Guidelines for AKTA principle implementation

WP 5. Design and implementation of Advanced Knowledge Transfer Activities (AKTAs)

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1.0 Introduction

The goal of knowledge transfer is to share valuable information so that they can be used when making decision and taking actions. The RENOVATE project aims to accelerate the adoption of innovative technologies for crop protection. A central element of the project is to perform the Advanced Knowledge Transfer Activities (AKTAs), which will serve as real-world demonstrations of how research findings and new technologies can be effectively implemented into common agricultural practices.

AKTAs are designed not only to demonstrate the usability and performance of innovative solutions, but also to generate high-quality training materials (videos, tutorials, interviews, datasets, etc.) to support the broader dissemination and uptake of these innovations by farmers, advisors, and stakeholders across the EU.

The selected innovative solutions being the subject of AKTAs (table 1) include a diverse range of technologies, grouped into four main categories:

- Smart sprayers

- Decision Support Systems (DSS) and online tools

- Drones

- Remote and proximal sensing tools for crop scouting, prescription maps production and targeted spraying

Each AKTA's innovation is unique in scope, maturity level, and expected outcomes. Therefore, while a general framework applies to all, specific guidelines are necessary for each group of technologies.

Country		Partner	Foreseen AKTA's innovation	Confirmed AKTA's innovation	Motivation for substitution	Type of AKTA's innovation	Link (if available)
1	BE	**PCFRUIT**	EVA	EVA AGROMANAGER	To support our customers even better and offer additional customised services, pcfruit/EVA and Agromanager are joining forces (2027). With the joined strengths of EVA and Agromanager, farmers are offered not just a solid, but a complete digital story.	Software, DSS	https://www.pcfruit.be/nl/eva https://www.agromanager.eu/en/
2	CZ	**CPS**	TOPPS-DROPS	**TOPPS-DROPS**	-	Risk evaluation assessment tool	https:// TOPPS - D.R.O.P.S.org/en/home
3	FR	**INRAE**	DECITRAIT	**DECITRAIT**	-	Online Decision support tool	https://decitrait.vignevin-epicure.com/login
4	FR	**INRAE**	PICORE	**BLISS ECOSPRAY**	The PICORE system (traceability system for bush and tree crops sprayers) is no longer commercially available. It was substituted by a high efficiency sprayer combining high level of target deposition and a	Sprayer	https://bliss-ecospray.com

					reduced drift by using air confinement		
5	IT	**UNITO**	OPTIMA	**NOVIAGRI**	The sprayer developed within the OPTIMA project is no longer available, but the newly-developed sprayer (NOVIAGRI) makes it easier for the end user to adjust a wider range of settings, such as air volume and direction, and the amount of spray mixture applied.	VRA sprayer	-
6	IT	**HORTA**	VITE.NET	**VITE.NET**	-	Online Decision Support System	https://www.horta-srl.it/en/vite-net/
7	IT	**LAORE**	IRRORASAR	**IRRORASAR**	-	Online Decision support tool	https://irrorasar.agenzialaore.it/Account/Login?ReturnUrl=%2f
8	PL	**INHORT**	LIFE-H3O	**LIFE-H3O**	-	Sprayer Control System	https://platform.innoseta.eu/product/31
9	PL	**INHORT**	TOPPS-DET	**TOPPS-DET**	-	Online Decision support tool	https://topps-drift.org/
10	PT	**DATERRA**	GOPHYTOVID	**GOPHYTOVID**	-	DSS	https://gophytovid.es/

11	PT	**DATERRA**	/	**Drone AKTA**	The newly added drones-AKTA aims to clarify current regulations, best practices, and relevant European project results, fostering informed understanding of drone-based PPP application.	Drone Spraying	-
12	ES	**UPC**	NOVATERRA	**NOVATERRA**	-	Remote imaging	https://www.novaterraproject.eu
13	ES	**UPC**	GOPHYTOVID	**GOPHYTOVID**	The sprayer developed in the OPTIMA project is no longer available; the new VRA sprayer from the OG GOPHYTOVID project is ready for use and has proven to significantly reduce PPP usage in vineyards	Smart sprayer	https://gophytovid.es
14	ES	**UPC**	CITRUSVOL	**CITRUSVOL**	-	DSS	https://citrusvol.com
15	ES	**UPC**	ENVISPRAY	**ENVISPRAY**	-	DSS	https://envispray-frontend.vercel.app
16	CY	**PEK**	DOSAVINA	**DOSAVINA**	-	DSS	https://dosavina.upc.edu

Tab. 1: List of foreseen vs. confirmed AKTA's innovations to be tested and evaluated in real-world situation within WP5

These guidelines aim to:

- Provide a common structure for testing and evaluating AKTA's innovations by their potential users across countries and partners.

