

## REDUCING AGRICULTURAL WATER CONSUMPTION IN WESTERN ROMANIA: CHALLENGES AND SUSTAINABLE SOLUTIONS

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### Introduction

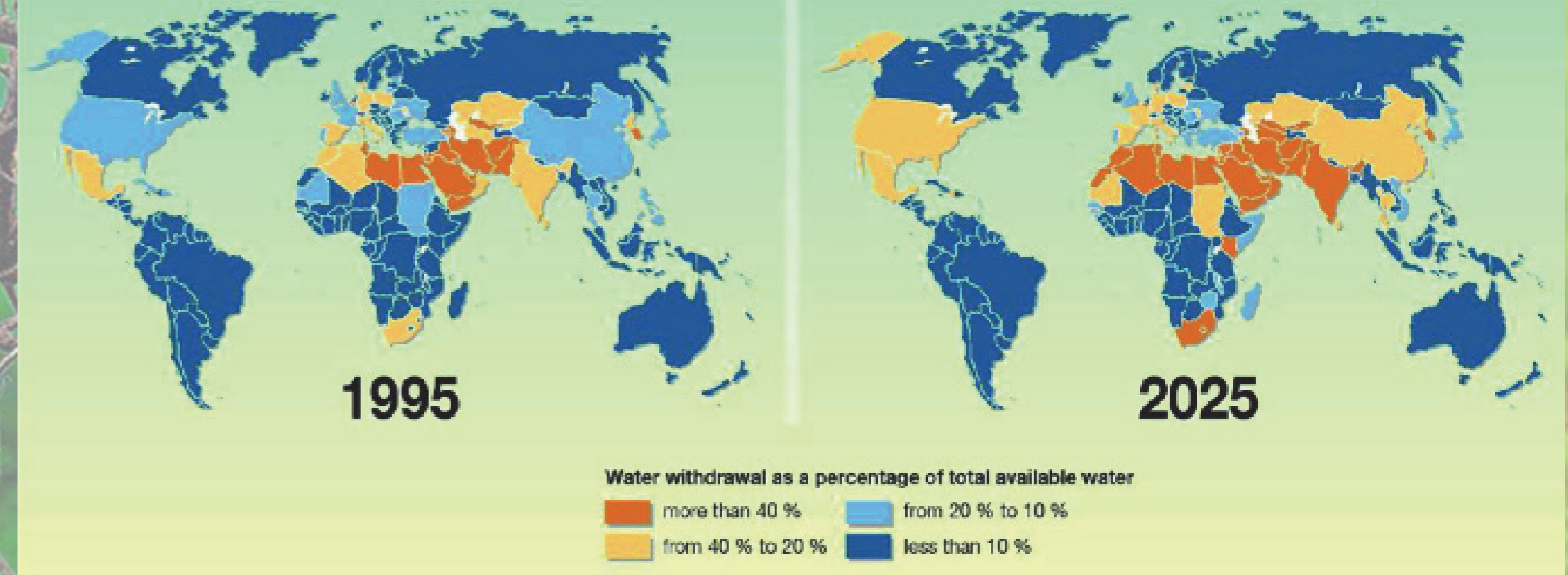
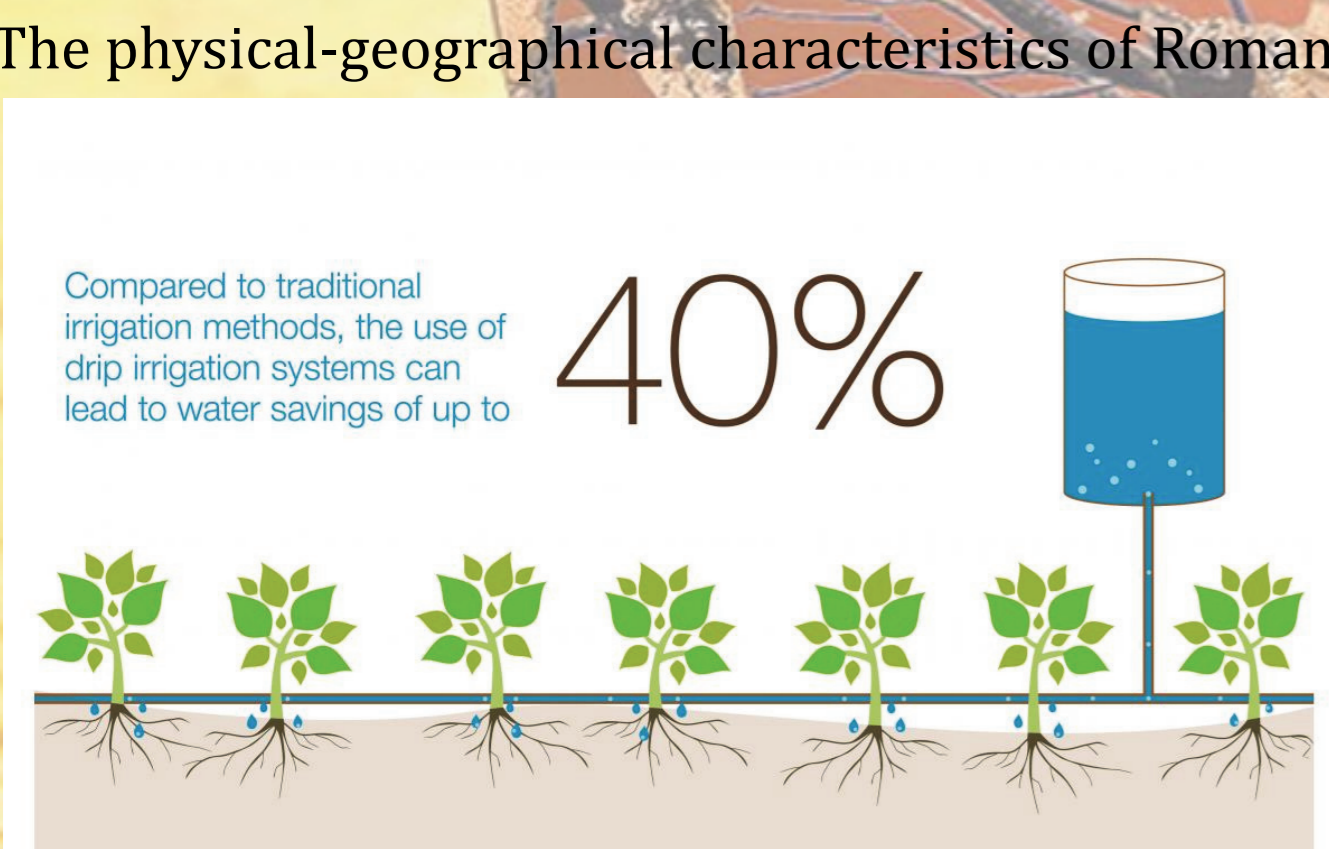
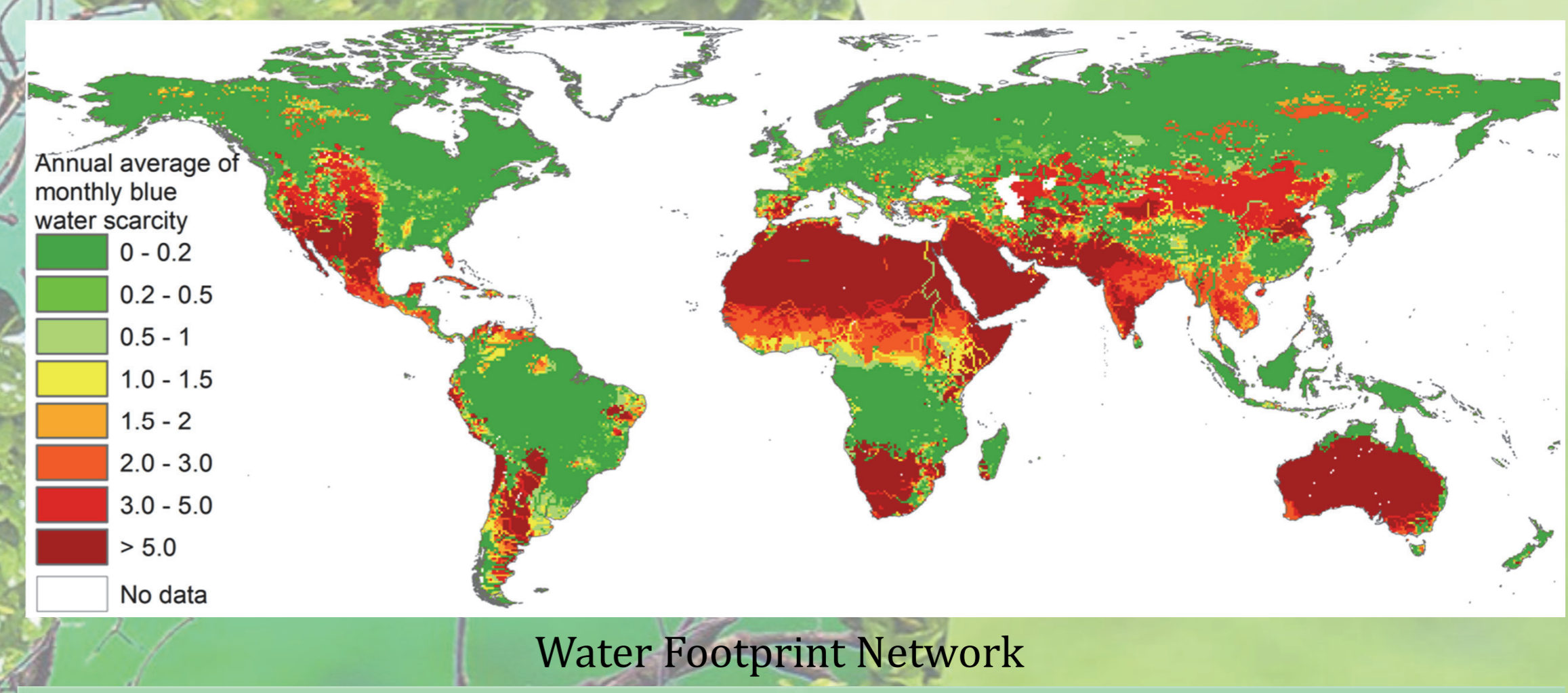
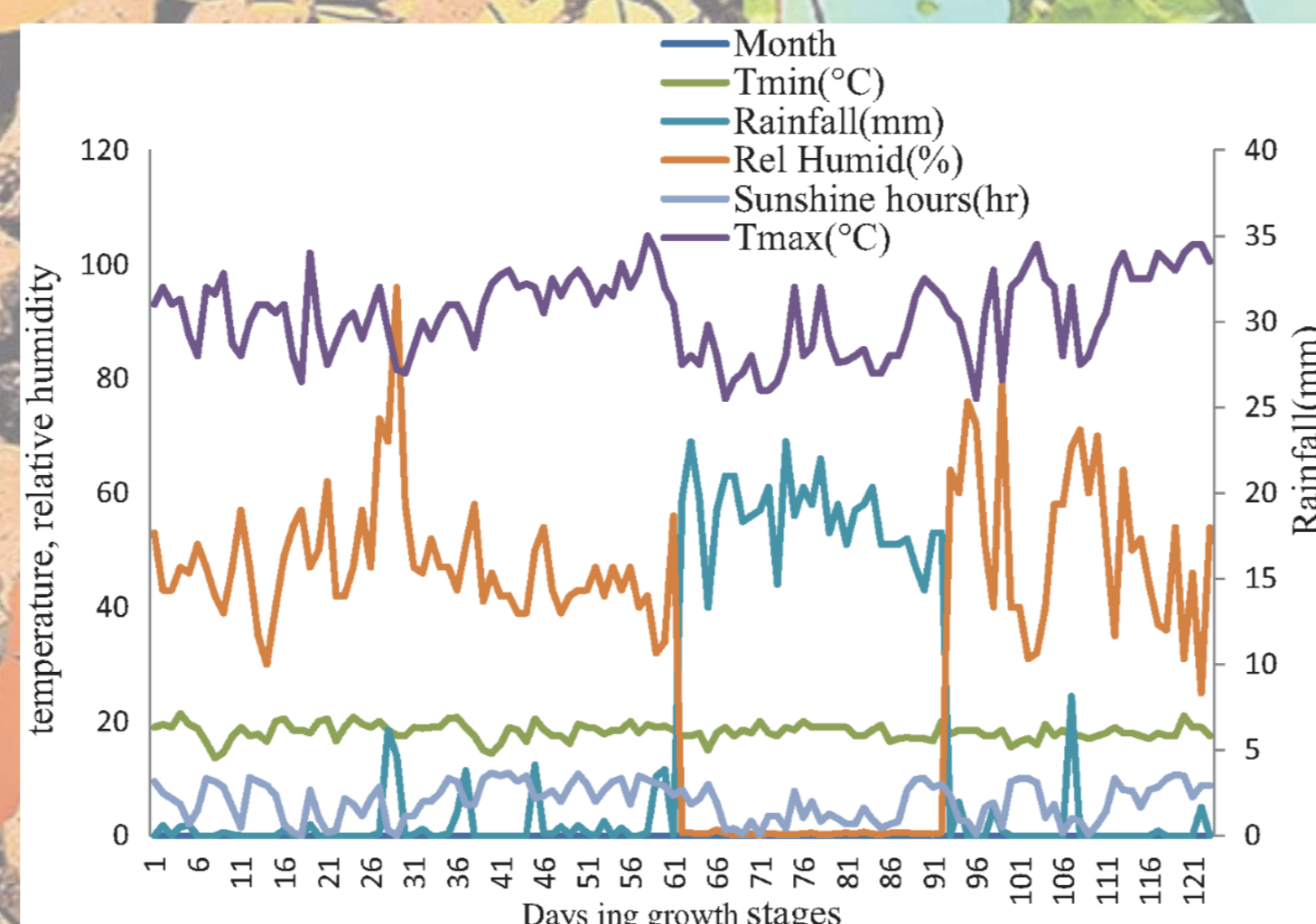
