

# Crop Production of the future – possible without a rethinking?

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The current production systems in arable farming have reached their limits. Sizes of machinery are continuously increasing. Compaction and limits on the road are the consequences. Production-related restrictions like nitrogen pressure and development of resistances against plant protection products are further problems. Last but not least, the sociopolitical acceptance of crop production is questioned in public opinion. Due to these circumstances the question arises if the system of crop farming which has been adapted to the machinery available on the market is the right strategy for the future. Why not going the other way round and decide what a plant production system has to look like to be at an optimum and then decide what kind of machinery is needed to cultivate? Following this idea the plants must be in the focus.

The demand of plants to a variety of factors is the origin for their growth. Local parameters, like the sufficient access of light, water or nutrients are some examples. Furthermore, different soils and the plant health are factors with high impact on best possible growth. Moreover, the available growing space is another parameter. An optimum would be in a triangulated growing system where all plants have the same distance to their neighbors. At the moment neither the typical seed drilling nor single-seeding is achieving this opti-

mized, homogenous and equal plant sharing. As a result of this triangulated system, the sowing density can hardly be reduced. Suitable wheat plant densities can be reduced by approximately 60-70%. Among various environmental factors, location and soil requirements of cultures are the most important ones. There are cultures existing like rye with low demands concerning location parameters and soil quality or ones with high demands like sugar beets.

The current practice is using soil mapping for agricultural areas. By using a map overlay on the basis of soil mapping and corresponding yield maps one can deviate so called potential-maps of a field. That permits to draw conclusions regarding the location heterogeneity.

With this location heterogeneity, it enables the opportunity to adapt different cultures to single soil properties so that there is more than one crop on a field. Several site-specific crop rotations might be adjusted to the location heterogeneity.

With this approach guaranteeing an optimum growing space and adapting crops and crop rotations to partial surfaces, the present situation in production systems in arable farming mentioned above can be prevented. Thus an essential element in forthcoming, sustainable and efficient crop production can be set.