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«ХАЛЫҚ» ЖҚ

# Х А Б А Р Ш Ы С Ы

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## ВЕСТНИК

РОО «НАЦИОНАЛЬНОЙ  
АКАДЕМИИ НАУК  
РЕСПУБЛИКИ КАЗАХСТАН»  
ЧФ «Халық»

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## THE BULLETIN

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В 2016 году для развития и улучшения качества жизни казахстанцев был создан частный Благотворительный фонд «Халык». За годы своей деятельности на реализацию благотворительных проектов в областях образования и науки, социальной защиты, культуры, здравоохранения и спорта, Фонд выделил более 45 миллиардов тенге.

Особое внимание Благотворительный фонд «Халык» уделяет образовательным программам, считая это направление одним из ключевых в своей деятельности. Оказывая поддержку отечественному образованию, Фонд вносит свой посильный вклад в развитие качественного образования в Казахстане. Тем самым способствуя росту числа людей, способных менять жизнь в стране к лучшему – профессионалов в различных сферах, потенциальных лидеров и «великих умов». Одной из значимых инициатив фонда «Халык» в образовательной сфере стал проект *Ozgeris powered by Halyk Fund* – первый в стране бизнес-инкубатор для учащихся 9-11 классов, который помогает развивать необходимые в современном мире предпринимательские навыки. Так, на содействие малому бизнесу школьников было выделено более 200 грантов. Для поддержки талантливых и мотивированных детей Фонд неоднократно выделял гранты на обучение в Международной школе «Мирас» и в *Astana IT University*, а также помог казахстанским школьникам принять участие в престижном конкурсе «*USTEM Robotics*» в США. Авторские работы в рамках проекта «Тәлімгер», которому Фонд оказал поддержку, легли в основу учебной программы, учебников и учебно-методических книг по предмету «Основы предпринимательства и бизнеса», преподаваемого в 10-11 классах казахстанских школ и колледжей.

Помимо помощи школьникам, учащимся колледжей и студентам Фонд считает важным внести свой вклад в повышение квалификации педагогов, совершенствование их знаний и навыков, поскольку именно они являются проводниками знаний будущих поколений казахстанцев. При поддержке Фонда «Халык» в южной столице был организован ежегодный городской конкурс педагогов «*Almaty Digital Ustaz*».

Важной инициативой стал реализуемый проект по обучению основам финансовой грамотности преподавателей из восьми областей Казахстана, что должно оказать существенное влияние на воспитание финансовой

грамотности и предпринимательского мышления у нового поколения граждан страны.

Необходимую помощь Фонд «Халык» оказывает и тем, кто особенно остро в ней нуждается. В рамках социальной защиты населения активно проводится работа по поддержке детей, оставшихся без родителей, детей и взрослых из социально уязвимых слоев населения, людей с ограниченными возможностями, а также обеспечению нуждающихся социальным жильем, строительству социально важных объектов, таких как детские сады, детские площадки и физкультурно-оздоровительные комплексы.

В копилку добрых дел Фонда «Халык» можно добавить оказание помощи детскому спорту, куда относится поддержка в развитии детского футбола и карате в нашей стране. Жизненно важную помощь Благотворительный фонд «Халык» оказал нашим соотечественникам во время недавней пандемии COVID-19. Тогда, в разгар тяжелой борьбы с коронавирусной инфекцией Фонд выделил свыше 11 миллиардов тенге на приобретение необходимого медицинского оборудования и дорогостоящих медицинских препаратов, автомобилей скорой медицинской помощи и средств защиты, адресную материальную помощь социально уязвимым слоям населения и денежные выплаты медицинским работникам.

В 2023 году наряду с другими проектами, нацеленными на повышение благосостояния казахстанских граждан Фонд решил уделить особое внимание науке, поскольку она является частью общественной культуры, а уровень ее развития определяет уровень развития государства.

Поддержка Фондом выпуска журналов Национальной Академии наук Республики Казахстан, которые входят в международные фонды Scopus и WoS и в которых публикуются статьи отечественных ученых, докторантов и магистрантов, а также научных сотрудников высших учебных заведений и научно-исследовательских институтов нашей страны является не менее значимым вкладом Фонда в развитие казахстанского общества.

С уважением, Благотворительный Фонд «Халык»!

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**ANALYSIS OF THE STATE OF STATE MANAGEMENT OF  
SUSTAINABLE ENVIRONMENTAL DEVELOPMENT OF THE  
REGION(ON THE EXAMPLE OF THE KARAGANDA REGION)**

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**Abstract.** The Local Agenda for the 21st Century is an action program that defines the goals and means of action to ensure sustainable development in the local community. Such a program requires the appropriate use of a number of technical, political and/or socio-economic instruments at the regional level. Thus, the purpose of this scientific article is to investigate and then develop some recommendations for the sustainable development of the Karaganda region. The authors used the methods of content analysis, statistical, mathematical, comparative analysis, as well as the method of causal relationship and analysis and synthesis. Hypothesis 1: The development and implementation of environmental and sustainable development planning provide the akimats of the region with an opportunity for development on an ecological and economic scale. Hypothesis 2: The implementation of development projects based on community development planning contributes to the improvement of living conditions and living conditions of the local population. Conclusions: For the effective implementation of environmental and sustainable development of the Karaganda region, the participation of all sides of society in five directions is necessary. 1) tightening and compliance with the legal framework in



the field of ecology. 2) participation of the private financial sector in the investment of ecological production. 3) awareness and participation of citizens in the culture of eco-friendly consumption, including waste sorting. 4) public-private financing of the tourism industry of the Karaganda region. 5) encouragement and stimulation of eco-friendly initiatives by public authorities. The empirical conclusions of the work can be used for the purposes of developing an effective ecological and economic regional policy, as well as for scientific and educational activities.

**Keywords:** public administration, ecology, environment, sustainable development, Karaganda region

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## **ӨНІРДІҢ ТҰРАҚТЫ ЭКОЛОГИЯЛЫҚ ДАМУЫН МЕМЛЕКЕТТІК БАСҚАРУДЫҢ ЖАЙ-КҮЙІН ТАЛДАУ (ҚАРАҒАНДЫ ОБЛЫСЫНЫҢ МЫСАЛЫНДА)**

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**Аннотация.** ХХІ ғасырдағы Жергілікті күн тәртібі-бұл жергілікті қоғамдастықтың тұрақты дамуын қамтамасыз ету мақсаттары мен құралдарын анықтайтын іс-қимыл бағдарламасы. Мұндай бағдарлама аймақтық деңгейде бірқатар техникалық, саяси және/немесе әлеуметтік-экономикалық құралдарды дұрыс пайдалануды талап етеді. Ғылыми мақаланың мақсаты Қарағанды облысының тұрақты дамуы үшін ұсынымдар әзірлеу. Авторлар контент-талдау, статистикалық, математикалық, компаративті талдау әдістерін және себеп-салдарлық байланыс әдістерін қолданды. 1-Гипотеза: экологиялық және орнықты дамуды жоспарлауды әзірлеу және іске асыру облыс әкімдіктеріне экологиялық және экономикалық ауқымда даму үшін мүмкіндік береді. 2-Гипотеза: қоғамдық дамуды жоспарлауға негізделген даму жобаларын жүзеге асыру жергілікті халықтың өмір сүру жағдайлары жақсартуға ықпал етеді. Қорытындылар: Қарағанды облысының экологиялық және тұрақты дамуын тиімді іске асыру үшін қоғамның барлық тараптарының бес бағыт бойынша қатысуы қажет. 1) экология саласындағы құқықтық базаны қатаңдату және



сақтау. 2) жеке қаржы секторының экологиялық өндірісті инвестициялауға қатысуы. 3) азаматтардың экологиялық тұтыну мәдениетіне, оның ішінде қалдықтарды сұрыптауға хабардарлығы мен қатысуы. 4) Қарағанды облысының туристік саласын мемлекеттік-жекешелік қаржыландыру. 5) мемлекеттік органдардың экологиялық бастамаларды көтермелеуі және ынталандыруы. Жұмыстың эмпирикалық қорытындылары тиімді экологиялық-экономикалық аймақтық саясатты әзірлеу мақсатында, сондай-ақ ғылыми және білім беру қызметі үшін пайдаланылуы мүмкін.

