

Adaptation of maize cultivation techniques to climate change

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Assessment of conservation soil tillage as advanced methods
for crop production and prevention of soil degradation



<http://www.activesoil.eu/index.php/hr/>

www.fazos.unios.hr



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Introduction



Climate change

- adaptation
- mitigation



Conservation agriculture
conservation soil tillage

- part of climate smart agriculture
- one of the most important measures with the aim to mitigate negative climate influence
- positive impact on plant production
- sustainability
- improved and continuous productivity
- increased profit and food security
- conservation and improvement of natural resources and the environment
- improving soil quality
- yield height optimization
- increasing biodiversity
- optimal dynamics in the soil (water/nutrient/organic matter)

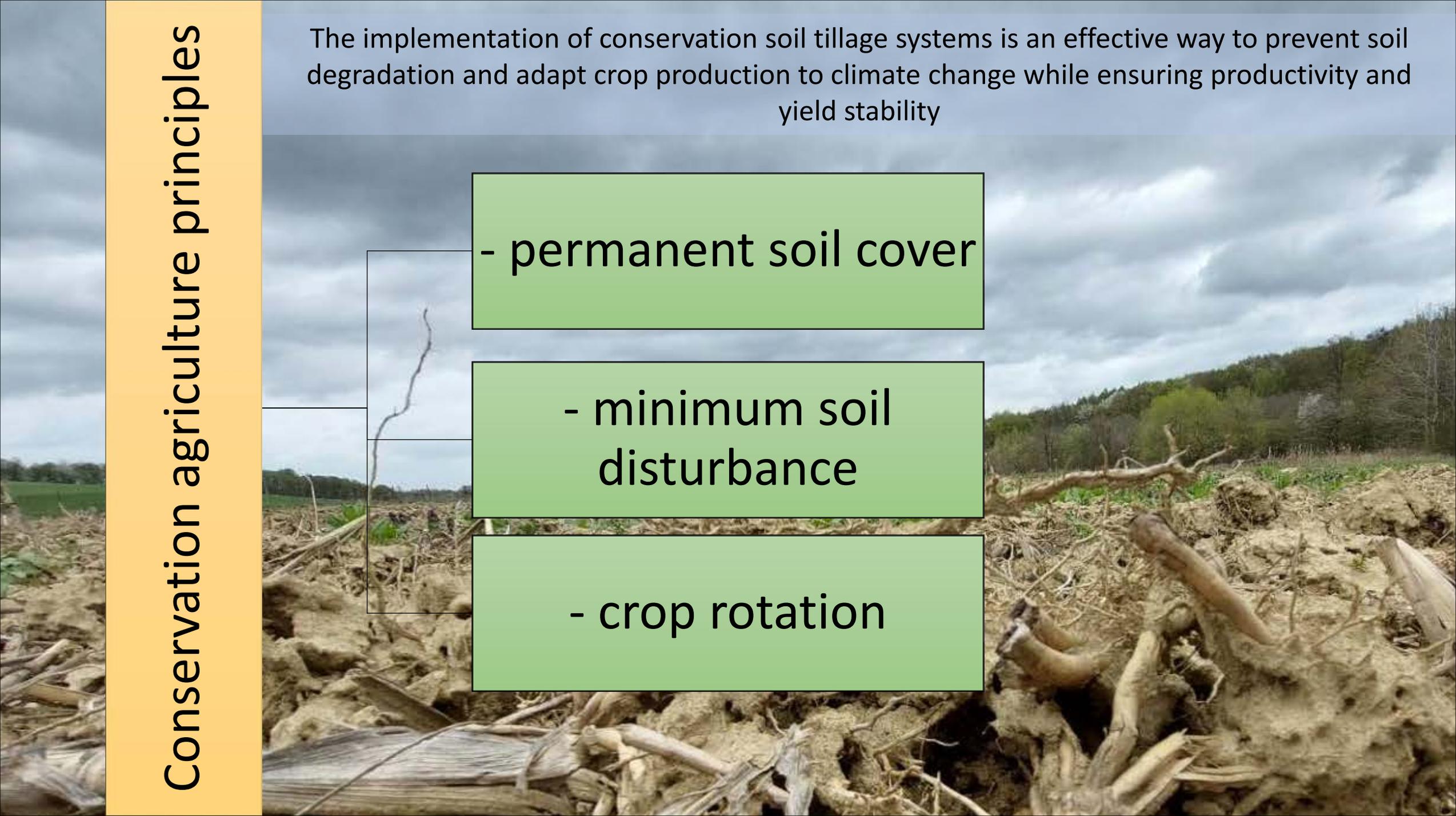
Conservation agriculture principles

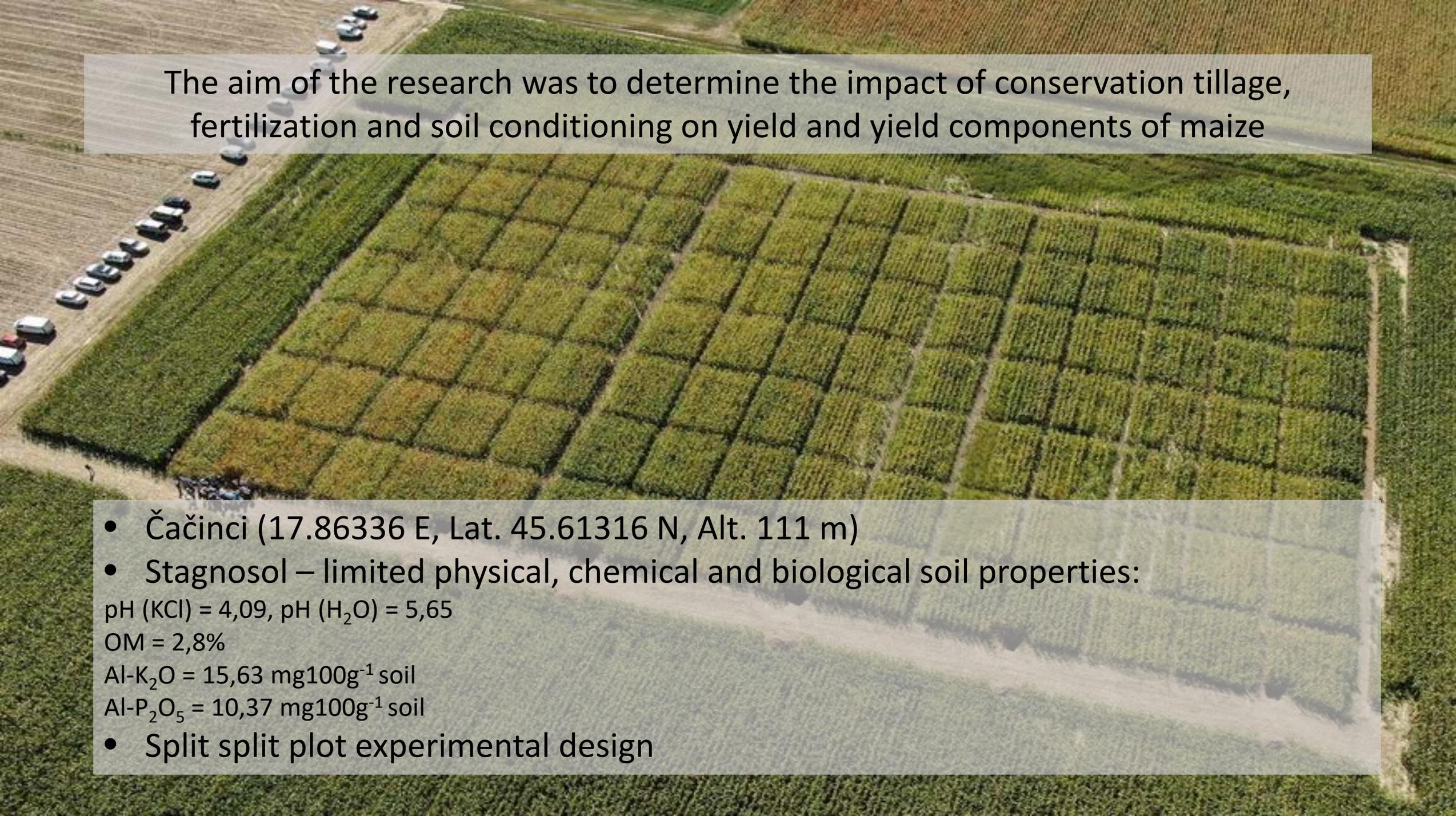
The implementation of conservation soil tillage systems is an effective way to prevent soil degradation and adapt crop production to climate change while ensuring productivity and yield stability

