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Deliverable 4.3

Good Practice Guidelines for Virtual Demonstration

WP4 : Increasing Access through Virtual
Demonstration



PLAID
PEER-TO-PEER LEARNING:
ACCESSING INNOVATION
THROUGH DEMONSTRATION



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ABSTRACT

Virtual demonstration through the use of farmer-made videos is a great way to share innovative approaches used on-farm, increasing access and decreasing the time constraints associated with traditional on-farm demonstration. Virtual demonstration platforms were trialled as part of PLAID activities to determine the best use of videos to sharing approaches on-farm. Training and support required for filming and editing videos was offered to farmers to produce innovation videos. Following feedback from stakeholders a set of guidelines and a training guide have been produced to help with future filming on-farm. Areas covered include: knowing your target audience; state of the art technology; ethical considerations; how to disseminate videos produced; potential barriers to effective virtual demonstration; recommendations.

Recommendations suggest: keeping introductions short; ensure context is topical and seasonal; use transitions wisely, keep interview clips short and ensure any framing (movement and momentum) is suitable. Audio should be clear and concise and where possible using a range of speakers, including farmers, advisors, researchers etc. In addition where possible, video training should be provided to farmers who are interested in creating their own videos. Lastly, the choice of dissemination route is very important when sharing videos. Dissemination options include social media such as Twitter and FaceBook for short videos, YouTube as the primary site for videos as well as farmer and research networks at a regional and national level. It is important to note that virtual demonstration is useful alongside on-farm demonstration but not as a replacement.

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INTRODUCTION

The overall objective of PLAID Work Package 4 is to develop and assess on-line solutions for expanding the possibilities of demonstration activities on commercial farms. The focus is on enabling commercial farmers to undertake virtual demonstrations and use this to support on-farm demonstrations. The emphasis is upon supporting on-farm demonstrations not substituting for them. The PLAID project recognises that it is often difficult for farmers to access on-farm demonstration due to logistical obstacles, including geographical and timing constraints. Rather than spend several hours of travel to access a demonstration that may have limited value, farmers like 'to do their homework' prior to planning an on-farm demonstration visit to assess the suitability of a demonstration to their specific situation. Some technology or management techniques may not be suitable for their farm. A visual representation that is readily accessible online may answer many queries, as to suitability, before setting out for the planned demonstration event. Equally, a video may tempt a farmer to attend a practical demonstration to gain further information.

The Work Package looked at many aspects of virtual demonstration, from how to produce materials from filming and editing, to disseminating the resulting videos, potential barriers to virtual demonstrating and how to overcome these barriers. The outcome of this Work Package is summarised in practical good practice guidelines for producing virtual materials as a means to support on-farm demonstration.

GUIDELINES

Knowing the audience

The contents of a video will differ depending on the target audience of the video. Visual content can be good for engaging at many different levels, for example, technical videos are good at explaining how new technologies can be used in different situations, so a video could include instructional content but also promotional as a point of selling. Videos of research data and results could be used to disseminate project results or they could show how research is translated to practical farming advice. Examples of audience type and their areas of interest are given below.

Peer-to-Peer

For videos that target peer-to-peer learning the videos are produced by farmers to inform farmers. These videos focus on material that is engaging to fellow farmers. The video footage has generally been taken by farmers, or on occasion by advisors, to showcase new innovations or management techniques that would be interesting to their peers. The videos can be used to inform on a technical aspect of machinery or husbandry or management techniques and can be used to gather interest or encourage discussion and debate or as a tutorial to help others to utilise technology.

Peer-to-peer exchanges help encourage communication within social groups and help the uptake of on-farm innovations. They encourage the development of sustainable agriculture by experimentation of new techniques in on-farm situations. The videos help create debate and critical problem solving to further develop innovations and encourage the use of new technology for specific on-farm situations where bespoke solutions are necessary. Often regional issues can be explored through the viewing and ensuing discussion on social media. Equally cross regions and cross sectorial solutions can be exchanged where face to face discussion would have been unlikely to have taken place.

Videos aimed at other farmers need to illustrate and provide additional details to a specific farming approach or method as well as whole farm approaches and systems. Areas of interest for other farmers will include how the approach was implemented, how transferrable it is to their farm, the benefits, barriers or challenges to implementing the approach.

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Videos for farmers should focus on a strong visualisation of the topic including machines in action, crops, animals etc. Farmers want to see practical solutions on other farms. Whenever possible use other farmers as testimonials. Let them speak about their experiences, about their success but also difficulties encountered. Different opinions on a topic increases the attractiveness and credibility of your video. However, statements should be very concise and clear.

Policy

Videos aimed at policy should highlight the transferability of an approach, how this farming approach/ trial can impact policy and how policy can be changed to further influence/ enhance farming practices across Europe. Videos aimed at policy makers can target wider topics, for example, the effect of a change in agriculture management and its impact on biodiversity. These videos can take a broader view on how a whole agriculture community may impact on the wider community and may be a good basis to provoke a wider debate. Equally policy targeted videos can highlight beneficial aspects of a change in agriculture practice and help encourage further changes that are beneficial to all.

Research

Videos are ideal to disseminate results of research. However, be aware that one minute of video corresponds to about 100 spoken words. Thus, a video about research will be in much less detail compared to a written article. But it is ideal to supplement articles and to tease the viewer to read a paper.

There are several approaches on how to use video on research results; either as a short and simple teaser video of 30 to 45 seconds, in which the researcher explains their main results. So called teaser videos can be used on social media and to link to the original paper.

Research can also be presented in a more extensive way (lecture-style). The easiest way would be to film a public lecture. However, the quality of these lecture videos is often not satisfying (dark room with projector), and they are often too long. Therefore, it is recommended to produce research videos separately: either on a location which fits the research topic e.g. in a lab, a stable or a field, or film indoors in a simple studio with a green screen. Both approaches have their advantages and disadvantages: the outdoor location might be more authentic, especially if objects related to your research can be demonstrated. Indoor videos allows the environment to be controlled (sound, light) better, and with the green screen technique graphs can be inserted and explained as a tutorial.

If the target audience are other researchers, focus on the most important results. Simplify graphs and tables used in written articles or papers, as the viewer will not have the time to understand too complex graphs. The methods applied in the research might also be interesting to be shown in a video.

If research results have a strong practical relevance or have been carried out together with practitioners, videos are the ideal tool to showcase the multi-actor approach, and to get the interest of farmers and advisors. In this case, an outdoor location might be the better choice. Again, do not overload the video with information! If uploaded to YouTube, practitioners can ask under the comment section for missing details.

General Public

Farmers like to engage the general public to help them understand the importance of the farming community in producing the food that they purchase to feed their families. Videos that promote the sustainable production of healthy food are welcomed to encourage the general public to purchase and support food that is produced sustainably. Often sustainably produced farm products produced according to EC ethics have a higher premium and videos promoting these foods are used to encourage the public to support these foods. The general public may not be aware of specific approaches, techniques or farming terms so the language used in the video and footage shown needs to reflect this.

