



Organic Knowledge Network Arable

OK-Net Arable

Identification of the best methods for learning and knowledge exchange

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Tools for learning and knowledge exchange
on organic arable farming in the EU



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1. Scope of the report

The main goal of the report was to identify processes and tools that better facilitated learning and knowledge exchange among farmers and advisers as well as among farmers, advisers, researchers and the agriculture community as a whole. The main topics of the knowledge exchange were related to organic arable crops. The outcome will serve as a guide to use the knowledge gathered within the project but will also serve for a broader scope.

The starting point was a recommendation from the EIP-AGRI Focus Group on organic arable farming, which highlighted the need to “develop new tools for knowledge sharing based on ICT and social media or other on-line tools”. Moreover, the report surveys the mechanisms of communication among farmers and advisers and, at large, within the farming community both at local level and at the European level. This is functional to facilitate the broad dissemination of the project outcomes outside of the community directly involved in the project and it may serve as well for the EIP-AGRI initiatives, beyond the organic community and topics, as it gives a detailed picture of the communication and knowledge flow processes in the whole farming community and may suggest approaches useful to all farming types.

Concerning the role of the report within the project (task 3.2), it is instrumental to orientate the work on knowledge platform and communication (WP4). In particular the report would give indications on the “shape” and type of materials that the knowledge platform will use, on the format and tools for discussion forum and on the methodology and tools to be used in the online courses. The report is also a working table that the farmers’ groups (WP2) will use to express their preferences and identify the most suitable tools and methods for learning and knowledge exchange, all while considering the different topics and the degree of specialization of the information they are looking for.



2. Changes in thinking support of innovation

Moving from a linear approach to innovation (Godin, 2005) to a more systemic one (Knickel et al., 2009) innovation flows and knowledge exchange processes have a radically different role. The attention, at theoretical level, shifts from the concept of “adoption” to the sources of technical change (Hayami and Ruttan, 1970), leading to the development of a theoretical framework that focus on learning processes. If it is true that segmented innovation systems generate knowledge asymmetries that reduce society’s potential to exploit it (Katsberg, 2007), it is also important to take into consideration that the increasing recognition of innovation as outcome of collaborative networks asks for adaptation of methods for learning and knowledge exchange.

In recent years the EU Commission and in particular the EIP-AGRI is working to stimulate the use of an interactive innovation model with the aim to develop more focused solutions towards the multi-actor approach to research. Knowledge exchange among farmers, advisers, researchers, businesses and other actors is acknowledged as a way to generate new insights and ideas in the 2014-2020 programming period. The agricultural knowledge and innovation systems (AKIS) model (Leeuwis and van den Ban, 2004) underline the role of farmers’ and rural actors’ knowledge to generate innovation (EU SCAR, 2012).

The focus of innovation policies has transitioned to the creation of an environment in which innovation can flourish. Innovation is closely related to information flows, learning and social interaction and different types of knowledge can play an important role in social learning (Knickel et al, 2009). A focus on innovation processes rather than singular innovative ideas is typical of transition theory, recently used to look at innovation for sustainability in European agriculture (Sutherland et al. 2014).

However, recent literature focused on paradoxes and dilemmas related to the growth of knowledge and the complexity of communicating and mediating between different scientific disciplines (Alroe and Noe, 2011). Joint knowledge production and co-innovation have several boundaries to cross due to differences on problem perception and framing by different bodies of knowledge. Several authors (Winch and Courtney, 2007; Howells, 2006; Klerkx et al. 2012) emphasise the need of specialized innovation network builders (innovation intermediary, knowledge brokers). However, the choice of tools to be used for the facilitation of the mutual learning among actors has also a strong influence in the innovation process. Different languages, different communication levels, different perspectives can be combined using common communication tools. The organic farming community worked as collaborative networks since its pioneering stage and can be an interesting starting point to look at how agricultural knowledge, innovation and support systems are



responding in practice to their continuous need for new knowledge for the successful exploitation of creative ideas.

3. Communication flows between farmers and researchers

“Although many farmers know their fields intimately, the complexity of biophysical processes is such that (...) the ‘why’ often remains. This is where science has made its inroads, prompting itself many of the questions it now tries to answer” (Tsouvalis et al. 2000). This sentence provides a good description of the knowledge exchange process that developed in the organic farming community and that today the EU in the EIP-AGRI approach requires. The need to enhance the impact of research and to foster public dialogue and debate based on science results asks for an improvement of research communication processes (EU, 2012).

Research communication is defined as the process of interpreting or translating complex research findings into a language, format and environment that non-experts can understand. It is not just dissemination, it is much more and it is a two-way and multi-dimensional flow involving a network of participants that often requires an intermediary figure between the researchers and the end users to facilitate the process in itself (DFID, 2010).

One of the main barriers in the development of a mutual learning community is related to the use of different languages, tools and standards by the different actors involved in it. Knowledge intermediaries play a key role in establishing good links with the target audience, by helping to build the capacity of users to interact with researchers. Morgan and Murdoch (2000) identified social interaction as an important means of sharing and exchanging ideas. Researchers should be trained to communicate the results of their work in a way that can be accessible to end-users. A good research communication strategy developed together with the research plan helps to improve research by involving end users and intermediaries in this process.

Farming is increasingly a knowledge-rich activity (Lobley et al. 2013) and in agricultural research, technical advisers are the main intermediaries and farmers are the main end users. In order to understand the most effective tools to exchange knowledge with farmers, there is a need to consider their decision making process (Blackstock et al. 2009), which is strongly influenced also by legal means and financial issues. Farmers often benefit from hands on experience rather than purely theoretical advice. They look at technical advice to find solutions to their own problems, so there is a need to share such problems with researchers in advance. Farmers welcome receiving advice from someone with a background in farming, which speaks the same language and can empathise with



farmers. Good advisers develop such capacities together with local knowledge and good interpersonal skills (IFER, 2002; University of Gloucester, 2006).

The main step to generate a mutual learning process involving farmers and researchers is to identify specific tools for knowledge exchanges. The OK-NET Arable project looks at the research communication process from a farmer's perspective and defines "tool" as *formatted information used as a mean for circulation of knowledge (on organic arable crops topics in the specific project case) among farmers and advisers, potentially involving (as source of information or as reference or other; but not as primary target) researchers too.*

Knowledge exchange in rural areas is mainly based on physical meeting and direct relationship between people. However this type of meeting can be organized in a way that facilitates the mutual learning process. For example, demonstration farms are an effective means for knowledge exchange as farmers and researchers directly meet each other and build long-term relationships. Showing someone as an example for good practice can create a ripple effect whereby farmers want to achieve the same successes (Slee et al. 2006). Molnar et al. (1992) underline how consultation with farmers is important, but also consultation between farmers should be encouraged as it allows farmers to bounce ideas off each other and facilitate informal discussion groups. Local farm networks and on farm events provide interesting opportunities for learning, reflection and education (Curtis et al.1999) but they can also have practical outcomes such as machinery sharing. More punctual opportunities for knowledge exchange are workshops and seminars focusing on specific issues.

In addition to physical meetings, tools can have several different formats, Anfoldi and Weidmann (2013) in a presentation at the CORE Organic II Research Seminar identify the most used tools in COII research projects. Written tools dominate, mainly peer reviewed articles but also technical leaflets that focus on recommendations and articles in magazines. ICT tools are also gaining importance such as, newsletters, social media, slideshows with text, video slideshows and videos on YouTube. However, different formats should be combined with specific communication needs.

The selection of tools and channels for research communication should vary depending on farmers' styles and the type of message the research would like to deliver. A well-planned mix of tools and channels would have the best impact on different target groups and the production of dissemination material together with the target groups would also increase their potential use.

4. The potential of ICT, social media and other on-line tools

ICT covers any technology that stores, finds, receives or shares information in digital format. Digital communication devices such as mobile phones and social networks (blogs, twitter, Facebook, YouTube videos) are recently growing and may have a wider usage. Internet usage spread during



the 1990s and today 1.8 billion people around the world are connected. More than two billion mobile phones exist and their number is larger than that of laptops or PCs (DFID, 2010), hence allowing for more people to be reached in every moment. These new ICT technologies offer interesting opportunities to handle information more cheaply and quickly than in the past. In addition, they are interactive and enable the development of dialogue, discussion and feedback. New ICTs technologies have proven to be a powerful means of raising awareness on topical new issues. The routine use of such technologies has a direct impact on research communication, advisory service activities and on the potential of farmers to establish connections and exchanges with colleagues all-over the world as well as with other actors of their community.

However digital information overload is common and the development of knowledge platforms that facilitate selectivity and establish search terms enabling users to rapidly and efficiently find what they need, will provide a strategic service.

Workshops and seminars have considerable social benefits because they enhance relationship building and communication however they have high costs in terms of time, organisation, travel costs etc.. Online conferences, such as calls and webinars, offer a low cost and accessible alternative to meeting and can help in keeping the social networks among people working on similar issues.