**Түйін сөздер:** Мемлекеттік басқару, экология, қоршаған орта, орнықты даму, Қарағанды облысы

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## **АНАЛИЗ СОСТОЯНИЯ ГОСУДАРСТВЕННОГО УПРАВЛЕНИЯ УСТОЙЧИВЫМ ЭКОЛОГИЧЕСКИМ РАЗВИТИЕМ РЕГИОНА (НА ПРИМЕРЕ КАРАГАНДИНСКОЙ ОБЛАСТИ)**

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**Аннотация.** Местная повестка дня на XXI век — это программа действий, в которой определены цели и средства действий по обеспечению устойчивого развития в местном сообществе. Такая программа требует надлежащего использования ряда технических, политических и/или социально-экономических инструментов на региональном уровне. Цель данной научной статьи исследовать и разработать некоторые рекомендации для устойчивого развития Карагандинской области. Авторами применялись методы контент-анализа, статистического, математического, компаративного анализа, а также методы причинно-следственной связи, анализа и синтеза. Гипотеза 1: Разработка и реализация планирования экологического и устойчивого развития предоставляют акиматам области возможность для развития в экологическом и экономическом масштабе. Гипотеза 2: Реализация проектов развития, основанных на планировании общинного развития, способствует улучшению условий жизни местного населения. Выводы: Для эффективной реализации

экологического и устойчивого развития Карагандинской области необходимо участие всех сторон общества по пяти направлениям: 1) ужесточение и соблюдение правовой базы в области экологии; 2) участие частного финансового сектора в инвестировании экологического производства; 3) осведомленность и участие граждан в культуре экологичного потребления, в том числе сортировке отходов; 4) государственно-частное финансирование туристической отрасли Карагандинской области; 5) поощрение и стимулирование экологических инициатив государственными органами. Эмпирические выводы данного исследования могут быть использованы в целях разработки эффективной эколого-экономической региональной политики, а также для научной и образовательной деятельности.

**Ключевые слова:** государственное управление, экология, окружающая среда, устойчивое развитие, Карагандинская область

### **Introduction.**

The relevance of the chosen topic is due to the global trend under the auspices of the UN (2023), which are expressed in 17 Sustainable Development Goals. Kazakhstan, as part of the world community, also supports international efforts to achieve the Sustainable Development Goals. However, in order to achieve these goals in the most effective way, it is necessary to make every effort at all levels, in particular at the level of the regions of the country.

In this regard, the purpose of this scientific articles is to study various ways of spatial and practical implementation of sustainable development on the example of the Karaganda region, as well as to develop some recommendations for the ecological and sustainable development of this area.

The specificity of this study is to identify spatial and operational ways of declination of sustainable development. In particular, it is about demonstrating that this regional deviation is carried out, on the one hand, in accordance with conditions common to all regions (regulatory context, political and administrative organization, general form of institutionalization of sustainable development, etc. on the other hand, in accordance with the special conditions associated with the specifics of each regional territory (geophysical, socio-cultural, economic, etc.).

In the development and subsequent implementation of a territorial sustainable development project, territorial authorities rely on the mobilization and cooperation of all: residents, associations, economic community, institutional partners, public services, neighboring communities and sub- or supra-territorial scale communities, experts, elected officials and community specialists. Territorial management is determined by the ability to use natural and human resources specific to each territory to develop a common project (Bezpalov et al., 2019).

To achieve the Sustainable Development Goals, it is necessary to be based on an accurate knowledge of the specifics of the territory, to know its strengths and weaknesses, to be able to identify potential opportunities and problems, to analyze knowledge and coincidences of interests.

One of the strengths of sustainable development is the need to integrate economic, social and environmental issues. In particular, the economy should be more sensitive to social and environmental problems and take into account the ethical aspect of prosperity. Prosperity should benefit everyone, lead to a more equitable distribution of income, contribute to the fight against poverty and provide everyone with the opportunity to find a job. Everyone has the right to a high-quality environment in their daily lives (water, air, space, urban planning).

This is the approach that should be taken in the implementation of the sustainable development of the Karaganda region, which is expressed in the research hypotheses of this scientific work:

Hypothesis 1: The development and implementation of environmental and sustainable development planning provide the akimat of the region with an opportunity for development on an ecological and economic scale.

Hypothesis 2: The implementation of development projects based on community development planning contributes to the improvement of living conditions and living conditions of the local population.

### **Research methods and materials**

Methods of statistical, mathematical, comparative analysis, causal relationship were used in the course of the research. Also, the research apparatus includes general scientific methods such as historical and logical approach, analysis and synthesis, comparison, consistency and complexity.

However, the main method has become content analysis, which can be defined as a systematic process of classifying and encoding data. This method aims to accurately identify the topics present in the analyzed documents. Thus, content analysis is a method aimed at reducing raw data and classifying them by topic or category. The data encoding process can be the subject of an approach that is either deductive or inductive. The content analysis method can be the subject of use, which relies on both deductive and inductive logic. These two logics are not mutually exclusive. They can be used in combination.

As part of this research, we decided to resort to an inductive approach of content analysis. We justify this appeal from the point of view of our research goal. This method is suitable for research that aims to describe and investigate social phenomena. To this end, the inductive approach to content analysis is presented as a method that is especially relevant for describing factors that may pose a challenge to identify the reliability of information related to the results of sustainable development and public administration of the Karaganda region.

Thus, the empirical analysis is based on secondary data collected by territorial authorities (or their associations) based on the resources of their websites, as well as official national reports and data from the National Bureau of Statistics have been studied. This is publicly available information provided voluntarily, such as plans, action programs, charters, activity reports or assessments. All of them concerned territorial policy and public actions in the field of sustainable development.

### **Results**

Experienced crises in the field of health, finance, energy or climate, often interconnected, encourage local governments to develop new strategies for adaptation. Within the framework of this scientific work, the authors made an attempt to identify the most significant environmental risks of the region, in order to further form some recommendations for implementing the most effective transition to sustainable development of the Karaganda region.

The main problems of the region include:

1. The quality of atmospheric air, which in turn depends on two key factors:
  - 1.1) stationary sources of pollutant emissions (Table 1);

*Table 1.* The number of stationary sources of pollutant emissions for 2019–2021, units

Name	2019 year	2020 year	2021 year
Stationary sources of emissions	18 168	17 998	17 421

Source: Bureau of National Statistics of the Republic of Kazakhstan.

- 1.2) motor transport.

According to the Bureau of National Statistics, 274.0 thousand units of passenger cars and 34.8 units of cargo vehicles were registered in the Karaganda region in 2021. According to the Department of Ecology of the Karaganda region, the volume of emissions of pollutants from motor vehicles for 2021 is 196.5 thousand tons (Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan, 2022).

2. Depletion of water resources.

The next environmental problem of the region – this is a matter of water resources. In the Karaganda region, Lake Balkash, Samarkand, Kengir, Sherubainur and Topar reservoirs, the rivers Nura, Sarysu, Kara Kengir, Zhezdy bear the main load. Their water resources are used in the process of production activities of ArcelorMittal Temirtau JSC, Temirtau Electrometallurgical Combine LLP, Kazakhmys Energy LLP, etc. After being used for production needs, the water is discharged back into the water bodies according to the categories of normative-clean and normative-purified. In total, there are 10 operating sewage treatment plants in the Karaganda region. The service life of the treatment facilities is 40–50 years, the average equipment wear is 60–70 %, the water purification technology used by enterprises is technically outdated (The Ministry of National Economy of the Republic of Kazakhstan, 2019).

*Table 2.* Discharges of pollutants with wastewater in the Karaganda region for 2021- 2020 years

Actual discharge volumes		2020 year	2021 year
Industrial discharges	Volume of water disposal, thousand m <sup>3</sup>	1 215.5	1 201.4
	Volume of pollutants, thousand tons	399.5	361.9
Household waste water	Volume of water disposal, thousand m <sup>3</sup>	163.1	163.1
	Volume of pollutants, thousand tons	57.8	57.8
Emergency and unauthorized discharges	Volume of water disposal, thousand m <sup>3</sup>	3 549.1	3 649.2
	Volume of pollutants, thousand tons	10	12
Total (all of the above resets)	Volume of water disposal, thousand m <sup>3</sup>	1 382.1	1 368.1
	Volume of pollutants, thousand tons	448.7	431.7

Source: Department of Ecology of the Karaganda region

### 3. Development of biodiversity

If we talk about the biodiversity of the region, then there are 13 specially protected natural territories of republican significance and 5 – local significance with a total area of 529.9 hectares in the region.

