

T1.11 PRECISION AGRONOMICS

What is this?

Agronomics is a theoretical application that combines *economics* and *agriculture*.

Precision agronomics, on the other hand, combines the theoretical achievements of agronomy and *economics* and the practical achievements of *precision agriculture*.

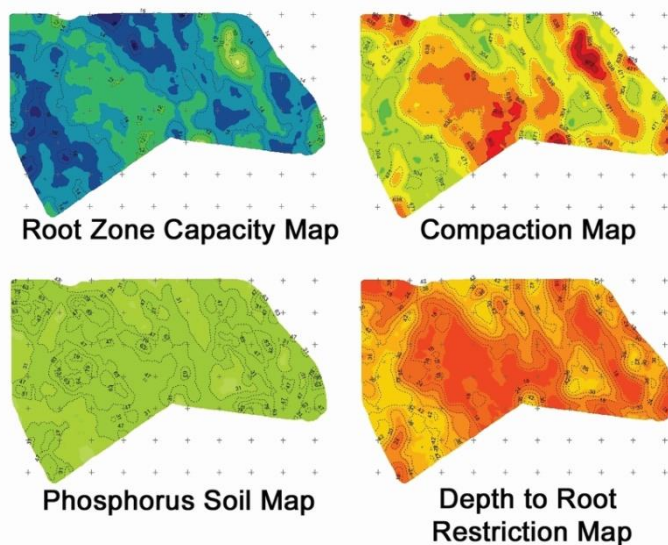
Some additional information...

Agronomics, or agricultural *economics*, is a hybrid direction that focuses on defining economic methods and models applicable to solving the practical problems of farmers.

It is an applied field of *economics* that deals with land use and with the application of economic theory designed to optimise the production and distribution of fiber and food.

Some major topics that agricultural *economics* tackles include food and consumer *economics*, development *economics*, agricultural environment and natural resources, production *economics*, and farm *management*. Each of these topics encompasses several other sub-areas.

The joint application of the economic concept and agronomic knowledge in scientific *research* makes it possible to analyse and optimise agronomic practices, especially in *precision agriculture*, and to define those of them that are of sustainable importance and those that should rather be discarded. The analysis allows for the formulation of at least four approaches through which *agronomics* contributes to optimising the yield of *precision* farmers.



Seeding and fertilizer rates

Precision farming practices are well accepted and widespread among farmers. As a result of its application, yields increase. It can be noted that the growth in yields exceeds the relative share of the growth of the

Mapping by different indicators

Source:

<https://www.globalagtechinitiative.com/institute/agronomics-will-drive-vra-advancements-precision-ag-institute-content/>



ITFARM

seeds used, which means that there is an optimisation of the number of seeds used and a relative reduction of costs.

Based on the growth in the amount of seed used, although, in favorable proportion to the growth in yields, farmers expected a need for increased fertiliser use. Scientific-experimental work in this direction has shown that no increase is necessary over existing practices. In this way, *agronomics* gave a clear path to farmers and contributed to the widespread reduction of costs.

Row Spacing

Precision farmers have been interested in this one for years, some strongly advocating that allowing more plant space by reducing row spacing would positively affect the yield output. Research suggests that narrow rows do not really impact yield output.

The Need for Starter Fertilisers or an Impetus

It is a widespread belief among *precision* farmers that treatment with starter fertilisers will increase yields. Scientific *research* by agronomic specialists shows that the additional use of starter fertilisers in well-maintained soils is nothing more than an unjustified waste of money. A long-held belief is that crop variants with different maturity levels didn't have much in the way of a yield difference. *Agronomics* found that longer maturities did increase yield quite significantly. They also found a fine line between the maturity level and how wet the corn was when harvested. It was found that in longer maturity varieties, the corn is sometimes 50% wetter than its younger counterparts, meaning that the drying costs did not offset dry-down quality. And this is another practice whose effect has been clarified by agronomists.

Traditionally, the activity of a farm is oriented towards growing one main crop, which is the backbone of the farm's financial flow, and a range of side crops and animals, which are a source of additional income. Farmer's interest in the achievements of *agronomics* and their application in practice is focused on *management*, marketing, pricing, and development planning. Modern *agronomics* combines, expands, and deepens the answer to these questions, concentrating on the possibility of extracting maximum economic value with a minimized amount of land, labor, and inputs (seeds, fertilisers, fuels, etc.). To achieve this goal, *agronomics* also affects essential





ITFARM

technical aspects of production such as irrigation and drainage, soil composition and properties, crop rotation, etc.

Precision agronomics combines basic economic theory with the latest technological discoveries and their application in *agriculture*. *Research* is focused on the economic effects of applying *precision* techniques for tillage, planting, and growing crops. *Precision agronomics* can include the following *elements*:

Variable rate technology (VRT) refers to any technology enabling the variable application of inputs and allowing farmers to control the number of inputs they apply in a specific location.

GPS soil sampling – Collecting data is vital for making informed and profitable *decisions*. Sampling illustrates differences in productivity and soil characteristics, allowing farmers to make informed *decisions* and formulate approaches that account for these differences.

Computer-based applications – these are widely used in modern *agriculture*. Their primary role is accumulating data through which maps and plans are generated, visualizing fields, soil reserves, crop yields, etc. They significantly contribute to optimizing seeds, pesticides, herbicides, and fertilisers, reducing costs, increasing yields, and improving the ecological parameters of production.

Remote sensing technology is an essential tool that creates opportunities for the precise *management* of resources. This technology, including drones and satellites, collects data on land, water, and other resources. The accumulated data allows tracking the dynamics of the factors that influence crop development at a specific moment, enabling an adequate



Thermal Image Processing and Acquisition
Source: <https://tofael.org/photo-gallery/>

and timely response from the farmers and improving the *decision-making* process.

The scope of *precision agronomics*, the *decisions*, and the recommendations that arise from its application give reason to some specialists to claim that this agro-economic science often plays the role of a qualified agronomist, directing the choices of farmers to *decisions* that are more precise and optimised.



ITFARM

As a discipline rooted in economic theory, the main focus of *precision agronomics* is on improving profitability, efficiency, sustainability, and environmental compatibility.

Using the big data collected with the help of *precision* technologies enables *decision*-making that syncs with the focus set above.

The future development of *agronomics* lies in the continued testing of theoretical constructs and existing beliefs and practices to provide farmers with verified information about the adequacy of assumptions and expectations. The theories generated by *agronomics* and their practical verification allow farmers to develop ideas, opinions, and knowledge for expanding their business practices and approaches.

Links

<http://sstinfofolab.com/services.html>

<https://www.farmmanagement.pro/agronomics-and-precision-farming-what-you-need-to-know-2/>

<https://agfundernews.com/what-is-precision-agriculture>

<https://farmbot.com.au/blog/precision-agriculture/>

<http://sstinfofolab.com/custom-agronomics.html>

<https://www.allthescience.org/what-is-agronomics.htm>

<https://c.chsinc.com/articles/precision-agronomics>

Keywords

Economics

Agriculture

Agronomics

Precision

Research

Elements

Management

Decision