- Define minimum requirements and recommended practices for data collection, stakeholder engagement, and training material production.

- Support the creation of reliable, consistent and transferable knowledge to feed the RENOVATE training platform.

2.0 General implementation guidelines

Regardless of the selected technology, the following general steps are recommended for each AKTA:

Stakeholder Identification

- Select collaborative farmers and/or advisors willing to test, demonstrate or support the AKTA.
- Where relevant, engage active focus groups or existing networks to recruit participants in AKTAs implementation activities.
- If possible, select stakeholders (and locations for AKTAs implementation) distributed across different geographical areas, in order to ensure broader territorial coverage and representation of diverse agronomic and operational conditions This approach may support the collection of more varied feedback and enhance the transferability of the knowledge generated.

Initial Informative Session

Organize an opening session (optional, but recommended) to introduce:

- The context of the project

- The specific AKTA(s) and its (their) purpose

- Expected benefits and implementation steps

It is suggested to collect input from stakeholders about their expectations or questions regarding the technology. This feedback can provide valuable insights to help steer the AKTA in the right direction, aligning its implementation with real user needs, expectations and priorities.

Training of users of AKTA's innovative solutions

The personnel directly involved in performing the AKTA — such as farmers selected for the testing and evaluation activities — should be adequately trained on the use of the technology. They should understand how it works, the contexts in which it is most appropriate, and what kind of data or feedback is expected from them by the end of the testing phase. This ensures that participants are confident and well-informed, improving both the quality of implementation and the relevance of the collected outcomes.

To this extent:

I. *Provide targeted training to the users of AKTA's innovations*. These individuals should receive practical and accessible training focused on how to properly operate the technology, interpret outputs, and understand its intended use in their specific context. Therefore, their training should go beyond basic functionality and include interpretation of feedback and benefits (e.g., from a DSS/online tool). The training should include real-operative scenarios, practical use of the technology, and, where relevant, practical exercises to ensure that users feel confident with the technology/tool. Clarity on what kind of data or observations they are expected to provide during and after testing the innovative solutions is also essential to ensure reliable outcomes and meaningful evaluation of the users.

II. *Provide users with clear information on what it is expected from them*. Training should include guidance on how to document or report their experience and observations. Use simple language and focus on practical information on "what-to-do" and "how-to-do" aspects. Users

should clearly understand their role in the process and the kind of feedback or observations they are expected to provide.

Implementation & Monitoring

I. Collect available data on performance of AKTA's innovations already gathered during previous trials or demonstration activities (e.g., during the development phase of the AKTA or in the context of previous EU or national projects). This data shall be used during the user's training phase (Section 2.3). The users shall be encouraged and trained to collect missing data (or new data when considered relevant) during the practical use of the AKTA's innovations, in order to reflect real operative conditions and support the end user final opinion and experience.

II. Support users during the AKTA use phase. Once trained, the AKTA users should not be left alone: continuous assistance is key to a successful implementation. Therefore, ensure ongoing support to users during the entire demonstration period. This includes helping with setup, resolving doubts or technical issues, and clarifying procedures when -and if- needed. Providing timely support increases the chances of correct use, improves user experience, and reinforces trust in the technology.

III. Collect qualitative and quantitative data. During the implementation phase, it is essential to gather both qualitative and, where needed, quantitative data. Qualitative data may include direct user feedback, satisfaction, usability perceptions, and observed strengths or weaknesses of the tool. Quantitative data can include basic performance indicators such as: amount of PPP used (compared to standard practice), time required for operations, number of applications, system alerts or errors, etc. This information is relevant to evaluate the real impact of the AKTA, to support future cost-benefit analyses and training materials development.

IV. Support AKTA users in tracking their activity: whenever possible, ask users to maintain a simple activity diary along the AKTA implementation period. This can include daily or weekly notes on operations, anomalies encountered, observed benefits/drawbacks, suggestions for

improvement, etc. These observations will provide practical insights that may not emerge from technical data alone. To support this process, the partner responsible for the AKTA should provide a simple and clear logbook template — either in hard copy or digital format — indicating what type of information should be recorded. That helps the consistency of information across different users and facilitates later the analysis and interpretation of the collected data.