- permanent soil cover

- minimum soil disturbance

- crop rotation

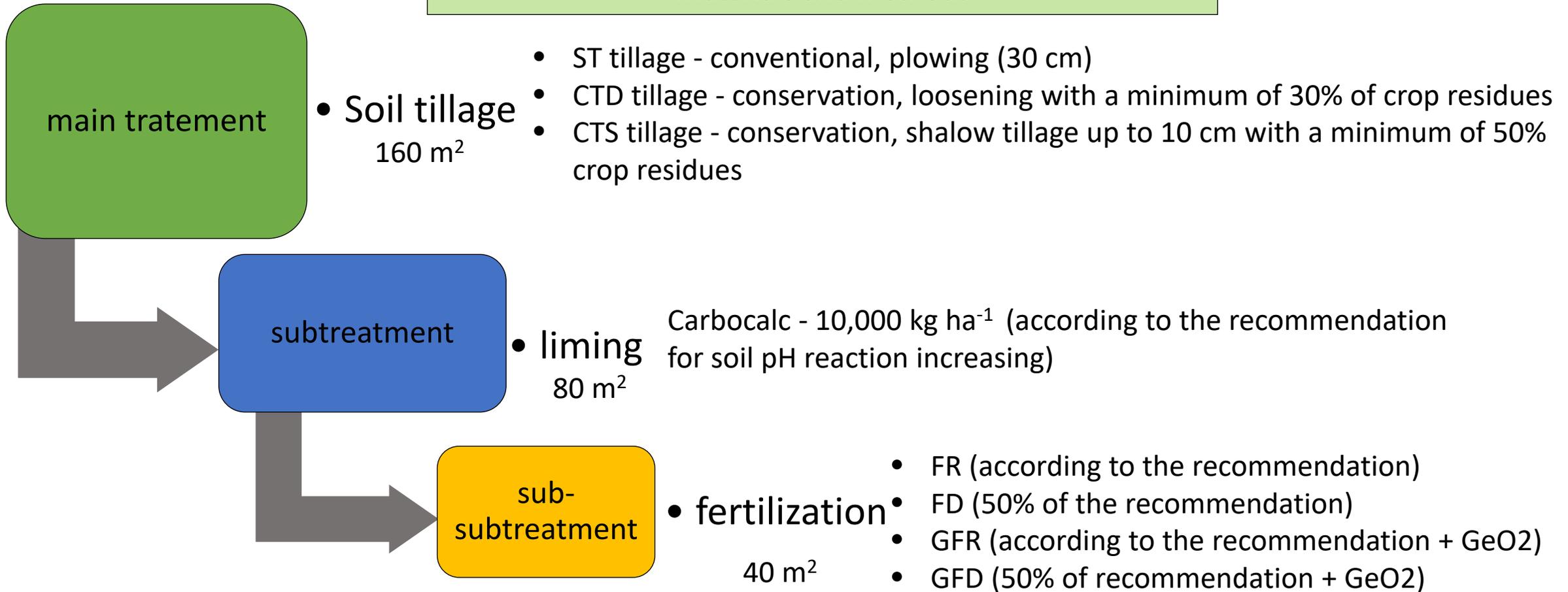




The aim of the research was to determine the impact of conservation tillage, fertilization and soil conditioning on yield and yield components of maize

- Čačinci (17.86336 E, Lat. 45.61316 N, Alt. 111 m)
- Stagnosol – limited physical, chemical and biological soil properties:
pH (KCl) = 4,09, pH (H₂O) = 5,65
OM = 2,8%
Al-K₂O = 15,63 mg100g⁻¹ soil
Al-P₂O₅ = 10,37 mg100g⁻¹ soil
- Split split plot experimental design

Materials and methods



- recommended fertilization: NPK 170: 150: 225
- **GeO₂**: biophysiological soil activator 300 kg ha⁻¹
- Organic certificate EU/CE 834/2007 in 889/2008
- pH=9, Cao 35%, MgO 8%
- (FE, Mn,Cu,B...)