The areas of interest for the general public will be more general compared to other farming, policy and research audiences and can include, how a demonstrated approach will affect the environment and the availability of food.

Children

Some children are unaware 'where their food comes from'. Therefore, videos helping them understand the source of the food and how the food is produced are encouraged. These videos need to be targeted specifically to them as their understanding is at a different level and short effective videos will promote engagement and lead to higher acceptance of healthy options for food choices as they grow. The subjects they find interesting often are more diverse than older viewers although their attention level is high for a limited period of time.

Enabling Farmers to Produce high quality audio-visual materials

Training materials

Videos play an increasingly important role in agricultural education, training and extension. With today's smartphones, a video camera is always present and filming has become very simple. Many researchers, advisors and farmers shoot video clips to capture their observations in the field and in the stables. In research projects, videos are becoming more frequently used as part of project dissemination activities.

Videos help to increase the reach of such events. Therefore, video training for farmers and consultants was carried out as part of the PLAID project to further enhance the use of videos in agriculture. Based on the experiences of these trainings, a manual providing tips on how to produce informative videos using simple means has been created. The guide follows the three steps of each video production: 1. Planning, 2. Production, and 3. Editing. The focus is on the specific requirements of videos for agriculture. The guide is targeted to beginners: farmers, consultants, but also researchers in national and international projects who would like to produce simple instructional videos themselves as part of their dissemination activities. A full video guide can be found in the Annex 1 and has been produced as a stand alone guide that can be viewed and accessed to help produce videos for all groups of practitioners.

The guide summarises the equipment that is available and to help select the most suitable for individual projects (page 26). Topic selection for individual projects that are suitable for virtual demonstration (page 24), how to plan the video (page 30) and collecting the footage for a video (page 33) including tips on conducting interviews and capturing this on video are included in the guide. Finally post production including dissemination can be found on page 37.

Editing

The video trainings showed that editing was the most challenging part for most participants, as it has some requirements on the performance of the computer. Efficient editing also requires practice and discipline. The following steps should be observed:

1. **Rough cut A-Roll:** Normally start with editing the A-Roll, i.e. the commentary track. All clips are listened to and the best versions are selected. The commentary is structured according to the plans and shortened to the essentials. When shortening, it is advisable to make several runs and always ask the following questions: Is this sentence relevant for the understanding of the topic? Does the sentence drive the story forward? This step takes between 1 and 4 hours, depending on the amount of material filmed.
2. **Fine cut A-Roll:** Once the "scaffold" of the A-Roll is in place cut out the misspells and "aahms".
3. **Insert B-Roll:** In this step, select the image material from the B-Roll and place it over the appropriate position of the A-Roll. The cuts of the A-Roll will be covered by these clips and thus made invisible. In addition, what has been said is clarified and emphasized with appropriate images.
4. **Provide rhythm:** This step is about providing the film with a rhythm. This means, for example, determining the duration of the A-roll sequences, deciding when B-roll images appear, adjusting B-roll cuts to the rhythm of the voice. Next music, intermediate titles and pauses should also be inserted so that the viewer has time to catch their breath. The film should flow and have no unnatural breaks.
5. **Vision:** The (almost) finished version should then be shown to an outside person. This will indicate if it is easy to follow and understand, the length is right and any parts which need to be amended. After these last corrections have been made, the video can be published on YouTube.

State of the Art Technology



Figure 1: Ricoh Theta V 360° camera

360° videos

What are 360° videos and how do they differ from standard videos?

A standard video is taken with a single lens and gives the viewer a 'flat' view of the object being viewed. 360° video is taken with a specialized camera that uses 2 fish eye lenses (Fig 1) to take views in every direction simultaneously. This allows a viewer to move the viewing angle/position during the video. So in practice during the video the viewer can move their orientation to look at a different aspects, for example up down and around, but it's not possible to zoom in or change the original video position.

360° cameras offer the viewer a comprehensive spatial experience, which is controlled by the viewer on the display or by means of VR glasses.

There are several viewing options. The videos are ideally suited to be viewed using a Virtual Reality headset or for a more readily available format using an Android phone and a cardboard (google) headset (Fig 2). This gives the viewer a virtual reality immersive experience and the video can be navigated using head movements. The viewer can move around the video to change the viewing position by moving their head. The videos can also be hosted on a YouTube channel and viewed using the chrome browser to allow the viewer to move within the video using a standard PC or Laptop and mouse control/navigation.

There is significant potential in the area of virtual training courses and virtual tours. However, producing virtual reality videos requires both experience and good planning.



Figure 2: PLAID Cardboard headsets being demonstrated at DATAgri, Spain

Drones

Aerial photos or clips of fields, field trials, machines, herds of animals or farm buildings enhance every video. The viewer obtains an excellent overview of the location of the event. However, drone recordings should only be used where it makes sense and ensure you use them within flying laws/regulations. The legal basis for drones is country-specific and varies in its restrictiveness. It is essential to consult the official information office of the country in question prior to use. An overview on drone legislation in different European countries can be found [here](#). The following applies in all countries: You may not fly over groups of people with drones. From this follows: If, for example, you want to film machine demonstrations with drones, you should do so before the demo if the machines are being tested and there are no visitors on the field yet.

Even though the modern drones now have many supporting functions that make flying relatively easy even for beginners, enough practice is still necessary. Drones with good cameras and good flight characteristics are available from 600 Euro. Sound recordings are not possible.

Tip: Engage a hobby drone pilot from your friends instead of buying your own drone. Kids often have more talent with the joystick than adults.

Drone Licence in the UK if using a drone for a hobby, a drone licence is not required as long as you follow the Civil Aviation Authority (CAA) regulations.

The Drone code states the following:

- Always keep your drone in sight to ensure you can see and avoid anything while flying
- Stay below 400ft (120m) to reduce the likelihood of an encounter with a manned aircraft
- Keep the aircraft within 1640ft (500m) of the pilot
- Always comply with the manufacturer's instructions for your aircraft
- Always stay 150ft (50m) away from people and property
- Always stay 500ft (150m) away built up and congested areas and never fly over them
- Stay away from other aircraft, airports and airfields. If you endanger another aircraft you can face up to five years in prison
- Legal responsibility is with the pilot. This includes reckless or negligent flight. Failure to fly responsibly may result in criminal prosecution

If you're planning on using your drone for profit or for business purposes, you will need to get a drone licence Permissions for Commercial Operations (PfCO) from a CAA approved provider. In place of a licence, UK permissions are granted by the CAA following your training and successful completion of your practical and theory tests, as well as your Operations Manual. In the UK there is **NO** license just a permission for commercial purposes. Currently, there is no requirement to register a drone or hold a drone license to purchase a drone in the UK

Ethics

Consent

For all activities funded by the European Union, ethics is an integral part of research from beginning to end (EC Participant Portal H2020 online manual). We are bound by rules of ethics in a modern society. Ethics ensure that we consider all individuals and their rights within society. Before filming we need to obtain free and informed consent. Consent can be given orally, in writing or electronically. Where appropriate participate information sheets should be provided to provide participants with the purpose, method, risk and benefits of the research and planned use of the data to enable them to make a clear informed decision to giving their consent. Consent can be given by completing a short targeted informed consent form (Annex 2) ensuring the participant has understood the use of the images, knows they can withdraw consent at any time and retains the right of the footage although allows the project to use the data captured or processed.