Forest Fund. The land area of the State Forest Fund of the Karaganda region in 2021 is 614.7 thousand hectares. The area of the state forest fund under the jurisdiction of the Department of Natural Resources and Environmental Management of the Karaganda region has decreased to 145,182 hectares compared to 2020.

Animal and plant life. In 2021, 23 facts of poaching were revealed on the territory of the Karaganda region (in 2020–18 facts), including illegal extraction of rare and endangered species of wild animals, as well as their parts and derivatives (Table 3).

*Table 3.* Facts of poaching, illegal extraction of rare and endangered animal species for 2021, units.

Name	Number of facts	Volume
Saiga	16	68
Roe deer	3	6
Boar	1	1
Horns	3	342

Source: Akimat of Karaganda region

### 4. Waste

According to the waste classification, there are two types: hazardous and non-hazardous. Regarding hazardous waste, there is a positive trend for the years 2020–2021 (Table 4)

*Table 4.* Information on the movement of hazardous waste for 2020–2021 in the Karaganda region, thousand tons

Movement of hazardous waste	2020	2021
Availability at the beginning of the year	739 480,8	44 788,8
Formed	11 836, 5	11 498,5
Received from other persons	1 872,1	9,0
Recycled, reused, disposed	3 977,2	649,0
Neutralized	4,6	0,1
Buried	5 973,1	16,8
Transferred to third-party organizations, enterprises	3 481,91	735,8
Availability at the end of the year	745 730,4	54 894,2

Source: Unified Environmental Protection Information System

As for non – hazardous waste, according to the Akimat of the Karaganda region, the volume of solid waste generated in 2021 in the region amounted to 398.7 thousand tons, 187.2 thousand tons or 47 % were processed (655 thousand tons of solid waste were formed in 2020, 190 thousand tons or 29 % of them were processed).

There are 202 facilities for municipal waste disposal on the territory of the

Karaganda region. In accordance with the Environmental Protection Action Plan of the Karaganda region, within 3 years it is planned to develop 6 feasibility studies and 10 PSAs for the construction of new landfills with subsequent reclamation of old landfills.

Thus, there is a need in the region for a more environmentally friendly approach to the processing and disposal of solid waste (The national report of the Republic of Kazakhstan, 2016).

In general, it should be emphasized that the local administrative authorities are constantly working to improve the indicators of the state of the environment and natural resources, however, the authors of the article suggest considering new ways and approaches to managing the sustainable development of the Karaganda region in the next section.

### **Discussion**

As part of the development of some recommendations, the authors of the work grouped measures into 4 directions of sustainable development of the region:

1. Priority in the regional policy of sustainable development: atmospheric air quality. It is necessary to turn the Karaganda region into a low-carbon region on the horizon of 2050. As a prerequisite for combating climate change, it also paves the way for sustainable production and consumption patterns that provide the jobs of tomorrow.

In this area, regional actions are focused on several areas:

- energy efficiency. With an ambitious policy of supporting the work of communities to renovate their public facilities, as well as individuals, associations and social;
- production of renewable and regenerative energy with the promotion of energy balance (wood energy, photovoltaic energy, wind energy, solar energy, methane or hydropower);
- actions in the field of management, communication and animation, taking into account the environmental conditions of regional construction assistance or involving a network of ordinary pioneers of ecological transition (Scarpellini et al., 2019).

1.1 Also, the authors believe that it is necessary to tighten the requirements for organizations that emit pollutants. For example, a change in the requirements for treatment facilities at large-scale enterprises, which could encourage industrial enterprises to use cleaner technologies. Along with this, the authors recommend tougher penalties for violations of environmental norms and standards at private and state-owned enterprises.

#### 1.2 Encourage easy mobility, public transport and car sharing

The development of urban public transport and measures to ensure sustainable mobility make it possible to combat congestion in cities and reduce air pollution, contributing to the transition to cleaner modes of transport.

Restrictions on movement. On an ongoing basis: Restricted traffic zones provides the city and districts with the opportunity to create restricted traffic zones to protect the health of the population living nearby. The community may restrict the movement

of vehicles that most pollute the environment, in accordance with the conditions that it determines at the local level after extensive consultations in accordance with the specifics and problems of its territory (Isaksen et al., 2018).

2. It is true that water scarcity is partly caused by inevitable population growth and unfair distribution of resources, but it is also true that people cause it by pollution and depletion of the few resources that exist. The solution of the problems should be carried out on the basis of political, scientific, technical, economic and technical cooperation.

General principles

- The supply of drinking water is a priority, and
- Mobilization of the maximum amount of surface water is a priority and permanent goal;
- The demand for water (drinking, agricultural, industrial) needs to be assessed in detail for the period from 2023 to 2050;
- Energy production should be carried out in a coordinated and harmonious manner
- Active promotion of the application of the basic principle: "who pollutes the environment pays." Thus, the involvement of municipalities, enterprises and users will increase;
- The actual price of the service should be indicated, and attention should be paid to the higher quality of management (Hassink et al., 2019).

Anti-littering policy and education in addition to fair price, and informing various decision makers and users in the field of water resources should be implemented through appropriate means, and educational modules should be introduced in primary school to increase students' awareness of the economics of water resources, its rational use and its importance, as well as promotion and development of water resources.

It is absolutely obvious and indisputable that sustainable development is impossible without control over water resources. The importance of water from an economic, social, cultural and strategic point of view no longer needs proof to ensure sustainable development. Local, regional, national or international information systems should be encouraged and developed. For the effective development of this sector and taking into account national and international experience and the environment, it is necessary to think about the development of a real policy in the field of water resources. Such a policy would contribute to the development and renewal of the industry in order to positively transform the entire hydraulics sector. It should really reflect the efforts that should be made in the form of investments, human and material resources that are necessary to meet economic, cultural and social needs.

For an effective water policy, for water to be the driving force of development and to achieve significant growth, it is very important to promote and support quality education and postgraduate study based on research. The State budget allocated to the hydraulics sector, especially for training and research in the field of hydraulics, should be adequately sufficient, and special efforts should be made to stimulate and



intensify applied research, industrial innovation and subsequent training through research.

### 3. Biodiversity

Biodiversity includes the diversity of life at all levels: the diversity of species, genetic diversity, as well as the diversity of the environment and ecosystems. High biodiversity is an important condition for the preservation of natural processes that provide valuable services to people, such as, for example, natural pest control, pollination of fruit tree flowers by insects, as well as the processes of soil formation and decomposition of organic substances (Gorroño-Albizu et al., 2019).

In this context, I would like to pay special attention to the use of agricultural land, since according to official statistics, it accounts for almost half of the entire land fund of the Karaganda region, namely 18,037 thousand hectares in 2021.

Agricultural policy increasingly supports cultivation methods aimed at improving environmental friendliness, preserving biodiversity and natural resources. Agricultural use suitable for the site, with extensive forms of production, is still an important condition for a diverse and species-rich cultivated landscape today.

In organic agriculture in the territory of the Karaganda region, it is recommended to apply various measures, such as:

- Rejection of herbicides;
- Rejection of synthetic chemical pesticides;
- Application of fertilizers in smaller quantities and purely organic;
- Lower density of cattle on the surface;
- Diverse landscape with a large proportion of temporary pastures;
- Methods of careful attitude to the soil (preservation of humus content);
- Higher proportion of surfaces close to the natural state;
- Higher proportion of high-quality useful and environmentally friendly surfaces;
- Diverse operating structure (Eremeeva et al., 2021).

These factors not only contribute to the conservation of biodiversity, but also enhance natural cycles and ecosystem effects, thereby increasing the sustainability of biological farms. Optimal promotion of biodiversity requires regional network measures that go beyond exploitation — ideally in a region where intensive exploitation is underway.

