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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Growth and productivity of basic agricultural crops in accordance with expected climatic changes in Bulgaria and Hungary

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To obtain a plausible picture of the way agro ecosystems will respond to climate change by the end of 2020 and 2050-2070 were carried out model simulations meteorological data were updated with the results obtained from climate models. From this perspective and taking into account the fact that many agricultural areas in the country are located in areas with unstable moisturizing, with limited resources to heat or exposed to extreme weather conditions such as frost, drought, flooding, which determines fluctuations in the yields of major cereal and grain and forage crops. In fact, during the ten of the last 20 years (1991-2010) were significantly lower yields than cereals for autumn anomalous extreme weather conditions. Cereals are the main source of food for humans and animal feed. More than half of the sown areas in the country are occupied by winter cereal crops. Yields of cereal grain set and grain-feed balance.

Fully rely on the accumulated experience and knowledge in the field of agro-meteorological forecasting to develop a set of methods for assessment of agro-meteorological conditions for growth, development and yield forecasting of autumn crops. In solving the task were considered two groups of key issues. The first group includes quantitative description of the influence of environmental factors on growth of agricultural crops, especially for modeling the impact of extreme conditions (frost and drought) that are at the heart of volatile yields. The second group of issues relates to the parameters of dynamic models that take into account the geographical characteristics of the environment and conditioned by this variability.

Due to its biological features winter cereals are subjected to various adverse effects due to the peculiarities of weather conditions - heat and moisture. They have the property of ecological plasticity and can withstand variations of these elements in quite widely in the different phases of development, but the highest yields are obtained while keeping them in optimal for each phase of development conditions. This is achieved with respect to deadlines for the main agricultural activities, otherwise, under certain extreme conditions - frost, drought, droughts and dry winds. Can cause partial damage - death of all or part of the plant or area that after exceeding a certain percentage leads to re-sow crops and significant losses for farmers.

In accordance with the simulated by climate models future climatic conditions are obtained temperature and precipitation. With these values and model WOFOST simulations were carried out at three levels - present, near future and far future to respond to the productivity of agro ecosystems for major grain and forage crops in the country. Under present to 2000-2010, of course, the near future - 2030-2050 onwards; and distant future - 2070-2100, the results of these simulations are summarized and areas represented in the form of maps through the application of four levels of clusters depending on the types of crops that have been conducted model calculations. Color-coding of clusters improves informative maps and makes them easier to understand. With red color are marked areas in which results from growing the crop are poor and can not rely on the sustainable production under natural conditions; yellow marked areas for which the resulting yields are close to the national average, but the probability of case is high enough; green code is used when yields are above average and have a high probability of happening (P> 75%).

To obtain more specific and accurate picture of what is happening and what are conducted model simulations for the two most important cereals in our climate - winter wheat and grain maize.