When dealing with mass attended events it is unrealistic to consider obtaining informed consent from all attending, therefore it is necessary to inform participants that filming is being undertaken and anyone that does not want to be captured in the footage should make themselves known to the management team. Common practice is to issue this person with a coloured badge to wear. This ensures that either footage is not taken if the badge is visible, or when editing any footage with someone displaying the badge is not used or edited out.

Disseminating audio-visual Materials

Social Media

Social media is a great way to share videos to a large number of people. Short 30 second to 1 minute videos can be used on platforms such as Twitter and Instagram to share a snapshot of an approach or technique. If your video is on YouTube and too long for Twitter, you can just upload e.g. the intro and link to the full version on YouTube. It is important to use subtitles, as most people watch videos on Twitter and Facebook without sound. Short videos can also be used as a great promotional tool for a demonstration event or conference. On Twitter videos can also be shared by followers, helping to increase viewership and interactions with the post.

FaceBook can also be used to share audio-visual materials. These can be either similar to short clips used on Twitter and Instagram or longer more in depth videos similar to that of YouTube videos.

Social media can be used to disseminate audio-visual materials to all audiences but some forms of social media may suit a specific audience more, so it is therefore important to know what forms of social media your target audience uses and tailor dissemination to this.

YouTube Channels

For agricultural videos, distribution via YouTube is recommended because it is the most popular platform in agricultural circles compared to Vimeo or other video platforms. In order to upload videos, you must have your own channel or open a new one. Every day, thousands of new channels are opened and millions of new videos uploaded. Therefore, some efforts are needed to make the uploaded videos known and to ensure optimal distribution.

The following measures help to make a YouTube video easier to find.

- Title: This should be meaningful and contain the most important keywords.
- Description: Briefly describe the content of the video; here you can provide further links.
- Tags: Specify keywords, also translate the most important ones.
- Thumbnail: Do not use the thumbnails suggested by YouTube, but upload your own meaningful screenshot from the video.

Particularly with newly launched YouTube channels, it is difficult to generate many views at the beginning due to the small number of subscribers. In the beginning, a YouTube channel serves more as an online video archive. From here the videos should be embedded into existing websites and made known through social media networks. Depending on the topic, the quality of the videos produced, and the existing networks, it can take months, if not years, for a new YouTube channel to be accepted by the audience.

Networks

There are a variety of different network types which can be used to disseminate audio-visual materials to target audiences. These include local farming groups, national or regional demonstration farm networks, research or trial groups (such as Innovative Farmers in the UK), advisory groups and email/ communication networks.

All of the types of networks are great for sharing videos to people who share common interests which can help increase the impact of the video. The number of people who view the video will vary with email communications offering a larger pool of people compared to research or local groups which may be significantly smaller. Some of the networks, such as demonstration networks, may also help to raise the profile of the video or topic area as these farmers are often highly regarded in the community/ farming industry and also come in contact with a variety of people across the industry who they can share a video with. Networks also provide opportunities to tap into new groups or stakeholders who might not currently be aware of a particular practice or approach, but by sharing a video within the network ensures all will have access to the video and increases the chances of them watching the video compared to sharing it widely outside of the network.

Networks set up within H2020 projects are another way of disseminating videos outside of a project or research group. An example of this is the NEFERTITI (Networking European Farms to Enhance Cross Fertilisation and Innovation Uptake through Demonstration) project. The NEFERTITI project has established 10 interactive thematic networks and brings together 45 regional clusters (hubs) of demo-farmers and actors involved (advisors, NGOs, industry, education, researchers and policy makers) in 17 countries. These networks allow videos to be disseminated more widely, across member countries, enhancing the Knowledge Exchange between farm clusters. Likewise, the European Network for Rural Development (ENRD) and respectively National Rural Networks (NRNs) serves as a hub for exchange of information on how Rural Development policy, programmes, projects and other initiatives are working in practice and provide another route for disseminating videos across Europe.

Virtual Farm

The PLAID Virtual Farm proof of concept has been created by students at the Abertay University, Dundee, Scotland, whilst studying for a masters in Gaming Technology, in conjunction with staff at The James Hutton Institute.



Figure 3: Simulated environment showing tractor

During research for the farm demonstration Inventory it became apparent that access to demonstration can, in some cases, be limited due to problems with access. The project therefore investigated innovative methods of increasing access to on-farm demonstration,

one way is by Virtual demonstrations. The students have developed a simulated environment (Fig 3) depicting a Farm platform, which is a virtual walk through environment of a typical farm. This can be accessed both on the web or with a virtual reality (Cardboard) headsets and an Android phone. Within the virtual reality environment, it is possible to access videos of innovations filmed in both standard video and 360° video. These videos showcase farming innovations in use around the farm.



Figure 4: Simulated environment depicting hosted 360° videos spheres

The hosted videos can be accessed within the simulated environment (Fig 4) by clicking on the sphere when the indicator is centred on the video. This allows the video to be accessed and the viewer can move around within the video to get a full spherical view that is omni-directional. The video can be exited, and the viewer can continue to explore the simulated environment using head movement to find further videos.

The videos can be removed and replaced depending on the requirements of the situation. For example, when demonstrating to children the videos can display child friendly videos, but when engaging the farming community technological videos appropriate to the audience can be hosted.

The virtual farm has been disseminated to various audiences both in the UK and at events across Europe, most recently at DATAgri 2018 Cordoba Spain. The visual nature of the technology has overcome language barriers often seen to halt/hinder communication to large crowds without a native speaker present to translate.

Potential Barriers

Finance

Video camcorders with good image quality are available from 300 Euro. Another 100-300 Euros are needed for an external microphone and tripod. If you have a limited budget, you may want to buy used equipment. If your budget allows a camera with Full HD or 4K resolution is preferred but requires a more powerful computer with more storage in order to edit 4K footage which may constrain its use.

Hardware

For a smooth editing process, your computer should have at least 8 GB, better 16 GB RAM. The minimum requirements are usually indicated if you buy an editing software. It is also recommended to use external storage space.

Good sound quality is just as important as a good image, especially in interviews but built-in microphones in video cameras and smartphones often do not meet this requirement. The solution here is to use an external microphone. It is important to always control the sound via headphones. When buying a video camera, make sure that there are inputs for the microphone and headphones. Another advantage of external microphones is the use of a synthetic fur windbreaker which helps to prevent rattling noises that make sound recordings unusable even in light winds (see Annex 1 for further details).

