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Risk in agricultural production in Poland and climate change

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The GISS scenario for Central Europe was chosen, when determining potential agriclimate changes on the area of Poland. It was assumed that the CO2 concentration will have doubled to 2050-2060, causing the temperature to increase by 2.8ºC, with an increase in winter equal to 3.2ºC and that in summer – to 2ºC. Annual precipitation would increase by 10% – 15% in winter with no change in summer (Climate Change 2007). The WGENK algorithm (Kuchar 2004) was used to generate data for 20 locations around Poland based on the climate characterisation for the period 1985-2005; a set of synthetic data was created which meet the assumptions of the adopted change scenario. In spite it is possible to achieve infinite number of the annual weather courses based on general climate scenario, 300 possible courses of weather passes in an annual arrangement were developed, representing decade around year 2050-2060, which made it possible to trace the variability of new agriclimatic conditions and to indicate potential extreme and mean values.
The synthetic data were used to determine selected characteristics of a vegetation period for each station:
- the mean and extreme dates of the start, end and duration of a vegetation period;
- the mean and extreme dates of the start, end and duration of the seasons;
- the mean, maximum and minimum value of the average daily temperature, maximum temperature, minimum temperature
- occurring of frost events and frostless periods;
- total and periodical precipitation;
- the number of days with precipitation;
- rainless periods longer than 10 days;
- hydrothermal conditions in the period from April to September were characterised by Sielianinov's index. Depending on its value, each month was classed as dry ($K \leq 1.3$), optimum ($1.3 < K \leq 2.0$) or humid ($K > 2.0$).
A comparative analysis of the basic parameters associated with the duration of the vegetation period showed that it is expected to have increased. The forecast mean data of the start of a vegetation period seems to be earlier at least about 13 days according to data from the period 1985-2005.
According to the adopted change scenario, the mean temperature of the vegetation period will increase from the current by 1.2ºC to 1.7ºC. Elongation of the vegetation period by a month will increase the number of days with precipitation by more then 10 days on average and the total precipitation during the vegetation period, which ranged from 370 to 390 mm during the period 1985-2005, will increase on average more than by 100 mm.
On the analysed area A comparative analysis of Sielianinov's index for the period from April to September has shown that a larger proportion of dry periods is to be expected in the future, with a decrease in the duration of humid periods, whereas the frequency of the optimum periods will remain on a comparable level. This trend occurred in individual months of the period in question (Łabędzki 2009).
The analyse assumed that the future weather changes from the perspective of mean values shows the increase of potential of plant productivity all over analysed area, however extreme values of weather courses by particular years or longer periods may progeny of deep loses of plant yields as well as increase in agricultural risk and destabilization of farm's cash flow. Actually there is not possible to estimate what kind of annual weather scenario will occur in the future, and it is the general fault of those predictions which take the general description of chosen climate scenario to estimate of prospective conditioning for agriculture.

References:
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