Bulter and Lobley, 2012, conducted a survey among English farmers looking also at Internet use on farms. Internet results to be used by the 89% of respondents. They identify four main factors influencing the use of internet: the farm size, the age of the farmers, the education level and the innovation capacity of the farmer. Larger farms, with over 100 hectares, are more likely to use internet than smaller ones; all farmers younger than 46 years use internet while only 72% of older farmers do. Farmers with vocational training education and more interested in changing their farming practices to improve their system are more likely to use internet than others. However, the percentage of farmers downloading farming apps for their mobile phone is still low, this questions also the availability of effective farming apps.

As already mentioned, ICT technologies are communication tools and specific messages should be developed and adapted to each tool format. A specific technology can be very effective but if the message that is being communicated is not well adapted, it will not reach the end-user in a proper way. Information on internet use by farmers and advisers can give two type of outcomes: an



understanding of their behaviors and preferred channels, and also an identification of areas for further development of adapted messages directed to farmers and advisers.

5. Methodology

Two different qualitative surveys have been set up to collect data on the use of different communication tools in the organic arable cropping community in EU: a first one was addressed to farmers, while second one was addressed to advisers.

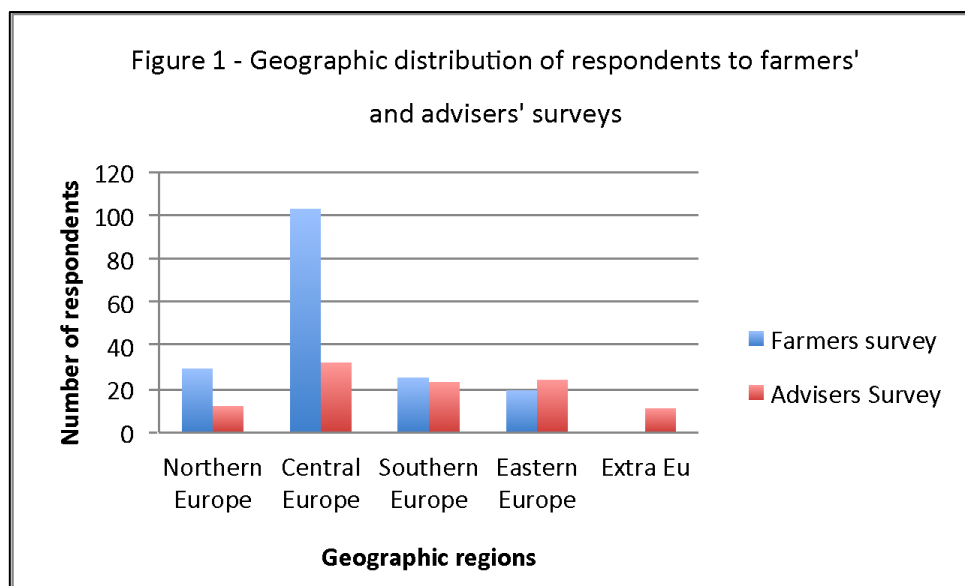
The farmers survey is part of a larger questionnaire developed within the project with the support of the involved farmers groups. The questionnaire was translated into 7 different languages (French, German, Italian, English, Bulgarian, Hungarian, Estonian) and respondents were identified among organic arable farmers, by actors involved in the project, on the basis of their long-term engagement and activity within the local contexts. The main criterion to select farmer respondents was their capacity to be innovative, or to be amongst the leaders in their community.

The farmers completed the questionnaire on Survey Monkey during the Summer of 2015. A total of 42 questions were addressed to farmers in their own language. The first section focused on respondent identification; useful to characterize the answers according to specific traits. The following sections focused on the different tools used, perception and requested characters: printed media publications, mailing lists (paper or digital), online videos, podcasts, social media (Twitter, Facebook, Instagram, LinkedIn), blogs, internet forums. For each tool the farmer was asked closed questions about the frequency of use and also open-end questions about the names of particular tools they made use of. Finally, a section was dedicated to assess farmers' motivation towards the use of internet forums and social media in a professional context, how they use them and when. The last question focused on difficulties to access agricultural information online. A final section gave the farmers the opportunity to provide additional comments. The template of the questionnaire (in English) is available in annex I.

Farmers' survey outcomes

The number of collected answers varied among the countries depending on the relationship within the farmer communities but also on the efforts that the partners put into the identification of relevant respondents. In some countries, the questionnaire was perceived as too long and some respondents skipped entire sections, in this case their answers were not taken into consideration.

The final sample included 179 complete responses which were well spread around Europe and a specific focus with 230 answers from Estonia. The answers from Estonia represented 14% of the Estonian organic farmers and it was decided to use them for validating the answers from the samples in other countries. The data analysis included the translation into English of the answers from 9 different languages. In this way the language barrier was eliminated for farmers, allowing everyone to participate to the survey, however the double translation may cause some bias in term of understanding of questions and possible answers. The bias risk was reduced through a translation check done by mother tongue speakers involved in the project.



The advisers survey design

Once the outcome of the farmers' survey was available, a second survey addressed to advisers was developed to improve the quality of the data and to have a different perspective in the use of tools for learning and knowledge exchange. The advisers were asked both about the tools they used for personal update and about the ones that help them to communicate with farmers. In this way the advisers' survey provided indirectly insight also on the farmers' use of communication tools. In the advisers' survey, English was used as the common language and the questionnaire was not translated. The questionnaire was improved using the experience gathered through the farmers' survey and additional information was included. Advisers completed the survey online using the



Google survey tool. The advisers' questionnaire had 4 different sections: (1) respondent information, (2) tools and sources for personal update, (3) tools for sharing information with farmers, (4) priority challenges. Each page of section 2 was dedicated to a specific source of information: (a) University courses, both face-to-face and online, (b) seminars and workshops, (c) field days and on farm events (d) printed media publications (e) online publications, (f) social media. The template of the questionnaire is available in annex II.

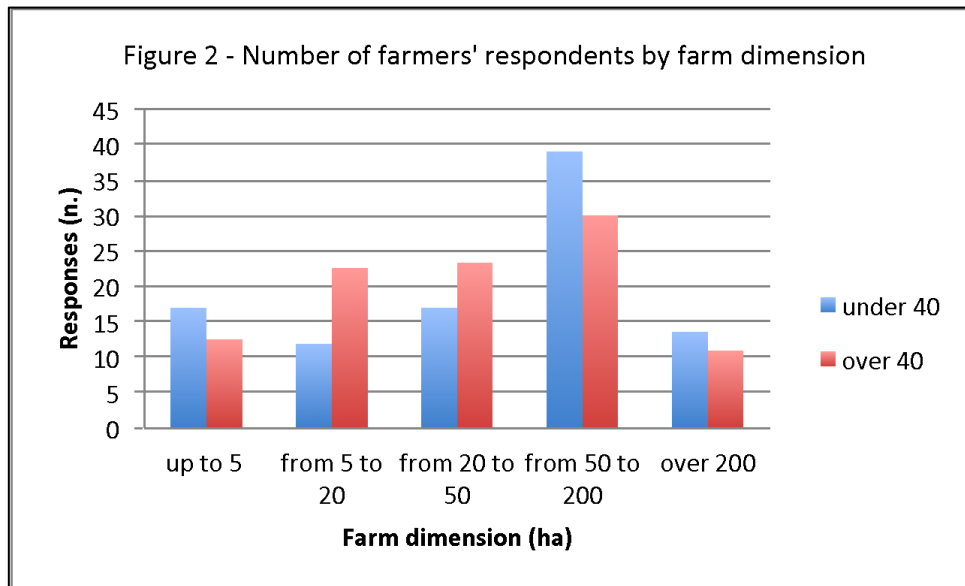
The advisers' survey was promoted in the EIP-AGRI website and the project partners were asked to identify in each country 5 or 6 key advisers on organic arable systems. The contribution of EUFRAS was particularly relevant due to their contacts in extension services in several EU countries. The survey got a total of 110 answers from all over Europe in one month of time. Considering that advisers work in close contact with a large number of farmers, the outcome of the advisers' survey contributes to better interpretation of the answers from the farmers' survey. The language barrier may have partially influenced the number of respondents, but facilitated the interpretation of the questions and answers as well as the data analysis process.