Editing Software

There are many editing software programs available on the market. Free programs such as iMovie on Apple devices, Movie Maker for PC or comprehensive programs such as [Hitfilm](#) or [Shotcut](#), are available.

Nevertheless, we recommend to use payable programs in the price range between 50 and 100 Euro such as [Adobe Premiere Elements](#). With free programs you quickly reach your limits and the extensive free programs like [Hitfilm](#) are often too complex to use for beginners.

Licences

Suitable background music can enrich videos but music should be used sparingly. Only royalty-free music may be used. YouTube offers a large selection of royalty-free music in its audio library. Popular pieces of music appear again and again in YouTube videos and gradually wear out. For higher demands, music can be purchased from payment providers such as [audiojungle.net](#) or [premiumbeat.com](#) prices range from 20 to 50 USD per piece of music.

Language

We generally recommend to let the protagonists speak in their mother tongue. As consequence, translations are needed for transnational projects. This can be done either by a voice-over or by subtitles. For both, a transcript needs to be created of all what is said in the original language. The appropriate file extension for subtitles is VVT or SBV or

TXT. The transcript can then be translated to other languages and then be read by a speaker or be inserted as subtitles on YouTube.

The time required to transcribe a minute of video ranges between 0.5 to 1 hour depending on the complexity of the topic and of the experience of the transcribing person. For inserting subtitles on YouTube, about 10 minutes per minute of video are needed. It can be concluded, that, if translation is part of the project, videos should be as short as possible, as the time required for translation increases linearly.

Ensure language used both as a transcription and in the native language is not too complex or scientific which may not be understood by the target audience. Abbreviations should not be used unless they are well known and easily interpreted.

Time

Videos can take several hours if not days to produce, therefore creators of videos may be limited by how much time they have available to produce a video.

On average the planning of a video takes between 1-2 hours, the filming itself between 1 and several hours and editing takes the most time. As a rule of thumb, the time required to edit a 5-minute video is about 1 day. In the beginning, without practice, it takes even longer.

Skills

Lack of knowledge of experience in creating videos may deter people from creating their own, it may also affect the overall quality and time taken to produce a video. It is therefore imperative practice is given in creating videos before producing any which will be shared with the target audience. Where possible training sessions should be given by professionals to provide people with the skills and confidence needed to produce videos.

File size

When you start shooting video footage you should remember to stop shooting from time to time to ensure files do not become too large. For example, a video file of 20 minutes from a good quality camera could easily reach 9 GB size. This file size is difficult to transfer and therefore process. If the laptop/computer has limited RAM/disk space it is possible the computer will either be extremely slow or will be unable to complete the task. Larger files are also harder to edit compared to small files with less footage.

For this reason, it is appropriate to stop recording after 5 minutes for some seconds before resuming to record again. Bear in mind that if the video files are too short (smaller than 2 minutes) this will make it difficult to process them and you will need more time and effort during the editing process to piece together the video footage.

Clip size

Clip size is very important to think about. Before starting to process footage check you have enough disk space on your computer/laptop. It means at least 2 GB free space for video making. You should take in mind that you will have several video clips before to finalize the last. One processed video clip with 2 minutes duration is about 200 MGB.

RECOMMENDATIONS

Content

1. Current content that is topical and sometimes seasonal will be the most appealing to viewers.
2. On-line demonstration at different type of farms (animal breeding, plant production, mixed, conventional, organic, etc.) and different size of farms (small, big, medium) should be produced.
3. Have a short 10 second introduction. It has been shown that people's attention is gained in the first 10 seconds after which they often become disinterested if the content does not catch their attention in this initial engagement.
4. Demonstrate not only whole farm approaches but also approaches to certain areas of the farm.
5. Use a simple topic to start with, e.g. a machine demonstration. Here, the storyline is linear, i.e. one machine just follows another.
6. Ensure videos easy to understand and follow.

Approaches and tools

1. Clearly state the contents of the video at the beginning.
2. Use transitions wisely. Unwarranted transitions are off putting and viewers get distracted from the real content by bad formatting.
3. Use short sections of interviews or people speaking. Viewers engage with moving footage rather than a static view, so movement is important to engage the audience therefore, only use short sections of interviews.
4. Voice overs can help narrate a technical clip.
5. Subtitles make content more widely accessible.
6. The framing of the video, including movement and momentum, is really important for a well produced video as it can make any subject pop into life and increase the interest of audiences to the approach or technique demonstrated.
7. Use alternative formats to present the content, for example, using music or graphics on the screen, which are well paced – not too long and include the right amount of information. Ensure thumbnails are used effectively. Where appropriate humour can be used to draw in the viewer.
8. Videos should be edited and shortened as much as possible to provide the maximum amount of information in the minimum amount of time. Audio should be clear and concise.

Presenters

1. Presenters: The presenter should have the ability to explain things clearly and concisely. This saves a lot of work in the subsequent post-production and is the best prerequisite for a successful video.
2. Where possible use a range of stakeholders (researchers, advisors, farmers including young farmers and female farmers) who are asked relevant questions and add value to any written online text.

Skills and Knowledge

1. Video training, where possible, should be provided to farmers and others interested in producing videos to share their on-farm approaches or activities to a range of audiences.
2. Editing is the biggest challenge for many beginners. Therefore, start with short videos of maximum 2 minutes. For this you have to narrow down the topic as much as possible. Short videos are also much less time-consuming for translations.
3. Always show your videos to an independent viewer before publishing. The viewer can point out ambiguities and unnecessary length.
4. Materials should be uploaded regularly.

CONCLUSION

'Virtual demonstration' through the use of videos and other audio-visual tools are a great way to share knowledge and support innovation uptake across the farming sector. They help to supplement on-farm demonstration activities, remove geographical barriers associated with on-farm events as well as share innovative approaches used on other farms which may not host on-farm demo events. Videos effectively increase access to farm demonstration to all stakeholders.

These good practice guidelines for Virtual Demonstration help to enable commercial farmers to produce videos on-farm and extend the legacy of 'virtual demonstration'. When producing videos, it is important to know the target audience, what their interests are and familiarity with the topic in question, allowing videos to be tailored to suit them. Well produced videos should last around 2-5 minutes; provide good quality narration; have a range of speakers/ participants; small file size and have good picture and sound quality including the absence of any lateral noise. To ensure the videos reach their audience the dissemination of these videos is equally important. Possible dissemination routes include Social media, YouTube, project websites and networks regional national and European.

The recommendations above provide the key tips for producing videos on-farm with focus to the importance of content and narrators as well as the technical tips in regard to editing, filming and training.

February 2019

Annex to Deliverable 4.3

Video production for agriculture

A guide for farmers, advisors and researchers

WP4: Increasing access through virtual demonstration



PLAID
PEER-TO-PEER LEARNING:
ACCESSING INNOVATION
THROUGH DEMONSTRATION



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VINIDEA

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ABSTRACT

Video training for farmers and consultants was carried out during the PLAID project. The experiences of these training sessions form the basis of this guide. It provides tips on how to produce informative videos using simple means.

