

Land cover in Varaždin (Croatia)

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Link to storymaps: <https://arcg.is/8a4ue2>

Introduction

Medical School Varaždin has been involved in the GLOBE program since 1998. We regularly carry out observations and measurements in Varaždin and its surroundings.

We have joined the GLOBE Global Climate and Carbon Campaign to monitor land cover changes in the Varaždin area.

Study area

Varaždin lies in the north of Croatia, on the right bank of the Drava. To the north lies the protected forest area of the Drava Forest Park. The area around the town is predominantly agricultural. According to the 2021 census, the city has 36,187 inhabitants.

Research goal

In this study, we were interested in whether the land cover in the surroundings of Varaždin changed between 2016 and 2022. We indirectly found out whether the built-up area of the city of Varaždin has increased in the same period.

Research methods

We conducted the study on the basis of satellite images of the Dynamic World Land Cover type, which are available on the Google Earth Engine Apps page. The images were taken as part of the Sentinel-2 mission. Sentinel-2 is a Copernicus Earth observation mission that systematically collects optical images with high spatial resolution (10 m to 60 m) over land and coastal waters. The mission supports a wide range of services and applications such as agricultural monitoring, emergency management, land cover classification or water quality.

We observed recordings that were taken on August 14, 2016 and June 18, 2022. Both recordings were taken in the summer period of the year.



Figure 1. Legend of maps

Results

When comparing the size of the built-up area (*red*) in the observed period, we could not find any differences.

When looking at the land cover, we noticed that the areas of forest (*dark green*) and grassland (*light green*) decreased at the expense of arable land (*orange*). We observed this change throughout the city, except on the northern edge, which is covered by the protected Drava Forest Park.

The area around Varaždin is traditionally an agricultural area, so we conclude that the demand for agricultural products has caused the conversion of land. The surroundings of Varaždin are urbanized, and agriculture is mostly very intensive.



Figure 2. Land cover in Varaždin in summer 2016



Figure 3. Land cover in Varaždin in summer 2022

Conclusion

The observed change in land cover has a negative impact on biodiversity. Most of the grassy areas were intended for mowing in the form of meadows. In this form, they provided a habitat for meadow plants and animals. The disappearance of wooded areas also reduced the biodiversity of these areas. The reduction of green areas (meadows, forests) around the town of Varaždin has a negative impact on the microclimate in this area. The intensive agricultural use of land also has a negative impact on groundwater. Artificial fertilizers and pesticides reduce the quality of groundwater.