6. Results and discussion

6.1 The farmers' survey results

The analysis of the data collected from the farmers' survey was based on the age of respondents. Only 33,5% of respondent are under 40 , while the majority of answers (66,4%) came from farmers over 40. As the aim of this survey was to look at innovative tools for knowledge exchange; the different vision between young farmers and older ones was highlighted. 85,8% of the respondents of farmers' survey were male: this percentage did not change significantly between the under and over 40 groups. However, looking at it in combination with the background information of respondents, it was interesting to note that 77% of under 40 female respondents were new entrants, in contrast with just 7,6% of female new entrants in the over 40 category. The sample included a significant number of answers from young female new entrants. Most of the over 40 respondents, both male and female, were new entrants (68,3%), while there was a higher number of family farmers (55,9%) in young respondents. This underlines the difficulties young people face to have access to land and credit, with respect to older ones. Most of the respondent farmers have a vocational education/professional level of education, focusing on agriculture (38.9% of under 40 and 48,3% of over 40) and the percentage of young farmers with higher education level (35,5%) is

slightly higher than the one of over 40. A significant percentage of farmer respondents also had different education than an agricultural one (25.4% of under 40 and 20,8% of over 40).

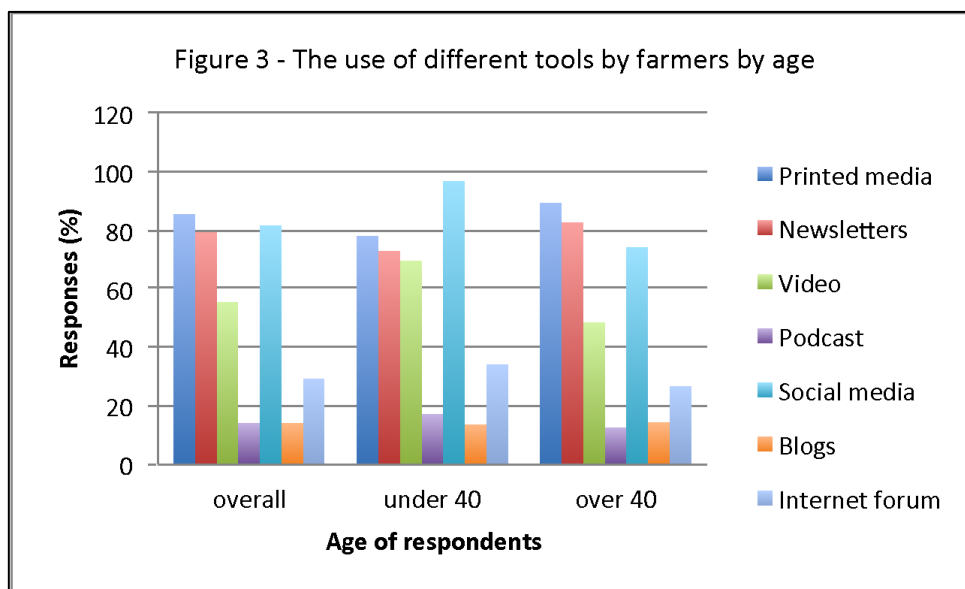


6.1.1 How farmers use Internet and Social Media

The survey focused on the use of different tools for knowledge exchange by the farmers' respondents. The most used tools are **printed media publications, newsletters and social media**, with a use up to 70% from all respondents. Less relevant are **blogs, Internet forums and podcasts** that are not used by more than 30% of respondents. It is interesting to notice some differences in the use of different tools by younger and older farmers as shown in figure 2. A specific case is the one of **online videos** that are mostly used by younger farmers: 69.4% of under 40s respondents declared to watch them, while 48,3% of over 40s farmers use them. The larger use by younger farmers underlines the potential for further use of online videos in the future. However, an interesting data is the important role that **printed media publication** still has for learning among farmers, even if the percentage of use is higher by older farmers (89.1% in over 40s farmers), this

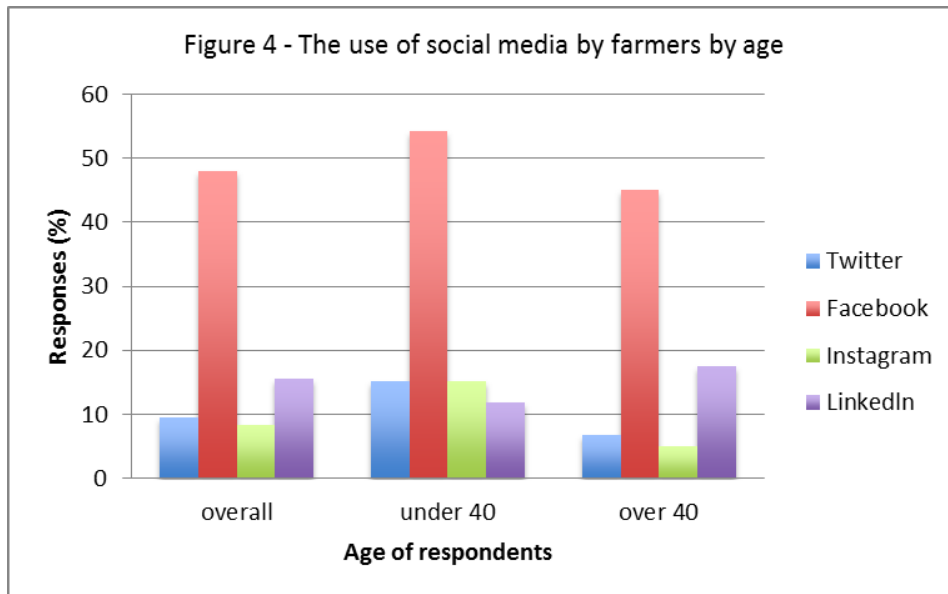
proportion is not so different from the overall use and 77,9% of under 40s respondents declared to use it.

The data from Estonia on the use of different tools mainly confirmed the results from the other countries, with blogs and podcasts as the least used tools. The importance of printed media was slightly reduced in comparison with the rest of the sample, while video and social media maintained a use up to 50%. Internet forums resulted to be used by more than 30% of farmers in Estonia.

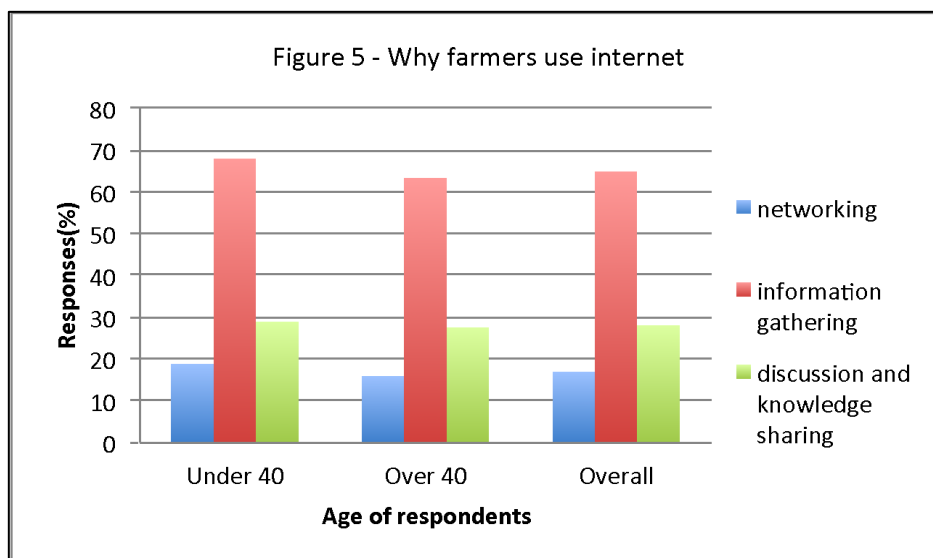


The use of **social media** is also gaining an increased importance for farmers, which, thanks to smartphones and internet connection availability are being used as a main tool for knowledge sharing: 81.5% of farmers use them and looking at under 40 users the percentage goes up to 96.6% of respondents and exceeds the use of printed media publications. The most used social media by farmers is definitely **Facebook**, used by 45,1% of overall respondents, and a difference in the use of other social media between over and under 40s respondents can be observed. **LinkedIn** is more used by over 40 farmers (17,5%), while **twitter** and **instagram** are largely more used by younger respondents: 15,2% of under 40 respondents use twitter and the same percentage use instagram,

while just 6,6% of older respondents use twitter and 5% of them use Instagram. Probably the communication strategies of Instagram and twitter are more familiar to young farmers.



Over 40 farmers declare a high use of **newsletters** (82.5%), while this is less common among younger farmers (72%). Probably social media is gradually substituting the use of newsletters, even if they are still largely used: 79,3% of overall respondents declared that they use them.