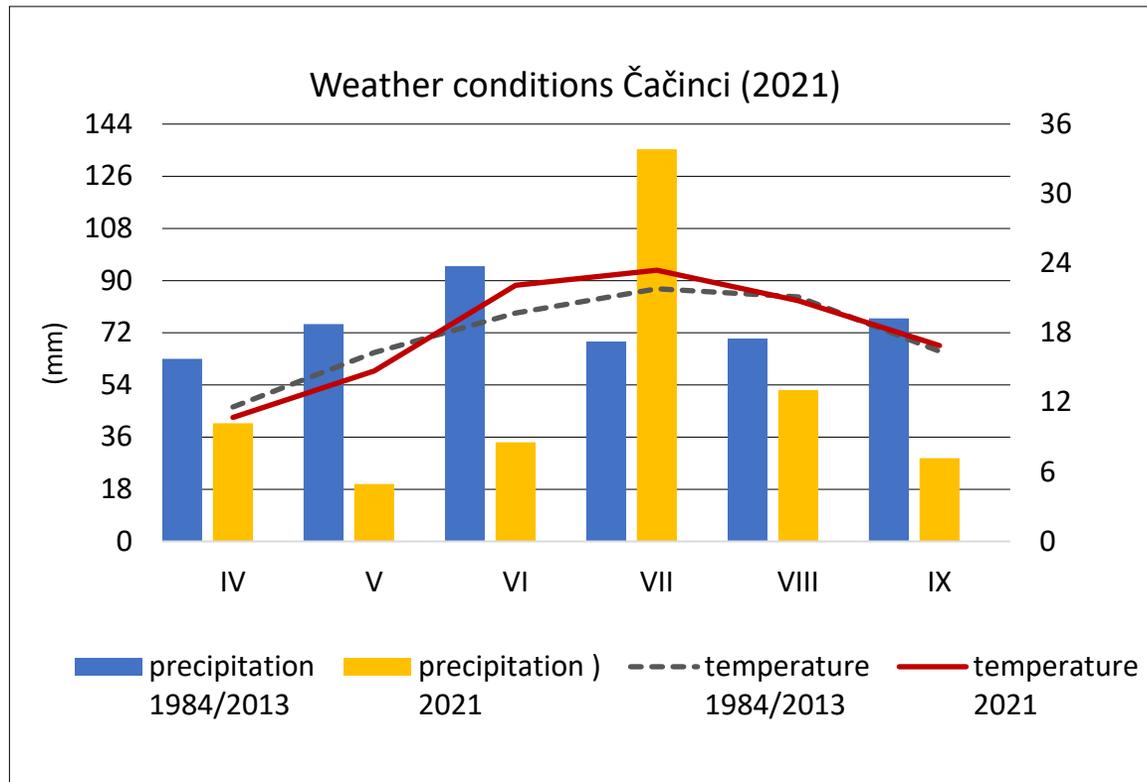
- stimulation of soil microflora and enzymatic activity
- better humification of organic matter
- development of the clay-humic complex
- improved soil structure and aeration
- rooting development



