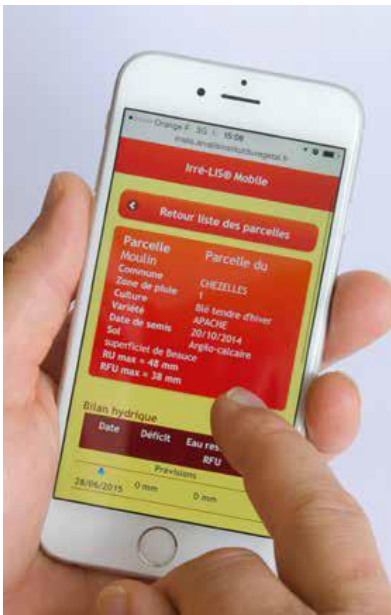


INNOVATION

but not at all cost



“Smart” technologies have been integrated into a European farmer’s daily life (essentially through decision support tools), but to a lesser extent than in the United States.

How do farmers see new, so-called “smart” technologies? A pan-European survey of farmers using very different systems shows that they are interested in new technologies, but do not expect them to solve all their problems.

The generic term of “smart” farming technologies (or SFTs) includes farm management systems, precision farming technologies, and automated or robotic devices. The recognised objective of those technologies is to bring solutions that boost productivity while minimising the impact of agriculture on the environment. However, whereas between 20% and 80% of American farmers (depending on States) are already using them in one form or another, in Europe, this percentage ranges between 0% and 24% depending on the country.

Why such a disparity? In order to understand the factors that affect the generation, adoption and dissemination of technological innovation in European agriculture, a qualitative survey was conducted as part of the SmartAKIS⁽¹⁾ project with 271 farmers from 7 European countries (France, Germany, Greece, Serbia, Spain, the Netherlands and the United Kingdom).

Variable perception of the crucial issues

In Europe, agricultural areas are facing many challenges, be they economic (fluctuating or decreasing income), social (farmer numbers continue to drop) or environmental (reconciling productivity with environmental protection), that those technologies are aiming to help overcome. The European farmers taking part in the survey are interested in smart technologies, but currently use them to a variable extent.

Farm size is a determining factor, with smaller ones (less than 10 ha) using SFTs less. One of the expectations highlighted by the survey is precisely to see those technologies adapted to the needs of smaller farms.

On average, disease control and soil preservation are the surveyed farmers' top two concerns; the other issues they perceived as important are reducing the use of PPPs (fungicides, insecticides and herbicides) and controlling weeds. The low priority given to the reduction of water inputs partly reflects the statistical predominance of Northern European countries, which do not face water shortages at the moment.

However, the perception of what challenges agriculture must meet, varies throughout Europe. In France, the majority of farmers mention weed control, regardless of what they produce and of the size of their farm. This is followed by disease detection and preservation of soil fertility and function.

What do farmers hope from which technology?

46% of the farmers surveyed perceive smart technologies as being very important for agriculture, but 51% are neutral or do not have an opinion regarding what degree of importance they should be given. The way the assistance that smart technologies are likely to bring to agriculture is perceived largely depends, actually, on the farm's context and the technology in question; Northern European farmers with large businesses feel the need much more for those new technologies, and place much greater hopes in them than small farmers in the South.

One of the more noticeable differences in the way SFT potential is perceived concerns the improvement they are expected to make to agricultural revenue: the countries that have embraced them least seem to be those, like Serbia, that expect that they will improve their revenue most; conversely, only 9% of the French farmers who took part in the survey think that those technologies have a very important role to play. Those answers showed again that the size of the farm (linked to the level of previous experience of smart technologies) has a bearing on a farmer's opinion. Hence, none of

Profound changes on the horizon

Agriculture is currently going through its fourth revolution, triggered by the exponential growth of communication technology and IT use: autonomous tractors for weed control, fertilisation and harvesting, autonomous drones equipped, for example, with full-spectrum cameras designed to monitor crops, decision support tools, virtual fences, connected sensors, etc. Technological improvements are, and will keep on drastically changing agricultural practices.

This trend isn't reserved to the Western world, it also applies to developing countries, where communication technologies are being deployed at a very fast pace, including with the generalisation of mobile phone use, and where they could bring change through, for example, drought and flood forecasts that would help farmers take the weather into account.

From the article "*Opinion: Smart farming is key to developing sustainable agriculture*" (2017) by A. Waltera, R. Finger, R. Huber and N. Buchmann, published on the US National Academy of Sciences' website.



A European survey reveals that farmers have expectations from innovative technologies, but that the latter must adapt to meet real needs.

the farmers with over 200 ha think that SFTs bring no improvement at all compared with old tools, or that they are not useful to farmers; and 36% of those farming over 500 ha think that SFTs reduce production costs.

When asked which smart technology seems to them to be most useful (in general or for their farm, whether it already exists or not, and regardless of cost), 25% of respondents mentioned robots, to carry out repetitive and monotonous tasks (weed control, hoeing, harvesting, etc.). Real time diagnosis via drones, satellite images or sensors linked to smartphones comes second.

Unsurprisingly, a more in-depth analysis of their replies shows that arable crop systems tend to give precedence to GPS and connected tools, whereas orchard fruit and grape farmers prefer software applications.

Expectations, and limitations

On the whole, however, the survey reveals that farmers doubt that those new technologies will be able to help them meet some of the challenges they are facing, including weed control, even though they are following their development closely. One of their main reasons is the cost involved: for most farmers, this is a significant obstacle to their adoption, and therefore to their future development. The farmers surveyed are wishing those technologies were more affordable. They are also expecting the return on investment to be assessed.

The survey reveals that one of the main improvements expected concerns information sharing. Farmers would like various devices to be able to communicate with each other; therefore, the lack of compatibility between them is a hurdle, but which can be overcome. They also expect the information to be presented in a less complicated way.

The difficulty in accessing an Internet connection in the middle of a field is the other obstacle to those technologies' development; with the expansion of 4G, this problem is about to be solved, but at a price.

Farmers are also concerned about the reliability and robustness of SFTs, as well as their potential dependency on their supplier; it is true that such sophisticated equipment can rarely be repaired by farmers themselves.

The communication networks between farmers such as the one proposed by the SmartAKIS project, are the most relevant source of information for farmers and developers of new technologies alike. Think-tank sessions were organised in France and in the rest of Europe in order to determine more precisely the specific needs in each country. They included farmers, scientists, experts and new technology designers, to exchange ideas and generate new projects.



To date, the main hurdles for the development of those technologies are their cost and the lack of compatibility between the different devices.



(1) Launched in March 2016, the SmartAKIS project, in which Arvalis is involved through ACTA, is EU-funded as part of the Horizon 2020 research and innovation programme (approval_N° 696294). This thematic platform is designed to encourage communication between research, industry and the wider agricultural community, in order to disseminate "smart" technology solutions resulting from applied and commercial research.

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