Dissemination & Production of Training Materials

Produce the following training materials, where appropriate, to support knowledge transfer and facilitate wider adoption of the demonstrated technologies. These materials should be concise, practical, and tailored to the needs of farmers, advisors, and other end-users. They can be developed in local language and are expected to reflect the real operative condition and context of the AKTA. Note that more detailed information about training materials can be found at the specific AKTAs' chapter.

I. Short videos showing practical use of the AKTA's innovative solutions. These should display the technology in action when performing the AKTA *with the final scope of explaining its advantages*. Examples may include: variable rate sprayers operating with canopy sensors, working principles of single components of the tested technology (e.g. PWM), effects of these technologies on the quality of distribution and on drift, a user browsing a DSS on a smartphone or computer, a UASS (drone) performing a treatment on a sloped vineyard, etc. Videos should include commentary or subtitles explaining key steps, benefits, and observed results. Partners should aim for clarity and relevance of the information provided by the short videos.

II. Tutorials (screen recordings, practical guides, video-capsules…). These materials *will help future users learn how to operate the AKTA's innovation solutions* (e.g., digital tools or the virtual terminal integrated on a smart sprayer). For DSS/digital tools, tutorials can include step-by-step screen recordings of procedures for login or personal account

creation, data input, and results interpretation. It is relevant to show how the user can i) set up the initial parameters (e.g., crop type, phenological stage, weather data) and ii) interpret the outputs generated by the system (e.g., disease risk levels, optimal spray timing, drift risk indicators, optimal spray volume, etc.). For smart sprayers a walkthrough of operations necessary for the sprayer configuration and setup shall be also provided.

III. Interviews with AKTA's innovation users and feedback collection. Partners are encouraged to conduct short interview with end-users who took part in the AKTAs. Interviews should aim to capture feedback and provide a perspective on the demonstrated technologies. Specifically, the interviews may explore the perceived advantages and strengths of the technology, limitations or difficulties encountered during implementation, suggestions for improvement or future development, the impact of the tested innovations on everyday farm practices and/or decision-making, overall satisfaction and availability to continue using or recommending the tool(s), etc.

Interviews can be recorded as short video clips (1–3 minutes max.) in the AKTA participant mother language that can be provided with subtitles in other partners' languages afterwards.

Feedback collected, where relevant, may be used to support further improvement of the tools and to produce policy recommendations.

3.0 Final Demonstration Event

At the end of each AKTA, it is suggested to organize a final demonstration event, designed to show the implemented technology and share experiences with a broader audience. These events will serve for knowledge transfer, engagement, and visibility of the RENOVATE project.

Plan the event in advance and communicate widely through local networks. Choose a location representative of local farming conditions (e.g. demo farms, test sites, farms involved in the AKTA). In case of limited access to technology

on-site, consider using pre-recorded videos or simulations to replace live demonstrations.

Main objectives of the event:

I. Show practical use of the technology/technologies
II. Facilitate sharing of experience between the involved users of innovative solutions and potential adopters (farmers, advisors, technicians)
III. Promote awareness and interest in innovative crop protection tools

Target audience:

I. Farmers and advisors directly and not directly involved in the AKTA
II. Local and regional agricultural stakeholders, including e.g., teachers of agricultural high schools
III. Researchers and project partners
IV. Representatives of public administrations
V. Media, local press, and communication agencies

Event structure:

The demonstration event should be as clear and engaging as possible. It may include:

I. Introduction to the project and presentation of the context
II. Brief presentation of the specific AKTAs' innovations, and of the goals of testing them in real conditions.
III. Live demonstration of the AKTA's innovations (if feasible) or pre-recorded video-demonstration
IV. Results of the test activities and feedback by the involved users of AKTA's innovations.

Depending on the type of technology:

- for smart sprayers show features, setup, calibration, spraying, and quality of distribution. If possible live demonstration should include spraying also with the conventional farm sprayer for comparison.
- For DSS/online tools: show how users input parameters, interpret outputs, and apply recommendations in the field (with real time spray demonstration or via previously recorded video). Comparison with common farm practice (without using the DSS) is encouraged.
- For UASS (drones): show a typical workflow, including drone setting. Normative restriction and quality of distribution should also be stressed.
- For remote sensing tools: show a typical workflow, including image acquisition, data processing, production of prescription maps and variable rate spraying (if feasible).

