

Climate change impacts on irrigation in Slovenia

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Climate change scenarios are predicting rise of the mean air temperature for around 3 °C for the Central Europe. About precipitations scenarios are not so clear. However, change of precipitation is between -20 % and 10 % for the period 2035 to 2064 according to period 1961 - 1990.

Regional Climate scenarios for Slovenia are showing the rise of the temperature between 4 °C in the winter in NW Slovenia to 1 °C in the east Slovenia in the summer. Predictions for the precipitations change vary between -10 % and 10 %.

In the following expertise we will investigate how the crop water demand will change in the different climate conditions. This is connected with amount of the water needed for irrigation and how the crop water stress will change in non irrigated areas.

For this purpose the Regional Climate (RegCM3 provided by the International Centre for Theoretical Physics) scenarios for Slovenia were used. Temporal downscaling was performed using weather generators to provide homogeneous time series of daily data for period 2035 – 2064. Input data were derived from RegCM3 scenarios, daily measurement of meteorological data in period 1961 – 2004 for various meteorological station in Slovenia. Calculation of phenological changes in different climate conditions were also considered.

To calculate irrigation in different climate conditions Slovenian irrigation model IR-RFIB was used. It calculates specific plant water needs using daily meteorological data (Air temperature, relative humidity, wind, solar radiation for calculation Penman Montheith evapotranspiration or Hargreaves ET_o and precipitations), soil data and crop data.

Preliminary results show that water demand for used crops will rise up to 50 % according to conditions in period 1961 – 1990. Potential irrigation area will expand to more than 40 % of Slovenian area for selected crops. This will increase the pressure to water sources, especially in arid parts of Slovenia.