

## Soil and Eco-Economic Substantiation of the Need for Switching to the Adaptive-Landscape Systems of Agriculture in the Krasnodar Krai

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### ABSTRACT

The climatic, soil, ecological and economic features of the natural landscapes in the Krasnodar Krai were analyzed. The land structure of cultivated land in Western Ciscaucasia was given; the current state of soils in the Krasnodar Krai was analyzed. The changes in the content of humus in the arable layer over the century were considered. The qualitative state of agricultural lands, such as the susceptibility to erosion, the content of humus, and indicators of the nutrients balance in the soil was shown. A conclusion the existing zonal agriculture systems do not use the landscape diversity of the region was drawn. The need for switching to the adaptive landscape system of agriculture was substantiated. Using the GIS technologies, the boundaries of the natural landscapes in the Krasnodar Krai and the areas of agricultural land was determined by types and the degree of the manifestation of erosion processes. An eco-economic assessment of the field crop rotations adapted to the natural landscape by cultivated lands was made.

**Keywords:** farming systems, soil erosion, humus, fertility, terrain, cropping pattern, crop rotation, eco-economic efficiency.

### INTRODUCTION

The Krasnodar Krai takes a leading position in the food complex of Russia. The black soil, which occupies over 60% of the Krasnodar Krai territory, has some unique properties, the most important of which is high buffer capacity, i.e., the ability to resist the changes of the properties, which is the prerequisite for a stable operation of cultivated lands. However, as a result of the intensive exposure to the anthropogenic factors, cultivated lands turned out to be very sensitive to the external influences (natural prerequisites and the anthropogenic factors), which resulted in the disbalance of the landscape systems. At the same time, the chain reaction mechanism started working at an increasing rate, when the causes and consequences of changes swap places. This applies to the emergence and the dynamics of

hydromorphic complexes in the initially auto-morphic soils. The lands with eroded soils among the non-eroded analogs, on the contrary, are permanent, but their dynamics tend to increase the size and severity of erosion. The main negative processes in the region are wind and water soil erosion, occurring in the area of 2,364.3 thousand ha of agricultural lands, and occupying 31.3% of the agricultural land.

According to the data of the Kuban State Scientific Research and Design and Survey Institute of Land Amelioration (KubanNIIgiprozem), water erosion currently affects 1,174.3 thousand ha of arable land and the speed of the process increases. Over 35 years (1975 to 2010), the area of medium-eroded arable land had increased 3.5 times, from 45 to 159 thousand ha. Erosion (by water and wind) decreases the content of humus, reduces the thickness of

