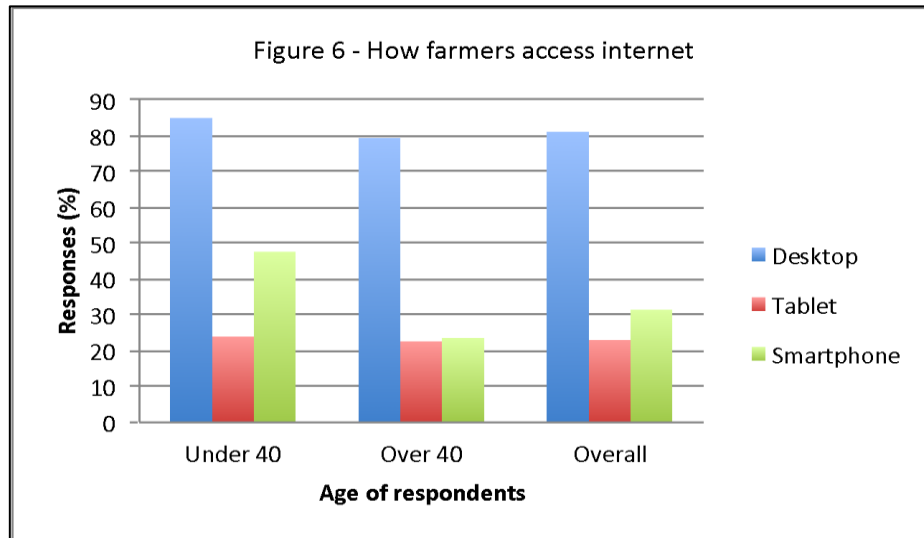
Among the least used tools, **Internet forums** still have a certain use among young farmers (33,8% of under 40) and (29%) overall . This means that even if they have a lower use, probably due to the large amount of time they need to be followed, their use is not disappearing with the new generations and they will still be relevant in the future. **Blogs** are used little by both the under and over 40 groups, with an overall use of 13,9%. A different case is **podcasts** and radio. As for videos, podcasts and radio have probably an increasing potential as a difference in their use between under 40 (16,9%) and over 40 (12,5%) is clear. Probably the lower use is also due to the little availability of agricultural programs.

Farmers mainly use Internet for **information gathering**, in particular younger ones (67,7%). The difference between over 40 and under 40 is not significant, but a little higher use of internet by the younger group emerges, as they are probably more familiar with the tool for personal use.

No more than 30% of farmers use Internet for **discussion and knowledge exchange** and an even lower percentage (16,7%) use it for networking. There is not a significant difference among countries, however French respondents seem to have a higher use of Internet for discussion and knowledge exchange. This can even be related to different cultural disposition to discussion and knowledge exchange.

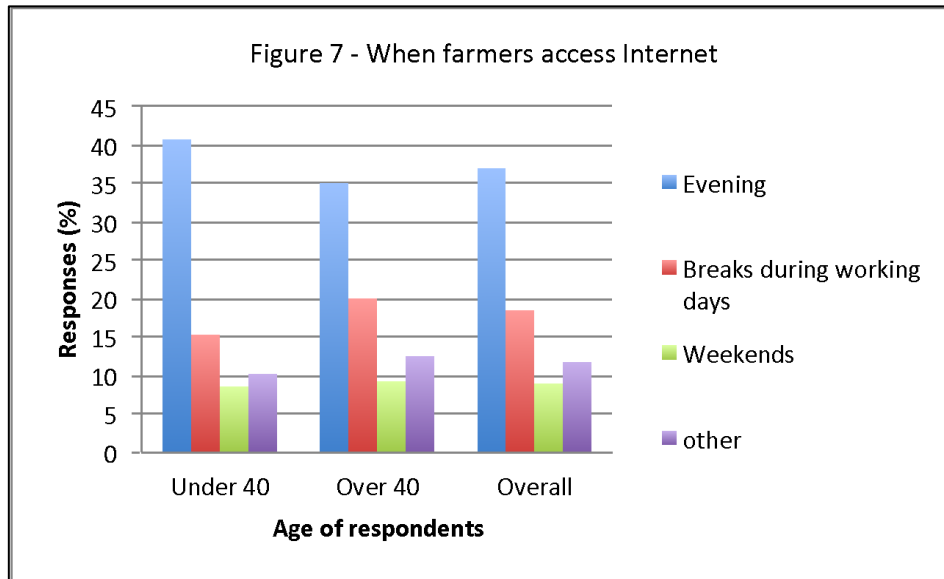
Mostly all respondents use **desktop/laptop** for Internet access, however there is also a significant use of **Smartphones**, in particular by young farmers, which means that this use will increase in the

future. This is relevant information to take into consideration when knowledge platforms for farmers are designed. **Tablets** are not used by more than 23,4 % of respondents.



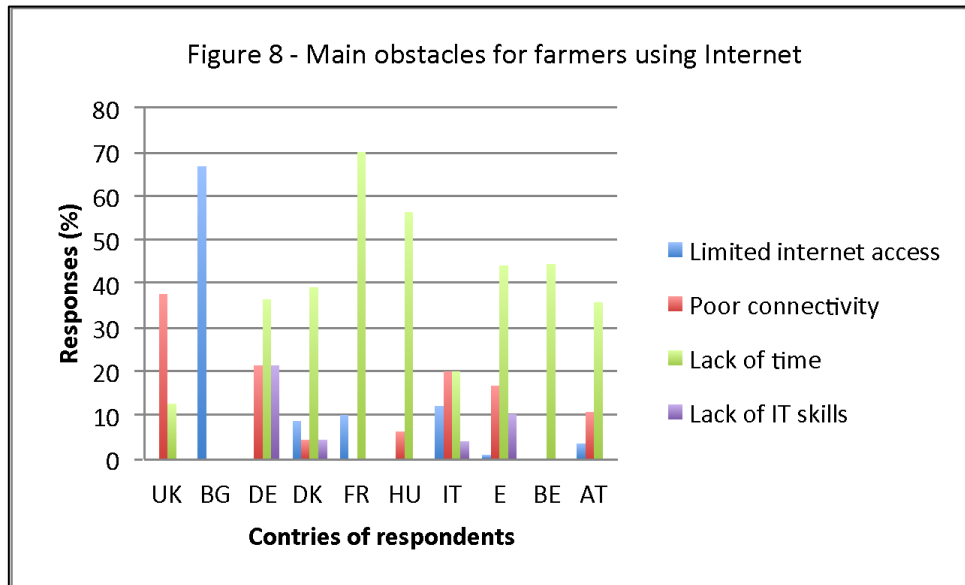
The under 40 farmers are more used to looking at information in internet in the **evening**, while the over 40 farmers are using internet more in their **breaks** during work days; this means shorter time

slots, and it also influences the kind of documents used. Less than 10% of farmers use Internet during **weekends**.



The main **difficulties** identified by farmers to access Internet for agricultural information is the lack of time. In Germany lack of IT skills has been identified as a difficulty by more than 20% of farmers, while this was not a significant difficulty in other countries. Poor connectivity was particularly

underlined by UK (38 %), Italy (20 %) and Germany (21 %) respondents; this was not a problem for other countries such as Belgium, Hungary, France, and Bulgaria.



6.2 The Advisers' survey

Organic advisers need continuous personal update for their area of expertise. In the EU there are few specialized organic advisers and it was quite easy for each country to identify the key persons who were appropriate to respond to this survey. Nevertheless there is an increasing number of advisers with experience in conventional farming who are now interested in gaining knowledge about organic practices since their clients are requesting so. This category was included in the sample invited to respond to the questionnaire. A total of 110 respondents participated in the survey. Most of them were male (72%), however female respondents were a higher percentage when compared to the farmers survey. Most of the respondents were between 41 and 60 years old, however there was a significant participation of young respondents, under 40 years old. The balance of the sample in term of age is particularly interesting considering the need to look at future use of tools and methods for knowledge exchange/creation and learning. The large majority of the advisers involved in the survey had a high educational level (81% hold a Bachelor or a Master), some hold a PhD (around 15%), while a minority (10%) have a vocational education. Advisers working on organic arable systems are often not too specialized in a specific production as organic farms are often mixed. 48% of the respondents declared to be experts in general cropping, but overall the main field



of activity/specialization resulted to be cereals and mixed cropping with livestock, as targeted by the survey design.

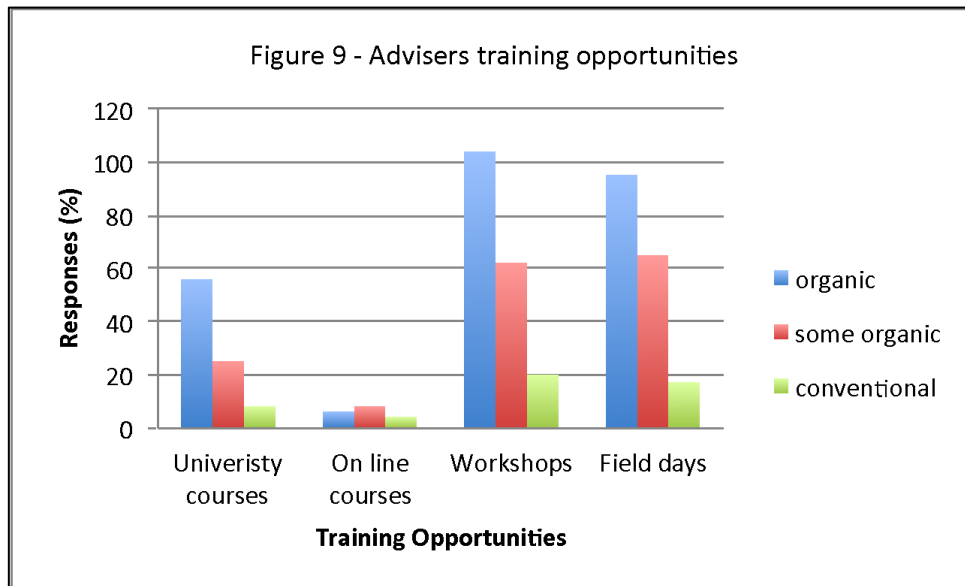
6.2.1 Tools for personal update

Public administration invests at different levels (regional, national, EU) economic resources for training activities. Several type of **training opportunities** nowadays exist on the market, however they differ in degree of effectiveness. The aim of the first section of the advisers survey was to understand how agricultural advisers working on organic arable systems in Europe, use such opportunities for personal update.