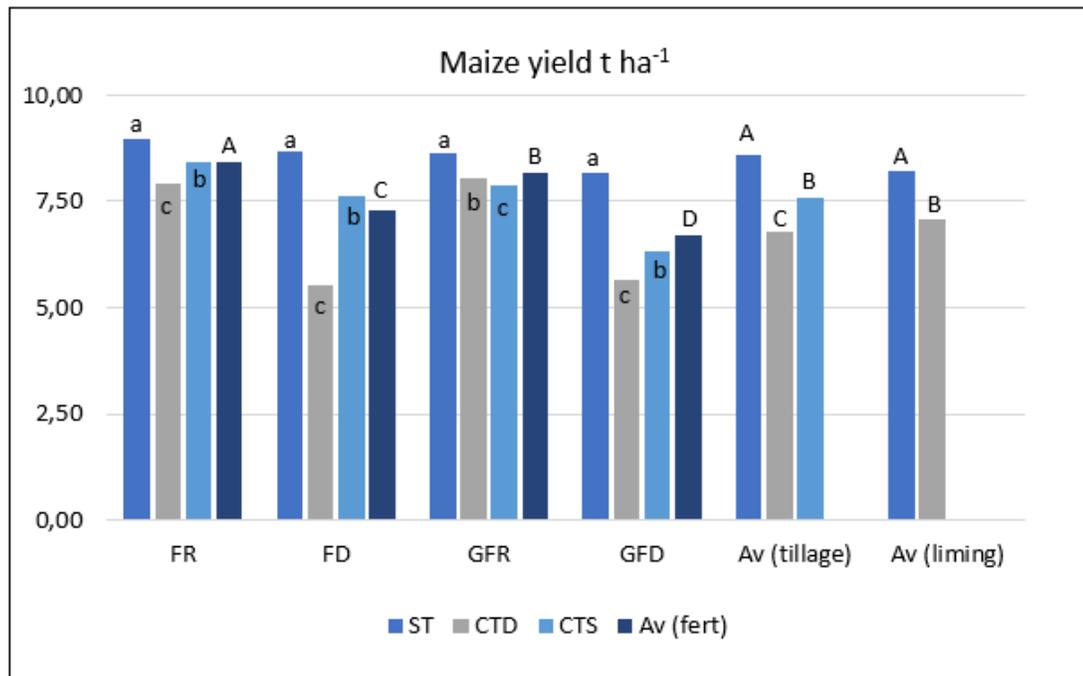
- Maize hybrid OS – 378
- Maize seeding – end of April – no till planter
- Maize harvesting – in late September
- Hectolitre mass
- Seed counter
- Calculation of grain yield (t ha^{-1}) - with grain yield moisture at 14% for maize