Combined testing of AKTA's innovations (optional)

Whenever possible, combine more than one AKTA's innovation in a single test to highlight their synergies. For example, a DSS for drift reduction can be combined with another DSS supporting volume adjustment, both used to set up and adjust a sprayer. The resulting application can then be compared with that of a conventional farm sprayer operated according to standard farm practices, in order to demonstrate differences in spray distribution quality and efficiency.

Q&A session and open discussion

Reserve time for participants to ask questions, express doubts, and discuss perceived challenges or opportunities. Facilitators should encourage interaction and exchange of views.

Make available printed or digital materials such as factsheets, QR codes to access video tutorials/the RENOVATE platform, and contact details for further information or support. Concise feedback forms can be used to capture participants' impressions, questions, and interest in adopting the technologies.

4. Specific Guidelines by AKTA Type

4.1 Smart Sprayers

Smart sprayers are among the most mature and field-ready technologies being subject of AKTAs in the RENOVATE project. They typically include features such as canopy detection sensors, variable rate application, and pulse-width modulation (PWM) systems to optimize PPPs use and reduce environmental impact.

As some partners have already collected extensive data on these systems in the ambit of previous projects (namely, H2020-OPTIMA, GOPHYTOVID, NOVATERRA, NOVIAGRI), their practical test and users' evaluation in RENOVATE shall focus on knowledge transfer and training, rather than on new field experiments. Therefore, the reuse of validated data (drift reduction, coverage, PPP savings, etc.) from previous projects - when considered relevant - is encouraged. However, as mentioned at paragraph 2.4, if some key data is missing — especially concerning performance in specific contexts — it is recommended to collect basic observations or measurements during the AKTA. Indeed, collecting context-specific data (e.g., PPP consumption, quality of distribution, etc. under actual field conditions) can greatly enhance the demonstration's relevance and quality of training material. It allows the technology to be evaluated not only in general terms, but in the actual operational setting of the end-user. This helps reinforce user confidence: rather than being told that "the tool works," they are able to see its benefits in their own fields, under their usual conditions. This experience is often more convincing than external evidence (namely, previously collected data) alone.

AKTAs should focus on education and skill-building, not only on technology promotion. Strengthening the knowledge and confidence of end-users increases their engagement and motivation, making them more likely to contribute meaningfully to the development of training materials (e.g. through interviews, feedback, or practical demonstrations). When users understand the value of the technology and see its relevance to their own context, they are more inclined to share their experience with others.

Objectives:

I. Demonstrate smart sprayers in real use conditions
II. Highlight potential PPP savings, drift reduction, and improved quality and efficiency of treatments
III. Train users on working principle, setup of the smart sprayer, and best practices

Recommended Preliminary Activities:

Select the farmer(s) for practical involvement (e.g., 1 for smart sprayers, 3-6 for DSS-related AKTAs). Prioritize those who are open to innovation and already equipped with basic technical knowledge, so that they will serve as a sounding board for the rest of the community. Organize targeted demonstration days to showcase real use in field conditions. Where possible, use existing sprayers already available at the farm for comparison with smart sprayer.

If smart sprayers are located at research institutions or demo farms make sure they can be used during on-site demonstrations. Collect feedback from farmers at the end of the testing period, focusing on usability, satisfaction, and observed effects on PPP use and work efficiency. Organize dedicated training sessions for the operators directly involved in the AKTA. The sessions should provide both theoretical background and practical experience.

Some possible key topics to cover are:

How PWM (Pulse Width Modulation) works, including the modulation mechanism, practical advantages compared to conventional nozzles, and the impact on droplet size and application precision.

Working principle and calibration procedure of canopy sensors, if applicable, including their response to canopy density, distance, and shape. Demonstrate how this information is used by the control unit to adjust spraying in real time.

Where available, use data visualization tools or live feedback from the machine interface to support understanding. Sessions should be recorded or documented for reuse as learning material.

Production of Training Materials

As part of the demonstration, plan in advance to collect content for training purposes. This may include filming the setup and calibration process, with details of key elements (e.g. nozzle activation, sensor placement, virtual terminal interface, etc.).

