ABSTRACT
of the dissertation by Zhyrgalova Alima Kebekkyzy
on the topic: "Improvement of the methodology for estimating the cadastral value of agricultural land considering technogenic pollution (on the example of Kostanay region)" submitted for the degree of Doctor of Philosophy (PhD) in the educational program 8D07308 – "Land Management"

1. Relevance of the Research Topic

Intensive activities of industrial enterprises in cities result in significant emissions of pollutants into the environment. Among these chemical pollutants, heavy metals are among the most hazardous. Heavy metals spread over long distances, causing land degradation and pollution around cities. Contaminated land often emerges in industrial areas, where pollutant emissions affect the surrounding environment.

In contaminated (disturbed) agricultural lands within the influence zone of industrial emissions, soil reclamation measures are required to produce quality agricultural products that meet relevant standards, which necessitates additional expenses. According to the 2010 methodology for calculating the cadastral value of agricultural land, land contamination with chemical substances, including heavy metals, is not considered. This leads to inaccuracies in determining cadastral land values and, consequently, erroneous calculations for taxes and rent, which are often inflated, creating an unfair burden on landowners and tenants.

Under these conditions, it is essential to adjust the methodology for cadastral valuation of contaminated agricultural land. This assessment should involve land monitoring, evaluation of ecological and economic damage from land disturbance or contamination, and refinement of the cadastral value of agricultural land.

2. Purpose and Objectives of the Research

The dissertation aims to improve existing methods for determining the cadastral value of agricultural lands in conditions of technogenic pollution. The objective is to develop methodologies that consider ecological factors and contamination levels, enabling more accurate cadastral valuation and appropriate adjustments in the tax and rent systems.

The research objectives include:

- Studying the theoretical foundations for improving the cadastral valuation of agricultural land considering technogenic pollution;
- Reviewing recommendations for effectively increasing the cadastral value of agricultural land with consideration of technogenic pollution;
- Justifying proposals for improving the methodology for assessing the cadastral value of agricultural land with consideration of technogenic pollution;
- Proposing an effective methodology for assessing the cadastral value of agricultural land considering technogenic pollution.

3. Methodology and Research Methods

The dissertation employs analytical, cartographic, and statistical methods, as well as factor analysis techniques. For assessing land contamination levels, comprehensive

monitoring is conducted, including chemical composition analysis of soils. Heavy metal levels (e.g., cadmium, lead) are analyzed alongside indicators of soil acidity, productivity, and yield. This enables correlation of contamination levels with impacts on soil fertility and agricultural product quality, which is crucial for substantiating adjustments in cadastral values.

4. Scientific Novelty of the Research

The novelty of the research lies in the integration of ecological aspects into cadastral valuation procedures. The dissertation proposes the inclusion of ecological factors in valuation metrics, accounting for the actual impact of technogenic pollution on land value. New approaches are developed to refine cadastral valuation, allowing for more accurate reflection of soil conditions, especially in areas affected by industrial emissions.

5. Key Points for Defense

1. The developed methodology enables adjustment of the cadastral value of agricultural land according to the degree of technogenic pollution, ensuring fairer taxation and rental payments.
2. Integrating ecological parameters, such as heavy metal content and soil acidity levels, into cadastral valuation allows for a precise reflection of the actual condition of land, enhancing assessment accuracy and objectivity.
3. The proposed methodology reduces the financial burden on landowners and tenants of areas impacted by technogenic pollution and promotes ecological improvement of agricultural lands.

6. Description of Main Research Results

1. Existing methods for cadastral valuation of agricultural land were analyzed, revealing deficiencies in accounting for ecological factors, especially in contaminated areas.
2. Field studies and laboratory analyses of soil samples were conducted, revealing excessive levels of heavy metals such as cadmium and lead in areas near industrial zones.
3. A methodology was developed to integrate data on soil ecological conditions into cadastral valuation, accounting for pollution-related damage and adapting land value assessments accordingly.
4. A soil cover monitoring system was created, including assessments of ecological damage from pollution, allowing for regular updates of cadastral data to accurately reflect current land conditions.

7. Justification of Novelty and Importance of the Results

The novelty of the work lies in the proposed methodology, which integrates ecological parameters into the cadastral valuation process for agricultural lands contaminated by heavy metals and other toxic substances. Notably, existing methods do not provide such adjustments, leading to inflated cadastral values in polluted areas. Implementing the proposed methodology can improve valuation systems, reducing the tax and rental burden on landowners and tenants, thus encouraging more responsible environmental practices.

8. Relevance to Science Development Goals and Government Programs

The dissertation aligns with key scientific development goals in ecology, land management, and cadastral valuation, as well as Kazakhstan's national program for environmental protection and sustainable resource use. The proposed methods and recommendations support ecological security and the sustainable development of agriculture, in line with the objectives of the Rural Development Program and National Environmental Protection Plan.

9. Doctoral Candidate's Contribution to Each Publication

The doctoral candidate made a significant contribution to each publication related to this research, including setting research objectives, developing the methodology, and conducting field studies. The author independently analyzed and processed the data, and presented the research results in publications, including peer-reviewed scientific journals and international conferences. The results include original soil cover analysis data and proposals for adapting cadastral methodology.

The validity and reliability of the research results have been confirmed and published in 15 scientific works, including: 1 article in a journal indexed in the Scopus database; 1 article in a foreign scientific journal included in the Agris database; 1 article in a journal indexed in the RSCI database; 3 articles in journals recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan; materials of 9 international and scientific-practical conferences, including 4 materials from foreign conferences.

10. Structure and Volume of the Dissertation

The dissertation consists of an introduction, three chapters, a conclusion, a bibliography, and appendices. The work comprises 109 pages of text, including 16 tables and 31 figures.