Face to face university courses, mostly longer than one week, were attended by 51% of the respondents in the last 5 years. The other 48% did not attend any University course, while online training courses appeared to be less attractive for agricultural advisers. Only 5,5 % of respondents attended **online courses** in the last 5 years. University courses attended by the respondents were specific to organic farming as well as not specific (43% in both cases), while in just 13,8% of cases, in the courses, organic farming was one of the issues in the course programme but not the main one. This result gives an indication on the fact that there is a clear difference between organic and conventional courses and advisers needs to make a specific choice to be trained in organic. Another clear outcome is that there is a need to include organic farming topics in general agricultural courses.

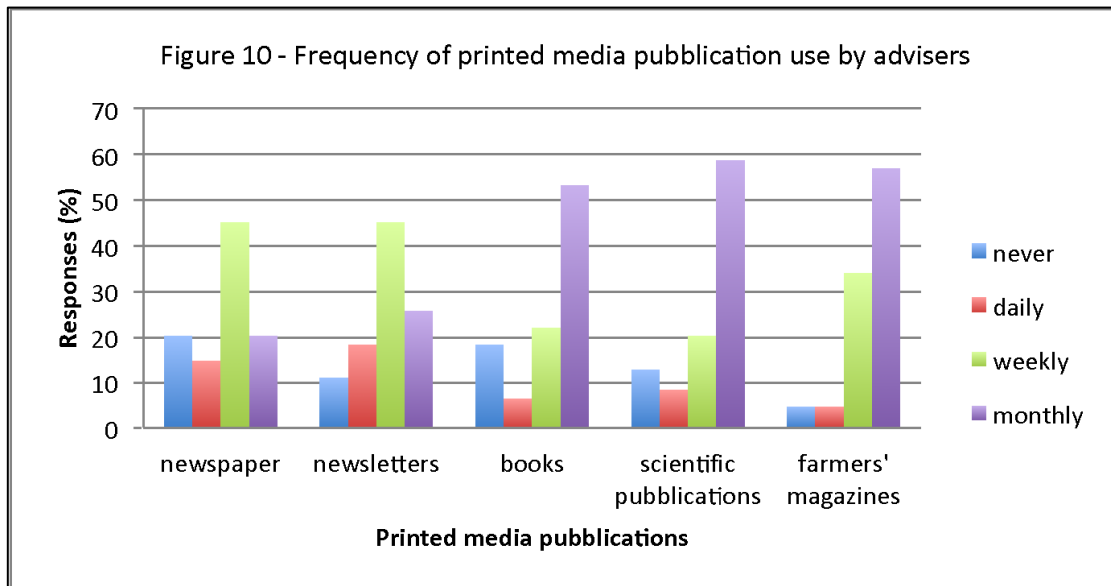
Seminars, workshops, field days and on farm events were used more than University courses by the interviewed advisers. More than 95% of responders attended a seminar or workshop in the last 5 years, while around 87% of them attended a field day or an on-farm event in the last 3 years. 67% of the workshops and seminars took place in the advisers' country, outside his/her region (67%), while 14,2% of them took place in the advisers' region and an other 18% abroad. Concerning field days and on-farm events, even if the proportion of events taking place at country level remained similar to the one of workshops and seminars (61,5%), they seemed to have a higher impact at local level: 31,3% of field days took place in the advisers' region, while just in 7 cases advisers participated in such events abroad. Field days and on-farm events attended by respondents are often specific to

organic farming (67%), as well as seminar and workshops (57,9%). This highlights the interest for continuous punctual training opportunities in organic also by experienced advisers.



From training opportunities, the survey focus moved to **printed media publications (fig 10)**. The use advisers made of newspapers, newsletters, books and scientific publication was explored on the basis of the frequency of use. Respondents mainly used newspapers and newsletters for agricultural information weekly; while books, scientific publications and farmers’ magazines are mainly used monthly. Farmers’ magazines and technical newsletters resulted to be the most used printed publications, just 4% of respondents declared that they did not use farmers’ magazines. Opposite to training courses, printed media publications appeared to be more interdisciplinary and not exclusively under the organic domain: all of them (newspapers, newsletters, books, scientific publications, farmers’ magazines) are -in more than 60% of the cases- used from partly organic

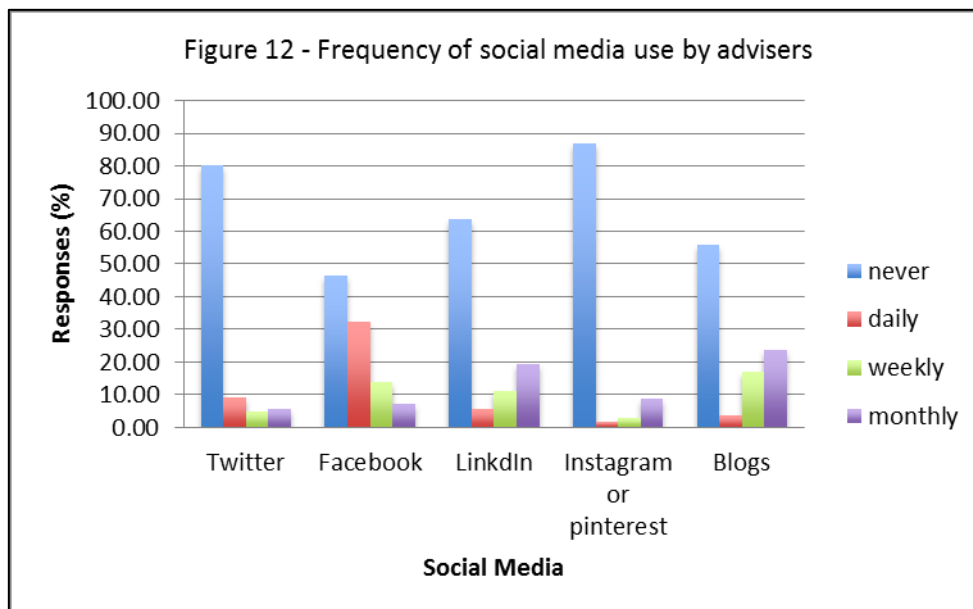
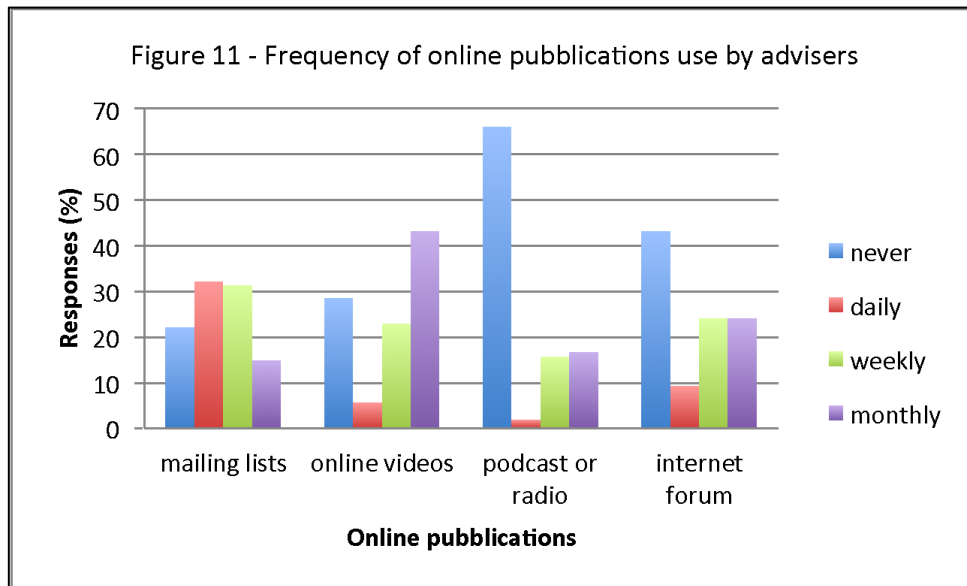
sources. Newsletters resulted to have the higher specialisation in organic: 29,6% of respondents used "exclusively organic" Newsletters.