This guide follows the three steps of each video production: planning, shooting editing. The focus is on the specific requirements of videos for agriculture.

The guide is targeted to beginners: farmers, consultants, but also researchers in national and international projects who would like to produce simple instructional videos themselves as part of their dissemination activities.

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1. Videos in agricultural knowledge transfer

Videos play an increasingly important role in agricultural education, training and extension. With today's smartphones, a video camera is always present and filming has become very simple. Many researchers, advisors and farmers shoot video clips to capture their observations in the field. In research projects, videos are becoming more frequently used as part of project dissemination activities.

There are excellent textbooks, specialized magazines and fantastic tutorials on YouTube for the production of videos. So why this guide?

This guide has been developed within the framework of the EU project PLAID.¹ The project focused on the learning between farmers and the importance of agricultural demonstration activities in innovation uptake. Videos help to increase the reach of such events. Therefore, video training for farmers and consultants was carried out as part of the PLAID project to further enhance the use of videos in agriculture.

The experiences of these trainings form the basis of this guide. We also build on FiBL's many years of experience in the production of over 300 educational agricultural videos.² In addition, we have adopted parts of a guide that FiBL Germany developed as part of a national project for knowledge exchange.³

This guide provides tips on how to produce informative specialist videos using simple means. First of all, we show different areas of application for videos in agriculture highlighting the main 3 steps for video production which are:

1. Planning
2. Production
3. Editing

This guide follows these three steps. Our focus is on the specific requirements of videos for agriculture. Box 1 lists the most important reasons for producing agricultural videos by yourself.

The guide is targeted to beginners: farmers, consultants, but also researchers in national and international projects who would like to produce simple instructional videos themselves as part of their dissemination activities.

¹ PLAID stands for: Peer-to-Peer Learning: Accessing Innovation through Demonstration

² YouTube channel of FiBL <https://www.youtube.com/user/FiBLFilm>

³ Knoll M., Alföldi T. und Liebl B. 2018: Videos in der Wissenskommunikation – Ein Leitfaden. 27 S mit Anhang.

Box 1: Reasons to produce educational videos for agriculture

- Many agricultural activities are linked to the time of year, such as tillage or harvesting. A video captures the current moment and the content becomes accessible to a wider audience.
- Agricultural videos are popular with farmers. Many farmers even run their own YouTube channels.
- Videos are an excellent way to show the experience of practitioners.
- Demonstration activities, such as machine demonstrations, have a high priority in agricultural knowledge transfer. The reach of such events can be significantly extended with videos.
- Like most people, farmers prefer videos over written resources to inform them about a specific topic or approach.
- After Google, YouTube is the second largest search engine in the world.
- Video equipment and editing software are now inexpensive and easy to use.

2. Fields of application of videos in agriculture

Agriculture offers a wide range of topics suitable for presentation in the form of videos (Fig. 1) which can be shared through videos including:

1. **Machine demonstrations. These** are among the most popular demonstration activities and achieve the highest number of views on YouTube.
2. **Training Videos** which are shot on site, i.e. in the field, in the stable or at a machine.
3. **Tutorials** on more complex topics are preferably realized in a simple studio in front of a so-called green screen (primarily filmed indoors vs training videos which are out door based).
4. **Practical innovations** and individual solutions from farmers.
5. **Event Videos** to convey selected conference contributions or impressions of conferences.
6. **Results of research** communicated to various stakeholders. These are in less detail and often supplement written articles or papers.
7. **Teaser videos** can be used, for example, to announce a new handbook or events.
8. Short video clips on agricultural advisory websites are a valuable addition to **online texts**.

Other popular formats in agriculture are **video blogs** (vlogs) in which farmers document and comment on their work on the farm. **Advertising films**, for example for a farm shop or **image films** for organizations, are other formats. We recommend hiring professional videographers to produce PR and commercial films.

Box 2: Tips for choosing a topic (for beginners)

- Start with a simple, clearly defined topic.
- Ask yourself: Is film really the appropriate medium for this topic?
- With every film idea, first consider whether the theme provides enough visual material.
- It should not be necessary to convey too much information at text level that cannot be illustrated. Avoid Talking Heads!
- Find the story behind a topic. Telling stories and evoking emotions are the strengths of videos.
- Know your own limits: Leave complex topics, concepts, PR and advertising films to the professionals.



Figure 1: Fields of application of videos in agriculture

3. Equipment

3.1 Camera

You can choose between smartphones, camcorders or photo cameras with video function (Fig. 2). Smartphones today usually have an excellent camera built in. In bright sunlight, however, image control on the display is difficult. The most important thing when filming with smartphones is to always film in landscape!

Camcorders are fully designed for filming. They are easy to handle and require little practice. They offer an adjustable display, a big advantage in bright sunlight. Camcorders with viewfinders and eyecups offer even better image control. The zoom lens is another advantage over smartphones.

Cameras (reflex and compact cameras) with video function also offer excellent image quality. Handling, especially focusing, requires more practice than with camcorders. Important for all camera types: There must be connections for an external microphone and a tripod.



Figure 2: Smartphone, video camera or photo camera: the image quality is good for all of them. The choice of the right device is determined by the application, budget and personal preference.

Box 3: Tips for choosing the right video camera

- Gain first experience with existing equipment.
- Rent cameras and see what suits your needs best.
- Video camcorders with good image quality are available from 300 Euro.
- Make sure you have inputs for an external microphone and headphones.
- It depends on your budget whether you buy a camera with Full HD or 4K resolution. Editing video in 4K requires a more powerful computer and more storage space.
- If you have a limited budget and high demands, you may want to buy used equipment.

3.2 Additional types of cameras

Here we present three types of cameras that are particularly suitable for the production of agricultural videos (Fig. 3). However, they are not part of the basic equipment for beginners.

Actioncams deliver spectacular images when mounted on a tractor or machine in the dustproof and shock-resistant protective housing supplied. The picture quality is usually very good, but the sound quality is poor.

Drones with good cameras and good flight characteristics are available from 900 Euro. The Mavic Air by DJI, for example, is light, small and easy to operate via smartphone. Aerial photos of fields, machines, herds of animals or farm buildings enhance every video. Sound recordings are not possible. However, drone recordings should only be used where it makes sense and ensure you use them within flying laws/ regulations.

Tip: Engage a hobby drone pilot from your friends instead of buying your own drone. Children and adolescents often have more talent with the joystick than adults.

Box 4: Country-specific regulations for the use of drones in Europe

- The legal basis for drones is country-specific and varies in its restrictiveness.
- This blog gives a good overview of the regulations in different European countries <http://dronerules.eu/en/recreational/regulations>.
- It is essential to consult the official information office of the country in question prior to use.

360° cameras offer the viewer a comprehensive spatial experience, which is controlled by the viewer himself on the display or by means of VR glasses. There is significant potential in the area of virtual training courses and virtual tours. However, producing virtual reality videos requires both experience and good planning.



