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Digitalization in crop farming presented at Agritechnica 2025

9 to 15 November 2025 in Hanover, Germany - Guiding theme “Touch Smart Efficiency” - Opportunities for digitalization on the farm - Challenges: system compatibility and network connection - Measures to increase acceptance - Agritechnica provides information on current solutions: The Digital Farm Center

Digital solutions for crop farming are now widely used in practice with proven benefits to both conventional and organic farms. Digital technologies used in data processing enable farm managers to make improved decisions, use resources more efficiently and simplify documentation to operate more profitably and sustainably. This is why digitalization in crop production will be a key topic at Agritechnica 2025. The world's leading trade fair for agricultural machinery from 9 to 15 November at the exhibition grounds in Hanover, Germany, will give visitors direct access to innovative, networked agricultural systems that use digital technologies to increase efficiency, sustainability and productivity under this year's guiding theme of “Touch Smart Efficiency”. The trade fair is organized by the DLG (German Agricultural Society).

The practicable application of advanced sensor technology and cloud applications today offer the agricultural and food sectors a range of digital solutions. Digitalization is expected to be pivotal in supporting the entire value chain to pursue economic and ecological requirements.

German farmer survey shows wide use of digital technologies

That farmers are increasingly taking advantage of digital technologies was confirmed by a German farmer survey conducted by the digital association Bitkom jointly with the DLG in 2024. The survey showed that farms make wide use of variable rate application to distribute fertilizers (36 percent) and pesticides (30 percent). Predictive maintenance for agricultural machinery is used by 25 percent of farms.

According to the survey, the use of digital technologies in arable farming increased between 2022 and 2024. The most common are GPS-controlled agricultural machines, which are already used by 69 percent of farms, followed by field maps derived from satellite or drone images.

The use of digital and smart technologies in agriculture is summarized by the term smart farming: solutions that can automate field tasks and aid farmers in their operational decisions. The spectrum of tasks ranges from automated data collection and the optimization of farm planning to more efficient accounting.

Advantages of digital technologies

Digital technologies can offer a range of benefits, increasing the quality of farm work and crop produce as well as offering ecological and economic criteria. Side benefits such as an improved work-life balance can also be gained. Reduced use of operating resources and increased productivity also have a positive effect on income and can help to stabilize the income situation of the farm.

Examples of digital technologies:

- Driver assistance systems on combine harvesters continuously monitor the quality of the harvested crop - like broken grains and impurities - and automatically adjust concave spacing and threshing drum speed as necessary.
- Sensor technology on precision air seeders, together with automated metering devices, monitors the placement (longitudinal distribution, double or incorrect placement, etc.) and adjusts as necessary.
- NIRS sensors on the slurry tanker record the contents of the manure, enabling needs-based crop nutrition.
- NIRS sensors on the forage harvester record the quality of the harvested produce, which offers an improvement to animal nutrition.
- Equipment- and drone-mounted camera systems are now used for weed detection with either mechanical weed control by robots or variable rate application by sprayers.
- Replacing paper-based farm management with a digital system drastically reduces the high manual effort required for routine and documentation tasks and frees up valuable time and resources.
- Farm management information systems (FMIS) support farm managers in planning, monitoring, documenting and optimizing operational processes through automated data collection and processing, for example through automatically generated field maps.
- GPS-supported steering systems save time, e.g. for headland turns, relieve the strain on drivers, ensure a higher quality of work and enable high quality work results, even at night.

- The automated application of fertilizers on zones and crop protection products according to digital application field maps offers the possibility of more efficient use of operating resources, which also has an impact on operating costs. The more heterogeneous the areas, the greater the effect of site-specific management.

Significant majority view digitalization as an opportunity

The results of the aforementioned survey by Bitkom and the DLG show that a large majority (79 percent) of farmers see digitalization as an opportunity. Time savings (69 percent), greater efficiency in production (61 percent) and manual labour reduction (57 percent) are cited as the greatest advantages of digital applications.

The farms also express high expectation for the future of the entire sector in digital solutions to make agricultural production more sustainable and efficient at the same time: 80 percent of farmers firmly believe that digital technologies will enable them to make agricultural production more resource-efficient, 91 percent regard them as a tool to save fertilizer, pesticides and other inputs, a further 67 percent to reduce costs in the long term and 60 percent to improve the quality of agricultural products.

Challenges: Compatibility and network connection

Data is the foundation for the digitalization of processes in agriculture. Smooth data exchange between all technical components and business partners is crucial for this. At present, digital solutions are still largely characterized by isolated solutions from different manufacturers. Networking with systems and applications from other providers is often not possible or only possible to a limited extent due to a lack of suitable interfaces or data standards. Such compatibility problems make the work of farmers more difficult and ensure that the technical potential of digital solutions cannot always be fully exploited.

Another limiting factor for accelerating the implementation of digital processes in practice is still the inadequate mobile network coverage in many rural areas. Often, only narrowband network access with low data rates is available, which does not allow the use of many real-time-capable and data-intensive applications. Sometimes there is no mobile phone coverage at all. This makes broadband expansion a key issue for the future of rural areas.

Removing barriers to acceptance

In order for digitalization to be implemented quickly and widely, those who still have doubts must ultimately also be convinced. Small and medium-sized farms in particular see the relatively high investment requirements as a barrier. Data protection and data sovereignty, interface problems, lack of user-friendliness and lack of IT expertise are other frequently cited barriers to acceptance.

In order to successfully shape the digital transformation in agriculture, the necessary framework conditions must be created to further acceptance. This can include the creation of financial incentive systems as well as the use of digital technology across farms in the form of machine communities. It is also important to strengthen the digital skills of farmers with suitable training so that they can take full advantage of the rapidly developing digital technologies.

Agritechnica provides information on the latest solutions

As the leading platform for innovation in agricultural machinery, this year's edition of Agritechnica aims to create proximity to digital solutions. With its guiding theme "Touch Smart Efficiency", Agritechnica invites farmers and contractors to discover the potential and discuss the challenges of implementation. The new "Digital Farming Center", presented by DLG's FarmRobotix platform, presents interactive displays of robotics, automation, AI, drones and precision farming for crop production. A dedicated exhibition day themed „Digital Farm Day on 13 November focusses on digital farming: Machinery dealers and professional farms can obtain the latest information and best practice examples from experts as well as engage in business networking and explore the exhibits in the Digital Farming Center.

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About DLG

With more than 31,000 members, DLG is a politically independent and non-profit organisation. DLG draws on an international network of some 3,000 food and agricultural experts. DLG operates with subsidiaries in 10 countries and also organizes over 30 regional agricultural and livestock exhibitions worldwide. DLG's leading international exhibitions, EuroTier for livestock farming and Agritechnica for agricultural machinery, which are held every two years in Hanover, Germany, provide international impetus for the local trade fairs. Headquartered in Frankfurt, Germany, DLG conducts practical trials and tests to keep its members informed of the latest developments. DLG's sites include DLG's International Crop Production Centre, a 600-hectare test site in Bernburg-Strenzfeld, Germany and the DLG Test Centre, Europe's largest agricultural machinery test centre for Technology and Farm Inputs, located in Gross-Umstadt, Germany. DLG bridges the gap between theory and practice, as evidenced by more than 40 working groups of farmers, academics, agricultural equipment companies and organisations that continually compare advances in knowledge in specific areas such as irrigation and precision farming.

www.dlg.org

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