The use of **online publications** (mailing lists, online videos, podcast or radio, internet forum) is still overall lower than printed ones, however it depends also on the innovative use of such tools that is still not well known. The most used online publication is the "mailing lists": 32,1% of respondents use them daily, while 31,2% weekly and 14,7% monthly. The least used are podcasts or radio. Internet fora are used by more than half of respondents, with low frequency, mainly weekly and monthly; while online videos are largely used (more than 70%), even if with low frequency: 43,1% of respondents used them monthly. Mailing lists result to be the most used tool within the organic sector, as 26% of respondents declared that they used exclusively organic ones, while the most innovative online publications used, such as online videos and podcasts or radio mainly deal with conventional agriculture. One of the reasons why respondents do not use podcasts and radio seems to be the low availability of such tool with a specific focus on organic farming, but the potentials of the tool is clear as it is easily accessible during working phases (on the tractor, while delivering goods etc.)

The use of **social media** has been explored looking at four different tools with different focus: Twitter, Facebook, LinkedIn and Instagram or Pinterest. The most used for personal use is definitely Facebook, (50% of respondents) and when it is used the frequency is high: 35% of respondents have a daily use of Facebook for personal reasons. Around the 30% of respondents use LinkedIn for

personal use, but mainly with a monthly frequency (21%), while more than 80% of the respondents declared that they are not using Twitter or Instagram for personal use.



Looking at the professional use of social media, their relevance decreased compared to personal use and in particular decreased the frequency of use. The use of Facebook moved to a weekly



frequency for 16.5% of respondents, while the use of Instagram and Pinterest had an even further decline with 95 % of respondents not using it at all. However Instagram and Pinterest are relatively new with respect to other social media such as Facebook. The use of blogs both own and others, was more common and they are used for professional reasons by 45% of respondents, mainly with a monthly frequency. The description of Facebook groups that advisers follow shows the potential of this tool to aggregate farmers and advisers living in different areas or through the Facebook page of farmers associations or through direct contact with farmers that have a Facebook account. In the case of LinkedIn the role of professionals groups focusing on specific topic emerge, in this case the use of social media is related to the need to get personal update and to keep advisers in contact with other professionals and research groups.

The main **reason for using Internet** fora and social media in a professional context is related to information gathering (86.2%). However discussion and knowledge sharing are also a reason for 43,6% of advisers. Networking covers a lower but still important role for advisers (28.7%) in comparison with information and discussion needs. Networking is more based on personal communication and social media and internet fora can help in keeping in touch with persons the advisers already know, more than building new relationships.

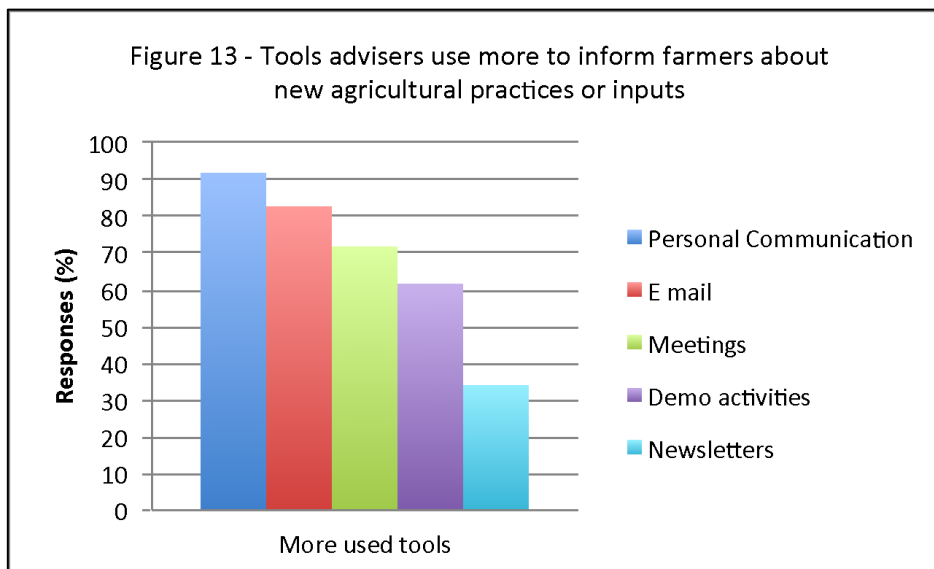
Mostly all respondents (93.3%) use desktop as main **device to access agricultural information** online. However the use of Smartphone is also important (42,9%) and this aspect should be taken into consideration in the development of new tools and knowledge platforms. The use of Smartphones and their diffusion allow people to access Internet and social media for agricultural information in different moments. The most relevant moments are during working hours (59.4%) and evenings (56.3%). However, probably thanks to the use of Smartphones, 41,7% of respondents declared to use those tools also breaks in the working day. Weekends are also important moments for personal update for advisers (33,3%).

The main difficulty to access agricultural information online is the lack of time (64.3%), however 25% of advisers affirm also to be “not sure where to look for what I am interested in”. This means that there is a need and a good potential for specialized, qualified and acknowledged platforms, since it would grant users an efficient search in limited time. Difficulties related to IT skills and connectivity resulted to be less relevant than the capacity to organize knowledge and the capacity to find relevant information quickly. Another important barrier to share information at the EU level is the language. Most of the advisers that used fora and social media, did so in English (77.2%). However the survey was in English so probably a pre-selection of respondents was done on language basis. Advisers who do not speak other languages than their mother tongue have more difficulties

to access online information from other countries, but can have a relevant role in the work at local level with farmers in their region and promote exchange of knowledge among them.

6.2.2 Tools to share information with farmers

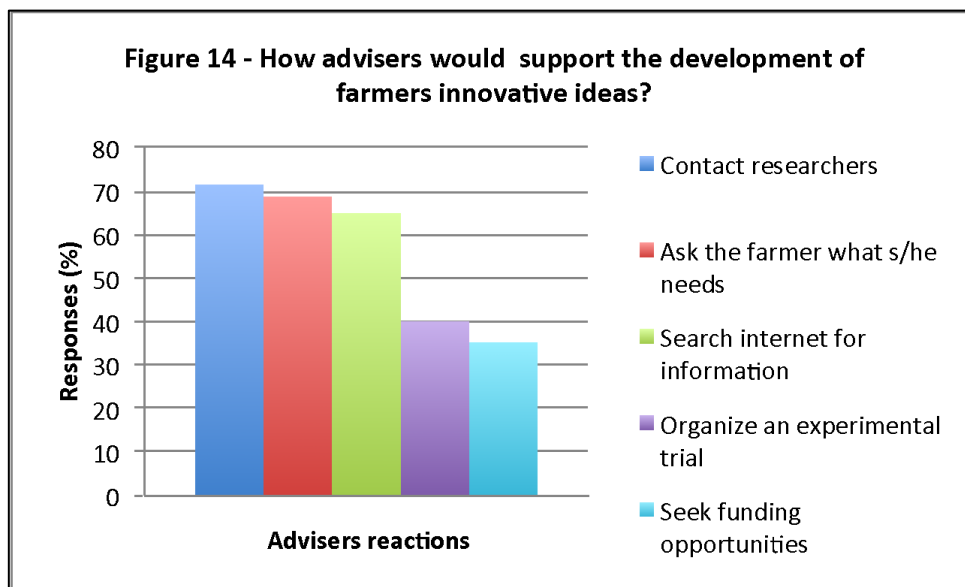
In addition to personal update, advisers use tools also to share information with the farmers they work with. This section gives an overview on tools preferred not just by advisers but also by farmers to circulate information and knowledge between them, at their community level or also at a broader scale. The main way the advisers use to share information with farmers is (not surprisingly) **personal communication** (91.7%), however **e-mail** is now well spread (82.6%) (Fig. 12). Meetings with farmers are also effective, even if they are not always easy to organize (71,6% of respondents declare to use it as way of information exchange with farmers). There are also demonstration activities (field days or visits on farms) that are used by 61.5% of the respondents. Advisers confirmed the role of newsletters, as the most used online tool (33,9%); however paper mail still has a relevant role (22%) in providing information to farmers. The same tools, personal communication (94,5%), e-mail exchange (67.9%) and meetings (70,6%), are the most common for advisers to collect the knowledge needs from farmers (fig.14).



