

T1.3 GRID SAMPLING

What is grid sampling?

A form of cluster sampling, the clusters being individual areas of a grid and hence consisting of groups of basic cells arranged in some standard geometrical pattern. The term “configurational sampling” is also used in the same sense (OECD, 2002).

The Grid Sampling method itself involves dividing the field into equal squares. Once samples and results are obtained, a soil map can be created and used to delineate areas of cells with similar characteristics in the field (Land-Grand Press, 2020). The optimum grid density depends on the site, and to some extent what nutrient is being assessed — soil organic matter, nitrate, phosphorus, zinc, etc. It helps to know the spatial variability of the field in order to know the optimum grid density — which, after all, is the reason for grid sampling (Ferguson and Hterger, 2000).

Types of grid sampling

There are two main methods for choosing the exact location of the samples to be taken in the cell:

1. Point sampling – in this case, core samples from the center of each grid square are collected, then mixed in an approximate 19-liter bucket, and a subsample is used for analysis. Another type of point sampling is to perform the same process for each intersection of the grid lines. For the correct performance of the method, samples should be collected between 30 meters (four samples per 0.4 ha) to 60 meters (one sample per 0.4 ha) apart.

2. Cell sampling – it involves collecting core samples from various locations within each cell. Most often, a zigzag pattern is used to effectively cover the entire cell.

Once collected, the samples are mixed and a representative subsample is taken for analysis. Cell sampling is a less intensive sampling method than point sampling. These sampling methods intend to create a representation of the “average soil” of each grid cell. Point sampling provides a better characterization of field variability, but requires the collection of more samples. In comparison, cell sampling requires fewer samples and cells can be of any size, however, less field variability is captured. For fields that have been farmed for many years, especially those that have been conventionally farmed and treated with common chemical applications, costs can be reduced by expanding the grid squares.

Although the latter does not lead to the greatest accuracy, it will still provide a reasonable estimate of the field characteristics due to the relative uniformity of field control (Land-Grand Press, 2020).

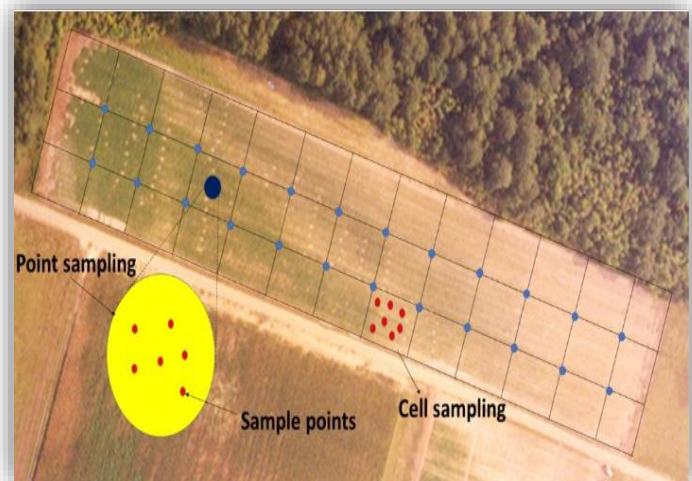


Figure 1: Grid sampling
Source: Land-Grand Press, 2020

When to apply?

It is good to apply grid sampling in the following cases (Ferguson and Hergert, 2000):

- Previous management – such as confined livestock, heavy manure application, or aggressive leveling for irrigation – has significantly altered the soil nutrient level.
- Small fields with different cropping histories have been merged into one.
- An accurate base map of soil organic matter is desired.

Grid sampling creates accurate, site-specific information that results in more efficient fertilizer placement, better environmental stewardship, and more impactful yield results. It also allows us to avoid placing high-cost inputs where they may not be needed or may exacerbate an existing problem (Cropquest, n.d.).

List to relevant topics

Cropquest (n.d.). Grid Sampling. Retrieved from: <https://www.cropquest.com/precision-ag-services/grid-sampling/>. Accessed on 25.09.2022.

Ferguson, Richard B. and Hergert, Gary W., (2000). "EC00-154 Precision Agriculture: Soil Sampling for Precision Agriculture" (2000). Historical Materials from University of Nebraska-Lincoln Extension. 708. Retrieved from: <https://digitalcommons.unl.edu/extensionhist/708>. Accessed on 27.09.2022.

Land-Grand Press (2020) Grid Sampling. Retrieved from: <https://lpress.clemson.edu/publication/precision-agriculture-based-soil-sampling-strategies/>. Accessed on 27.09.2022.

OECD (2002). Grid Sampling Defenition. Glossary of Statistical Terms. Retrieved from: <https://stats.oecd.org/glossary/detail.asp?ID=3667>. Accessed on 27.09.2022.

<https://www.youtube.com/watch?v=EegUZ2DVVCA>

<https://www.youtube.com/watch?v=IQkEko3NWIM>

Key words

cell sampling

cluster sampling

field control

point sampling

soil sampling