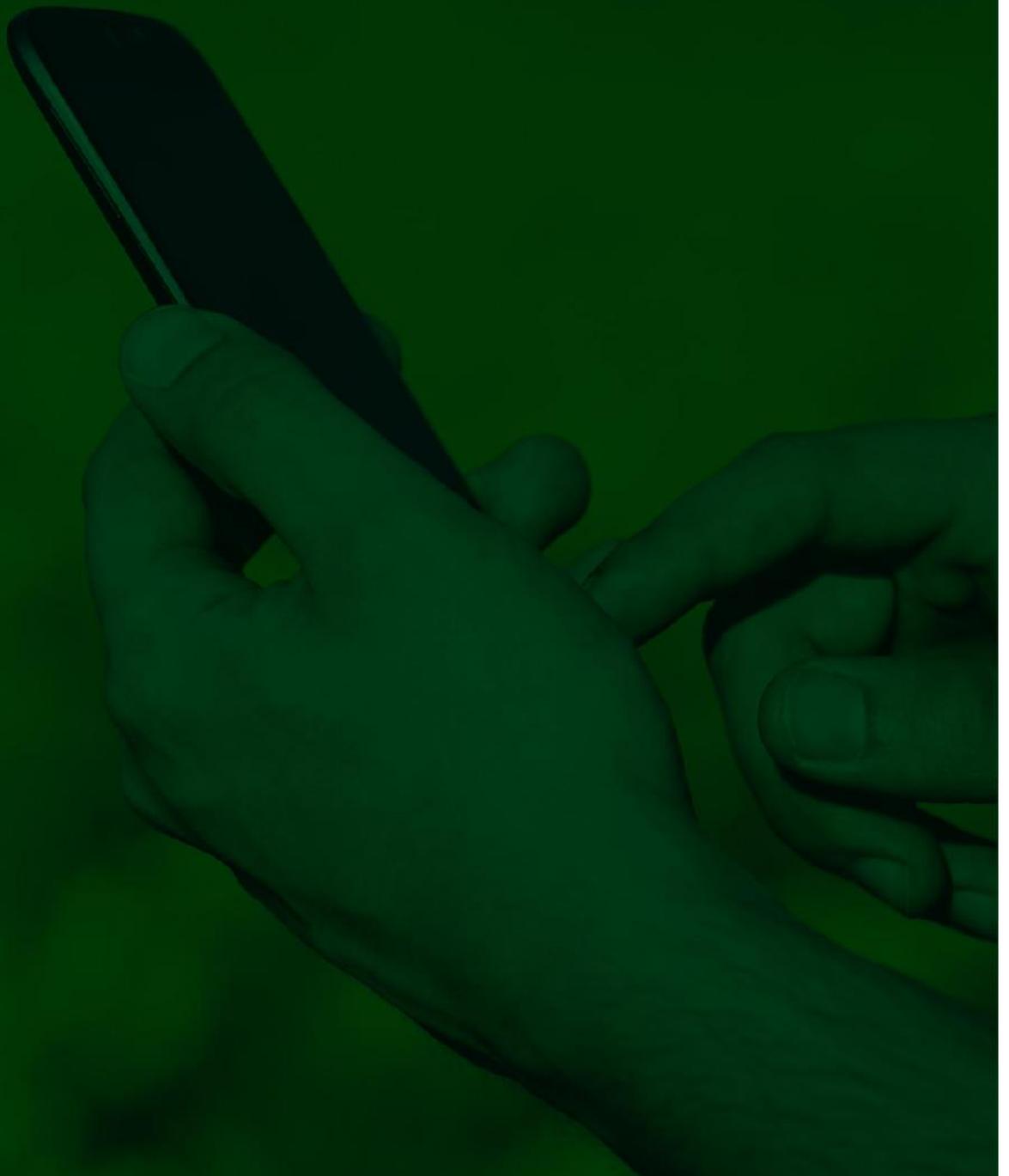




FAIRshare

DIGITAL TOOLS FOR FARM ADVISORS



D5.1

Vision at macro level towards enhanced DA

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1. Introduction

The aim of Task 5.1 is to create a dynamic visioning and innovation exercise at macro level to enhance the adoption and use of digital advisory tools and services (DATS) in different farm advisory services.

The outcomes of the created visioning process are an important basis for the advisory community and for future policymaking at EU, but also at a national and regional level. In order to guarantee and ensure this, country-specific input and specifications are needed. In addition, the vision as a framework for the 30 planned user cases (UCs) is an important component of Tasks 5.3 and 5.4 (Grant Agreement, 2018).

A visioning process (or the vision itself) is a powerful tool to involve many partners and colleagues in the future path and process of digitalisation of the agricultural sector. It serves to motivate and energize people, gain commitment, and provide direction (FAO, n.d.).

The elaboration and definition of a vision is often a process rather than a precise definition or idea. The vision represents a step towards a future position, which is not fixed yet but can take one or two detours if this seems helpful. In other words, no specific actions are planned in the description, rather the opposite: there are no limits to the way it can be realised and implemented. The important thing is to keep the focus on the overall aim, which represents the imaginary idea of the vision in the future. The main focus should be on WHAT (e.g., how do you imagine digital guidance in your home country in 10 years) and WHY (e.g. what kind of advantages or developments do you expect with this kind of changing behaviour, tools, etc.).

The overall aim is to get a "common vision" and not a vision per company or country. Therefore, the elaborated vision offers a common goal, hope and recommendations to achieve it (FAO, n.d.). This common goal provides an opportunity for each partner to actively participate and accordingly increases the motivation by initiating creative and focused work in their range of possibilities!

Table 1: Vision statement versus vision story.

Vision statement	Vision story
<p>Be the global leader in convenient foods and beverages by winning with purpose. This reflects our ambition to win sustainably in the marketplace and accelerate our top line growth, whilst keeping our commitment to do good for the planet and our communities.</p>	<p>Farmers are recognized as innovators and have the support they need to continually do better. Farm animals explore and find pleasure daily, live in a stimulating environment, and are bred to thrive outdoors. Healthy living soils with more organic matter and worms, helping tackle climate change and producing better food.</p>
<p>Source: (Pepsico, n.d.)</p>	<p>Source: (Soil Association, 2017)</p>

Furthermore, it is a goal to describe such a vision in detail, but also in a comprehensible and clear way. A so-called vision story is much better suited for this rather than a simple statement of the vision. The story involves the reader directly in the topic and gives him the feeling that he is part of it (Table 1). This is immensely important because the only way to achieve the overall aim is to ensure that everyone related to the topic is involved. The more ideas, suggestions, and actions arise from this, the more positive,

interesting, detailed, and promising the implementation and further development of the vision will be.

To implement a common vision among the people involved in the FAIRshare project, we organised a visioning workshop with all the partners on 18 November 2020 in the frame of the annual meeting of the FAIRshare consortium. More than 40 participants provided a representative set across Europe. During preparation for the workshop, we have used the results from the project known so far and supporting documents from the SCAR AKIS group.

An advantage of the collaborative approach to develop the vision in the plenary during the annual meeting was the development of a common impression that everyone is facing a big challenge of the digitalisation of advisory services.

2. Current status of Digital Advisory and DATS in use

The digital guidance structures in the EU member states are currently differentiated. However, the FAIRshare inventory, which comprises more than 200 DATS (status on 11 January 2021), shows that a wide range of tools already exists. In a Europe-wide survey among farmers and advisors set up and analysed by LKO Austria in a previous task of FAIRshare (WP 3 – D3.2), it became clear that most of them appreciate the positive effects of digital offers. However, one major obstacle in this context is that the concrete benefit of a DAT is often not clearly defined and thus tends to lead to confusion instead of practical benefits in daily work (Miron, 2020) (Annual Meeting, 2019) (SCAR AKIS, 2019a). Currently, a so-called good practice is being collected and analysed in WP 2 in order to prevent the issue of insufficient comprehensibility as far as possible. The benefits for individual companies should be directly visible to users.

It is clear that digitalisation can make agricultural extension services more flexible. This process was very much accelerated in 2020 with the start of the Covid-19 crisis and in certain areas, it probably had an impact too quickly. One could observe that, for example, the personal on-farm visits were restricted, so travel costs were saved, which also meant fewer cost for the advisory services. Furthermore, time was saved, which could be used additionally for the preparation and follow-up of advisory meetings and for adapting to digital formats. However, the reduction of personal contact between advisor and farmer also holds risks. Farmers and advisors have a strong trust-based relationship, with farmers relying heavily on advisors in their decision-making process. That means the social components in advisory services should not be underestimated and are extremely important in building a long-term relationship between advisor and farmer (Miron, 2020).

A survey by the Bavarian State Institute for Agriculture showed that farmers rate their own knowledge of new digital technologies as high. Furthermore, the use of apps and online seminars are already very widespread on farms, which naturally requires a certain proportion of digitised advisory services and thus offers excellent starting conditions, at least in Bavaria (Gabriel & Gandorfer, 2020). But it can be assumed that countries with a similar level of digital use and knowledge in the agricultural sector can draw on similar conditions as Bavaria in particular or Germany in general can. This technical affinity may apply to many farmers, but for those who find it more difficult, reliable access has to be secured as well. For this, the conditions are very

heterogeneous throughout Europe, which means a "wide range of digital farmer profiles". Parallel to the use and dissemination of DATS, proper support and training for understanding and correctly using DATS must be provided continuously.

