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Press Release

Project "More Sustainable Milk"

Using data to produce milk more efficiently and sustainably

Walldorf, 15 November 2022 – A collaboration of farms, research organisations and businesses working in agriculture and food production is developing a method to make milk production more sustainable and productive.

The More Sustainable Milk project involves the Hofgut Neumühle research institute, the Technical University (TU) of Kaiserslautern, Hochwald Foods, John Deere and BASF SE plus farms who are investigating how the CO_2 equivalents (CO_2e) of milk production can be reduced with technology and consistent data use.

Saving CO2e together
The project aims to make a significant contribution to data management on dairy farms. Across all interfaces, data produced by a dairy farm during a normal working day will be made usable without additional effort. For this purpose, all production steps of a dairy farm around milk production are considered – including harvest, feeding, and the application of organic fertiliser. At each step, data is collected, summarised and analysed to determine the CO_2e savings potential.

The farms – Wahlerhof, in Zweibrücken, and Schmiedhof, in Neupotz – and Hofgut Neumühle research institute supply the milk cooperative Hochwald and check the effectiveness and implementation in practice. They receive scientific support from the TU of Kaiserslautern. For the Hochwald dairy, it is not only important how the measures affect milk quality and milk marketing, but also the transfer of knowledge to other dairy farmers. The knowledge gained on CO_2e reduction and data management is to be implemented as comprehensively as possible where it brings ecological and economic benefits.

Harvest - measurement of constituents
Harvesting is the interface between field work and feeding. It is the basis for all further measures in milk production. It is already possible to, during harvest, collect information about the moisture of the crop and the contents, such as protein, starch, energy and fibre. This makes it possible to derive initial information about the composition of the future silo. The harvest results can be used to determine field-specific differences in real time to gain insights into the efficiency of nitrogen use, the CO_2e footprint per tonnes of harvested crop and to use this as a data basis for the cultivation of the subsequent crop.

Feeding - measurement of fermentation losses and forage quality

The next step in milk production is demand-based feeding. The change in ingredients after ensiling is precisely recorded by sensors. This allows fermentation losses to be determined and the feed ration to be adapted precisely to the animals' needs. A deficiency or surplus of nutrients is avoided. The result is lower emissions, better animal health and lower feeding costs. In addition, feed purchases can be avoided.

Organic fertilisation & nutrient management

The utilisation of organic fertilisers plays a central role in the nutrient cycle of dairy farming and for the carbon footprint. Emissions can be reduced by fertilising according to needs. This means:

(a) The farmer precisely matches fertiliser application to crop needs using historical field information and yield potential maps.
(b) The organic fertiliser is applied precisely using NIR sensor technology and variable fertiliser maps.
(c) Nitrification inhibitors are used to stabilise the nitrogen in the organic fertiliser.

The interaction of these measures is one of the challenges for data management and carbon footprint calculations. This will be taken into account in the project to provide the appropriate solutions.

Fertilisation according to demand can increase nitrogen use efficiency and avoid nutrient surpluses with their consequences, such as eutrophication and nitrous oxide emissions. The efficient use of organic fertilisers also makes it possible to save on mineral fertilisers, which reduces costs and the emissions associated with the production of mineral fertilisers.

Data management enables transparency

The end product of the cycle is More Sustainable Milk. The data from all activities is collected, analysed and summarised in the project by the TU Kaiserslautern. This makes it possible to centrally assess the effects on milk yield, animal performance, CO_2e footprint and other important influencing variables. In addition, adjustments can be planned and their potential for improvement calculated, which ultimately allows sustainability to be quantified. The project aims to make data management so efficient that it can be widely applied in practice. This allows for greater transparency in the entire value chain, which can be a necessary basis for new marketing, pricing and business models.

Knowledge transfer

The measures are developed jointly with the partner farms and Hofgut Neumühle research institute, ensuring their implementation in practice from the very beginning. In addition, the farms act as transmitters of information by making knowledge available across farms. As soon as the project starts, all results and findings will be available on a freely accessible website. The project is financed by the European Union, through the EIP (European Innovation Partnership) via the state of Rhineland-Palatinate and self-financing by the partners.

Solution components

The partners contribute their experience and solutions in the fields of agricultural technology, farm inputs, agricultural software and sensors.

The goal of More Sustainable Milk begins with harvest analytics using John Deere's HarvestLab™ 3000 near-infrared sensor. The data is transmitted to the John Deere Operations Center within seconds. This allows the first quality determinations of the forage to be made. Any fermentation losses can be reduced with the use of silage additives.

It is also possible to measure the ingredients after ensiling. This is done with the help of the HarvestLab™ 3000 sensor as a tabletop device and the trinamiX sensor, which can easily be carried in a trouser pocket. With the sensors, fluctuations in the forage stand are detected and can be compensated for when composing the feed ration.

Data acquisition during harvest enables the cultivation of the following crop to be planned. This is done by using the data as a basis for calculating the organic fertiliser required by the xarvio Agronomic Decision Engine (ADE). With its help, variable fertiliser maps can be calculated and made available via the xarvio FIELD MANAGER®. These maps are then transmitted to the John Deere Operations Center. Controlled by the permanent HarvestLab™ measurement and the application map, the tractor automatically varies the application rate with the slurry tanker. The addition of the nitrification inhibitor VizuraTM to the slurry enables higher nitrogen use efficiency and reduction of nitrogen emissions.

Finally, the compiled data basis can be used to calculate, for example, CO_2e footprint of the field and the feeding. This can be done with the digital greenhouse gas calculators AgBalance™, Opteinics™ and Cool Farm Tool™, among others.

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