Recording practical spraying sessions, with commentary or subtitles explaining what is happening and why certain parameters are used. Interviewing the user after the activity, asking them to provide feedback on the ease of use, efficiency, observed results, and his/her opinion vs. previous expectations.

Create infographics (schematics, graphs, pictures…) about the performance of the tested smart sprayer vs conventional spraying (spray volume, coverage, deposit, drift, working rates, time savings…).

These materials should be clear, short, and tailored to the target audience (e.g. farmers, advisors, students). When possible, produce bilingual versions (English + local language).

4.2 Decision Support Systems (DSS) and Online Tools

Decision Support Systems (DSS) and online tools assist farmers and advisors in optimizing crop protection strategies by transforming data into operative recommendations. Those included in the list of the RENOVATE AKTAs are highly diverse, ranging from simple decision aids (e.g. drift evaluation tools) to complex disease forecasting or spraying recommendation systems. Unlike smart sprayers, DSS are non-hardware-based and have to be evaluated by use via mobile devices or web interfaces. Some are ready-to-use with a clear user base and data from previous projects; others are still under adaptation or rebranding.

Objectives

The primary goal of DSS-related AKTAs is to generate high-quality training materials that demonstrate how these tools support better decision-making in crop protection and to demonstrate their added value to farmers and advisors. These materials will hopefully also serve as reusable resources for farmers and advisors beyond the project's duration through the RENOVATE platform.

Specifically, AKTAs for digital tools aim to:

- Support farmers and advisors in understanding, using, and trusting these tools by documenting and explaining how the selected DSS/online tools work in real operative conditions, including key functionalities, outputs, and support decision-making processes.
- Develop clear and accessible contents (e.g. tutorials, screen recordings, workflows, etc.) supporting the user in a self-learning process and in the future dissemination of the tools.
- Provide practical examples of how DSS tools influence the planning of the treatments, optimize PPP application, and help in risk management.
- Capture user experience and feedback to identify the main benefits, limitations, and adoption barriers of each tool.
- Promote informed decision-making by improving stakeholders' confidence in digital tools and building awareness of their potential role in the crop protection sector.

Recommended Preliminary Activities:

Ensure the DSS is accessible and operational during the project (confirm licenses – if needed, availability, updates). Where tools have changed (e.g. rebranding of EVA), ensure clarity about the current version and its features. Identify whether the DSS requires field validation (e.g., practical activities in the field to visually check the effect of the DSS utilization) or if can be used with simulated scenarios only.

Suggested Topics for Implementation

To best support the creation of meaningful training content, the following activities are recommended:

I. demonstration of key functionalities: use representative scenarios to illustrate how each tool supports specific decisions in crop protection. Focus on functions that are relevant and intuitive for end-users, such as, e.g., risk level visualization (e.g. for diseases or drift), optimal spray timing and weather-based alerts, spray volume recommendations, treatment planning and tracking of operations. These demonstrations should be clear and concise, showing not only how to access the tool, but also how to interpret and to put DSS/online tools outputs into practice.

II. Design examples/practical activities where the same treatment is planned with and without the DSS and highlight expected advantages (e.g. time savings, reduced PPP use and drift). If possible, display the effect of DSS/online tool utilization in real operative scenarios (e.g. drift when spraying is performed with or without the aid of the DSS). For simplified tools (e.g. drift calculators), organize short and focused training sessions where users are guided through example cases. To do so, use real-operative parameters (e.g. nozzle type, wind speed, crop training system). Compare DSS outputs with conventional farm practices. Collect feedback on tool clarity, user confidence, and perceived advantages. For operational DSS (e.g. disease forecasting), involve advisors or farmers throughout a growing season. Monitor how users interact with DSS recommendations and how they are integrated in everyday farm practices. If possible, keep track of treatments performed and whether they were influenced by the DSS. For non-field-based tools, design simulated scenario and exercises.

Production of training materials

- Short video-tutorials: use screen recordings, animations, and step-by-step demonstrations to make short videos. For example, show how to enter crop and weather data into the DSS and provide an interpretation of the resulting risk alerts, highlighting the actions a farmer should take based on the output. Each tutorial should cover a specific feature or task, such as creating an account, inputting relevant data, navigating the tool,

interpreting outputs, adjusting actions (e.g. the sprayer) according to the DSS recommendations. The videos should prioritize clarity and simplicity, avoiding too technical language.

