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Climate change impact on growing degree day accumulation values

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A well-known and often used method to assess and forecast plant growth cycle is the growing degree day (GDD) method with different formulas used for accumulation calculations. With this method the only factor that affects plant development is temperature. So with climate change and therefore also change in temperature the typical times of plant blooming or harvest can be expected to change. The goal of this study is to assess this change in the Northern Europe region. As an example strawberry bloom and harvest times are used.

As the first part of this study it was required to define the current GDD amounts required for strawberry bloom and harvest. It was done using temperature data from the Danish Meteorological Institute's (DMI) NWP model HIRLAM for the years 2010-2012 and general strawberry growth observations in Latvia. This way we acquired an example amount of GDD required for strawberry blooming and harvest.

To assess change in the plant growth cycle we used regional climate models (RCM) – Euro-CORDEX. RCM temperature data for both past and future periods was analyzed and bias correction was carried out. Then the GDD calculation methodology was applied on corrected temperature data and results showing change in strawberry growth cycle – bloom and harvest times – in Northern Europe were visualized.