A major and important point of discussion regarding using the different DATS is the corresponding data security, sovereignty, quality, and quantity. A lot of studies and workshops proved the importance of these aspects but also farmers concerns regarding these issues. It should be emphasised that both the storage of the generated data on the farmers' home storage media and on databases of agricultural self-help organisations or also public administrations are regarded as safe by the farmers participated in the survey (Gabriel & Gandorfer, 2020) (EIP-AGRI, 2018).

The farmers are used to receive personalised advice and decision support tailored to their farm needs through their personal consultations over the past years. This aspect has already been partially taken into account by the existing DATS and must be also considered in the future development and evaluation of DATS. In this context, it is also important to emphasise that DATS are not intended to and cannot replace advisors. Instead, DATS are considered as an additional aid to support advisory services in their daily work (Miron, 2020).

The supply and dissemination of useful DATS mostly take place through recommendations and suggestions from professional colleagues. For farmers, the advisor is also an important source of similar information (Miron, 2020). However, to support the promotion of exchange and the identification of helpful tools, a pan-European data platform is needed. A start for this is the FAIRshare inventory of DATS (<https://fairshare-pnf.eu/tools>), which was created within the FAIRshare project. This platform has to be updated and maintained continuously.

Using different and farm-adapted DATS helps advisors and farmers to make the farmer's work more targeted, efficient, and economical. There are already numerous examples of this in the FAIRshare inventory. But there are also other advantages of using DATS that may not be obvious immediately. For example, calculating working time is often a big problem for farmers, which is often reflected in insufficient time for private activities.

Furthermore, in the face of the climate crisis, there is huge potential for the use of various DATS to make systems more climate-friendly, sustainable, and ecological. It seems clear that digital tools can contribute to this which is shown by first examples. These kinds of demands will be increasingly made by society and also policymakers in the future, which will accelerate the urgency of developing such systems (EIP-AGRI, 2018). This also serves as an example on how digitalisation can significantly contribute to achieving the aims of the EU Green Deal and developed in the Farm to Fork and Biodiversity strategies.

All these aspects confirm the increasing digital affinity of advisors and farmers. However, in order to continue to support this trend, the barriers still existing must be identified consistently and appropriate solutions have to be found.

2.1. Barriers for enhanced use of DATS

As mentioned before, advisors and farmers are still facing many barriers for better uptake of digital tools in their daily work. The FAIRshare Deliverable 3.1 pointed and summarized already the main barriers of using Digital Tools (Sarzeaud, 2020). Furthermore, despite the small number of participants, the results of the focus groups also highlighted similar barriers as different sources before (Lambrecht, 2021).

The main barriers are:

- Lack of digital infrastructure, such as network coverage, connectivity, or interoperability
- Different digital approaches of users
- Lack of appropriate training in the use of DATS & ongoing support
- Sustainability of digital infrastructure (e.g. energy consumption will rise)
- Costs of DATS are still too high, or rather the cost-benefit ratio
- Data security
- Distrust in technologies
- Lack of user-friendly interface/ unsure about added value

In order to be able to use DATS in practice, the basic requirements have to be set up first. It is important to note that the **digital infrastructure** in Europe still lags far behind the requirements. Insufficient network coverage, connectivity, and general technical requirements are just some of the burning issues (EIP-AGRI, 2018) (Miron, 2020) (Gabriel & Gandorfer, 2020). Furthermore, due to the different conditions, there are **different approaches** of farmers and advisors using DATS in the individual EU countries. This results in a wide range of digital user profiles, who naturally have different demands and user behaviours (EIP-AGRI, 2018).

To be able to influence this different user behaviour and to bring it as far as possible to the same level, both advisors and farmers need to be trained in the use of DATS and familiarized with the available DATS offer across Europe. Comprehensive and detailed **training, education**, and day-to-day **support** will be needed to tackle these issues (Annual Meeting, 2019) (Juhola, et al., 2020).

It has to be also considered that increased use of DATS and associated communications can represent further **energy consumption** that must be produced elsewhere. In fact, the use of specific farming tools can save fertilizer, which does not have to be produced in an energy-intensive way, but the use of DATS produces huge amounts of data, and technical equipment and connections must be available for the process. Of course, the energy needed for that should be preferably produced from sustainably generated energy sources according to the EU's Green Deal. All EU member states urgently need to catch up here. Furthermore, the introduction of 5G networks is currently being debated.

According to Huawei, upgrading data centres, more transmission masts and increased consumer behaviour could lead to a doubling of energy costs (Huawei, 2019).

This places, even more, focus on the pressing issue of sustainable energy and the support of digital technology.

Another big barrier is the **lack of compatibility** of different data sets and formats between different storage. This may be due to the many different types of DATS and digital data sets, but also to the insufficient willingness of individual manufacturers and

companies to agree on fixed procedures or standards (EIP-AGRI, 2018) (Annual Meeting, 2019). The compatibility of the data sets has to be urgently improved so that they can be used variably. This can promote greater use of DATS and thus generate added value for advisors and farmers.

Compatibility is not the only requirement for greater and efficient use of DATS. A major obstacle, especially for farmers, are the currently still very high costs. This applies to both acquisition and maintenance costs. Appropriate training and dissemination actions can support the use of DATS, trying to pronounce the advantages, but currently, there are no far-reaching actions visible. The costs for digital tools that could be used on farms and by advisors have to be reduced in order to generate a higher use and consequently a higher output from this tools and to make them more cost-efficient (Annual Meeting, 2019) (Gabriel & Gandorfer, 2020) (Miron, 2020).

The last but possibly the biggest and most diverse barrier is **data security and ownership**. With the Europe-wide use of several DATS, huge amounts of data are created, which of course need to be safely protected from third parties. Especially in the digital sector, however, the ownership and privacy of data are often not ensured, which is a major aspect of the critical consideration of using DATS, especially for farmers (EIP-AGRI, 2018). This barrier has to be removed, building on the EU code of conduct on agricultural data sharing by contractual arrangement. The advisor could play a key role here. Participants at the FAIRshare annual meeting 2019 in Athens mentioned that the "advisor is viewed as having a gatekeeper role" (Annual Meeting, 2019). But of course, one advisor cannot do this for all of the farmers he/she works with.

Overall data security is one of the main topics that everybody must be aware of. The development of DATS being used in practice, on farms and advisory institutions depends among other things on how trustworthy the industry and the EU adjust the basic requirements concerning data protection.

2.2. Factors to improve the use of DATS

Increased use of DATS can be considered carefully from several points of view. Various barriers and disadvantages have already been briefly addressed in the previous chapter.

Both advisors and farmers appreciate the benefits that digital solutions offer them. At the 2019 FAIRshare annual meeting, the project partners identified the following key benefits of DATS (Annual Meeting, 2019) (SCAR AKIS, 2019):

- Easy and improved communication – quick information
- Efficiency
- Knowledge exchange
- Added value
- Competitiveness
- Easier decision making

Additional advantages of working with DATS would be (Davis, et al., 2018):

- Improve livelihoods and develop skills by directly contributing to the use of innovations
- Develop human resource capacity

- Increase sustainability (particularly important because of the EU's new Green Deal)
- Engage farmers with successful local approaches to establish productive relationships with other farmers

The often-quoted thought (in several documents and meetings) that the age of the user is a significant factor in the intensity of use has to be overcome as well, although this seems to be more of an assumption than a fact. In the future, special attention needs to be paid to the motivation and education of potentially critical users, like older people or people with large retentions against Digital Advisory (DA). Otherwise, more work must be done on this. In the accumulation of all the advantages, it becomes clear that there are enough of them to put DA forward, but they are often inadequately implemented and explained in practice. This needs to be addressed.

In order to further prepare potential users for the use of DATS, training and education is essential. But also those who already use DATS have to be further trained and supported. This addresses not only the application itself, but also the communication, methodology, and content. In particular, ongoing support for certain applications is essential to make their added value as great as possible (SCAR AKIS, 2019a) (EIP-AGRI, 2018) (Miron, 2020).

The focus groups held late in November and December 2020 mainly confirmed the existing arguments and thus reinforced them. In concrete terms, the following points were recommended for action (Lambrecht, 2021):

- Organisation of networks to support peer to peer learning, trainings, on-farm-demos
- Develop DATS that are able to work offline, at least for a certain period of time
- List of interesting tools, to get an overview/platform
- Direct online translation to face the barriers of language
- Development and support of interoperability
- Data security

Due to the Covid-19 crisis, the use of DATS has increased widely and this development will not go back to its previous level. In the future, more and more hybrid solutions will be demanded and used. This means that the currently impossible face-to-face meetings will take place again, which is indispensable and important for building a relationship between advisor and farmer. However, the crisis has also shown that many questions and requirements can also be solved digitally via appropriate tools so that a personal visit is not always necessary. This will save travel costs and working time, which is an advantage for the advisors on the one hand (as they gain time and save money), but of course, also has positive environmental aspects.

A fundamental framework is missing to further increase the intensity for advanced use of DATS or to make it steadier and more consistent. This is the pioneering step for future development. Certain data protection standards such as protection of personal data, ownership of the data, storage, etc. are just as necessary as the possibility of further business development and opportunities to implement new ideas, techniques, and advances.

