspect, demonstrations of new technologies and users' feedback are necessary to assess the available supply and to be able to assess the reliability of these new technologies.

On the public policy side, authorities and funders must have the opportunity to communicate and collaborate with accessible experts about new spraying technologies in order to know and understand them.

2.19 Official launch of Innoseta newsletter

The official Innoseta newsletter was launched in January, 2019. Main aim of the newsletter is to inform target groups in a 6-month base for the developments and news about the Innoseta project. Milestones of the project concerning implemented research, communication and dissemination activities, and the Innoseta Platform, are included. The newsletter's original language is English. However, it is translated to all 7 official languages of the project (Greek, Spanish, Dutch, French, Polish, Swedish, Italian), because the mailing list includes people from all 7 HUB-countries and it is the best practice to engage with all different stakeholders. Considering the content of the newsletters, all partners contribute providing translations and, furthermore, ideas for the newsletter's content. You can find all newsletters uploaded on the Innoseta website (www.innoseta.eu/newsletter) and you can register yourself into the newsletter's mailing list. The generation of the newsletter is a procedure coordinated by WP5 "Communication and Dissemination".

2.20 Innoseta news publication and website section

The news section on the Innoseta official website (www.innoseta.eu/news) is a constantly updated section with the goal to inform the public about the new developments of the project, communication and dissemination activities of the partners and other relevant to SETA news and advancements. News for the website are collected from all consortium partners on a monthly basis, in the form of excel sheet reports, depending on availability, they are translated into all 7-HUB languages and uploaded on the website. News section acts as a informative section on the website and can feed the project's calendar with upcoming events. The visitor gets valuable insight from the project and is constantly up-to-date. News section maintenance and updating is a task coordinated by WP5 - Communication and Dissemination.

2.21 Official Innoseta social media pages

The official social media of Innoseta had been launched from the beginning of the project (before the kick-off meeting in May, 2018). They include pages in: (a) Facebook (@InnosetaNetwork), (b) Twitter (@InnosetaNetwork), (c) LinkedIn (Innoseta - Thematic Network) and (d) Instagram (@innoseta_thematicnetwork). From September the 15th, 2019, a Youtube page has been launched for the project (Innoseta Thematic Network H2020). Following the project's social media, you can get real time updates on the project's activities, news and eventually be part of the Innoseta community. Social media are managed by WP5 - Dissemination and Communication.

2.22 Innoseta visual identity and materials

Since the very beginning of Innoseta, a visual identity has been created to ensure the homogeneity and wide recognition of the project. The visual identity covers: (a) the official logo of the project, (b) trademark, (b) official image used for background in all materials and tools, (c) colors, (d) fonts, (e) templates for documents and presentations, and every other material and tool for the purpose of communication and dissemination (website, social media, newsletter, brochures, posters, roll-up banner etc.). You can recognize the project's visual identity in all Innoseta events and other activities where the project is represented. Moreover, on the official website, you can check out more about the project's visual identity and communication and dissemination materials and tools. Just take a look at www.innoseta/documents, "Communication and Dissemination Strategy" and "Dissemination Materials". The generation of the visual identity and communication and dissemination materials and tools is a task managed by WP5 - Communication and Dissemination.

2.23 Training materials in Innoseta platform

A deep search for training materials related to PPPs application was carried out by the Innoseta partners.

In the first phase, a total of 325 SETAs about training material were identified and were uploaded into the INNOSETA platform. All materials were classified into four classes/topics: 1) Optimization of spray quality and precision of application, 2) Prevention of spray drift, 3) Correct filling and cleaning of sprayers – prevention of contamination and 4) New technologies for spray application. They include materials in 10 different languages, which will make the platform more accessible for all the users of the European Union countries and also easily disseminated among the target people. Digital tools (websites, applications, webinar and e-learning courses) represents the 36% of the collected material, educational material available (manuals, videos, presentation and case studies) covers the 44% and the dissemination material (leaflets, diagrams and photos) the 20% of the total collected information.

The database will help to cover the existing gap between the wide range of training materials already developed for universities, research institutes, companies, etc. available and their final users (farmers and contractors).

This large list of material represents the starting point of the process. The INNOSETA platform was launched including all this material, and it will be implemented progressively with new records during the total period of the project and even after the end of the project.

2.24 An open access inventory of scientific and technical papers for farmers and scientists.

Within the InnoSeta project a comprehensive search of scientific and technical papers related to PPPs application was carried out by the partners. Special focus was posed to papers addressing an innovative and environmentally friendly approach to plant protection products application (PPPs) and to technical papers providing practical information to farmers.

The survey was carried out by using the main available online databases such as Scopus, Web of Science and national repositories. Results led to the collection of 251 articles, 109 of those (69 scientific articles and 40 technical papers) were considered relevant after the screening process performed by the partners and suitable to be included in the InnoSeta multi-actor platform. Articles' predominant language is English, as it is the official language for international literature. Nevertheless, about 50 articles in other languages (namely Spanish, French, Dutch, Italian, Portuguese, Polish and Chinese) are available. Most of the papers (53) fall within the innovative sprayers' category including sprayers for arboreal, field and greenhouse crops.

To date about 50 papers are already available on the InnoSeta platform. Users can freely search for them by using keywords. Search results will display a list of papers matching the keywords. By clicking on the desired record, all main information about the selected paper will be displayed, e.g.: title, authors and contact details, abstract, link to the original database etc. The database on the platform will serve as a tool for both scientists and SETA users (farmers and contractors) to have a comprehensive overview of the state of the art on research and good practices in the PPPs sector.

2.25 First regional workshop in Spain -Viticulture.

The first regional workshop organized by the UPC as part of the INNOSETA project took place on 25 October in the school of viticulture of Espiells (Barcelona). The aim of this regional workshop was to bring together different interest groups from the wine sector in order to share knowledge and get to know the different concerns of the sector in relation to innovation in phytosanitary products. With this purpose, the participants were divided into 3 thematic groups: Improvements in quality and precision in the distribution of phytosanitary products, reduction of drift and filling and cleaning of the sprayer. In each thematic group, different challenges to be faced were presented, then a selection was made of the SETAs that best solve these challenges, and finally a brainstorming session with the objective of promoting these SETAs and developing their implementation. The best SETAs selected are the following ones:

- Variable application based on maps
- Systems that are close to the objective
- Incorporation of phytosanitary products

The best evaluated SETAs are those that help the farmer to reduce the risks of contamination of the field and the farmer. The subsequent discussions revealed that the majority of participants are concerned about training and awareness, the safety of the applicator and the reduction of environmental pollution. It is important to advise and inform farmers on all these issues in addition to new innovations. In the regional workshops it is also very important that the authorities and financiers have the opportunity to communicate and collaborate with the farmers, technicians and other professionals of the sector, in order to know and understand the different problems and concerns they have.