Fig. 3: Popular in agriculture: Actioncams, drones and 360° cameras.

3.3 Microphone

A good sound is just as important as a good image. Especially in interviews, the built-in microphones of video cameras and smartphones do not meet this requirement. As the distance between camera and sound source increases, the sound quality decreases rapidly. Moreover, ambient noise or wind often spoil such sound recordings. The solution here is to use an external microphone.

Microphones with cable connections and wireless microphones are available in various price classes (Fig. 4). We also distinguish between lavalier (Lapel) microphones and handheld microphones. Wireless lavalier microphones are well suited for agricultural contexts. The filmed person can move freely and use their hands to show and demonstrate things. The RodeLink wireless microphone offers a very good price-performance ratio and costs around 300 Euros.

It is important to always control the sound via headphones. It can happen that there is noise, that the battery is empty or that you forgot to switch on a wireless microphone. When buying a video camera, make sure that there are inputs for the microphone and headphones (Fig. 4, right).

Another advantage of external microphones is the use of a synthetic fur windbreaker which helps to prevent rattling noises that make sound recordings unusable even in light winds. In addition to a lavalier microphone, we also recommend a handheld microphone. This is needed when interviews have to be conducted in situations with a lot of ambient noise.



Figure 4: Simple microphones with cables for smartphones are already available from 20 euros. The RodeLink radio link offers a good price-performance ratio. When buying a video camera, make sure that there are connections for microphone (red jack) and headphones (green jack). Unfortunately, these connections are only available for a few models in the consumer segment.

3.4 Tripod

Shaky videos look unprofessional and exhaust the viewer. Therefore, a tripod should always be used. There are a variety of options which can be used (Fig. 5) including:

- Simple rigs for smartphones are available from 20 Euro.
- Gimbals which produces especially soft and dynamic movements ("steady cam")
- A shoulder tripod or a monopod are recommended for many changes of location when there is no time to set up.

The tripod is the ideal solution for many applications. Thanks to a special video head and with a bit of practice they allow for smooth pans.



Figure 5: Shaky shots expose the beginner. A tripod belongs thus to the basic equipment.

4. Planning a video

As mentioned earlier, every video production consists of three steps: planning, shooting and editing. Of course, you can also shoot a video without planning. However, good planning avoids stress and increases the quality of your video. Depending on the topic and experience, you will have to allow 2-4 hours for the planning phase. More complex topics will take more time to plan.

4.1 Select a topic

The first question is: Is my idea suitable for a film at all and can the content be visualized well? Next, you have to narrow down the topic and what action-oriented elements are there for you to include in your video?

The main theme "Biodiversity in agriculture" is transformed, for example, into "Creating areas to promote biodiversity on an arable farm" or even more specifically "Planting hedges" or "Maintaining hedges". As a general rule, only one topic should be dealt with per video.

4.2 Structuring the topic

During the planning phase, the most important points you want to get across to the audience should be written down. First as keywords and afterwards as formulated sentences. This gives a first indication of the duration of the video. As a rule of thumb: 100 words make 1 minute of film.

The formulated content must then be structured. Like any story, a film needs a beginning (intro), a main part and an ending (outro) (Fig. 6). The intro introduces the theme and its relevance. During the first 30 seconds, the viewer must understand why it is worth watching this video. In addition to the topic, the main speaker and, if necessary, the location should also be introduced.

In the following main part solutions are presented or recommendations for action are shown. It is often useful to divide the main part into short chapters.

At the end, a short conclusion should be drawn or, for example, reference should be made to further sources of information (call for action). This basic structure is recommended for all video formats.

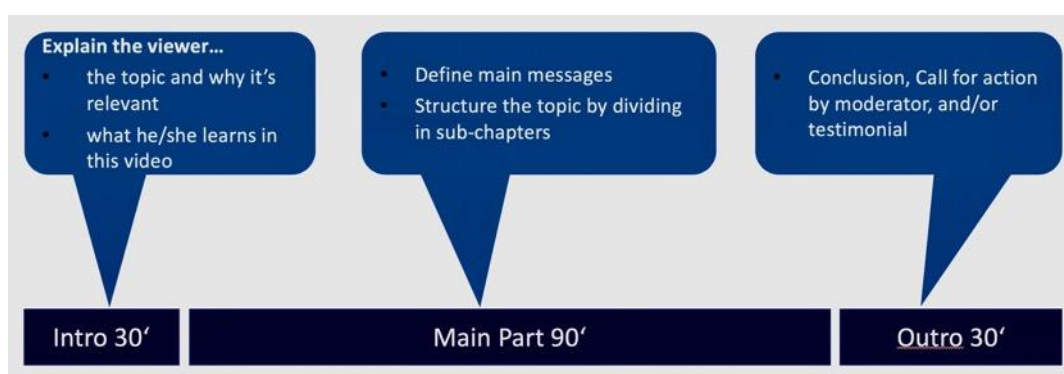


Figure 6: Basic structure of a short video of 2-3 minutes. Whether a further subdivision is needed in the main part depends on the complexity of the topic.

4.3 Speaker, presenter or text inserts

Once the content has been determined, it must be decided whether it should be told by one or several people. In the case of agricultural videos, for example, farmers, researchers or advisors can be considered. As experts, they can convey the content in an authentic and credible way.

An alternative is to have the main points written and then read by a speaker as voice-over. Both methods have advantages and disadvantages (Fig. 7).

Off-camera speakers and original voices of experts are often combined. In short videos, pictures can also be supplemented with short text insertions or subtitles. Especially on social media, videos are often viewed without sound so subtitles are very advantageous in these videos.

	Advantages	Disadvantages
 <div style="background-color: #FFC107; padding: 2px; text-align: center;">Presenter</div>	<ul style="list-style-type: none"> • efficient • authentic 	<ul style="list-style-type: none"> • suitable person • good planning • no corrections afterwards • editing time consuming
 <div style="background-color: #FFC107; padding: 2px; text-align: center;">Off-speaker</div>	<ul style="list-style-type: none"> • writing afterwards • precise formulations 	<ul style="list-style-type: none"> • suitable voice • writing needs more time
Combination: Moderator and off-speaker		

Figure 7: Advantages and disadvantages of presenter and off-speaker.

4.4 Planning A-Roll and B-Roll

Whether you let the content be narrated by an interviewed person or whether a speaker is off video: It is important to plan the video both at a narrator and image level. The narrator's level is also known as the A-Roll. The image level is referred to as B-roll or footage (Fig. 8).

Once you know what the narrator will say, it is necessary to plan the appropriate images to complement the narrator level. This is important so that all the images required can be filmed on the same shooting day. If there are gaps in the planning, existing image material - photos or clips - must be used. It is important to list all the pictures you need so that you don't forget anything during the shooting. A template for an outline is shown in Fig. 9.

