

AGRO-CLIMATIC RISKS IN TERMS OF WATER SUPPLY

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The choice of technological and economic decisions that do not guarantee the achievement of the set goals can be called a risk in agronomic decision-making. An agro-climatic risk has two components – climatic and biological; the article considers only climatic risks. The consequences of the agro-climatic risks are possible yield losses due to a deficit of agro-climatic resources during the growing season. These losses are caused by meteorological parameters of the environment that are physiologically critical for the growth and development of crops, including the occurrence of dangerous agrometeorological phenomena during vegetation. Changes in the spatial and temporal distributions of extreme atmospheric and soil droughts are taken into account when assessing agro-climatic risks and their consequences under predicted climate change. The forecast procedure for risk assessment is mandatory, but difficult to implement under the observed conditions of climate instability and insufficient adequacy of modern mathematical climate models to the processes of global circulation of the atmosphere and ocean. The purpose of the paper is to reveal the essence of the concept of "agro-climatic risk" and to outline a methodology to generate probabilistic forecasts of changes in precipitation by summarizing the set of deterministic forecasts published by the Intergovernmental Panel on Climate Change. The original author's modification of the ensemble method for generalizing deterministic model precipitation forecasts was used in preparing the materials of the paper. The paper presents the results of applying the methodology for predictive model assessment of changes in the amount of precipitation in the agricultural territory of Russia in the time interval of 2011–2030. The results of mapping the generalization data indicate local decreases in the amount of precipitation in regions affected by desertification, and, as a result, an increase in the probability of agro-climatic risks in terms of the water supply factor for agricultural crops. The research novelty lies in the formulation of the concepts and specificity of the characteristics of agro-climatic risk in a series of climatic and agronomic risks, as well as in the use of the author's modification of the ensemble generalization method to bring the deterministic data of a fuzzy set of forecasts to a probabilistic representation. The relevance of the research is due to (1) the observed global climate changes; (2) corresponding increase in the uncertainty of climate criticality of agriculture in arid and semi-arid zones; (3) the need to manage agro-climatic risks to prevent or reduce their consequences.

Keywords: droughts, agro-climatic risk, precipitation forecast, probability.