3. Vision towards enhanced use of digital tools and services (DATS)

A visioning workshop is a good method to develop a common vision. It is a creative process that encourages participants to think abstractly and disconnected from the current state of affairs. To be useful, the developed vision must be specific, ambitious, realistic, and involve representatives of regional and national knowledge and innovations systems, which was given by all partners of the FAIRshare consortium (FAO, n.d.). Unfortunately, no representative of SCAR AKIS was able to attend the annual meeting or the workshop directly. However, Pascal Bergeret has assured us that the project will be presented to the SCAR AKIS group in 2021 on a suitable occasion and that its expertise can thus be incorporated. The findings will provide additional content to the outputs of this deliverable and both will be used when implementing the project User Cases.

The workshop was conducted online during the FAIRshare annual meeting on 18 November 2020. Originally, this event, like many this year, had been planned as a face-to-face event, which was not possible due to the Covid-19 crisis. Of course, this inhibited the participants' interaction with each other to a certain extent. In addition, the time available for such a creative process was relatively short, but the workshop participants managed this well and worked constructively so that a good result could be achieved.

3.1. Set up of the visioning workshop

The central element for developing the vision took place as a workshop during the general meeting, for which the project leader had planned a total of two hours. Like the entire annual meeting, the workshop was held in "Zoom". First, a script was developed to guide the entire workshop and breakout sessions, providing a thematic orientation and time frame. The next step was to choose a suitable tool to visualise the participants' ideas and the framework of the workshop. After some functional tests regarding the compatibility, comprehensibility and practicability of different tools, the tool Klaxoon turned out to be the most suitable one. With this tool, ideas and contributions from the participants were collected via digital Post-It within the given framework. Afterwards, the individual steps of the program could be further concretised and shared to the partners.

During the workshop, the participants were divided into three break-out groups based on the distribution of the regional hubs (West Europe, Central Europe, South-east Europe and North-east Europe). This was done because in the further course of the project, more work will be done in these regional hubs and therefore the workshop enables a first joint work. As few partners were involved in the North-east Europe hub, these were briefly assigned to the South-east Europe hub in order to ensure the participation of all partners. The respective regional hub leaders took over the moderation of the break-out sessions. To support the moderators, a roadmap was drawn up (see Annex 1), which the moderators could use as a guide. Additionally, some back-up questions were developed in order to react flexibly to the working methods of the respective groups. These questions, called "oil questions", were meant for situations in which the group would not have had any new impulses so that the

questions would have functioned as new suggestions. However, they were not needed due to the great performance of all partners.

At the beginning of the meeting, the participants were briefly introduced to the aim of the workshop. An overview of the current state of digital advisory was given, based in particular on the survey results from T3.2. The time horizon for developing the vision for the future of digital advisory was defined at 10 years and illustrated with examples. These showed the discrepancy that this period can have in terms of visions and technical developments. On the one hand, technology is developing very dynamically, so 10 years seems like a long time, but on the other hand, 10 years can be considered reasonable or even short for a strategic realignment.

In order to make sure that every participant is familiar with the use of the digital pinboard, a short introduction to the functioning of Klaxoon and its features was given (see Figure 1).

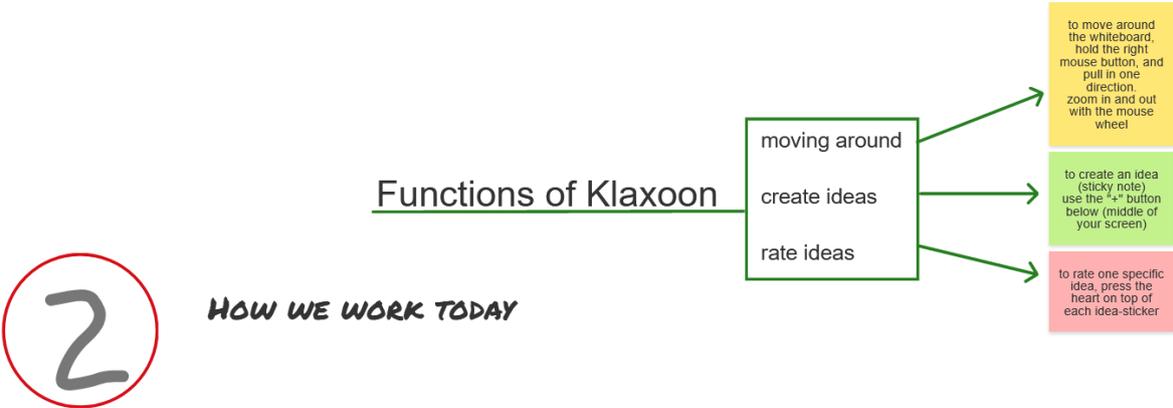


Figure 1: Introducing the participants into working with Klaxoon at the FAIRshare annual meeting 2020

To overcome the distance between the participants and the lack of personal exchange during the annual meeting, a small ice-breaker session was planned to avoid any inhibitions that might have arisen and to give the participants a small idea of who is working in their group. This was very well received by all groups and served its purpose very well (see Figure 2).

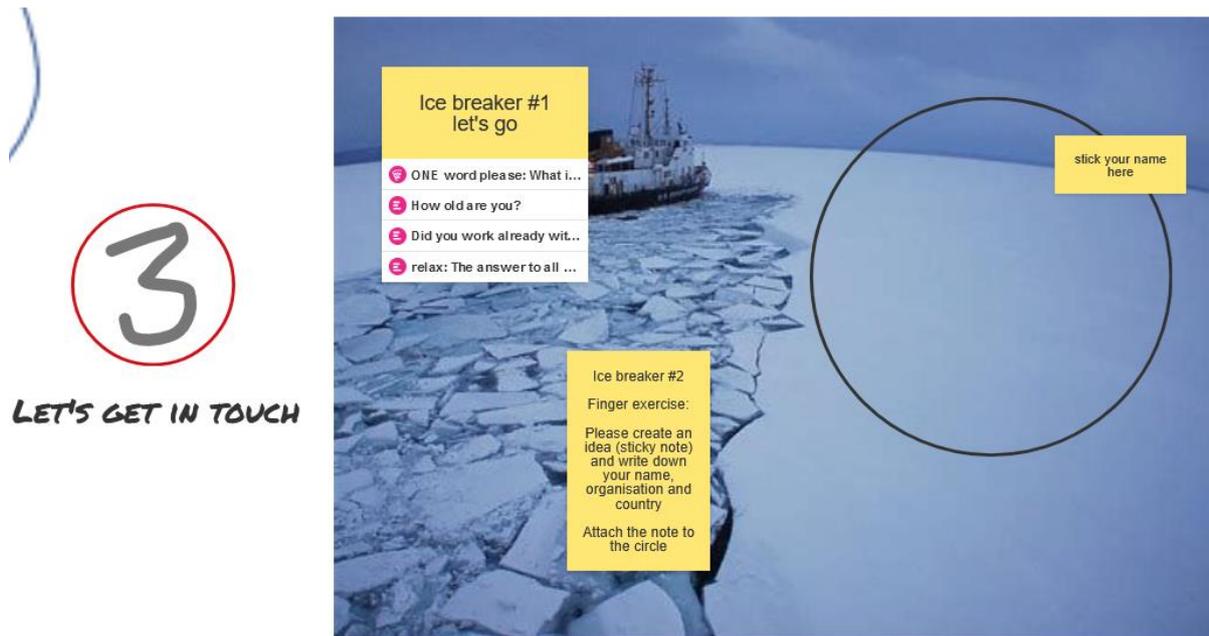


Figure 2: Ice-Breaking session during the visioning workshop at the FAIRshare annual meeting 2020

To stimulate the discussion, the participants' fears and hopes in connection with the digitalisation of advisory services were to be verbalised first. This introduced the central point of defining the visions and the resulting challenges were also worked out. Afterwards, the ideas were rated in order to highlight the best individual ideas of fears and hopes (see Table 2 and Table 3).

Back in the plenary, the respective results of the individual groups were presented by a speaker and handed over to the workshop leaders.

3.2. Results of the workshop

All ideas mentioned by the partners were classified into different categories. This made it easier to recognise the main points and provide a clear overview. Of course, many points could not be clearly assigned to a single category, so sometimes two categories are mentioned. However, an attempt was made to clearly allocate them for the purpose of clarity. Furthermore, several target groups were listed to which the individual points relate directly or also have an impact. These are divided into advisor, farmer, developer, EU/ Management and Social (impact). During the workshop, the participants also had the opportunity to evaluate and rank other ideas. This automatically resulted in a list that clearly and transparently shows the significance and importance of the individual ideas.

3.2.1. Fears & Hopes of DA in the future

Knowing one's fears about the future is a basic requirement to give free thoughts and to be able to think of visionary ideas. The doubts or even fears regarding DATS are often multiple, which was also shown in the workshop held at the FAIRshare annual meeting 2020. More than 70 digital ideas came together in the workshop from all participants, which fears arise in terms of increased digitalized advisory services. Table 2 shows a list of all fears, which were divided into categories, sorted according to the

main groups (like Advisor, Farmer, ...) concerned and ranked according to the number of mentions.