### 4. Improving waste collection and sorting

Finally, the last direction, but no less important – recycling and disposal of waste. The first step towards better waste management in the Karaganda region is to improve the collection and sorting of waste produced by households and enterprises. Indeed, efficient collection and sorting make it possible to ensure better recycling of waste and reduce its impact on the environment (Rae, 2017).

To do this, it is important to raise awareness of citizens and businesses about sorting rules and waste collection methods. For example, you may be advised to use multi-colored bags for various types of waste (packaging, paper, glass...) or to store bulky waste in special collection points.

In addition, the collection infrastructure needs to be improved by installing more sorting points and separate collection points, especially in rural areas and small municipalities, where access to these facilities may be difficult.

*Develop recycling and recycling of waste*

Waste recycling is an important lever to reduce the impact of waste production and recycling on the environment. In the region, the level of recycling is still insufficient, especially for some types of waste, such as plastic packaging or electronic waste.

For the development of recycling and recycling, it is important to invest in new waste recycling and disposal facilities, such as sorting centers, composting plants or incinerators. These installations also need to be upgraded so that they are more productive and less polluting (Wood et al., 2018).

In addition, it is important to encourage eco-friendly design of products to facilitate their recycling and reduce their impact on the environment. This can encourage companies to use recyclable materials and develop products that are easier to disassemble and recycle.

*Limit waste generation at the source*

In order to reduce the impact of waste on the environment, it is also necessary to limit the generation of waste at the source. This includes, in particular, the promotion of a closed-loop economy, which aims to reduce resource consumption and waste generation by promoting the reuse, repair and recycling of products (Cameron et al., 2020).

For example, you can get information about the purchase of environmentally friendly, repairable and recyclable products, as well as about responsible consumption and food waste. Companies may also be asked to develop proposals for the rental or sharing of goods, as well as to offer services for the repair or restoration of their products.

Introducing incentive tax incentives, such as a tax on plastic packaging or extending the shelf life of glass bottles, can also help reduce waste generation by encouraging consumers and businesses to behave more responsibly.

*Promote composting and methanization of organic waste*

Organic waste, such as vegetable peeler or food waste, makes up a significant part of household waste and can be recycled by composting or methanization. Both of these methods make it possible to process organic waste into fertilizers for the soil or into biogas, which can be used as a renewable energy source (Abreu et al., 2018)

Therefore, it is important to promote the development of composting and methanization in the Karaganda region, encouraging households and enterprises to sort and recycle their organic waste. This may include the distribution of individual composters, the installation of collective composters in apartment buildings or neighborhoods, or the creation of composting and methanization platforms throughout the territory.

*Strengthen regulation and control of waste processing enterprises*

Finally, in order to ensure optimal waste management in the region, it is important to strengthen the regulation and control of waste processing enterprises. This is due to the fact that some installations can have a negative impact on the environment and health, especially in terms of greenhouse gas emissions, air, water and soil pollution, as well as noise and odor (Beunen et al., 2019).

Therefore, it is necessary to establish strict standards and control measures for these facilities to ensure their compliance with environmental and sanitary requirements. Competent authorities should also ensure transparency and inform the public about waste treatment facilities and their impact in order to increase the social acceptability of these facilities and strengthen citizens' confidence in the waste management system.

Following these various areas of improvement, the Karaganda region can gradually optimize waste management and limit the impact of their production and processing on the environment. It is important that state actors, enterprises and citizens jointly participate in this process and adhere to responsible and environmentally responsible behavior.

Kazakhstan, and in particular the Karaganda region, should continue and intensify its efforts to improve waste management and limit their impact on the environment. The areas of action presented in this article, such as improving collection and sorting, developing recycling and recycling, limiting waste production, promoting composting and methanization, strengthening regulation and control over processing enterprises, improving efficiency and rationalization, and supporting local authorities are all levers that need to be mobilized to solve this problem.

It is important to remember that Waste management applies not only to government agencies and enterprises, but also to citizens who have a vital role to play in shaping responsible and environmentally responsible behavior. Together we can contribute to building a more sustainable society that respects our nature.

### **Conclusion**

The proposed plan for the development of the territory fits into the logic of evolution so that the economy of tomorrow can respond to the challenges of our time, including the energy and environmental transition, by creating high-quality jobs and fixing incomes on our territory. Thus, the regional scheme of economic development and innovation is strongly focused on this stage of transition to sustainable development of the Karaganda region.

Thus, the following factors are important for the sustainable and ecological development of the Karaganda region:

1. On the part of local government bodies, as well as, if necessary, national state participation, to tighten measures in case of violation of environmental standards. Such norms and standards include regulation of the quantity and quality of emissions of pollutants into the atmosphere and into the water basins of the Karaganda region, the service life of treatment facilities, the wear of which averages 60-70%, as well as poaching;

2. One of the acute problems is a large amount of solid waste. In this regard, it is necessary to attract investments for the construction of new enterprises for the processing and disposal of waste, such as sorting centers, compost plants or incinerators. I would like to pay special attention to the production of fertilizers privately, as well as on the scale of large-scale production.

3. It is necessary to carry out educational activities among all segments of the

population about the culture of sustainable and ecological development, including respect for nature, eco-friendly consumption, as well as waste sorting;

4. In order to preserve and develop the biodiversity of the region, it is recommended to develop tourism both within the region and at the national level. Thus, investments in tourism will bring a double positive effect, on the one hand, the flora and fauna of the region will be preserved and developed, on the other hand, tourism will bring additional profit to small and medium-sized businesses, which will increase jobs;

5. The authors of the paper recommend the introduction of incentive tax incentives, such as a tax on plastic packaging or an extension of the shelf life of glass bottles, can also help reduce waste generation by encouraging consumers and businesses to behave more responsibly. At the same time, the authors recommend that local governments encourage the reduction of emissions from transport by using more environmentally friendly modes of transport, or at least with the least amount of emissions of pollutants.

The empirical conclusions of the work can be used for the purposes of developing an effective ecological and economic regional policy, as well as for scientific and educational activities.