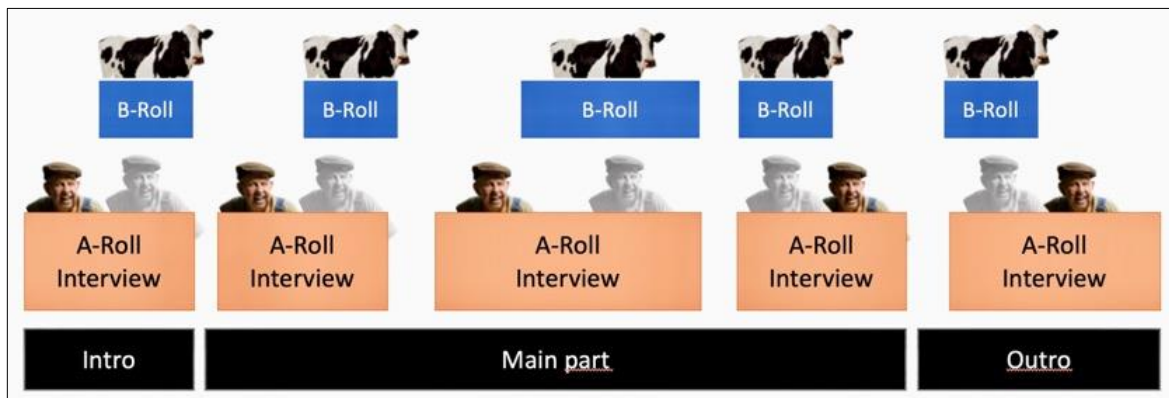


Figure 8: The backbone of a video is the A-Roll, i.e. the essential statements of an interviewee. With the B-Roll, what has been said is illustrated.



Outline for Video (title):

Format: _presenter _narrator (voice-over) _only titles _other

Content 100 words=1 Minute	Picture level
<p>Intro Explain the problem, say what will be shown in the Video</p> <p>Keywords:</p> <ul style="list-style-type: none"> - - - - - - - <p>Estimated time:</p>	<p>e.g. presenting farmer, crop</p>
<p>Main part: Explain your innovation step by step</p> <p>Keywords:</p> <ul style="list-style-type: none"> - - - - - - - - - - <p>Estimated time:</p>	<p>e.g. machines in action, details, photos</p>
<p>Outro: recommendations, call for action, statements of farmers etc.</p> <p>Keywords:</p> <ul style="list-style-type: none"> - - - - - - - <p>Estimated time:</p>	

Fig. 9: Template for an outline to plan a video.

5. Video shooting

5.1 Shooting of A- and B-Roll

During the video shooting itself it is also helpful to think in both levels A- and B-roll respectively. Which part you shoot first depends on the situation. For a machine demonstration, for example, one usually films the machines "in action" first, i.e. footage images or the B-roll. This includes details and long shots, hands examining the worked soil, people around the machines, etc.

It is usually not recommended to film the live commentary that the organizer makes for the visitors on the field as an A-Roll. This is because the sound quality is often too bad and the explanations are usually too long. Therefore, if possible, the explanatory commentary should be recorded in a separate step as an interview with a competent person (if possible, clarify it during preparation).

Ideally, the commentator should be able to explain the individual machines directly in front of the machines. The expert describes the working methods, advantages and disadvantages of the machines just presented. The person must speak in the present tense and formulate the sentences as if they were commenting on the subject live. This then sounds like: "Here we see machine XY...", "As you can see, it works somewhat less deeply than machine XY...".

This will ensure comments fit exactly behind the pictures of the machines. That's why the commentary is usually recorded only after the demonstration: the commentator must first have seen the machine in operation under the current conditions.

In other situations, e.g. when a farmer explains a routine process, the explanatory comment ("A-roll") can be recorded first and the illustrative pictures ("B-roll") can then be filmed. If the commentator can show actions, speaking and acting are often ideal. In order to be able to edit such recordings well afterwards, the commentary should be recorded as a whole without action. Afterwards, the details of the action are filmed.

5.2 A-Roll: 10 tips for conducting interviews

An explanatory commentary is often recorded in the form of an interview. Here are some tips for conducting interviews.

1. **Relaxed atmosphere:** Always ensure a relaxed atmosphere between you and the person you are interviewing.
2. **Sitting or standing:** Normally the person to be interviewed should stand; sitting only during long interviews as well as for people who move strongly.
3. **Image composition:** In the interview, the eye line must lie on the upper third line (rule of thirds). If the eye line is lower, the person appears unnaturally small (Fig. 10). You are responsible for ensuring that the person to be interviewed looks professional (hairstyle, clothing, etc.).
4. **Direction of sight:** The interviewee should not look directly into the camera, but slightly laterally past it, into the eyes of the interviewer. Only if the interviewee has a moderation role should he or she look directly into the camera.
5. **Fully automatic:** If the interview is conducted by only one person (simultaneous camera and interview conducting), the camera must be mounted on a tripod and operated in fully automatic mode. That is the only way you can fully concentrate on the person to be interviewed and the content of what is said.

6. **Do not turn off the camera:** We recommend that you let the camera run through the entire interview. Turning the camera on and off will distract you and can increase nervousness every time. In addition, there is a risk of forgetting to switch it on.
7. **Silent nodding:** During the shooting, the focus must be on the interviewee and the content. Communicate by eye contact and non-verbally, for example by nodding your head. The interviewer must not make any intermediate remarks such as "Yes," while the person to be interviewed is speaking. They cannot be removed.
8. **Crisp statements:** Very few people can describe something concisely and precisely. Therefore, it is recommended to plan at least two rounds. The first serves to get an overview of the topic and to reduce nervousness. The second round focuses on the relevant aspects and formulates them as concisely as possible.
9. **Integrate the question into the answer:** In order to save time, the question is often cut out at post-production. In order for the viewer to understand the context, the interviewee must integrate the keyword of the question into their answer.
10. **Follow-up without insisting:** If questions are not answered in an optimal way, it is necessary to follow up. Individual shots should be repeated until the result meets expectations. Sometimes, however, it is helpful to skip a question and pick it up again at the end.



Fig. 10: In the interview, the eye line must lie in the golden section, i.e. on the upper third line. If the eye line is lower, the person appears unnaturally small.

5.3 B-Roll: Ensure varied image settings

The motifs for the B-roll should have been roughly defined in the outline beforehand. There are a variety of settings which can be used as B-roll (Fig. 11). The individual clips should last at least 30 seconds without zoom and pans, so that they can be used afterwards in the editing without problems.