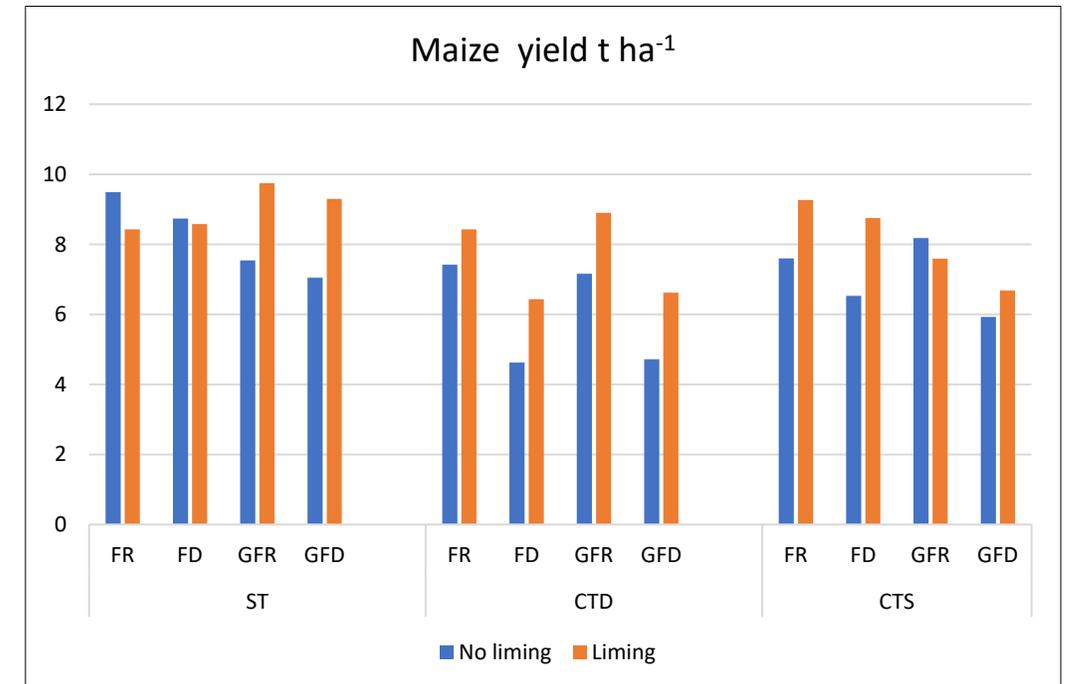
Weather conditions



Results

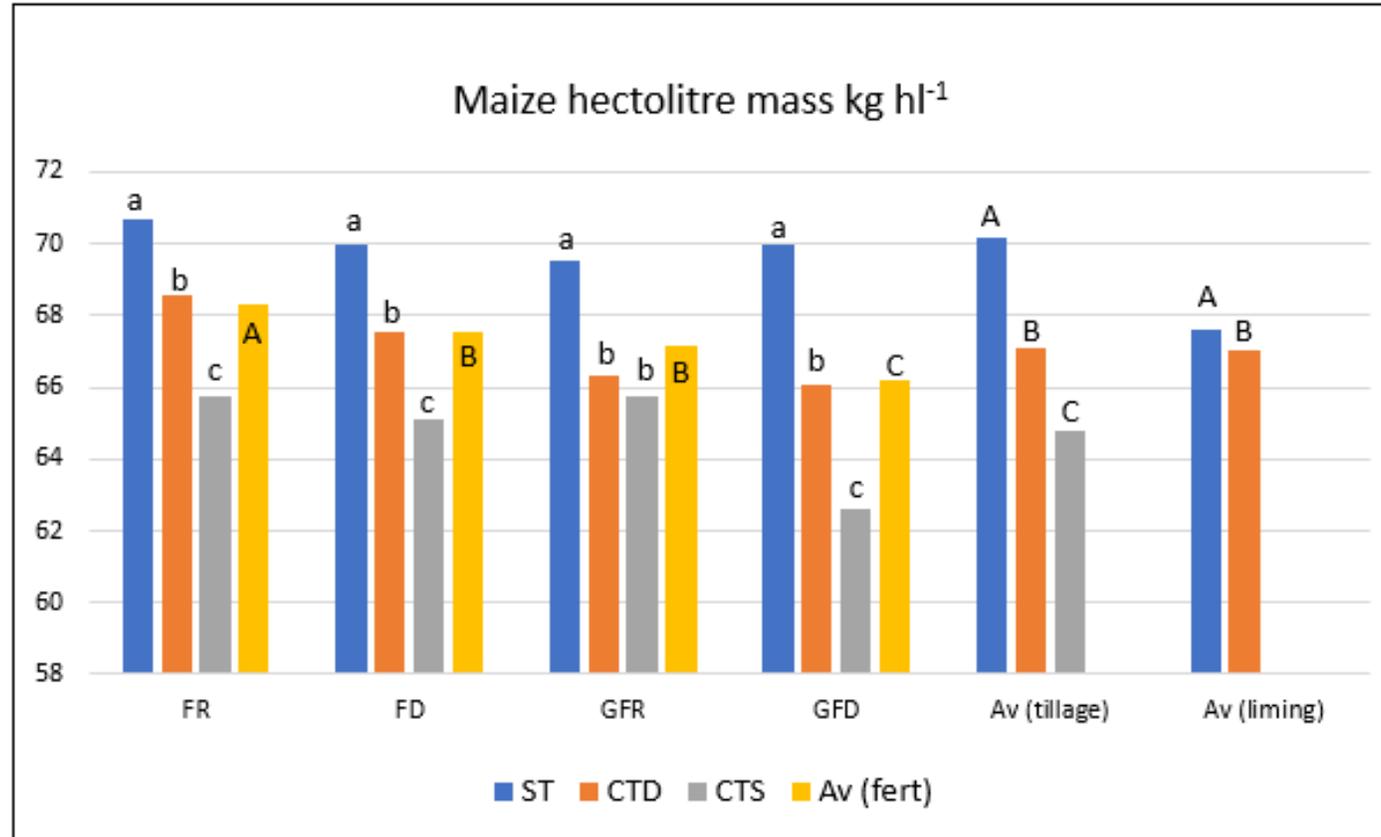


- FR (according to the recommendation)
- FD (50% of the recommendation)
- GFR (according to the recommendation + GeO₂)
- GFD (50% of recommendation + GeO₂)



- ST tillage - conventional, plowing (30 cm)
- CTD tillage - conservation, loosening, 30% crop residues
- CTS tillage - conservation, shallow tillage, 50% crop residues