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**МАЗМҰНЫ  
ПЕДАГОГИКА**

<b>У.М. Абдиганбарова, А.Д. Сыздықбаева, А.М. Байкулова</b> ЖЕЛІЛІК КОММУНИКАЦИЯ МӘДЕНИЕТІ ЖӘНЕ ЦИФРЛЫҚ ЭТИКЕТ ТЕОРИЯЛАРЫНЫҢ ДИСКУРСТЫҚ ТАЛДАУЫ.....	7
<b>М.У. Абдинаги, Ж.Қ. Қорғанбаева, Д.Ә. Қаражанова</b> МАМАНДАРДЫ ДАЯРЛАУДАҒЫ ҮЗДІКСІЗ БІЛІМ БЕРУДІҢ ЕРЕКШЕЛІКТЕРІ.....	18
<b>С.Қ. Әбілдина, А.О. Әукен, И.Д. Бакирова, Қ.Ж. Балапанова, Ж.У. Дагарова</b> БАСТАУЫШ МЕКТЕП ЖАСЫНДАҒЫ БАЛАЛАРДА КӨЛДЕНЕҢ DAҒДЫЛАРДЫ ДАМЫТУ.....	28
<b>С.Т. Айтбаев, С.В. Суматохин, А.А. Кітапбаева, Д.У. Сексенова, Г.Б. Аталихова</b> ҚАЛЫПТАСТЫРУШЫ БАҒАЛАУ – МЕКТЕПТЕГІ МЕТАПӨНДІК БІЛІМ БЕРУ НӘТИЖЕЛЕРІН МОНИТОРИНГЛЕУДІҢ ҚҰРАЛЫ РЕТІНДЕ.....	38
<b>М.Б. Аманбаева, А.Д. Майматаева, С.А. Есентурова, П.В. Станкевич</b> БИОАЛУАНТҮРЛІКТІ ЗЕРТТЕУ НӘТИЖЕСІН ТҰРАҚТЫ ДАМУ МҮДДЕСІНДЕ ОҚУ ҮДЕРІСІНЕ КІРІКТІРУ.....	52
<b>А.Н. Аманжолова, Р.К. Измагамбетова, О.С. Серікова</b> STEAM ТЕХНОЛОГИЯСЫ НЕГІЗІНДЕ МЕКТЕП ЖАСЫНА ДЕЙІНГІ ЕРЕСЕК ТОП БАЛАЛАРЫНЫҢ ТАНЫМДЫҚ DAҒДЫЛАРЫН ДАМЫТУ.....	63
<b>А.Г. Аубакир, Д.У. Сексенова, Т.Р. Оспанбек</b> БОЛАШАҚ БИОЛОГИЯ ПӘНІ МҰҒАЛІМДЕРІН КӘСІБИ ДАЯРЛАУ БАРЫСЫНДА ЦИФРЛЫҚ ҚҰЗЫРЕТТІЛІКТЕРІН ҚАЛЫПТАСТЫРУДА ЖАОК-ДЫҢ MAҢЫЗЫ .....	76
<b>М. Аширмбетова, Д. Шаяхметова</b> УНИВЕРСИТЕТ СТУДЕНТТЕРІНІҢ АҒЫЛШЫН ТІЛІН БІЛУ DEҢҒЕЙІН ЖОҒАРТУДА КОГНИТИВТІ СТРАТЕГИЯЛАРДЫ ҚОЛДАНУ.....	93
<b>П. Елубаева, М. Буркитбаева, Г. Құлжанбекова, А. Хамидова</b> ТҰРАҚТЫ ДАМУ ҮШІН ТІЛДІК БІЛІМ БЕРУ БІЛІМ БЕРУ BAҒДАРЛАМАСЫНА МЕДИА САУАТТЫЛЫҚТЫ ЕНГІЗУ.....	102
<b>Ж.С. Ергубекова, А.А. Қуралбаева, А.Б. Сақулова</b> ОРТА МЕКТЕПТІҢ ҚАЗАҚ ТІЛІ ОҚУЛЫҒЫНА ЕНДІРІЛГЕН МӘТІНДЕРДІҢ ДИДАКТИКАЛЫҚ MAҢЫЗЫ.....	112
<b>М. Ерденев</b> МЕКТЕП ОҚУШЫЛАРЫНЫҢ ЭТНОБОТАНИКАЛЫҚ БІЛІМДІ СЫНЫПТАН ТЫС ОҚЫТУ АРҚЫЛЫ ҒЫЛЫМИ ТАНЫМДЫЛЫҒЫН ҚАЛЫПТАСТЫРУ ЖОЛДАРЫ.....	126
<b>Г.З. Искакова, А.С. Ысқақ, Н.А. Тасилова, Р.Ж. Мрзабаева</b> ЖЕТІСУ ОБЛЫСЫНДА ПОШТА-ТЕЛЕГРАФ МЕКЕМЕ ҚЫЗМЕТКЕРЛЕРІ (XIX ҒАСЫРДЫҢ ЕКІНШІ ЖАРТЫСЫ- XX ҒАСЫРДЫҢ БІРІНШІ ЖАРТЫСЫ).....	142
<b>Ғ.И. Исаев, Д.Ж. Юсупова, А.И. Исаев</b> БИОЛОГИЯ ПӘНІНДЕ STEM ТЕХНОЛОГИЯЛАРЫН ЖҮЗЕГЕ АСЫРУ АРҚЫЛЫ ОҚУШЫЛАРДЫҢ ІЗДЕНУШІЛІК DAҒДЫСЫН ҚАЛЫПТАСТЫРУ.....	153
<b>Р.И. Кадирбаева, Б.Т. Алимқулова, А.М. Базарбаева, Х.Т. Кенжебек</b> МЕКТЕП МАТЕМАТИКА КУРСЫНЫҢ «TEHDEУЛЕР MEH TEHСІЗDІKTEP» MAЗMҰNDЫҚ ЖЕЛІСІН ОҚЫП-ҮЙPEHУDE APACAC OҚЫТУ TEХНОЛОГИЯСЫН ҚOЛДАНУ.....	169
<b>Ж.Р. Каратаева, Г.М. Абильдинова, Джелал Карача</b> ӘДЕБИ ШOЛУ: ЖAҢAPТЫЛАТЫH ЭHЕРГИЯ КӨЗДЕРІ MEH БІЛІM БЕРУДЕГІ AҚПAPATТЫҚ TEХНОЛОГИЯЛАP APACЫHДАҒЫ БАЙЛAНЫС.....	185
<b>М.А. Касимбекова, Е.Т. Картабаева, Р.Ж. Мрзабаева</b> ОРТАЛЫҚ АЗИЯҒА ИСЛАМНЫҢ ТАРАЛУ ТАРИХЫНА ҚАТЫСТЫ KEЙБІP MӘCEЛEP (Bатыс зерттеушілерінің еңбектері бойынша).....	196
<b>Б.З. Кенжегулов, Ж. Сайдолқызы, Р.Қ. Аманғалиева</b> ОРТА MEКTEПTE TPИГОНOMETPIЯЛЫҚ ФУHКЦИЯЛАP APҚЫЛЫ KEЙБІP ФOPМУЛАЛАРДЫ ДӘЛEЛDEУ.....	212



<b>Г.Б. Қыдырбаева, А.С. Стамбекова</b> БОЛАШАҚ БАСТАУЫШ СЫНЫП МҰҒАЛІМДЕРІНІҢ КӨП ТІЛДІ БІЛІМ БЕРУДЕГІ СЛІТ ТЕХНОЛОГИЯСЫНА КӨЗҚАРАСТАРЫ.....	229
<b>Е.Н. Ноянов, М.Д. Байдавлетова, Б. Еділ, Р.Ж. Мрзабаева</b> «СЫРЫМ ДАТУЛЫ БАСТАҒАН ҰЛТ-АЗАТТЫҚ КӨТЕРІЛІС» ТАҚЫРЫБЫН ҚАЗАҚСТАН ТАРИХЫ ПӘНІНДЕ ОҚЫТУ МӘСЕЛЕЛЕРІ.....	242
<b>Д.А. Шрымбай, Э.Т. Адылбекова</b> ЖАППАЙ АШЫҚ ОНЛАЙН КУРСТАРЫ (MOOCS) – БОЛАШАҚ МҰҒАЛІМДЕРДІҢ КӘСІБИ ДАЙЫНДЫҒЫН ЖЕТІЛДІРУ ҚҰРАЛЫ.....	254

