# Orchard Evolution on the Surroundings of Cluj-Napoca Town, Romania

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## SUMMARY

In the last 30 years Romanian policy regarding the land management was changed a lot, especially near the urban areas. Cluj-Napoca is the largest town situated in northwestern part of Romania. The surroundings are hills with 83.82% of slopes between 3%-28%. The hills are in proportion of 31.62% south, southeast and southwest oriented. In the late '80 orchards played an important role as a source of fresh fruits for growing population. In 2011 the urban area of Cluj-Napoca was 10465ha, in 2015 it was 17950ha. The official urban area for 2019 is not final yet, but is considerable larger. In the same time, the surface for orchards decreases in disagreement with the need for quality fruits in the context of the short supply chains.

The aim of this paper is to emphasize the role of smart survey for land management applied in precision agriculture especially in orchards evolution near urban area. Our study includes the period 2012-2019 and intermediate year 2015. Our objectives were:

(i) Identify the surface occupied by orchards in June 2012, May 2015, June 2019;

(ii) Emphasize optimal area on which new orchards can be set up as a part of sustainable evolution for surrounding of urban area.

The method used, combine image classification based on raw data imagery provided by EOS from Land Viewer platform, and spatial analyses based on DEM of the studied area of 77384.91ha.

Optimal area implies: slope between 3%-12%, aspect S-SE, water source from watersheds and soil without excess of water with variate texture from CORINE land cover. The classes for supervised classification were orchards, built area, forest, pastures and the other.

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Results are the following:

- evolution of the mentioned categories show that: orchards surface decreased from 35.47%  in 2012 to 12.45% in 2019, built area grows five times, forests double its surface and the pastures have decreased by half in 2019.

- The optimal area occupied by orchards, determined by the mentioned factors becoming 2.02% in 2019.

Correlate the results with the fact that NDVI index shows an increasing of the surfaces covered by moderate vegetation, we can conclude that most of the landowners wait to extend the urban area and pastures are covered by shrubs that over time became new forest. We consider that an agreement between surveyors and urban area administration is mandatory to create a sustainable land management strategy for surrounding urban areas that include agriculture areas in order to provide fruits and quality food in short agriculture chains.