Table 2: fears and barriers among enhanced use of DATS – outcome of visioning workshop at the FAIRshare annual meeting 2020

FEARS	Categories	Main groups concerned					Ranking
		Advisor	Farmer	Developer	EU/Manag.	Social	
Affordability of DATS	Financial	x	x	x	x		12
Misuse of data	Dependencies	x	x		x		10
Break of social links and trust	Communication	x	x			x	7
Changing advisors' role	Communication	x			x		7
Farmers reluctant to change	Communication	x	x				7
Digital infrastructure not ready	Technical				x	x	6
Data protection & privacy	Management				x		5
Climate change	Environment				x	x	5
Support from management	Communication	x	x	x	x		3
Gap between technology providers and users	Communication/ Technical	x	x	x			3
More robots and more AI	Technical			x			3
Advisors infrastructure is not prepared yet	Management	x			x		2
Technology advances very fast	Management					x	2
Risk of too many DATS	Management					x	2
Interoperability is not given	Technical			x	x		2
Users must gain full benefits	Communication				x		1
Focus on impact of tools, not directly on tool	Communication	x	x			x	1
Wrong expectations on DATS	Communication	x	x	x		x	1

What is striking here is that about 40% of all fears can be counted toward the communication category. The most frequently mentioned barriers for increased use of DATS in agriculture is the **financial investment in DATS**. So far, these investments are often still too high to be able to achieve a large market penetration of DATS. Especially smaller advisory companies and smaller farms cannot afford as many digital tools as they maybe want to. Basically, they would be taking too high risks and thus questioning the future capability of their business if they wanted to go fully digital. Some digital services are usually free of charge, but often only in the basic version. An advanced and improved version is mostly available at a higher surcharge. This may not seem dramatic from the first point of view, but it quickly adds up, as there tend to be too many DATS needed to generate any real benefit from them. This is where both policymakers and developers are challenged to find more guidance systems and practical solutions. This can be done by funding the development of new systems, better education, and training of developers, or by thinking of new approaches to user systems for digital tools.

The second most frequently mentioned barrier is the **misuse of data**. This point is often discussed when it comes to digital applications or basically working with the internet. The dependence on large companies that offer captive software and solutions, but then also have control over the data entered by users, is seen as a major threat. The distrust and the greed for profit they are accused is obviously widespread. The servers they operate are often not subject to any control, as long as they are located in Europe at all. Therefore, some farmers see their independence in their daily work and decision-making as endangered. There is a great fear that large companies will access all kinds of data about the farm, resulting in customized solutions for each farm. With farmers' consent, this could be a great opportunity for efficient farming, but several participants during the workshops were more concerned about what will happen if farmers or SMEs have no choice and no options for decision-making by themselves anymore.

In third place among the most frequently mentioned fears are three overarching terms, all of which serve the **communication channel** of farmers and advisors. A loss of personal contact and social interaction is feared, as this is simply no longer needed with modern digital technology. A **loss of security and trust** is thereby lost, which could ultimately lead to social isolation and distance. In contrast, there are claims that both farmers and advisors are reluctant to embrace digitalisation and are thus not motivated enough to use DATS and exploit its advantages. Often the age of the users is used as an argument here, that especially older users do not want to complete this adaptation and thus are not able to follow digital things. But some of the participants in the workshop also see the willingness to do this as insufficient, whether it is the willingness to share data or to use it for their own purposes. In particular, sharing and using the data collected on the farm requires digital tools to work well. However, there is a fear that many farmers tend to be individualistic (further increased if they operate as a single enterprise) and so are reluctant to share their data with external advisors. Furthermore, the role of an advisor will change. It is feared that they will slowly, but surely lose their intuition to solve problems with increasing use and trust in DATS. This will lead the advisor to change his role. The previous facilitation role will change more into a technical advisory role which needs special skills to give farmers good and helpful advice, as they will already be very familiar with digital technology. The important thing here is qualitative (advice) instead of quantitative advice. Some colleagues even see the danger that artificial intelligence (AI) will continue to expand in the area of advice and in this way completely replace the classic advisor in the future.

Another argument that is often mentioned as a reason for the insufficient use of DATS is the **lack of digital infrastructure** in Europe. Rural areas around Europe still have low access to broadband, which results in a lower application of digital tools. This may be caused, among other things, by the fact that rural areas are naturally unattractive for investors to invest in the expansion of the internet and connectivity. For this reason, in particular, the state must be more active here. A large part of the DATS is based on online access, although some can also work in offline mode and upload the data as soon as an internet connection is available again. But this does not help for example with RTK positioning signals, as these can only balance out signal gaps over a certain distance. The current poor starting position in digital infrastructure for rural areas therefore promotes restructuring and urbanisation immensely.

Furthermore, the project partners observed another interesting aspect. The **support** from both their own superiors in the companies, who use various digital tools in their daily work and from government or state authorities is described as **insufficient**. This is reported by both advisors and farmers. That means even before the actual use and the associated problems, a certain distance is created between users and the actual use of DATS if the potential users are not used to digital tools or rather are not open-minded for that. This must be urgently avoided in the future in order to keep the entry and the barriers as easy as possible.

A final major point of concern, which is taken up again in both the visions and the challenges, is the **interoperability** of different tools and data sets with each other. Due to various isolated solutions from individual providers and the lack of a policy framework, there are still far too many individual solutions that are often not compatible with each other. This makes daily life and use of more than one DATS from different manufacturers more difficult. This renders the transfer of benefits to the producers who make a special effort to adopt digital tools in their daily work more difficult. That means, that many kinds of datasets or platforms are not able to connect with each other and work together so that more profit can be achieved.

However, in addition to the fears, positive examples of practice or own experiences motivate to create optimism and to enable meaningful and integrated use of DATS in the daily workflow. In the individual groups of the workshop, more than 100 hopes were expressed. This clearly shows that there is a positive starting position in using more DATS among all participants. In more than 70% of the cases, the partners directly named farmers as the specific groups of people to be addressed by their hopes. The categories into which the ideas were divided are very different and have to be considered in a differentiated way.

Table 3: Hopes for enhanced use of DATS – outcome of visioning workshop at the FAIRshare annual meeting 2020

HOPES	Categories	Main groups concerned					Ranking
		Advisor	Farmer	Developer	EU/Manag.	Social	
Increase knowledge + network	Knowledge & Network	x	x			x	19
Advisers able to give timely, effectively, and tailored advice	Decision making advisor	x	(x)			x	16
Improved decision making and farm management	Decision making farmer	(x)	x			x	12
Positive social dimension of use of DATS	Social	x	x			x	12
Increase competitiveness and productivity	Effectivity & Productivity	x	x				9
Collaboration between DATS developers and users	Collaboration	x	x	x			9
Focus on sustainability	Sustainability	x	x	x	x	x	6
Support trainings and utilizations in agriculture school	Training	x	x	x		x	6
Clear ownership, open-source development	Data sovereignty	x	x				4

Digital infrastructure for rural areas	Digital infrastructure				x	x	4
Transparency in value/supply chain	Transparency				x	x	4
Affordability DATS	Affordability	x	x	x	x		3
Strengthening support systems to help users	Support	x	x	x			3
Variety of users	Variety				x	x	2
Increase policy solutions and fund effectiveness	Policy & funding	x	x	x	x		1

Every farmer knows that a **good network** among peers helps in many ways. So it is not surprising that increasing knowledge and building a network are the most frequently mentioned hopes, with almost 20 responses. It is clear that these two points are still far less developed in terms of digitalisation and the use of digital tools in agriculture and extension compared to, for example, a crop farming network. And yet this is precisely what we hope for in order to push forward the use and acceptance of DA. There should be a stronger focus on teamwork and peer-to-peer learning. A better flow and quality of information around the topic of digitalisation, more time for discussions or a faster adoption of ideas are just a few suggestions from the workshop.

As the second-most mentioned point were a lot of ideas for **advancing the decision-making process** of several advisors. Points like being able to give timely and effective advice, less time for collecting and gathering information, but rather more available time for specific advice, remote consulting, or real-time advice on the fields. But there are also hopes for providing responsible advisory services concerning the use and application of new technologies, which in turn means sustainable and efficient use of resources. This, of course, also goes hand in hand with efficient planning and implementation of the decision making of each farmer. A **simplified and effective decision making** of both, advisor and farmer, are closely related to each other. The aim of this is, among other things, efficient farming due to better and faster decision making based on data sets collected directly on the farm. In this way, problems can be solved more quickly. In overview, the most diverse requirements and challenges of farmers are bundled with suitable DATS, analysed and the right conclusions are drawn from them with the help of specialised advisors. Standardised data sets that are used for advisory purposes can help to achieve this quicker.

The biggest **social dimension** of the use of DATS is probably in the further development of rural areas. Closing the gap between small and larger farms can also be achieved with appropriate DATS, which can lead to less enforcement and a greater balance within society. Furthermore, there are hopes that agriculture is becoming more attractive again as a profession for younger people, as long as they see the increasing technical requirements in this occupational field. The perception of this sector will change in society. This is accompanied by a wider range of different communication channels directly with customers, which farmers offer the possibility to advertise their products and present their production methods. This kind of marketing is important to bring another factor back into focus - trust. On the one hand from consumers in agriculture, but also from farmers and advisors in the use of DATS, which can have a positive impact on the success of the advisory service and the farm if it is used properly. The added value using available farm data can **increase competitiveness and productivity**. This is especially important for smaller farms, e.g. part-time farms, which cannot benefit as much from decreasing unit costs at higher production rates.