### ЭКОНОМИКА

<b>А.А. Абдикадинова, Ж.Т. Темірханов</b> ЗЕРТТЕУ НӘТИЖЕЛЕРІНІҢ ТИІМДІЛІГІ: МЕМЛЕКЕТТІК АУДИТ ПЕРСПЕКТИВАСЫ.....	271
<b>Е.Б. Аймағамбетов, М.Қ. Жоламанова, Е.А. Ставбунник</b> ӨҢІРДІҢ ТҰРАҚТЫ ЭКОЛОГИЯЛЫҚ ДАМУЫН МЕМЛЕКЕТТІК БАСҚАРУДЫҢ ЖАЙ- КҮЙІН ТАЛДАУ (ҚАРАҒАНДЫ ОБЛЫСЫНЫҢ МЫСАЛЫНДА).....	288
<b>А. Алибекова, Л. Сембиева, З. Башу, С. Идырыс, С. Christauskas</b> МЕМЛЕКЕТТІК АУДИТТИ ДАМУЫ ШЕҢБЕРІНДЕ ТАБИғИ РЕСУРСТАРДЫҢ ТИІМДІЛІГІН БАҒАЛАУ.....	302
<b>Э.С. Балапанова, Р.К. Арзикулова, А.Т. Исаева, М.Н. Нургабылов, К.Н. Тастанбекова</b> ҚАЗАҚСТАНДАҒЫ ҚАРЖЫЛЫҚ САУАТТЫҚ БАҒДАРЛАМАЛАРЫНЫҢ ТИІМДІЛІГІН БАҒАЛАУ.....	316
<b>М.Қ. Болсынбек, Р.А. Ерниязов, А.А. Ауесбекова, М.Т. Жумажанова, К.Б. Байдаирова</b> БУХГАЛТЕРИЯДАҒЫ ЖАСАНДЫ ИНТЕЛЛЕКТ: АРТЫҚШЫЛЫҚТАРЫ МЕН ҚИЫНДЫҚТАРЫ.....	333
<b>А.Ж. Ибрашева, К.М. Камали, А.Ж. Сугурова, Ш.А. Игенбаева, Қ.Ж. Демеуова</b> ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ЭКОНОМИКА САЛАЛАРЫ БӨЛІНІСІНДЕ ИННОВАЦИЯЛЫҚ БЕЛСЕНДІЛІКТІ ДАМУЫ ЖОЛДАРЫ.....	345
<b>З.О. Иманбаева, Е.К. Кунязов, Д.С. Бекниязова, Г.Ы. Бекенова, М.Н. Нургабылов</b> ЛОГИСТИКА КӘСПКЕРЛІК ТИІМДІЛІГІНІҢ НЕГІЗГІ ФАКТОРЫ РЕТІНДЕ.....	358
<b>А.М. Казамбаева, С.М. Есенғалиева, К.У. Нурсапина, Н.А. Ибадильдин, А. А. Саякбаева</b> АУЫЛШАРУАШЫЛЫҚ ӨНДІРІСІНІҢ ТИІМДІЛІГІН АРТТЫРУДЫҢ ИНТЕГРАЦИЯЛАНҒАН ТӘСІЛДЕРІ: ҒЫЛЫМ МЕН БИЗНЕС АРАСЫНДАҒЫ ЫНТЫМАҚТАСТЫҚТЫҢ РӨЛІ.....	376
<b>Г.К. Кеңес, Р.К. Берстембаева, Г.М. Мукашева, Г.А. Орынбекова, Д.Т. Жуманова</b> ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДА ОРГАНИКАЛЫҚ АУЫЛШАРУАШЫЛЫҒЫНА КӨШУДІҢ ЭКОНОМИКАЛЫҚ-ӘЛЕУМЕТТІК ӘСЕРІ.....	393
<b>А. Кизимбаева, А.К. Қадырбергенова, Г.Т. Ахметова, А.Т. Жансейтов</b> ДАМУШЫ ЕЛДЕРДЕГІ ТІКЕЛЕЙ ШЕТЕЛДІК ИНВЕСТИЦИЯЛАР (АФРИКА ҰЛЫ КӨЛДЕРІ ЕЛДЕРІНІҢ МЫСАЛЫНДА).....	413
<b>Б.С. Қорабаев, Г. Абуселидзе, Б.К. Кадыров, Б.А. Еспенбетова</b> ТАБИҒАТТЫ ҚОРҒАУ ЖӘНЕ ЭКОЛОГИЯЛЫҚ ШЫҒЫНДАР ЖҮЙЕЛЕРІНІҢ ЕСЕБІ МЕН ТИІМДІЛІГІН ТАЛДАУ МОДЕЛДЕРІНІҢ МӘСЕЛЕЛЕРІ.....	426
<b>А.Е. Култанова, Х.Х. Кусаинов, Б.А. Жакупова, Н.В. Калюжная, А.С. Рахманова</b> КӨШІ-ҚОН САЯСАТЫНЫҢ ТИІМДІЛІГІН АРТТЫРУ – ҚАЗАҚСТАННЫҢ ТҰРАҚТЫ ДАМУЫНЫҢ ФАКТОРЫ РЕТІНДЕ.....	444
<b>Д.С. Махметова, Э.Б.Тлесова, Л.Б. Габдуллина, А.Т. Карипова, М.Н. Нургабылов</b> ӨҢІРДІҢ АГРОӨНЕРКӘСІПТІК КЕШЕНІН ЦИФРЛАНДЫРУДЫҢ ЖАЙ-КҮЙІ МЕН ПЕРСПЕКТИВАЛАРЫ.....	462
<b>Е.Т. Меңдіқұл, Г.К. Кеңес, Ж.К. Басшиева, Э.С. Балапанова, Р.К. Айтманбетова</b> АГРОӨНЕРКӘСІПТІК КЕШЕН ЖӘНЕ ОНЫҢ ҰЛТТЫҚ ЭКОНОМИКАНЫҢ БӘСЕКЕГЕ ҚАБІЛЕТТІЛІГІН ҚАМТАМАСЫЗ ЕТУДЕГІ РӨЛІ.....	483



<b>Б.Б. Мубаракова, Н.С. Кафтункина, М.М. Мухамедова, М.С. Каюмова, С. Дырқа ШАҒЫН ЖӘНЕ ОРТА КӘСПКЕРЛЕРДІҢ ХАЛЫҚТЫ ЖҰМЫСМЕН ҚАМТАМАСЫЗ ЕТУДЕГІ РӨЛІ.....</b>	<b>500</b>
<b>М.Б. Муратова, К.А. Абдыкулова, Д.С. Тенизбаева, Б.А. Сергазиева, Г.Е. Қожамжарова ҚАЗАҚСТАННЫҢ ҚАРЖЫЛЫҚ ТҰРАҚТЫЛЫҒЫ ЖӘНЕ ТӘУЕКЕЛДЕРДІ БАҒАЛАУ КРИТЕРИЙЛЕРІ.....</b>	<b>514</b>
<b>Г.А. Насырова, Ш.Т. Айтимова</b> ЕҢБЕКПЕН ҚАМТЫЛҒАН ХАЛЫҚТЫ ӘЛЕУМЕТТІК ҚОРҒАУ ЖҮЙЕСІНІҢ ЭВОЛЮЦИЯСЫН РЕТРОСПЕКТИВТІ ТАЛДАУ.....	532
<b>Г.А. Рахимжанова, А.Б. Майдырова, А.А. Кочербаева, Л.М. Шаяхметова</b> АДАМИ КАПИТАЛДЫҢ САПАСЫН ЭКОНОМИКАЛЫҚ БАҒАЛАУ (ШЫҒЫС ҚАЗАҚСТАН ОБЛЫСЫНЫҢ МЫСАЛЫ БОЙЫНША).....	546
<b>А.С. Садвақасова, А.Н. Ксембаева, Г.К. Демеуова, А.С. Мукатай, И.В. Бордияну</b> БУХГАЛТЕРЛІК ЕСЕП ЖҮЙЕЛЕРІНІҢ ҚАЗІРГІ ЖАҒДАЙЫ ЖӘНЕ ДАМУ ТЕНДЕНЦИЯСЫ ЖӘНЕ КӘСПОРЫННЫҢ ИНВЕСТИЦИЯЛЫҚ ТАРАМДЫЛЫҒЫН БАҒА АЛУ.....	563
<b>К.Б. Сатымбекова, Ж.Қ. Тайбек, Д.С. Жакипбекова, Б.И. Сатенов, Е.Н. Несіпбеков, И. Узун</b> ИННОВАЦИЯЛЫҚ ЖОБАЛАРДЫ ІСКЕ АСЫРУ ЖӘНЕ ОЛАРДЫҢ ЭКОНОМИКАЛЫҚ ТИІМДІЛІГІН АНЫҚТАУ ҮРДІСТЕРІН ЖЕТІЛДІРУ ЖОЛДАРЫ.....	581
<b>К.Е. Шертимова, М.К. Сейдахметов, Ж.Қ. Тайбек, Г.Е. Мауленкулова, В. Сейтова</b> ТЕХНОЛОГИЯЛАР ТРАНСФЕРТІН ПАЙДАЛАНА ОТЫРЫП, ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ АӨК-НІҢ ИННОВАЦИЯЛЫҚ ӘЛЕУЕТІН АРТТЫРУДЫҢ ЭКОНОМИКАЛЫҚ ТЕТІГІ.....	593