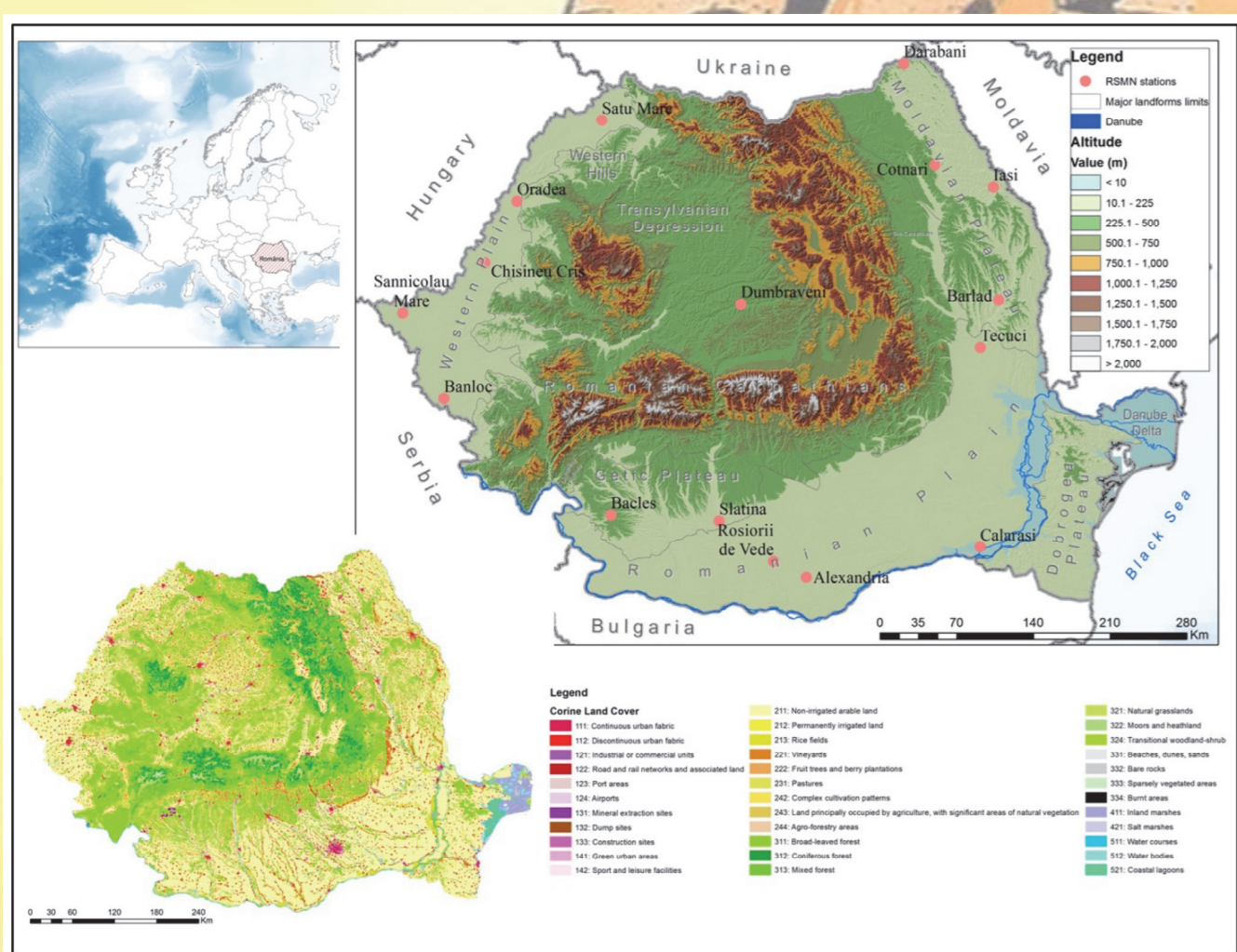
Western Romania faces increasing pressure on agricultural water resources due to recurrent droughts, rising temperatures, uneven rainfall, and inefficient irrigation practices. The region includes productive plains and mixed farming systems where maize, wheat, sunflower, vineyards, and vegetable crops depend on reliable seasonal moisture. This abstract examines the main drivers of excessive agricultural water consumption and proposes sustainable solutions suited to local environmental and socioeconomic conditions. Key challenges include aging canal networks, conveyance losses, low adoption of precision irrigation, fragmented land ownership, limited farm capital, weak monitoring of groundwater extraction, and declining soil organic matter that reduces water retention. Climate variability further intensifies demand during summer heatwaves while competition with households, industry, and ecosystems is growing.