Furthermore, simple benchmarking processes can be used with DATS to further optimise the farms and thus save working time and input of the farmers but also of the advisors. The use of new technologies can thereby result in higher efficiency of the entire enterprise.

In order to ensure the increase in efficiency and especially the added value of DATS, long-term cooperation between the users, such as farmers and advisors, and the developers of DATS is immensely important. Only through **trustful cooperation** between these actors, DATS, that generate real added value in practice can be developed and successfully implemented. To achieve this, communication must further improve, international cooperation of these actors has to be strived for and possibly an integrated platform with different available DATS or rather ideas for DATS has to be set up. At this stage, the already existing and continuously developed FAIRshare inventory offers a good starting point for that.

But the focus is not always on efficiency and maximising production. A significant number of partners at the annual meeting emphasised the **sustainability of farming systems** and the associated value chain. DATS are especially useful for evaluating and promoting biodiversity and sustainable farming practices and actions. It is particularly relevant because it affects almost every actor in society, from farmers to advisors and developers to policy-makers and the public community. The EU, in particular, has taken a step forward here with the Green Deal, which now has to be followed by action.

However, the best digital tools are of little use to users if they are too complex to understand and use. This is where **training, daily support, and the development of user-friendly DATS** play an important role in promoting acceptance and use. Some participants of the workshop could even imagine regular training in agricultural schools and universities to ensure the basics at a very early stage. Basically, better training and understanding of ICT across the whole board is needed, including farmers, students, and advisors. Various demo activities can contribute to increased use and affinity with DATS. Support in the use and daily application of digital tools need to be provided by both employers and public administrations to make it as easy as possible for users.

Among the concerns, data security, digital infrastructure, and the currently high costs for some DATS were already rated as insufficient. Accordingly, these points were also declared as hopes to overcome them.

3.2.2. Visioning ideas

The first step was to categorise the visioning ideas which were developed and to show which ideas were most frequently mentioned (see Figure 3). In general, **technical implementation and knowledge exchange**, as well as **interoperability and collaboration**, are considered most important. The focus on these most frequently mentioned categories illustrates the desire of the participants that all actors can participate equally and in equal parts in a changed and digitalised advice in the future. This is also essentially in line with the basic idea of the FAIRshare project that an independent farm advisory community can create a movement for farm DATS through sharing tools and experiences.



Figure 3: Most relevant types of vision for advanced use of DATS

As can be seen in the word cloud and the table (see Table 4), the collaboration category combines many of the participants' mentions and visions. Roughly 25% of the workshop participants mentioned somehow the importance of **data ownership, usability, accessibility, and security**. As we saw in the previous chapter on fears and hopes, these points have already been mentioned frequently, which underlines the importance of these points and therefore also the urgent recommendation for action to change the current status. Besides, the points referred to concern each of the groups mentioned in the table - advisor, farmer, developer, EU/management and they have a societal impact as well. According to one partner at the 2020 FAIRshare annual meeting, the goal should be "automatic data sharing among each other, keeping it simple, but leaving data sovereignty with farmers and not to corporations". Automatic data sharing becomes evident to improve the work and the use of digital tools. Another vision describes the connection and synergistic effects of DATS from advisors with DATS from the farm to realise a fast **data exchange** and thus a faster and more concrete advisory service.

Table 4: TOP 10 visions for digital advisory – outcome of visioning workshop at the FAIRshare annual meeting 2020

VISIONS	Categories	Main groups concerned					Ranking
		Advisor	Farmer	Developer	EU/Manag.	Social	
Data ownership, usability, accessibility, and security	Collaboration	x	x	x	x	x	34
DATS contribute to sustainable agriculture and social life	Sustainability		x		x	x	14
Digital minded advisors and farmers	Collaboration	x	x				13
Findable, interoperable, reusable, sharable DATS	Interoperability	x	x	x	x		11
Change of kind of advisory	Knowledge exchange	x	x			x	10
Teamwork within the supply chain	Collaboration	x	x			x	7
Farmers independence	Independence		x	x	x	x	6

Facing Farm to Fork strategy	Collaboration	x	x	x	x	x	6
Better connection between science and practice	Collaboration & Knowledge ex.	x	x		x		6
Improvement of economics, affordable DATS	Financial	x	x	x	x	x	6

Another big point mentioned is again in relation to **sustainability**, which will become more important in the future than it is already. In the face of climate change, various digital programmes will continue to deal with possible solutions for certain problems such as intelligent irrigation etc. It seems clear that both advisors and farmers will need to become more digitalised in the future. A hybrid advisory concept for farmers is conceivable. The familiar face-to-face advisory meetings, stable or field schools, printed information and also possible new interactive tools are part of it. The **future optimal advisory service** will be a mix of all points. In addition, it is conceivable that advisors will possibly no longer be on the farms and in the fields, as the advisory process will be completely remote. They will redefine their role as an advisor by focusing more on advising on digital tools, ways and solutions for farmers to be more sustainable. That means they analyse and interpret the data from different tools and tailor recommendations directly to the farm, so that very specific action can be taken. Interoperability has already been mentioned several times in this report. It has also been strongly mentioned and desired in the visions so that this topic should be intensively tracked and treated in the future.

Teamwork and collaboration were also mentioned several times by participants of the workshop, which refers in particular to the value chain and the cooperation between all actors involved. The result could be a system such as a regional hub, in which all partners of the food chain are represented, share information and give consumers a better understanding of the background of the products sold so that consumers know how the product was produced and what resources were spent on it. This would also lead to greater independence of individual farmers from large corporations so that digital tools lead to innovation and farmers' resilience. This is also part of the European Commission's farm to fork strategy. In order to achieve these and all other goals, intelligent smart and digitalised solutions and tools are needed from which all actors in the value chain can benefit.

An important point in this context is that, for everyone to benefit as much as possible, the future users of DATS should also be **directly involved in the development process**. This was also mentioned in the previous section. It is also necessary to develop systems which truly work around end-user needs. So, it is not only about increasing the economic situation, but in the first place about developing well-designed, easily accessible, and also affordable solutions for end-users (be it farmers or advisors), addressing real problems of farmers and advisors, and in the case of DATS offering advice which is understandable and trustworthy. In this way, the connection between science and practice can be better integrated and thus made more accessible to the broad community in helpful DATS. This ultimately leads to an improvement in the economic situation of advisory services and farmers, even in rural areas. If DATS are seen as really helpful and are also financially viable, they will also be adopted in practice. However, the current situation is slightly different (as already described in chapter 3.2.1). The various digital solutions are not yet affordable for every farmer and advisor, which is a major problem that the community is facing.

Furthermore, Table 5 lists visions that were mentioned in addition to these before. Many of them overcome social barriers, such as no longer having a digital divide or small and sustainable farmers being able to compete on the same level as larger entities can do.

Table 5: Further mentions of the vision towards enhanced use of DATS – outcome of visioning workshop at the FAIRshare annual meeting 2020

VISIONS	Categories	Main groups concerned					Ranking
		Advisor	Farmer	Developer	EU/Manag.	Social	
Sharing knowledge	Knowledge exchange	x	x		x	x	5
AI recommendation systems	Technical	x	x	x	x	x	3
Agriculture getting more attractive	Social	x	x			x	3
DATS as a regular part in daily work	Usability	x	x			x	2
Small farmers will be future-proof	Social		x		x		2
No digital divide anymore	Social				x	x	2
Digital literacy developed on farms	Knowledge exchange	x	x				2
Digital risk analysis prevents major catastrophes	Knowledge exchange				x	x	1
Agri ICT will be Normal part of curriculum	Social	x	x	x	x	x	1

3.2.3. Challenges for implementation of these ideas

The last part of the visioning exercise towards enhanced use of DATS was to identify the **specific challenges** they are facing. The answers and their sorting showed that **80%** of the challenges mentioned concern completely or partially the **EU, national government, or general management**. This means a big task for them to face the following challenges and to initiate actions to tackle those effectively.

There are three different points which were the most important ones for the participants of the workshop. In order to convince potential users for better uptake of digital tools, the **added value** obtained through their use must be pointed out. Ideally, these should be presented or clearly demonstrated with practical examples to convince farmers and advisors about the benefits of going digital. For example, the working time can be saved or production efficiency increased. Often, smaller farms are not interested in digital software because it is still too expensive under current circumstances and therefore not relevant. There is still a lot of convincing to do to show that some DATS are not just about collecting and storing data but can also have a positive effect on daily business. Nevertheless, cost efficiency has to be increased by reducing development and running costs. In overview, the cost-benefit ratio has to be balanced for the use of digital tools.