- Field videos: they can be recorded to show pesticide applications carried out with and without DSS recommendations. These clips may highlight differences in canopy coverage, effects on drift, product savings, providing a visual comparison of how DSS influence spraying operations.
- Interviews: interview users or organize small discussion groups to gather opinions such as first impressions and ease of use, how the tool influenced decisions or increased awareness, perceived strengths and weaknesses, willingness to continue using or recommending the tool. These actions can be used to create short testimonial videos, infographic summaries, or Q&A-based materials addressing frequently asked questions or concerns of farmers/advisors.

4.3 Drones for Pesticide Application

Drones are emerging technologies in the context of crop protection, but their practical implementation across Europe is still limited due to regulatory barriers, lack of authorized products, and limited technical awareness among end users. Nevertheless, they represent a promising tool for site-specific, low-volume, or hard-to-access areas. ***The goal of AKTAs focused on drones shall not to promote large-scale adoption***, but rather to inform and educate stakeholders on what drones can (and cannot) currently do, under which conditions, and what their potential roles might be in the future.

Objectives:

The main objective of drone-related AKTAs is to generate informative and realistic training materials that help farmers and advisors understand the current and future role of drones in crop protection. Rather than focusing only on training the participants directly involved, these AKTAs are also intended to produce reusable content that can support wider dissemination and awareness through the RENOVATE platform after the project ends.

Specifically, drone AKTAs should aim to:

I. Develop clear, practical training materials (videos, guides, infographics) explaining how and where drone-based spraying can currently be applied, based on legal, technical, and practical considerations.
II. Present real examples of drone use in specific contexts (e.g. steep-sloped terrains) and promote discussion about advantages, limitations, and safety.
III. Collect what farmers and advisors think, expect, or find confusing about the tools, so that training materials can clearly answer common questions.
IV. Contribute to a baseline of knowledge that supports future adoption of drone technologies in specific contexts, with a focus on safety, feasibility, and efficacy of treatments.

Recommended Activities:

Drone-related AKTAs should focus primarily on raising awareness and clarifying expectations about drone-based pesticide application. The objective is to produce clear and practical training materials that show what can currently be done, under which conditions, and with what limitations. To this end, the following aspects/activities are suggested as contents and demonstrations to be addressed for the production of the related training materials.

1. Technical and Legal Framework

Prepare materials explaining current EU and national regulations, limitations regarding authorized PPPs for drone application (which, if any, and in what context), safety rules and pilot certifications, as well as typical operational parameters (e.g. application volumes, nozzles, altitudes, forward speed, routes, no fly zones, authorization procedures, etc.)

2. Use-cases and live demonstrations

Identify real-operative examples from past or ongoing projects/trials in the EU to highlight main results, pros and cons and logistic aspects (batteries autonomy, payloads, tanks refilling). Use them as a baseline for “storytelling”, trying to focus especially on scenarios where PPPs application with drones

makes more sense (steep-sloped surfaces, flooded areas, very fragmented plots, etc.). Demonstration sessions (e.g. in closed environments or test sites by using aqueous dye solutions) can be organized to show how drones are adjusted, how planning/spraying are carried out in practice and what the quality of distribution is (e.g. target coverage) with a specific focus on 3D crops, where it is more challenging to reach different parts of the canopy when spraying from above.

Production of training materials

Drone-related training materials should help farmers and advisors understand what drone spraying entails, how it is carried out, and under what conditions it can be effective and legally permitted. In the production of the training materials, focus on information, not promotion. Use drone-related AKTAs as an opportunity to raise awareness, not to reinforce adoption.

Suggested materials include:

- Short introductory videos (1-3 min. max) explaining how drone-based spraying works, and should cover legal requirements, technical settings, and safety considerations in a concise and accessible format. A video per each of the above-mentioned topic can be foreseen.
- Field-case video clips showing real drone applications in the field, with live commentary about setup, flight planning, spraying execution, and observed effects (e.g. coverage, drift, efficiency). To this extent, recordings of demonstrations (e.g. using water and dye solutions) that visually compare spray quality and distribution, especially in complex canopy conditions such as 3D crops can be produced.
- Presentations/infographic materials highlighting when drone spraying is most appropriate, key benefits and constraints, and best practices for operation and safety.
- Short interviews with farmers, companies providing drone-based pesticide application services or advisors sharing their experiences, expectations, and concerns.

All materials should be developed in a format that allows for easy integration into the RENOVATE training platform and local dissemination efforts, using clear language and, when possible, subtitles or versions in different languages.

