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Spotlight

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Management of scarcities

"The essential driving force behind technical progress in agriculture is the substitution of capital by labour" – this, or something like this, is what we learned many years ago in our basic foundation course. Better utilization of the limiting factor "labour" was the key to success for ever larger and more powerful machinery and equipment.

It has been clearly perceptible for years now that the focus is changing and other limiting factors are more and more characterizing developments in agriculture. Direct scarcity factors such as the availability of water, hours of sunshine and harvest days are present and obvious. The non-reproducibility of the limiting factor soil motivates us constantly to increase our production intensity. Indirect scarcity factors are increasingly being discussed as well. Regionally, emerging resistances can lead to a scarcity of effective plant protection agents. Diminishing humus contents, soil compaction and soil erosion are leading to reduced soil fertility. The effects of "surplus" factors as a reciprocal concept are identical to those resulting from scarcities. A surplus of slurry in regions with strong animal husbandry or a surplus of CO_2, methane and nitrous oxide emissions leads to challenges comparable with those resulting from a limiting factor.

Since a scarce factor limits the effectiveness of all factors in the process chain, a compelling requirement holds true for agricultural machinery and equipment as well. We need more "holistic thinking", more "thinking in process chains", more "thinking outside the box" than the traditional and customary optimizing of individual machines and components that we usually aim for without thinking the consequences right through to the end.

Holistic thinking is an ancient virtue of our grandfathers, but in the age of digital agriculture it takes on a completely new meaning. Digitization of all process elements and their influence factors will enable us to network data and information from a wide range of sources. We will identify cause and effect connections that may sometimes lead us to completely new problem-solving approaches. New sensors and direct communication between process elements offer the chance of structuring processes anew and differently. Or of reviving very old traditional and sometimes forgotten virtues because we understand them better and can manage limited resources to target results, taking the diverse cause and effect connections into account.

On the other hand, digitization of all processes in agriculture also involves major challenges. The global availability of data and the ability to network such data open up considerable scope for data abuse. Data security is not only a matter for legislative regulation, but also a question of trust and

confidence. Trust must be earned, and this applies as well for companies that collect, store and analyze data.

The agricultural sector will be unable to prevent the internet from creating a new kind of (apparent) transparency. Citizens and pressure groups believe ever more often that they have identified interdependencies and feel called upon to denounce agricultural production methods using a high media and policy profile. The industry does not always respond skilfully to these often one-sided reports and frequently romanticizing and idealized concepts.

There are indeed areas where we may have pushed technical progress too far without sufficient consideration – until society now no longer wishes to follow us. We have a chance to develop new, improved and socially acceptable processes here. A potential restriction of the use of glyphosate, limiting of machinery widths in road traffic, or additional rules and requirements in areas where groundwater is endangered are examples, which new limiting factors may come into focus, and for which we need to seek innovative solutions. We need to take an active part in creating transparency and to enter into dialogues to explain and justify production methods. Even if some groups in society remain ruled by "diehards" in future too, our country is not technology-adverse. We are still one of the most innovative nations worldwide. And that should encourage us.

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