## СОДЕРЖАНИЕ ПЕДАГОГИКА

<b>У.М. Абдиганбарова, А.Д. Сыздықбаева, А.М. Байкулова</b> ДИСКУРСИВНЫЙ АНАЛИЗ ТЕОРИЙ СЕТЕВОЙ КОММУНИКАТИВНОЙ КУЛЬТУРЫ И ЦИФРОВОГО ЭТИКЕТА.....	7
<b>М.У. Абдинаги, Ж.К. Корганбаева, Д.А. Каражанова</b> ОСОБЕННОСТИ НЕПРЕРЫВНОГО ОБРАЗОВАНИЯ В ПОДГОТОВКЕ СПЕЦИАЛИСТА.....	18
<b>С.К. Абильдина, А.О. Әукен, И.Д. Бакирова, К.Ж. Балапанова, Ж.У. Дагарова</b> РАЗВИТИЕ ТРАНСВЕРСАЛЬНЫХ НАВЫКОВ У ДЕТЕЙ МЛАДШЕГО ШКОЛЬНОГО ВОЗРАСТА.....	28
<b>С.Т. Айтбаев, С.В. Суматохин, А.А. Китапбаева, Д.У. Сексенова, Г.Б. Аталихова</b> ФОРМИРУЮЩЕЕ ОЦЕНИВАНИЕ КАК ИНСТРУМЕНТ МОНИТОРИНГА МЕТАПРЕДМЕТНЫХ ОБРАЗОВАТЕЛЬНЫХ РЕЗУЛЬТАТОВ В ШКОЛЕ.....	38
<b>М.Б. Аманбаева, А.Д. Майматаева, С.А. Есентурова, П.В. Станкеевич</b> ИНТЕГРАЦИЯ РЕЗУЛЬТАТОВ ИССЛЕДОВАНИЙ БИОРАЗНООБРАЗИЯ В УЧЕБНЫЙ ПРОЦЕСС В ИНТЕРЕСАХ УСТОЙЧИВОГО РАЗВИТИЯ.....	52
<b>А. Аманжолова, Р.К. Измагамбетова, О.С. Серикова</b> РАЗВИТИЕ ПОЗНАВАТЕЛЬНЫХ НАВЫКОВ ДЕТЕЙ СТАРШЕЙ ГРУППЫ ДОШКОЛЬНОГО ВОЗРАСТА НА ОСНОВЕ ТЕХНОЛОГИИ STEAM.....	63
<b>А.Г. Аубакир, Д.У. Сексенова, Т.Р. Оспанбек</b> ЗНАЧЕНИЕ МООК В ФОРМИРОВАНИИ ЦИФРОВЫХ КОМПЕТЕНЦИЙ В ПРОЦЕССЕ ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКИ БУДУЩИХ УЧИТЕЛЕЙ БИОЛОГИИ.....	76
<b>М. Аширмбетова, Д. Шаяхметова</b> ИСПОЛЬЗОВАНИЕ КОГНИТИВНЫХ СТРАТЕГИЙ В ПОВЫШЕНИИ УРОВНЯ ВЛАДЕНИЯ АНГЛИЙСКИМ ЯЗЫКОМ СТУДЕНТОВ ВУЗОВ.....	93
<b>П. Елубаева, М. Буркитбаева, Г. Кулжанбекова, А. Хамидова</b> ВКЛЮЧЕНИЕ МЕДИАГРАМОТНОСТИ В ПРОГРАММУ ЯЗЫКОВОГО ОБРАЗОВАНИЯ В ИНТЕРЕСАХ УСТОЙЧИВОГО РАЗВИТИЯ.....	102
<b>Ж.С. Ергубекова, А.А. Куралбаева, А.Б. Сақулова</b> ДИДАКТИЧЕСКОЕ ЗНАЧЕНИЕ ТЕКСТОВ, ВКЛЮЧЕННЫХ В УЧЕБНИК КАЗАХСКОГО ЯЗЫКА ДЛЯ СРЕДНЕЙ ШКОЛЫ.....	112

**М. Ерденов**

ПУТИ ФОРМИРОВАНИЯ НАУЧНОГО ПОЗНАНИЯ ШКОЛЬНИКОВ ЧЕРЕЗ ВНЕКЛАССНОЕ ОБУЧЕНИЕ ЭТНОБОТАНИЧЕСКИМ ЗНАНИЯМ СТУДЕНТОВ ПУТЕМ ВНЕДРЕНИЯ STEM-ТЕХНОЛОГИЙ В ПРЕДМЕТ БИОЛОГИИ.....126

**Г.З. Искакова, А.С. Ысқақ, Н.А. Тасилова, Р.Ж. Мрзабаева**

СЛУЖАЩИЕ ПОЧТОВО-ТЕЛЕГРАФНЫХ УЧРЕЖДЕНИЙ СЕМИРЕЧЕНСКОЙ ОБЛАСТИ (ВТОРАЯ ПОЛОВИНА XIX - ПЕРВАЯ ПОЛОВИНА XX ВЕКА).....142

**Г.И. Исаев, Д.Ж. Юсупова, А.И. Исаев**

ФОРМИРОВАНИЕ ИССЛЕДОВАТЕЛЬСКИХ НАВЫКОВ СТУДЕНТОВ ПУТЕМ ВНЕДРЕНИЯ STEM-ТЕХНОЛОГИЙ В ПРЕДМЕТ БИОЛОГИИ.....153

**Р.И. Кадирбаева, Б.Т. Алимкулова, А.М. Базарбаева, Х.Т. Кенжебек**

ПРИМЕНЕНИЕ ТЕХНОЛОГИИ СМЕШАННОГО ОБУЧЕНИЯ В ШКОЛЬНОМ КУРСЕ МАТЕМАТИКИ (НА ПРИМЕРЕ ТЕМЫ «УРАВНЕНИЯ И НЕРАВЕНСТВА»).....169

**Ж.Р. Каратаева, Г.М. Абылдинова, Джелал Карача**

ЛИТЕРАТУРНЫЙ ОБЗОР: ВЗАИМОСВЯЗЬ ВОЗОБНОВЛЯЕМЫХ ИСТОЧНИКОВ ЭНЕРГИИ И ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ В ОБРАЗОВАНИИ.....185

**М.А. Касимбекова, Е.Т. Картабаева, Р.Ж. Мрзабаева**

ПРОБЛЕМА ПРОНИКНОВЕНИЯ И УТВЕРЖДЕНИЯ ИСЛАМА В СРЕДНЕЙ АЗИИ В РАБОТАХ ЗАПАДНЫХ ИССЛЕДОВАТЕЛЕЙ.....196

**Б.З. Кенжегулов, Ж. Сайдолқызы, Р.Қ. Амангалиева**

ДОКАЗАТЕЛЬСТВО НЕКОТОРЫХ ФОРМУЛ С ПОМОЩЬЮ ТРИГОНОМЕТРИЧЕСКИХ ФУНКЦИЙ В СРЕДНЕЙ ШКОЛЕ.....212

**Г.Б. Кыдырбаева, А.С. Стамбекова**

ОТНОШЕНИЕ БУДУЩИХ УЧИТЕЛЕЙ НАЧАЛЬНЫХ КЛАССОВ К CLIL ТЕХНОЛОГИЯМ В МНОГОЯЗЫЧНОМ ОБРАЗОВАНИИ.....229

**Е.Н. Ноянов, М.Д. Байдаuletova, Б. Едил, Р.Ж. Мрзабаева**

ПРОБЛЕМЫ ПРЕПОДАВАНИЯ ТЕМЫ «НАЦИОНАЛЬНО-ОСВОБОДИТЕЛЬНОГО ВОССТАНИЯ ПОД ПРЕДВОДИТЕЛЬСТВОМ СЫРЫМА ДАТУЛЫ» ПО ПРЕДМЕТУ ИСТОРИЯ КАЗАХСТАНА.....242

**Д.А. Шрымбай, Э.Т. Адылбекова**

МАССОВЫЕ ОТКРЫТЫЕ ОНЛАЙН-КУРСЫ (MOOCS) КАК ИНСТРУМЕНТ СОВЕРШЕНСТВОВАНИЯ ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКИ БУДУЩИХ УЧИТЕЛЕЙ.....254

**ЭКОНОМИКА****А.А. Абдикадирова, Ж.Т. Темирханов**

ЭФФЕКТИВНОСТЬ НАУЧНЫХ РЕЗУЛЬТАТОВ: ПЕРСПЕКТИВА ГОСУДАРСТВЕННОГО АУДИТА.....271

**Е.Б. Аймагамбетов, М.К. Жоламанова, Е.А. Ставбунник**

АНАЛИЗ СОСТОЯНИЯ ГОСУДАРСТВЕННОГО УПРАВЛЕНИЯ УСТОЙЧИВЫМ ЭКОЛОГИЧЕСКИМ РАЗВИТИЕМ РЕГИОНА (НА ПРИМЕРЕ КАРАГАНДИНСКОЙ ОБЛАСТИ).....288