Table 6: Challenges for enhanced use of DATS – outcome of visioning workshop at the FAIRshare annual meeting 2020

CHALLENGES	Categories	Main groups concerned				Ranking
		Advisor	Farmer	Developer	EU/Manag.	
Added value for users, cost benefits	Value	x	x	x	x	15
Competency development of farmers & advisors	Support	x	x	x		14
Involving different actors in development of DATS	Collaboration	x	x	x	x	14
EU Legal Acts on Data use, sharing, storage and security	Data sovereignty				x	10
Funding need to address the right topics and stakeholder	Funding				x	8
Bridging cultural differences	Collaboration	x	x	x	x	7
Harmonising data exchange formats/ interoperability	Interoperability			x	x	6
Supporting collaboration instead of competition	Policy				x	6
Create ICT expertise	Management	x	x	x		6
Make long-term policies	Policy EU				x	5
Support adaption of innovative technologies	Policy national			x		5
Open mindedness of different actors	Collaboration	x	x	x	x	4
Environmental value	Environment		x		x	2
Digital infrastructure	Policy				x	1
Interlinked data sharing platform	Collaboration	x	x	x	x	1

If DATS are used, the **competence of farmers and advisors** have to be trained in order to ensure optimal use of digital tools. Training in the use of digital technology is recommended in agricultural schools. These should also include the basic principles of legal requirements, technical steps and the use and interpretation of data. Ideally, best-practice examples from farmers or advisors who already use DATS on the farm are suitable for this, as people prefer to learn most easily and sustainably from their working colleagues. Furthermore, the tools used in practice also need support that can guarantee assistance and timely corrections in case of questions, suggestions or bugs. This could, for example, be located in the offices of the advisory services to guarantee quick help.

Nothing is worse than DATS that have been elaborately developed, tested and implemented with practitioners but are not used in practice because either the competence or the support and maintenance in the background is missing. This is a consequence of not **involving all relevant actors** in the development process of new DATS. This point has already been addressed in the visions, which again highlights the importance of this. Usability is a key function in the adoption and implementation of good DATS. This is also shown by the ranking of the challenges of

the workshop participants, who rated usability and involving of different actors as the third most important point.

The most highly rated point of the visions deals with **data sovereignty and data security**. This is also seen as very important in the challenges. Although the European GDPR regulates certain principles, there is still a lot that is unclear in the handling of user data. In particular, there is scepticism about the data storage of EU citizens at companies that manage their headquarters or servers outside the EU. This is an urgent concern and has to be brought more into focus in the future.

Cost benefits have already been an important topic for the enhanced use of DATS. Accordingly, **funding** already exists to support the promotion of the use of digital tools. These programmes have to be further sharpened in order to reach the end-user and not lose them to fund hunters. Abuse has to be stopped urgently. Funding has to address the right people in the right place to support digital technologies.

A big challenge for every participant in the digital guidance matrix is Europe. Europe consists of many **different countries, cultures, and languages**. To save duplication of investment costs and effort, tools could be relevant for more than one country. However, in order to realise this, certain barriers in terms of language and different approaches have to be taken into account. In particular, partners from South-Eastern Europe complained about the lack of English skills of their colleagues, which leads to reduced use of digital tools that are available in English across Europe. This also means that efforts should increase to close the gap of cooperation between European countries in terms of digitalisation. However, the different cultures can also be seen as an advantage to achieve wider acceptance and impact in development and implementation. Taking into account local needs is a key to broader acceptance of DATS in agriculture.

Further efforts should be made to close the barriers and to focus on the particular advantages of each European country.

In the digital world, many things move very fast, changes can be made quickly. However, this also means that things change quickly and may require quick reactions. So it is difficult to keep the **legal acts** for a digitalisation process and framework in every sector up to date. It is therefore especially important to make legal arrangements possible and to agree on framework conditions for this, instead of declaring a competition. The credo here is to "work together instead of against each other". Some actors even have the impression of a "top-down" policy, which does not suggest a good feeling of understanding and involvement of experts.

To push this forward, DATS should be included in strategic documents or plans. Currently, these are dominated by mostly big ICT companies. The installation of a collaborative ICT experts group across Europe would be a good approach to address this.

An important task for national policymaking is the promotion of the **adoption of innovative technologies** in society. The advantages and benefits of DATS should be clearly communicated and demonstrated to make potential users aware of them. In this way, the possibilities of digitalisation could be recognised and integrated as a distinctive strategic component among guidance organisations. For this to happen, all those involved must basically demonstrate an open attitude towards new technology.

If this is guaranteed, smart and useful integration of artificial intelligence is possible and can also be assessed as useful.

The **sustainability** and ecological methods of farms can also be tracked, evaluated and documented with DATS. In this way, the environmental value of farmers' actions can also be rewarded. Digital tools can thus also contribute to achieving the goals of the European Green Deal.

The **digital infrastructure** in Europe has already been mentioned several times in this report and declared to be deficient. The participants of the workshop also took up this topic in the challenges. However, it is noticeable that the weighting is by far not as high as it was in the previous chapters. This could be due to the fact that some may already have the feeling that initial progress can be seen in this area. In this regard, it is still unclear who will pay for the costs of broadband expansion in rural areas.

3.3. Conclusion of the visioning process

A vision is often more of a process than a precise idea, therefore the vision of an enhanced use of DATS, elaborated at the FAIRshare annual meeting in November 2020, should be considered as a good starting point on which the consortium can build on further.

Many requirements and arguments are duplicated and repeated in the individual sections such as fears and hopes, visions and challenges. However, this shows how urgent and important these individual points are seen in practice. These need to be met and further improved to advance the use of meaningful digital technologies.

In the first part of the workshop, the participants were asked to name their main and spontaneous fears and hopes that come to their mind for enhanced use of DATS in daily life. This is to be seen as a basis for the later visioning process in order to be as free as possible from these concerns and open to any new ideas.

The main barriers identified during this process were a lack of digital infrastructure, affordability of DATS, insufficient training and ongoing support, sustainability, data security, distrust in technologies and the fear of misuse of data. The participants of the workshop declared the following aspects as their greatest hopes: increasing efficiency, knowledge exchange, achieving added value, social dimension like improved communication and collaboration, competitiveness and easier decision making and sustainability. As a result, many hopes were carried forward into the vision ideas and were described in more detail.

Visionary ideas can be seen in particular in the social as well as in the technical area. The social aspects include new approaches and possibilities for collaboration and knowledge exchange, the importance of independence, in particular of operational data, but also the social aspect concerning the impact of agriculture on society and the reputation of the profession. In addition, the participants hope for financially affordable DATS, which must then also bring economic benefits to the companies.

A point that is often discussed is data security. Data ownership and security are two central points that must be taken into account even more in the future. The technical aspects of the visionary ideas focus on the interoperability of different DATS, but also on usability and accessibility. The sustainability of development and use of DATS is

and will be considered important because of the increased awareness of citizens and in view of the EU Green Deal.

As a final point of the workshop, the participants were asked about the challenges that directly affect the visionary points mentioned. The biggest challenges that directly affect the visionary approaches mentioned were the presentation of the added value of the individual DATS, the competence and skills of the users and the necessary collaboration and inclusion of all relevant actors in the development of new DATS. Of course, the data sovereignty often referred to in the previous chapters also represents a challenge. Furthermore, participants would like to see targeted funding. Bridging cultural differences is a major topic in Europe, which also represents a challenge within the framework of FAIRshare with more than 20 assigned partners. On the one hand, the challenge is to get different partners and cultures to work at the same level. On the other hand, culture- and country-specific details have to be taken into account, as the diversity and the different approaches are also an advantage within the EU.

Annex

Annex 1: Workshop at the annual general meeting of FAIRshare project on the 17th of November 2020 with all the partners – roadmap for group leaders / regional hub leaders

Date: Wednesday, 18.11.2020, 11.00 – 13.00 o'clock

Organisation: Naturland – Johannes Weiß & Franz Hobmeier

Used Tools: Zoom, Klaxoon

Responsibilities:

General		
Overview DATS, fuel questions, group overview	Franz Hobmeier FH	f.hobmeier@naturland-beratung.de
Introduction, moderation, group overview and conclusion	Johannes Weiß JW	j.weiss@naturland-beratung.de
Technical issues	John Hyland JH	john.hyland@teagasc.ie
Presentation WP 5	Evelien Lambrecht EL	evelien.lambrecht@inagro.be
Break Out-Group leaders		
Hub Western Europe	Anita Naughton AN	anita.naughton@teagasc.ie
Klaxoon-link		https://app.klaxoon.com/animate/board/AUAZEWT
Hub Central Europe	Peter Paree PP	peter.paree@zlto.nl
Klaxoon-link		https://app.klaxoon.com/animate/board/C5EHZRF
Hub South-East Europe	Milan Husnjak MH	milan.husnjak@mps.hr
Klaxoon-link		https://app.klaxoon.com/animate/board/DUBSVTK

	Time	Duration	TO DO	Preparation in advance/ further information	Media & Layout	Who
START / INTRODUCTION	10.55	00.15	<ul style="list-style-type: none"> • Introduction into Task 5.1 and in today's workshop • Overview of the upcoming workshop – aims and procedure • Digital Introduction refer to actual digital use to get all participants on the same stage of knowledge • Short Explanation of Klaxoon, which we are going to use in the workshop • Work in 3 groups, Lead: regional Hub leaders <p>Steps:</p> <ul style="list-style-type: none"> - Warm up with getting used to Klaxoon - fears and hopes - picture of future DA - finalise and rate ideas - classify and concretise the challenges (& for who) - share the results in plenum 	<ul style="list-style-type: none"> • Introduction (JW) • Aims (JW) • Digital Introduction (FH) • Explanation & Introduction in groups (JW) <p><u>Group leaders:</u> Anita Naughton Peter Parea Milan Husnjak/ Mateja G. Janezic</p>	Zoom presentation plenum	JW + FH
			Dividing participants into 3 groups			JH
WARM UP	11.10	00.10	<ul style="list-style-type: none"> • Group leader shares the link of Klaxoon, explain the functions if necessary, keep structure and an eye at the time! • Every partner opens the link in an extra window on the screen, so everybody can work in Klaxoon! • Maybe select a back-up leader, in case, the group leader gets technical issues • Warm up for training the use of Klaxoon • Ice-Breaking 	<ul style="list-style-type: none"> • Set up a Klaxxon Board (JW&FH) • Share the links 	Groups – Zoom + Klaxoon	AN PP MH
FEARS & HOPES	11.20	00.20 00.10 per point	<p>Fears What fears do you have when you think about using more digital (advisory) tools in the future?</p> <p>Hopes What kind of hopes and advantages do you expect from enhanced use of digital advisory tools?</p>	Expressing fears: Changes in your environment have to do with yourself, if you express these inhibitions you will be clearer, freer and more open to new thoughts, things and ideas in the further progress of this creative process	Groups – Zoom + Klaxoon	AN PP MH