An interesting aspect is to consider that not all the advisers would react to farmers' innovative ideas (fig. 13). Just 68.6% of advisers systematically ask the farmer about his/her needs and in the case that the farmer expresses an interest, a need or an innovative idea, 71,4% of the advisers react by

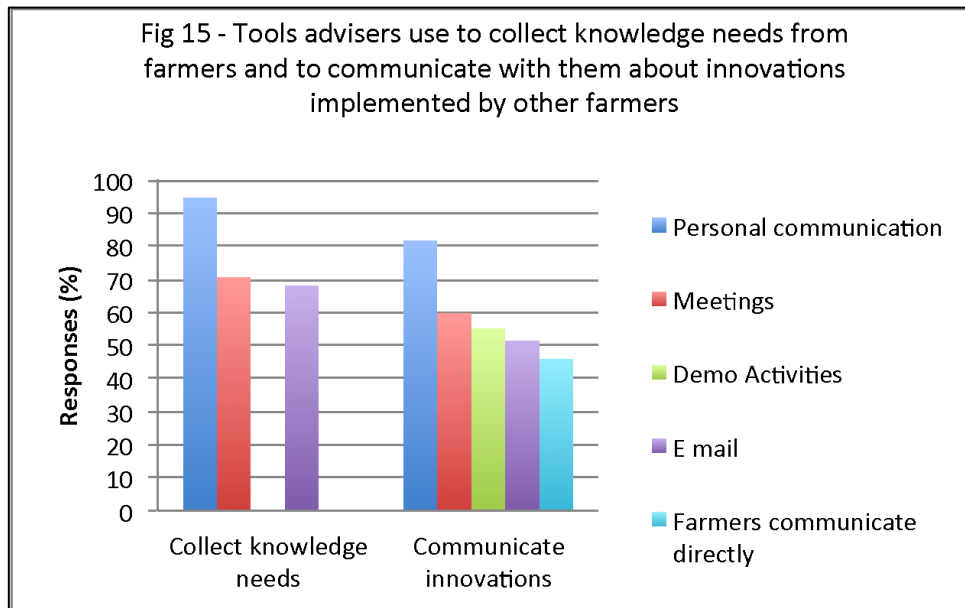
contacting a researcher. A lower percentage of respondents would organize an experimental field trials (40%) or seek funding opportunities (35,2%). This means that they do not see the potential of being part of the innovation process and have a very “conventional” view of innovation as something researchers produce and can be only passed over to farmers. As a consequence, most of the time farmers’ innovative ideas remain out of research projects and funding opportunities. However if a farmer implements an innovation, advisers would use it in their everyday work. They would communicate it to other farmers mainly through personal communication (81,7%), but also meetings (59,6%), demonstration activities (55%) or peer-to-peer exchange (45,9%) and e-mail (52,4%) would represent possible opportunities of knowledge exchange among farmers. However demonstration activities and direct farmer communication are not considered as tools to collect knowledge needs from farmers, so field days and on farm experiments are still seen too much as a one way information provision rather than as a part of a mutual learning process.

While newsletters appear to be important tools for personal update and information exchange between farmers and advisers, in the case of farmers innovations they have a less relevant role, only 30% of respondents would use newsletter to communicate an innovation to other farmers.

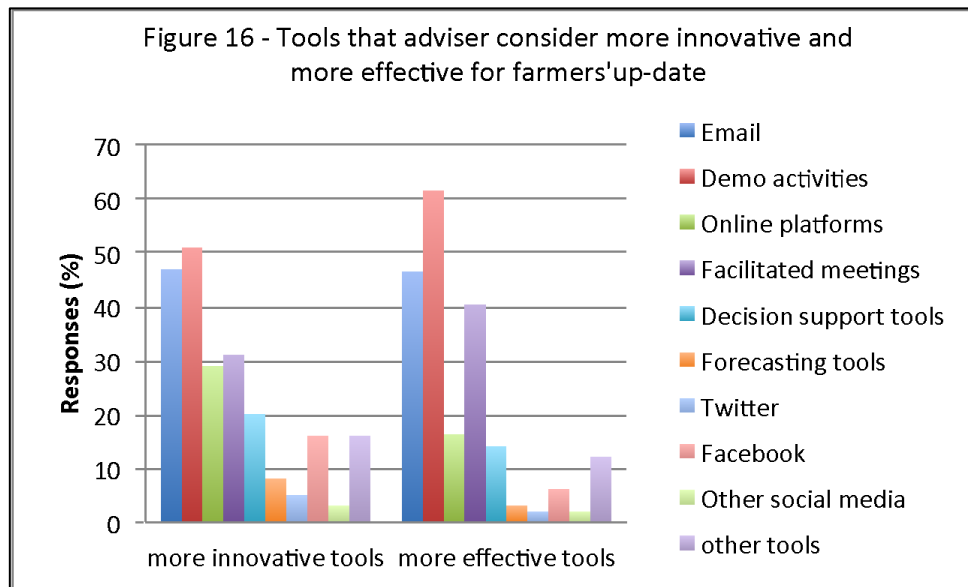


The main tool to communicate with farmers about training/information events is e-mail (89,4%), followed by personal communication (72,1%), meetings (41,3%) and newsletters (39,4%). Demonstration activities could also be an opportunity to invite participants to further training and

information events (29,8%); paper mail still covers a relevant role in communication with farmers (22,1%).



The comparison between tools that are considered by advisers as more innovative and more effective is of particular interest. Email exchange is still considered to be an innovative tool (47% of respondents), followed by online platforms/websites (29%) and Facebook (16%). Decision support tools, for pest and disease management or for crop rotation and fertilization planning, are also innovative for 20% of respondents. However physical tools that encourage a direct exchange with farmers, such as demonstration activities (51%) and facilitated meetings (31%) are also considered innovative by a similar percentage of respondents. Even if the first five more effective and more innovative tools are the same as the most innovative (Email, demonstration activities, Online platforms, facilitated meetings and decision support tools), when advisers were asked about effectiveness of the same tools, the role of physical meeting increased in comparison to the online ones. Demonstration activities and facilitated meetings are considered the most effective tools for farmers' update and technical support. The percentage of advisers that consider such tools effective is even higher than the one of advisers that declared to use them. Not all the advisers that consider online platforms and decision support tools as innovative, consider them to also be effective. Social media is still not considered by most of respondents as an effective tool for farmers' update and technical support, however considering the high use of social media that emerged from the farmers' survey, particularly by younger generations, they could have a potential to become more effective and deserve more consideration.



7. Conclusion and Recommendations

Several interesting results emerged from the two surveys. In combination with the literature on co-learning and some reflection on the role of advisers, they could be useful as a basis to develop knowledge exchange and learning materials both within the project OK ARABLE NET and more in general for future development of EIP-AGRI.

The increasing use of **smartphones allows farmers to raise the** number of moments in which they can **access Internet** to look for technical information (breaks during working days, evenings etc.). Since lack of time was their main constraint for Internet use, the possibility to have an Internet device always with them, included **when they are in the field**, is a great opportunity to improve technical advice and to facilitate the flow of information, both scientific and practical. However, it requires the **web tools** (e.g. webpages, DSS, platforms) **to be responsive**, otherwise they will be not be used. For the same reason texts and tools need to be short and broken in blocks to make them easy to be read in smartphone format. They need to be built with hypertexts where further or deeper information is available, but **the user can decide to access them at a different time (and from a different device) and easily skip them when not needed**. Such a structure would facilitate their use in different moments, during short periods of time.

Social media use has also spread significantly among farmers, in particular Facebook, which, farmers use both for personal and professional reasons. The role of social media will not be to directly give



technical information to farmers, but instead to **inform farmers about the availability of specific new technical information online**, in specific web portals and knowledge platforms. If such tools, as already said, are well structured for the use in smartphone, farmers can directly link to them from social media and have continuous access to new technical knowledge. In addition, social media can be used to raise **awareness of farmers on specific issues and to promote on farm events, field days and other physical knowledge exchange opportunities**. In addition, social media allow each farmer and adviser to have an active role in knowledge exchange also as a knowledge provider and not only as a user. **The knowledge flow becomes more inclusive** since with social media it is indeed far easier and self-explaining to post a short video or a comment, compared to web platforms or printed material.

The survey confirmed that both farmers and advisers **prefer physical meetings** as training opportunities, in particular demonstration activities such as farm days and on farm experiments to anonymous online courses. Personal communication, meetings, e-mails and demonstration activities resulted to be the most used tools by advisers to reach farmers and give them info about new practices. The word of mouth and group events resulted to be the most popular methods for agricultural advice also in other surveys (e.g. DEFRA 2010).

This result confirms the idea that despite the potential of ICT tools, **peer to peer exchange and co-learning approaches remain the more effective knowledge exchange tools to trigger the innovation process and the move from creative ideas to innovative practices**. The use of demonstration farms and field days as knowledge exchange tools, even if they seem to be costly in term of organisation, staff cost, time and travel costs, still have a high social benefit as they are at the base of a good mutual learning process and co-development of knowledge. Farmers need to know each other personally, in order to see other farmers' experiences and to discuss between themselves and to be motivated to apply innovative solutions in their fields. These are the only tools that can create the ripple effect identified by Slee et al. (2006).