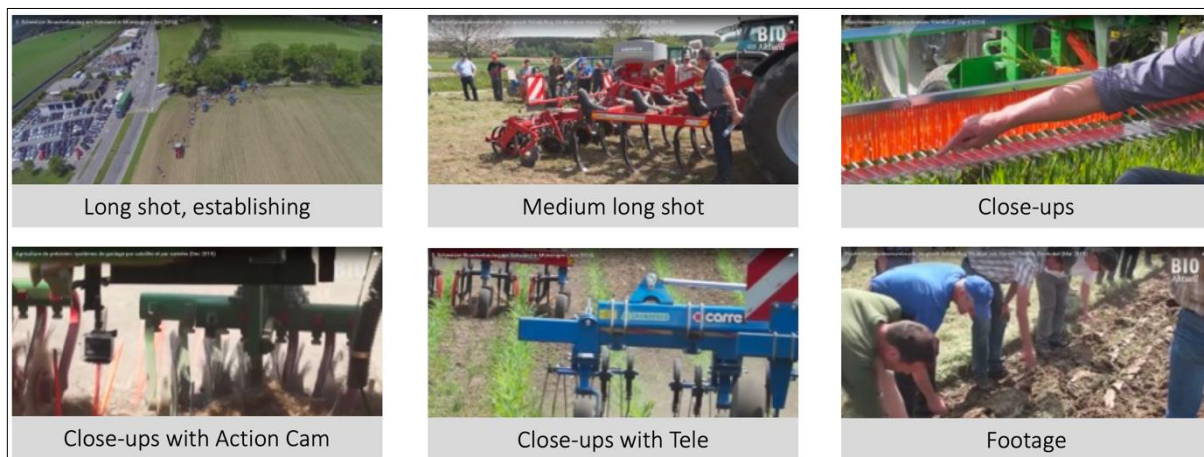


Fig. 11: Varied camera settings of B-Roll motives are the basis for an interesting editing.

B-Roll clips can include:

1. **Long shots as opening a scene:** At the beginning the viewer should get an overview of the place of the event (establishing shot). A long shot either from the ground or drone shot is suitable for this purpose.
2. **Medium long shot:** This setting is ideal for machine shots but can become boring if used frequently or for too long.
3. **Details, close-ups:** Long and medium shots should be supplemented with close-ups. These can be produced in different ways: By getting close with the camera or zooming in on details with the Tele lens. An action cam mounted on machines also provides exciting perspectives which live viewers do not have.
4. **Additional image material:** Additional material such as farmers in conversation, hands in the ground, plants, landscape shots are very helpful for editing and improve the quality of the video.

6. Post-production

Post-production primarily means editing. In addition, dissemination via YouTube is also discussed.

6.1 Editing software

There are many editing software programs available on the market. Free programs such as iMovie on Apple devices, Movie Maker for PC or comprehensive programs such as [Hitfilm](#) or [Shotcut](#), are available.

Nevertheless, we recommend to use payable programs in the price range between 50 and 100 Euro such as [Adobe Premiere Elements](#). With free programs you quickly reach your limits and the extensive free programs like [Hitfilm](#) are often too complex to use for beginners.

6.2 Editing

A and B-roll are joined together during editing and the story is created (Fig. 12). Efficient editing requires practice and some discipline. Beginners often lose themselves in the fine cut before the rough cut is done. You should always work from rough to fine and observe the following steps:

1. **Rough cut A-Roll:** Normally you start with editing the A-Roll, i.e. the commentary track. All clips are listened to and the best versions are selected. The commentary is structured according to the plans and shortened to the essentials. When shortening, it is advisable to make several runs and always ask the following questions: Is this sentence relevant for the understanding of the topic? Does the sentence drive the story forward? This step takes between 1 and 4 hours, depending on the amount of material filmed.
2. **Fine cut A-Roll:** Once the "scaffold" of the A-Roll is in place you can cut out the misspells and "äähms".
3. **Insert B-Roll:** In this step, you select the image material from the B-Roll and place it over the appropriate position of the A-Roll. The cuts of the A-Roll will be covered by these clips and thus made invisible. In addition, what has been said is clarified and emphasized with appropriate images.
4. **Provide rhythm:** This step is about providing the film with a rhythm. This means, for example, determining the duration of the A-roll sequences, deciding when B-roll images appear, adjusting B-roll cuts to the rhythm of the voice. Now music, intermediate titles and pauses should also be inserted so that the viewer has time to catch their breath. The film should flow and have no unnatural breaks.
5. **Vision:** The (almost) finished version should then be shown to an outside person. This will indicate if it is easy to follow and understand, the length is right and any parts which need to be amended. After these last corrections have been made, the video can be published on YouTube.



Fig. 12: Arrangement of A- and B-roll in the editing program. Images of the B-roll are used to cover cuts in the A-roll and to visually support what has been commented on in A-roll.

6.3 Ideal length of online-videos

There is no general rule about how long an online video should be but generally, a duration of 2-3 minutes is recommended. In contrast to professional films, the image quality and the presence of the film protagonists is often not as high a quality rather its strength lies in the technical content. In order to avoid unnecessary lengths, the finished videos should be shown to third parties who can point out any unnecessary sections of the video prior to publication.

6.4 Music

Suitable background music can enrich videos but music should be used sparingly. Only royalty-free music may be used. YouTube offers a large selection of royalty-free music in its audio library. Popular pieces of music appear again and again in YouTube videos and gradually wear out. For higher demands, music can be purchased from payment providers such as audiojungle.net or premiumbeat.com prices range from 20 to 50 USD per piece of music.

6.5 Dissemination on YouTube

For agricultural videos, distribution via YouTube is recommended because it is the most popular platform in agricultural circles. In order to upload videos, you must have your own channel or open a new one. Every day, thousands of new channels are opened and millions of new videos uploaded. Therefore, some efforts are needed to make the uploaded videos known and to ensure optimal distribution.

The following measures help to make a YouTube video easier to find.

1. **Title:** This should be meaningful and contain the most important keywords.
2. **Description:** Briefly describe the content of the video; here you can provide further links.
3. **Tags:** Specify keywords, also translate the most important ones.
4. **Thumbnail:** Do not use the thumbnails suggested by YouTube, but upload your own meaningful screenshot from the video.

Particularly with newly launched YouTube channels, it is difficult to generate many views at the beginning due to the small number of subscribers. In the beginning, a YouTube channel serves more as an online video archive. From here the videos should be embedded into existing websites and made known through social media networks. Depending on the topic, the quality of the videos produced, and the existing networks, it can take months, if not years, for a new YouTube channel to be accepted by the audience.

Acknowledgements

We thank all farmers, advisors and other experts for sharing their knowledge in the PLAID videos.



Annex 2

Informed consent Form

Photograph, Video or Audio Recording Consent Form PLAID

I, _____ (person's full name), do hereby consent to the use of my image or voice, or both, by members of the PLAID consortium project. The image may have been captured by either video recording or still photography.

- I agree that all such pictures, video or audio recordings and any reproduction thereof shall remain the property of the author and that the PLAID project may use the image as it sees fit.
- I understand that these images may appear publicly as part of PLAID's website and/or other marketing materials related to the project.
- It is understood that this material will be used in a legitimate manner and is not intended to cause any harm or undue embarrassment to the parties involved.

Signature: _____

Date: ____ / ____ / _____

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www.plaid-h2020.eu/

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