4.4 Remote and Proximal Sensing to produce prescription Maps

Remote and proximal sensing technologies provide spatial data that can be used to optimize crop protection strategies, typically by generating prescription maps based on canopy structure, vigour, or specific indicators (e.g. NDVI, location of pest or disease, etc.). These technologies include satellite or drone-acquired imagery, sensors mounted on tractors or sprayers and image-processing software. Within the AKTAs, these tools will be primarily used to demonstrate the process of converting the acquired information into prescription maps, and to develop training materials showing how to interpret and apply these maps for variable-rate applications. Therefore, these AKTAs could be combined with those described at paragraph *3.1 – Smart sprayers*.

Objectives:

The main objective of these AKTAs is to produce training and educational materials showing how remote and proximal sensing data can be transformed into useful information for pesticide application. The focus is not only on technical features, but on the practical understanding on when, how, and why prescription maps can be used effectively in real farm contexts. Specifically, the AKTAs aim to:

- Demonstrate the step-by-step process from data acquisition to prescription map generation.
- Provide clear examples of how spatial variability can provide information to drive crop protection decisions.
- Develop materials that help advisors and farmers to interpret and apply prescription maps.
- Strengthen user confidence in site-specific management by showing added value in terms of efficiency, coverage, and product use.

Recommended Activities

As part of the AKTAs, it is recommended to organise short meetings or technical sessions with end-users to introduce the basic principles of prescription map usage. These sessions should help farmers and advisors understand key aspects such as the required spatial resolution, the frequency of image acquisition, and the technical limitations of different data sources. For example, while drones equipped with specific sensors can be flown on demand to collect data under optimal conditions, satellite imagery depends on the satellite's orbit and revisit schedule — meaning that new images may only become available after several days. This type of knowledge is useful to ensure the correct interpretation of the maps and to ensure effective decision-making in the field.

Besides, to support the development of useful training content, the following activities are recommended:

1. Workflow Demonstration

Use real or simulated datasets to accompany users through the entire process: data acquisition (e.g. from drone/satellite/onboard sensors), image processing and indicator calculation (e.g. NDVI, spots where disease was detected, etc.), division of the field into homogeneous crop areas for prescription map creation, upload of prescription maps into the sprayer's virtual terminal.

2. Field Comparison

Develop/simulate use-case scenarios comparing uniform vs. variable-rate application based on prescription maps. Where - and if - possible, visualize or log: differences in spray volumes across the field, effect on canopy coverage, drift, input and time savings. Previously acquired dataset can be exploited at this stage.

3. User Engagement and Feedback

Involve advisors and farmers in interpreting maps and deciding how to act on them. Use this opportunity to collect: their understanding of maps meaning and implications, challenges faced of foreseen in applying the recommendations, opinions on practicality, perceived benefits, and integration with their usual practices.

Production of training materials

The focus of these training materials should be the generation of content that simplifies complex workflows and supports farmers/advisors in understanding the whole procedure.

Suggested outputs include:

- step-by-step short video tutorials showing how to go from raw images to prescription maps, using common tools or software platforms. Videos may include screen recordings, and audio of notes for real-time explanations. Videos may include visual summaries and diagrams explaining the workflow: image acquisition → processing → map creation → decision making (how to manage different areas and why) → upload to the sprayer virtual terminal.
- Practical videos may be combined with Smart Sprayer demonstrations — e.g. showing how different zones of a field receive different spray volumes based on the map.
- Interviews from users explaining how map-based spraying influenced their work, efficiency, or product use.

All materials should be designed for clarity and reusability, and made available in both English and local languages where appropriate. Content should be compatible with the RENOVATE training platform and easily shareable across digital channels.

5. Final Considerations

The implementation of AKTAs is key for the RENOVATE project's goal to bridge the gap between research and practice. Through practical demonstrations and high-quality training materials, each AKTA serves as a tool for knowledge transfer, helping farmers and advisors to adopt innovations in an informed way. These guidelines are intended to support partners in planning and executing effective AKTAs. While flexibility is needed to adapt to different tools and national contexts, the shared structure is supposed to ensure that all AKTAs contribute to the same goal.

Reminder: The detailed economic evaluation of the AKTAs will be carried out under Task 5.3 – Cost-Benefit Analysis. Partners are encouraged to collect relevant data and documentation to support this work.