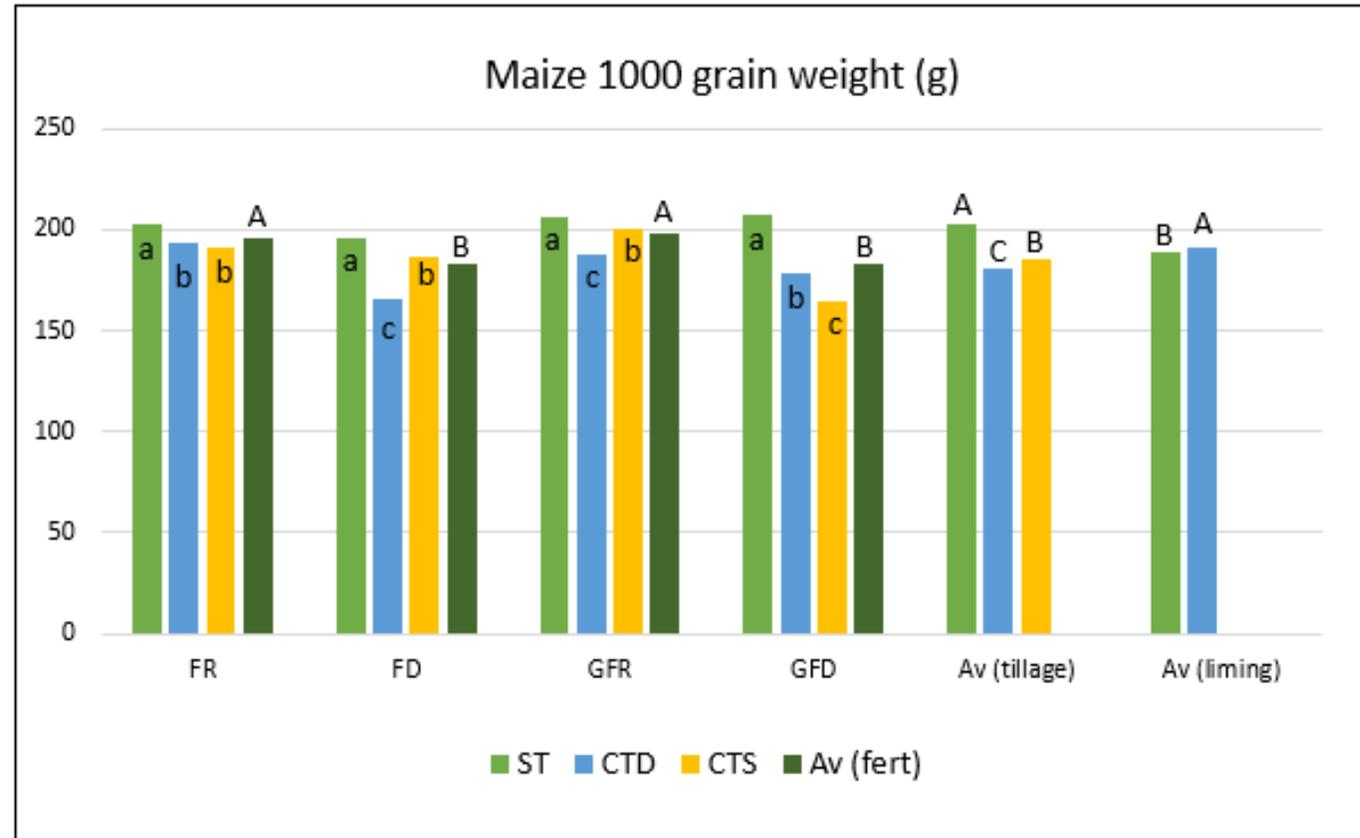
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Conclusion

- Tillage and fertilization on average had a statistically significant effect on yield, hectolitre weight and 1000 grain weight
- ST tillage treatment – average - the highest maize yield and yield components
- CTS – proved to be better compared to CTD regarding maize yield
- Liming – significant impact on increasing maize yield and hectolitre weight
- FR – average- highest yield and hectoliter according to the recommendation
- GFR – average - the highest 1000 grain weight
- Significant interactions between tillage – liming – fertilization were recorded for all investigated parameters

Thank You for Your attention

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