### Material and method

The study was carried out using data obtained from agricultural reports, climatic information, irrigation system characteristics, and field observations specific to western Romania. The analyzed region is characterized by low-altitude relief, extensive agricultural land, and significant seasonal variations in precipitation and temperature. The methodology involved the analysis of factors influencing agricultural water consumption, including climatic conditions, irrigation methods, soil characteristics, and crop water requirements. Climatic parameters such as temperature, precipitation, and evapotranspiration were considered in order to evaluate water demand during the vegetation period. The evaluation of irrigation efficiency was performed by comparing traditional irrigation methods with modern systems such as drip irrigation and sprinkler irrigation. Particular attention was given to water losses caused by infiltration, evaporation, and inadequate irrigation scheduling.

### Result and discussions

The results highlight that agricultural water consumption in western Romania is strongly influenced by climatic variability, irrigation infrastructure conditions, and agricultural management practices. Prolonged drought periods recorded during recent years have increased irrigation demand and intensified pressure on available water resources. Traditional irrigation systems are associated with significant water losses caused by evaporation, infiltration, and inefficient distribution networks. In many agricultural areas, outdated irrigation infrastructure contributes to reduced irrigation efficiency and increased operational costs. The implementation of modern irrigation technologies such as drip irrigation and automated irrigation systems significantly improves water use efficiency. These systems allow better control of irrigation quantities and reduce unnecessary water consumption by adapting water supply according to crop requirements and soil moisture conditions.



### Conclusions

The study highlights that reducing agricultural water consumption represents a major challenge for sustainable agriculture in western Romania, especially under current climatic conditions characterized by increased drought frequency and irregular precipitation. Traditional irrigation methods are associated with significant water losses and reduced efficiency, while modern irrigation systems and precision agriculture technologies contribute to optimizing water use and improving crop productivity. The integration of digital monitoring systems, soil moisture analysis, and geospatial technologies provides important support for irrigation management and sustainable water resource use.

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