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A possibility of using deep neural networks to estimate the average district-level expected winter wheat yield for the territory of the North Caucasus Administration for Hydrometeorology and Environmental Monitoring is shown. The neural network was trained on a dataset that included satellite indices, meteorological data, and historical series of average regional yields for the period from 2012 to 2023. An experimental search for optimal neural network hyperparameters was carried out and made it possible to achieve the balance between the model's accuracy and generalizability. A comparative analysis of the accuracy of calculating the expected yield was performed using neural networks, statistical regression models, and machine learning algorithms (decision tree, random forest, linear regression). The results of the analysis showed that the maximum convergence between actual and calculated winter wheat yields is achieved when using the neural network. The results demonstrate the potential of the neural network approach for assessing the expected yield of winter wheat based on the integration of ground-based and satellite data.

*Keywords:* crop yield, meteorological information, NDVI, VCI, VCNI, regression, neural network

Tab. 2. Fig. 5. Ref. 15.