

Good working practices with precise technology achieve even greater resource efficiency

Fertilizer application using drone and soil data, precise cultivation and hoeing techniques for weed control, sensor technology for planting sugar beets and a new module course - these were the main topics on the Swiss Future Farm team in Tänikon in 2020. The results confirm, when using Smart Farming technologies, additional revenue due to savings on seeds, herbicides, and fertilizers will be achieved.

Mechanical weed control becomes more and more relevant in agriculture and has shown promising results in trials, conducted at the Swiss Future Farm in Tänikon. Silage corn, for example, has been grown as a successor crop on grassland, using various weed control treatments. In 2020, harrowing treatment without herbicides achieved the highest contribution margin. "This is mainly due to the high area performance when harrowing and herbicides were not applied," Christian Eggenberger, Director of the Tänikon farm, explained during the online media conference. The trial with winter wheat also demonstrated that digital technologies can help to reduce fertilizer and result in cost savings. Before the second and third application of fertilizer, soil data and drone images were used to determine the nitrogen already absorbed by the plants and the amount of fertilizer required was adapted accordingly. "We were able to reduce the amount of fertilizer applied by up to 10%," mentioned Florian Abt, Project Manager SFF.

New trials with Cover Crop Banding

If neither mechanical nor chemical weed control measures are an option, cover crop banding is the way to go. An essential prerequisite for this task is a high-accuracy guidance system. Back in the autumn, cover crops were planted with 30cm wide gaps and 75cm apart. These small plants grow over unseeded areas, protect the soil in winter, promote biological soil activity and help suppress weed germination. "In the spring, we use a knife roller to stop the growth of the cover crops while planting the grain corn precisely to the nearest centimeter in the 30cm wide bands," explains Nico Helmstetter, Division Manager GVS Agrar AG. The Swiss Future Farm team expects this trial will provide key insights on how to optimize this alternative method of cultivation. Initial results will be available by the end of 2021. Further, 2020 saw a continuation of the sugar beet trial that uses a precision planter to achieve accurate sensor-based planting. "A sensor-controlled seed placement depth of 3.8 cm (1.5 inch) proved once again to be advantageous," explains Dr. Nils Zehner, Project Manager AGCO. Needless to say, the Swiss Future Farm team conducted further trials in 2020. For example, on the deep fertilization of rapeseed plants or alternatives to rapeseed dressings.

The SFF trials are always based on agronomic challenges for which process optimization is required in sustainable farming. Moreover, the SFF utilizes digital tools and precise technologies to optimize the application of herbicides and fertilizers. "In the event of pest infestation, however, resorting to protective measures to prevent total crop failure is sometimes the only option," says Christian Eggenberger.



Dr. Bernhard Schmitz, Director EME Agronomy and Team Lead Digital Products Fendt, adds: "Since the autumn of 2020, tractors with the new operating concept FendtONE have been in use on the Swiss Future Farm. This concept makes full-scale use of Smart Farming solutions possible and intuitive, also in small-scale agriculture."

Smart Farming finding its way into training

"In cooperation with the Strickhof farm and the Agricultural Center in St. Gallen, we started teaching the newly developed Smart Farming BF30 module at the Swiss Farm Management School," explains Martin Huber, Director Arenenberg. The eBook "Digital Technologies in Agriculture – DiTeLA" was developed to better integrate the topic of digital technologies and the practical application into teaching and training. The Swiss Future Farm team contributed significantly to this compact and modern teaching aid. Knowledge transfer is an essential part of the work in Tänikon, and the whole team is already looking forward to upcoming live events, courses and training sessions when those can be held again, and the fascinating trials can be presented to interested parties during visitor tours.

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Photo material:



Figure 1. GPS technology used smartly - In cover crop banding, the corn is planted precisely between the rows of cover crops drilled in the fall.



Figure 2. Targeted deep fertilization during tillage before rapeseed planting.



Figure 3. The harrow method in the trial for mechanical weed control in silage maize was characterized by the highest contribution margins.



Figure 4. In 2020, the planting depth of 3.8 cm for sugarbeets with Precision Planting's sensor-controlled planted proved beneficial.

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