	Time	Duration	TO DO	Preparation in advance/ further information	Media & Layout	Who
FUTURE DA	11.4 0	00.3 0	<p>Developing a picture of the future/ developing a vision/ Brainstorming Important to think of: Get rid of actually or “normal” perspective. Try to think really detached and abstract. What can you not imagine at all? Think about, how advisory service was in 2010 – 2000?!</p> <p>questions:</p> <ul style="list-style-type: none"> • For which kind of tasks will DATS exists/ for which will DATS be irreplaceable? • What kind of digital advisory tools will be used in ten years? • How will the technical equipment of advisors and farms change fundamentally? <p>Should be a pure collection of ideas!</p> <p>Group leaders needs to add fuel to the fire in time since the time for a creative process is very short. They have to think very abstractly. → “fuel”-questions at the end of the table</p>	<p>Group leaders have to animate participants to write something down</p> <p>Johannes and Franz will have a look through the groups to support, give ideas or give some “fuel-questions” in the discussion</p> <p>Franz provide some examples of “fuel-questions” in advance</p>	Groups – Zoom + Klaxoon	AN PP MH
FINALISE AND	12.1 0	00.1 0	<p>Finalise and sort the ideas</p> <p>Rate them</p> <p>Collect the TOP 5 Ideas around the Vision</p>		Groups – Zoom + Klaxoon	AN PP MH

	Time	Duration	TO DO	Preparation in advance/ further information	Media & Layout	Who
CLASSIFY CHALLENGES	12.20	00.20	Challenges: Specify and classify challenges, that affect the implementation Classes: <ul style="list-style-type: none"> • Legal Acts EU • Legal Acts national • Financial • Technical • Structural/ Organisation • Educational → Who has to move in order to achieve the goals?	The results must be recorded, that they can be used later without the need of further processing	Groups – Zoom + Klaxoon	AN PP MH
PRESENTATION	12.40	00.20 00.05 per group	Short summary of the 5 key facts of each group by the group leader or someone else! max. 5 min per group	John shares the screen with the selected Klaxoon-link of each group	Plenum	AN PP MH + JH
CONCLUSION	13.00	...	Conclusion and further procedure		plenum	JW

“oil”-questions:

- Are the mobile phones still used for Calls in 2030?
- Do tractors still have driver seats in 2030?
- Can the advisor analyse the crops on a field or rate the soil fertility without stepping on it?
- Is it possible in 2030, to recognise the disease before e.g., the dairy cow becomes ill?
- In 2010, 89% of the Germans haven't had a smartphone!
- How do the advisors get to the farm in 2030? Even by car? Do they have to go to the farm, or can they access a realtime-digital Walk over the farm on the computer? (Installed a lot of cameras, or a high-resolution satellite camera)
- Do farmers need some advice anymore? If yes, still face-to-face (even digital) or just an algorithm that knows
- Can one advisor run an advisor company with AI – artificial intelligence - which had been a 10 people-company before?
- Just in 2 years from 2017 to 2019 the amount of mobile data grew in Germany about 110%

quotes:

- “It's not a faith in technology. It's faith in people.” [Steve Jobs]
- “You can't just ask customers what they want and then try to give that to them. By the time you get it built, they'll want something new.” [Steve Jobs]

FEARS

small farmers get lost and large ICT companies dominate, and use data for their own profits.

Willingness to share data

That farmers lost their own decisions

Some may fear that DATS create greater social distance b/w advisers & clients

generation gap Olders vs young farmers

Lack in digital training for farmers

Small farms cannot pay for specific DATS

LACK OF INTEROPERABILITY (platforms not connected)

Functioning of data tools depends on good infrastructure-problems with rural digital divide

Too much data

Data protection & privacy

There is too much focus on the tool rather than the impact that the tool will have

Ambassadors are well ahead - What about the others

Dependence of Technology providers

Misuse of data for private market gain

Too much tools so difficult to choose

who are the owner of the data

Only one language=only one culture ?

Small farmers will struggle to keep up

captive software and solutions

Advisers will lose their ability to use intuition to solve problems

Data tool companies are profit driven and are not always coherent with predominant cooperative agri business model

TOO MUCH INFORMATION TO BE ADRESSED

The internet coverage

lack of trust

Data use--it hasn't gone well in other sectors, like finance, etc.

farmers reluctant to change

Transfer benefits to the producers who make the effort to adopt digital tools

HOPES

Advisers able to give timely advice

Increase knowledge

more effective advisory service

Reduce cost of production and improve farmers income

Optimal use of inputs

That coop representative entities take a more cooperative approach to this issue, like they did in past with other challenges

Adding value to the huge amounts of farm data available

better advice

More efficient farming due to better and more informed decision making

increase Knowledge exchange

Increase commun knowledge

greater equality

More informed decision making

Advisors prepared for the new digital era

Advising efficiency

improve remote consulting when needed

Increase competitiveness

Faster and better sustained decisions

focus on SUSTAINABILITY and not just increased production

advice in relation with the real data

Monetary value placed on data that can make farming more viable

facilitate peer to peer learning

better use of data

To promote benchmarking for a better understanding and management of the production system

exchange knowledge

All farmers become more comfortable with sharing and using data when they see that all farmers benefit

more time for discussion

Knowledge network, including advisors community

Better training in ICT across the board

More transparent food system

A new role for advisor ?

More coaching

confidence

Increase of WOMEN in AGRI-TECH

exchanges directly online

Better use data, better policy solutions and fund effectiveness

Trust

strengthening support systems to enable advisors to do their job

Farming and agriculture becomes more attractive to young people due a change in perception of the sector

data coops

Visibilize good farmer practices

Transparency

there is a positive social dimension the use of DATS especially for remote rural areas

To facilitate traceability

More trainings and utilizations in agriculture school

increased transparency in value/supply chain

Improvement advice using value data

Attractive sector for new entrants

5G all over the world...in rural areas too

VISIONS

Accepted standards to allow interoperability

Tools that leave all their place to advisors

Digital Agriculture practiced by digital motivated & trained farmers and advisors

Agri ICT will be Normal part of curriculum

The consumer will know perfectly how the product that he is buying has been produced

Fair and affordable DATS

Interoperability to improve human knowledge

mixed type advisory services through DATs and face to face

Farm to Fork knowledge will be a reality

A single digital hub which all tools can communicate with and which farmer, advisors and other actors can interrogate and use

Tools to help innovation and farmers resiliency

European Ontology of data

A vibrant social movement propelling the sustainable and popular use of DATS

better connection between science and practice

User friendly DATS

organised small sustainable farmers will be able to compete on same level as larger entities

integrated advices including more various datas

Digital tools are widely use to interact and transfer data with public bodies, reducing administrative burdens and barriers for farmers

interoperability between DATS

Greater gap between small and large farmers

Enhanced ability to measure climate smart agri

Automatic recommendation systems

Knowledge generated by public funds, better utilized and shared

Interoperability between database and DATS

Advisors tailoring recommendations aimed from digitalization

Food will be traceable to the farm

AI recommendation systems

Agriculture and forestry is attractive and profitable as economic activity comparing to other sectors through the use of digital tools

farmer as a influencer

ability to predict more accurately climate events

Findable, accessible, interoperable, reusable DATS

CHALLENGES

To convince growers for sharing their data

EU Legal Acts on Data use, sharing and storage

Overwhelming power of ICT companies and a few entities in the agri value/supply chain will dominate

The main challenge is the question of language (human language/data languages)

protect the rights of farmers to own their data so that it is not exploited or used against farmers or advisors

European budget for the agriculture

Farmers get inspiration and learn best from other farmers - will need farmer champions

poor internet connection in remote rural areas

To achieve a perfect interoperability between DATS

Support back office in advisory services

complex legal environment does not favour less sophisticated actors

Duplication of data entry and potential for conflicting advice based on the same data

ensure that there is clear separation between digital agriculture law and other law, taxation, etc.

