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Application of a semi-automatic tool for field variability assessment on a cultivated field in Northern Italy to evaluate variable fertilization benefits

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Traditional fertilization techniques in crop production consist in a homogeneous distribution of inputs all over the cultivated field. Alternatively variable fertilization methods could minimize the environmental impact and increase economic benefits.

The objective of this study is to evaluate the capabilities of a Google Earth Engine code conceived to rapidly study the variability of cultivated fields, for a possible variable fertilization. The tool is semi-automatic as it requires just the field boundary and it gives few outputs ready to be inspected by the user. This work presents an application of this model in a corn field in Northern Italy (province of Venice).

Field variability is evaluated through NDVI index extracted from Sentinel-2 images from 2017 to 2021. For the purpose, the tool provides NDVI statistics, classified maps, classified area percentages, and punctual NDVI trends.

Results show that boundary regions of the field are systematically less vigour than other parts, thus crop production is not efficient. Otherwise, fertilization should be enhanced in internal parts, as they are steadily healthier.

The proposed model is a fast way to analyse field vigour status and Google Earth Engine capabilities permit to apply it nearly all over the world. Field variability and linked variable fertilization are crucial to reduce environmental and increase economic benefits, especially in extensive farming.