Even if the use of printed media publications, in particular farmers' magazines is still well spread among EU farmers and advisers, **Internet is becoming the place where technical information is searched for** and new ICTs tools have a good potential in **maintaining active the social relations** that Morgan and Murdoch (2000) identified as the base for effective knowledge exchange processes.

Social media and online videos, that can easily be disseminate towards social media, are the most spread new ICTs tools, especially among young farmers. **Videos reduce the language barriers**, particularly strong in EU, and have an **immediate communication language**, appreciated by farmers.



A similar potential could be possible in the visual social media (e.g. Instagram and Pinterest), even if they are still not yet well spread. The **use of images** instead of written texts allows for a **reduction in the time needed to catch up on technical information** and this is particularly relevant, since lack of time was identified clearly as the main barrier against internet use for technical advice. To develop good videos for technical advice, research findings and farmers practices should be processed in a way that aims to **reach different audiences effectively**, which requires the **integration of technical and communication skills**. The availability of **good quality processed information** is definitely a factor that influences the use of specific tools. For example, podcasts and radio could have a good potential to reach farmers even when they are using their hand for the work in the field, but they are still not well spread because very little content on agricultural technical advice is available in that format.

An interesting focus is the **role of advisers**, which is clearly **changing with the change of the innovation model underpinning agricultural research**. Most of pioneering organic advisers developed an interdisciplinary approach to new knowledge and good communication and networking skills. For a long time they had the role to facilitate knowledge exchange processes among organic farmers to develop innovative practices that improved synergies of the production system with the environment, without a strong research support. For many years, much of the research in organic was based on comparisons between conventional and organic farming systems and did not address **agro-ecological processes** that could create useful synergies for organic farmers. Furthermore, such **skills have not been easily transferred to the new generation of advisers**. Training opportunities completely dedicated to organic farming make it difficult for conventional advisers to get to know something about organic and this prevents or at least does not support the transfer of skills to advisers about the processes of converting new farms or advisers to organic. The presence of modules on organic agriculture in conventional training programmes would allow for a better **interaction between organic and conventional production models, instead of competition**. Numbers and the age of the respondents of the survey show that few new advisers entered the organic scene and that it is a weak point of the sector. However this could also depend on the advisers, their mindset and educational background. Agricultural **advisers are still mainly trained in a knowledge transfer approach to innovation**, with a great sectorial specialization of agricultural knowledge. In any case the advisers appear to fail in their role of connecting research and practices in an innovative and participative way.

The capacity to link “physicalities” in order to get farmers and advisers involved in research is no longer a peculiarity of agricultural advisers. Several other figures are nowadays active in facilitating relationship building in agricultural knowledge and innovation networks. The survey underlined how advisers still try to do their personal updates using written sources and still make a low use of new ICTs tools in comparison to farmers. This means that **new actors**, such as companies offering web based services to farmers or social scientists and professionals managing ‘communities of practices’ **are fitting into the role of intermediaries in research communication** since they have the skills to



facilitate two-way multi-dimensional communication flows. The French experience of “facilitators” is an example of this trend. **Facilitators differ from advisers as they do not directly provide information** but they are professionally prepared to **build up links between different actors in order to allow the knowledge to flow and to develop**. Facilitators’ skills and knowledge are essentially to link to sources of information (scientific and practical), mapping and networking capacity. It is an emerging professional role that can complement advisers. Historical organic advisers and private technical advisers still have the incentive to develop their personal update also in the direction of co-learning approaches and they could have an interesting role in developing training opportunities focusing on new approaches to innovation in agriculture for the whole agricultural adviser community, both younger and elder ones. **The peer to peer exchange is more common and natural among farmers;** that consider themselves all colleagues and easily meet between conventional and organic, exchanging experiences and knowledge; than for **advisers that tend to specialize** in one sector or another and have less interaction and exchange of practices between organic and conventional farming systems.

However the **use of new ICTs tools for knowledge exchange is changing quickly**, due to the evolution of communication technologies and user preferences. Social media are starting to substitute online newsletters to promote events and spread immediate news and they need to be integrated with books and scientific publications that still represent important points of reference for more deep learning. **Technical agricultural advisers could still play a key role in developing technical material for new ICTs tools** by adapting them to different formats.

Since the sector of knowledge exchange is developing very fast, **there is a need to keep asking farmers and advisers about their use of new ICTs tools**. The results of this survey can be used as a **baseline to discover evolutions and trends in ICTs tools use for agricultural advice by collecting further data**. The sample can be enlarged by increasing the number of countries involved and the type of actors interviewed and the number of respondents, but also by moving the reference subset from arable organic farming to other sectors.

A questionnaire, with selected questions on the use of tools for knowledge exchange could be available on-line over the next years as a tool to keep on exploring the mechanisms of communication among farmers and advisers and, at large, within the farming community.

The results of this report are going to be further validated by the farmers groups within the project lifespan through the assessment of specific tools. The guiding principles in the development of OK NET Arable knowledge platform will be **the facilitation of selectivity through the establishment of search mechanisms that enable users to find what really they need efficiently and rapidly**. A successful application of such principles will ensure the platform’s usefulness and interactivity and consequently granting it the possibility for further use even after the end of the project.

The knowledge platform developed by the OK NET arable project could be a space for the EIP-AGRI to collect further data in the future on the quality of knowledge exchange tools.



8. References

- Alrøe, H. F., & Noe, E. (2011). The paradox of scientific expertise: A perspectivist approach to knowledge asymmetries. *Fachsprache-International Journal of Specialized Communication*, 34 (3–4), 152-167.
- Alföldi, Thomas und Weidmann, Gilles (2013) Disseminaton: Tips, tricks and lessons learnt. Vortrag at: CORE Organic II Research Seminar, Amsterdam, 15. April 2013
- Butler and Lobley, (2012) Resource Management, Knowledge and Interent Use on farms in South West England. A Report for the SWARM Knowledge Hub. Centre for Rural Policy Research, Department of Politics, University of Exeter.
- Blackstock, K. L., Ingram, J., Burton, R., Brown, K. M., & Slee, B. (2010). Understanding and influencing behaviour change by farmers to improve water quality. *Science of the Total Environment*, 408(23), 5631-5638.
- Curtis, A., Britton, A., & Sobels, J. (1999). Landcare networks in Australia: state-sponsored participation through local organizations. *Journal of environmental planning and management*, 42(1), 5-21.
- DIFID (2010) Research communication: Insights from practice A working paper of the Research Communication Strategy Group Edited by Isabel Carter and Kurt Paulus
- EU (2012) Communicating EU Research & Innovation: a guide for project participants.
- EU SCAR (2012), Agricultural knowledge and innovation systems in transition – a reflection paper, Brussels.
- Howells, J. (2006). Intermediation and the role of intermediaries in innovation. *Research policy*, 35(5), 715-728.
- Kastberg, P. (2007). Knowledge communication-the emergence of a third order discipline. In *Kommunikation in Bewegung*. Peter Lang.
- Klerkx, L., Schut, M., Leeuwis, C., & Kilelu, C. (2012). Advances in knowledge brokering in the agricultural sector: towards innovation system facilitation. *IDS Bulletin*, 43(5), 53-60.
- Knickel, K., Brunori, G., Rand, S., & Proost, J. (2009). Towards a better conceptual framework for innovation processes in agriculture and rural development: from linear models to systemic approaches. *Journal of Agricultural Education and Extension*, 15(2), 131-146.
- Hayami, Y., & Ruttan, V. W. (1970). Factor prices and technical change in agricultural development: The United States and Japan, 1880-1960. *Journal of Political Economy*, 78(5), 1115-1141.
- Leeuwis, C. with Van den Ban, A. (2004) *Communication for Rural Innovation: Rethinking Agricultural Extension*.



- Lobley, M., Saratsi, E., Winter, M., & Bullock, J. (2013). Training farmers in agri-environmental management: the case of Environmental Stewardship in lowland England. *International Journal of Agricultural Management*, 3(1), 12-20.
- Morgan, K., & Murdoch, J. (2000). Organic vs. conventional agriculture: knowledge, power and innovation in the food chain. *Geoforum*, 31(2), 159-173.
- Slee, W., Gibbon, D., Taylor, J., 2006. Innovative Methods for Influencing Behaviour and Assessing Success in Relation to Enhancing Sustainability at Farm Level. CCRI report to Defra, UK.
- Sutherland, L. A., Darnhofer, I., Wilson, G., & Zagata, L. (Eds.). (2014). Transition pathways towards sustainability in agriculture: case studies from Europe. CABI.
- Tsouvalis, J., Seymour, S. and Watkins, C. (2000) Exploring knowledge-cultures: precision farming, yield mapping, and the expert - farmer interface. *Environment and Planning A*,
- Winch, G. M., & Courtney, R. (2007). The organization of innovation brokers: An international review. *Technology analysis & strategic management*, 19(6), 747-763.