T 1.16 HARVESTING

What is this?

Harvesting is an activity in which the economically important parts of the plant are collected. It occurs when the plant has reached a stage of development characterised by the accumulation of an appropriate amount of nutrients in a state that allows further processing.

Precision harvesting technology includes *sensors* and other components installed on harvesting equipment to measure crop mass flow and provide spatial *yield* estimates within a field.

Some additional information…

The economic value of man-grown plants derives from the possibility that the plants can be used for food and the production of other products. For this purpose, the plants must reach the optimal *maturity* level before being harvested from the field. So, harvesting is a process of gathering the crop from the field when the plant reaches the required *maturity*.

Depending on the type of plants grown and their valuable parts, harvesting is done in different ways, which include: cutting, digging, picking, laying, gathering, curing, and stacking.

Two additional agricultural operations - threshing and windowing - are often included in the harvesting process. These activities are carried out immediately after the harvest of cereals, which are of crucial economic importance, and their essence consists in separating the cereal seeds from the chaff and husks.

The harvest itself can be carried out manually, using simple tools, or with the help of machines of varying degrees of complexity. In most cases, the process is carried out mechanised, such as the choice of a specific device, including the degree of mechanisation tied to the average annual size of the areas to be harvested, as well as a cost-benefit analysis.

In practice, the harvesting process does not end only with the harvest, although this is its essential part. Usually, the following activities are added to the harvesting activity such as threshing, cleaning, hauling, field drying, stacking or piling the crops, and bagging. The range of activities covers the entire range from the beginning of harvesting to bringing the collected produce into a form convenient for storage and sale.

Adequate implementation of the entire harvesting process, especially with the help of modern technologies, reduces grain losses and increases the quality of the harvested produce.

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It is essential to quality that the right tools are used in the right way and at the appropriate stage of crop *maturity*.

Source: https://www.deere.co.uk/en/combines/

Ensuring an appropriate harvesting approach requires consideration of a range of factors, the most important of which are: the availability of labour resources, availability of financial resources, length of appropriate harvesting period, proper field shape and opportunity for harvester access, the type and variety of the specific crop, preferences regarding additional products (e.g., straw), etc.

A *combine harvester* carries out the mechanised harvesting of mass quantities of grain. It is an important and complex machine with high productivity and reasonable inventory versatility.

One of the main directions in which the mechanisation of agriculture is developing is precisely the improvement of harvesters. Many companies producing agricultural machinery, and in particular *combine harvesters*, invest significant funds in improving the technology and design of these machines. The new models have a wide working range, provide large grain tanks, and support high unloading speed. They also have applications for *remote monitoring* of harvest parameters. A significant contribution to the reduction of costs is made by self-propelled combines, where the fuel consumption is significantly lower than those pulled behind a tractor, and the work on their improvement continues.

Harvest technology is an essential component of a precision agriculture program. It includes *sensors* and other components installed on harvesting equipment to measure crop mass flow and provide spatial *yield* estimates within a field. Grain and cotton *yield* monitors are some of the most commonly utilised harvest technologies in row-crop production. *Yield maps* generated from *yield* monitor data provide valuable information to growers on spatial *yield* variability and how management decisions can be adjusted to maximise productivity across the whole field.

Data presented by harvester manufacturers show that the latest developments in the sector are aimed at improving unmanned vehicle control systems, guidance automation for row work, vehicle-to-vehicle communication, camera visualisation, the *monitoring* of production, including in the field and in the office-analyses, as well as planning applications, which, based on an analysis of the accumulated data, automatically plan activities to optimise operations in the next business year.

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Harvesting software marketed by various developers enables the precise collection, mapping, *monitoring*, and evaluation of yields and supports farmers in developing their businesses.

Links

https://en.wikipedia.org/wiki/Harvest

https://www.fao.org/3/t0522e/T0522E05.htm

https://www.embibe.com/exams/harvesting/

http://www.knowledgebank.irri.org/step-by-step-production/postharvest/harvesting/harvesting-systems

https://www.ugaoo.com/blogs/gardening-basics/best-harvesting-tools-and-equipments

https://www.agriculture.com/machinery/harvesting/the-combine-king-of-the-harvest

https://precisionag.caes.uga.edu/programs/harvest-technology.html

https://www.engineeringnews.co.za/article/state-of-the-art-harvester-brings-precision-agriculture-to-the-fore-2021-04-08

https://blog.caseih.com/precision-upgrades-to-boost-your-harvest-season/

https://assets.ctfassets.net/npb3dl1oqqgh/OGzpPgaVFOhMAgE7NvaUI/19fd61e7ecf6fabf0ab8e5f8f1e8f794/agriculture-solutions-harvest-brochure.pdf

Video

https://www.youtube.com/watch?v=ufIeET-q5Aw

https://www.youtube.com/watch?v=EGr2JuptuOA

Keywords

Maturity

Yield

Combine harvester

Monitoring

Sensors

Maps

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