Farm-led research should be facilitated

involve the different actors when building DATS

Lenders and finance providers do not understand agri sector sufficiently, even in agri-tech

Farmers will need to see clear value in increased income or time saving to justify spend on digital tools
Difficulties to keep updated the legal acts for a digitization process framework in all sectors, including agriculture
To develop models able to estimate correctly the performance of the growing system
Funding in CAP RDP should be used to support more digital Technology solutions
Interoperability of different data bases
normatives based on sustainability, not in policy rules
AgFunder found a huge challenge for women entrepreneurs in agri tech sector to get funded.
use of Artificial Intelligence
open minding of the different actors
higher education may value complex ICT skills, but not in conjunction with agri
FAIRshare should be a long-term project to support an efficient and low cost solutions for advisors
collaboration and networking between researchers and advisors
Too many funds and calls in digitization, risk to appear "fund hunters" putting aside farmers
lack of leadership on data issues to facilitate farmers really benefitting from their data, (although some good examples exist)
bottom up policy needed, but a lot of top down policy happening
exchange knowledge between I+D and advisory services
Digitalization should be embraced as a distinctive strategic component among advisory organizations
All education programmes should mainstream digital and be challenging but not leave anyone behind
(just transition)
Legal competences of regions and countries can create a fragmented and non coherence legal framework
talent pool in ICT gets seduced by other sectors like finance, defense, entertainment, rather than agri
train advisors/advisors leaders
guarantee quality of data
need to take seriously context specific demo and p2p
ICT adoption gap for educational centers, organizations and teachers
New technologies, new training methods

Take into account the environmental value in farmer actions

Demonstrate added value to users

GENERAL REMARKS

Encouraging exercise!

Need to get farmers and advisors points of views to compleate

I think that the Hopes; Fears; Visions and Challenges should be "workshopped" with the target audience of advisors and farmers - maybe using what is posted here to vote on and add any that are missing. That may already be planned in this WP

thank you for coordination

FEARS

Climate change

Only advisors with special skills are needed anymore

no more family/smallholder farms (unable to follow)

impact of climate change

extreme urbanisation

a lot of time to spend to work with all the tools if they are not integrated

digital infrastructure and support for farmers and advisors is still atomized

Farmers don't need advisors without E connection

Advisors completely replaced by AI advisory services

Becoming dependent on digital tools

too much costs for farmers and advisors

lack of a concrete advice

loss of personal connection

people getting unsocial because of digitalisation

some farmers and advisors getting too far behind, because of lack of digital skills

Big companies (chemical/data) make prescriptions / menus of how to farm (dependency)

high costs to make use of a lot of different DATS

farmers and advisors are not always teamplayer (as an efficient DATs use needs)

rural areas still have low access to broadband, so low application of digital tools

People being less connected to reality

pandemic every 3 years

rural areas are left behind (less interest for investors)

Being dependent on companies running cloud servers etc

costs too high for farmers to catch up with technology

run out of water

qualitative consultancy, not quantitative consultancy

HOPES

More distributed services, more smaller players
adequate digital infrastructure for rural areas
Teamwork
use of new technologies increases resource efficiency
More correct advice, that is very farm specific, thanks to more data input
we have all the data and tools ALSO, so not only the big companies have them
Less admin work
Users/farmers being well organised shaping systems/ approaches
standardized data formats for advisory purposes
Tools to make and share concrete advice
increased farm performance (covering a number of aspects)
efficient monitoring of data to fight diseases, ...
integrated platform with different DATs
More time for advice itself, less for collecting information
more continuous connection
combined development and open source
responsible advise regarding use of new technologies
easier exchange of information/data
decreasing costs by sharing development costs, clever EU arrangements
common understanding of combined knowledge and competency development
More international collaboration
attention paid to continuous learning
enough support on digital skills for advisors and farmers
high tech is high motivation

shared ownership

tools are accompanied by other methods (learning networks etc) for more interaction, and higher motivation

trust

VISIONS

Vision 2030 advisors and farmers are the same. they are specialists sharing knowledge and experience in common platforms

Automatic datasharing becomes an evidence, and makes the use of digital tools very easy

integrated national platform with data, easily accessible

data is easily shared, and data ownership remains with the farmers (as much as possible)

combined advisory system:

- face to face
- field/stable schools
- printed informations
- interactive tools

VISION:

work together with different actors such as advisors, farmers and all the other actors of the food chain (with the use of system thinking in e.g., a hub)

Digital literacy is a basic skill developed in all farmers & advisors

Broadband connection is universal, digital divide has been closed rather than widened

even international?

data sharing between

- farmers
- experience exchange group
- advisors

this risico analysis helps prevent major catastrophes

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even international?

CHALLENGES

data sovereignty of farmers

to keep my motivation

dissemination

harmonising data exchange formats

competency development, both in farmers & advisors

tools

well developed and broadly used data sharing platforms, that are also interlinked

create

ict collaboration expertise

data ownership

make long-term policies

solving public/private good qs. eg. who is paying for rural area broadband

standardization

Fixed structures don't allow for necessary agility

secure data management

transparency

make legal arrangements possible (instead of competition)

managing cultural differences

costs of datasharing not too high for farmers

Digital support team within advisory organisations
Small farms in Europe not interesting for good software solutions
costs-benefits in balance for use of tools
easy handling is the key

Too complicated

Distancing will last longer - no return to old life

advisors will not be supported any more

Connectivity issues in rural areas

no interest for DATAS in Balkan countries

Less personalized

cybersecurity

Advisors will have more technical than facilitation role

bad connections and less developed infrastructure (no internet in rural area)

old farmer will not be able to follow

to be disappointed, because there is always the potential of the tech not being helpful or future-proof

lack of support from bosses and policy makers

Costs of tools

break of social links

Random advice and tools

Gap between technology providers and users

the collapse of small farms that do not have the potential to use digital tools

technology advances very fast

my data is not safe

job loss (advisors)

willingness for using new tools for older advisors

support from management

HOPES

More frequent communication

Better decision making

Better and guided farm management

Better communication
sustainable agriculture
Prompt access to clients needs
strong support from management
faster problem solving
new contact channels with customers, more services provided
fast decision making for farmer
DATs will help to service more clients
better decision-making
hope
10 % of peoniers in advisory & farmers cocietty will bee happy to implement new ICT TEHNOLOGIES
interest for new tools from small or selfsufficient farmers
reduction of some costs
DATs will become regular tool in farming
eco friendly attitude
increase in work productivity
affordability of DATS
easier communication and teamwork
close collaboration between DATS developers and users
DATs as a regular tool in advisory work, as soon as possible
using tools in evryday work
safety use platform
better flow and quality of information
DATS to support small rural communities
HOPE
YOUNG ADVISORS & farmers will bee avlible for DATS IN BALKANS STATES

combining the different databases
Common DATs for advisors within the region
open source digital tools
demo activities to enhance the adoption of DATS
develop infrastructure network in rural areas in all region
DATS IS BEST DEVELOPMENT WAY FOR ADVISORS & FARMERS
Integrating different farm needs within common DATs
farmers participation in DATS development
biodiversity
faster diffusion of ideas

VISIONS

preserving natural resources
DATs have solved the most common issues in farmin
DATs are regular part of everyday work and living, just like fb or other
technological solutions have been integrated in nature-friendly farming methods
DATs to promote innovations among farmers
Development of DATs is unstoppable, only farmers who accept DATS may me sustainable
advisors wont go on the field anymore, because they will be completely remoted
DATS to upgrade advanced farmers to innovation brokers
advisors/farmers are co-developing DATS
DATS contribute to sustainable agriculture preserving environment at the same time
DIGITALISATION BRIN MORE INCOME IN AGRICULTURE FOR ADVISORS & FARMERS
DATs focused on environmental issues
DATS improves the quality of work
advisors will have a new role in providing knowledge to farmers about using digital tools and about ways of being more sustainable (low-carbon way)

application of robotic solutions
 Connect DATS from advisory service with DATS from farm
 DATs to automate a lot of functions on farm
 common platform
 DATs to automate advisory functions
 ADVISORY EORK HAS FUTURE ON BASED ON OBJECTIVE DATA/, INDICATORS
 ESPCIALY IN ANIMAL HEALT AND WELFARE
 Advisors embrace AI for less pesticides and fertilizers
 improvement of economic and enviromental situation on the farm and rural areas
 advisors and farmers must learn new skills

CHALLENGES

system interoperability
 Provide technical backup for use of DATs
 language
 stimulate adaption of innovative technologies
 lack of understanding and isufficient political support
 cybersecurity
 LEGISLATION IST COPLICATET AND OFTEN NOT GOOD APLICABLE IN BALKANS REGION
 constant updates to meet new specifications
 local data availability
 proper training of advisors for standardized use of DATs
 training on DATS use
 train the trainers
 Set standards for use of DATs
 Provide training on digital skills for advisors
 LACK OF SUPORTT FOR NEW TEHNOLOGIES AND INOVATION IN BALAKANS CONTRIES

data privacy and ownership

involvement of DATS in strategic documents (like strategic plans)

lack of integration in whole-farm workflow

Set units for DATs at different levels

provision of reliable advice/ control?

training

equal access

Promote DATs use as common advisory tool

acceptable from farmers

Promotion / public awareness on importance of advisory work

MANY ADVISORS AND FARMERS DON'T SPEAK ENGLISH IN BALAKANS AND THEREFORE NOT ABLE FOR NETWORKING AND INTERNATIONAL COOPERATION

DATs as a obligatory part in the educational schemes

more flexible billing models for DATs

DATs finance public support

There is no financial support for advisors who take part in DATs or innovation

supply-driven vs. demand-driven

use of DATs in a collaborative way with multiple farmers/cooperations

state/municipality subsidies use of DATs

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