**А. Алибекова, Л. Сембиева, З. Башу, С. Идырыс, К. Кристаукас**

ОЦЕНКА ЭФФЕКТИВНОСТИ ПРИРОДНЫХ РЕСУРСОВ В РАМКАХ РАЗВИТИЯ ГОСУДАРСТВЕННОГО АУДИТА .....302

**Э.С. Балапанова, Р.К. Арзикулова, А.Т. Исаева, М.Н. Нургабылов, К.Н. Тастанбекова**

ОЦЕНКА ЭФФЕКТИВНОСТИ ПРОГРАММ ПО ПОВЫШЕНИЮ ФИНАНСОВОЙ ГРАМОТНОСТИ В КАЗАХСТАНЕ.....316

**М.К. Болсынбек, Р.А. Ерниязов, А.А. Ауесбекова, М.Т. Жумажанова, К.Б. Байдаирова**  
ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ В БУХГАЛТЕРИИ: ПРЕИМУЩЕСТВА И ВЫЗОВЫ.....333

**А.Ж. Ибрашева, К.М. Камали, А.Ж. Сугурова, Ш.А. Игенбаева, К.Ж. Демеуова**

ПУТИ РАЗВИТИЯ ИННОВАЦИОННОЙ ДЕЯТЕЛЬНОСТИ В РАЗДЕЛЕНИИ ОТРАСЛЕЙ ЭКОНОМИКИ РЕСПУБЛИКИ КАЗАХСТАН.....345

**З.О. Иманбаева, Е.К. Кунязов, Д.С. Бекниязова, Г.Ы. Бекенова, М.Н. Нургабылов**

ЛОГИСТИКА КАК КЛЮЧЕВОЙ ФАКТОР ЭФФЕКТИВНОСТИ БИЗНЕСА.....358

<b>А.М. Казамбаева, С.М. Есенгалиева, К.У. Нурсапина, Н.А. Ибадильдин, А.А. Саякбаева</b> ИНТЕГРИРОВАННЫЕ ПОДХОДЫ К ПОВЫШЕНИЮ ЭФФЕКТИВНОСТИ СЕЛЬСКОХОЗЯЙСТВЕННОГО ПРОИЗВОДСТВА: РОЛЬ СОТРУДНИЧЕСТВА МЕЖДУ НАУКОЙ И БИЗНЕСОМ .....	376
<b>Г.К. Кенес, Р.К. Берстембаева, Г.М. Мукашева, Г.А. Орынбекова, Д.Т. Жуманова</b> ЭКОНОМИКО-СОЦИАЛЬНОЕ ВЛИЯНИЕ ПЕРЕХОДА К ОРГАНИЧЕСКОМУ СЕЛЬСКОМУ ХОЗЯЙСТВУ В РЕСПУБЛИКЕ КАЗАХСТАН.....	393
<b>А. Кизимбаева, А.К. Кадырбергенова, Г.Т. Ахметова, А.Т. Жансейтов</b> ПРЯМЫЕ ИНОСТРАННЫЕ ИНВЕСТИЦИИ В РАЗВИВАЮЩИХСЯ СТРАНАХ (НА ПРИМЕРЕ АФРИКАНСКИХ СТРАН ВЕЛИКИХ ОЗЕР).....	413
<b>Б.С. Корабаев, Г. Абуслидзе, Б.К. Кадыров, Б.А. Еспенбетова</b> ПРОБЛЕМЫ МОДЕЛЕЙ УЧЕТА И АНАЛИЗА ЭФФЕКТИВНОСТИ СИСТЕМ ПРИРОДООХРАННЫХ И ЭКОЛОГИЧЕСКИХ ЗАТРАТ.....	426
<b>А.Е. Култанова, Х.Х. Кусайнов, Б.А. Жакупова, Н.В. Калюжная, А.С. Рахманова</b> ПОВЫШЕНИЕ ЭФФЕКТИВНОСТИ МИГРАЦИОННОЙ ПОЛИТИКИ КАК ФАКТОР УСТОЙЧИВОГО РАЗВИТИЯ КАЗАХСТАНА.....	444
<b>Д.С. Махметова, Э.Б. Тлесова, Л.Б. Габдуллина, А.Т. Карипова, М.Н. Нургабылов</b> СОСТОЯНИЕ И ПЕРСПЕКТИВЫ ЦИФРОВИЗАЦИИ АГРОПРОМЫШЛЕННОГО КОМПЛЕКСА РЕГИОНА.....	462
<b>АГРОПРОМЫШЛЕННЫЙ КОМПЛЕКС И ЕГО РОЛЬ В ОБЕСПЕЧЕНИИ КОНКУРЕНТОСПОСОБНОСТИ НАЦИОНАЛЬНОЙ ЭКОНОМИКИ.....</b>	483
<b>Б.Б. Мубаракова, Н.С. Кафтункина, М.М. Мухамедова, М.С. Каюмова, С. Дырка</b> РОЛЬ МАЛОГО И СРЕДНЕГО БИЗНЕСА В ОБЕСПЕЧЕНИИ ЗАНЯТОСТИ НАСЕЛЕНИЯ.....	500
<b>М.Б. Муратова, К.А. Абдыкулова, Д.С. Тенизбаева, Б.А. Сергазиева, Г.Е. Кожамжарова</b> ФИНАНСОВАЯ СТАБИЛЬНОСТЬ КАЗАХСТАНА И КРИТЕРИИ ОЦЕНКИ РИСКОВ.....	514
<b>Г.А. Насырова, Ш.Т. Айтимова</b> РЕТРОСПЕКТИВНЫЙ АНАЛИЗ ЭВОЛЮЦИИ СИСТЕМЫ СОЦИАЛЬНОЙ ЗАЩИТЫ ЗАНЯТОГО НАСЕЛЕНИЯ.....	532
<b>Г.А. Рахимжанова, А.Б. Майдырова, А.А. Кочербаева, Л.М. Шаяхметова</b> ЭКОНОМИЧЕСКАЯ ОЦЕНКА КАЧЕСТВА ЧЕЛОВЕЧЕСКОГО КАПИТАЛА (НА ПРИМЕРЕ ВОСТОЧНО-КАЗАХСТАНСКОЙ ОБЛАСТИ).....	546
<b>А.С. Садвакасова, А.Н. Ксембаева, Г.К. Демеуова, А.С. Мукатай, И.В. Бордияну</b> СОВРЕМЕННОЕ СОСТОЯНИЕ И ТЕНДЕНЦИИ РАЗВИТИЯ СИСТЕМ УЧЕТА И ОЦЕНКИ ИНВЕСТИЦИОННОЙ ПРИВЛЕКАТЕЛЬНОСТИ ПРЕДПРИЯТИЯ.....	563
<b>К.Б. Сатымбекова, Ж.К. Тайбек, Д.С. Жакипбекова, Б.И. Сатенов, Е.Н. Несипбеков, И. Узун</b> ПУТИ СОВЕРШЕНСТВОВАНИЯ ПРОЦЕССОВ РЕАЛИЗАЦИИ ИННОВАЦИОННЫХ ПРОЕКТОВ И ОПРЕДЕЛЕНИЯ ИХ ЭКОНОМИЧЕСКОЙ ЭФФЕКТИВНОСТИ.....	581
<b>К.Е. Шертимова, М.К. Сейдахметов, Ж.К. Тайбек, Г.Е. Мауленкулова, В. Сейтова</b> ЭКОНОМИЧЕСКИЙ МЕХАНИЗМ ПОВЫШЕНИЯ ИННОВАЦИОННОГО ПОТЕНЦИАЛА АПК РЕСПУБЛИКИ КАЗАХСТАН С ИСПОЛЬЗОВАНИЕМ ТРАНСФЕРТА ТЕХНОЛОГИЙ.....	593

**CONTENTS  
PEDAGOGYR**

<b>U.M. Abdigapbarova, A.D. Syzdykbayeva, A.M. Baikulova</b> DISCURSIVE ANALYSIS OF THE THEORIES OF NETWORK COMMUNICATIVE CULTURE AND DIGITAL ETIQUETTE.....	7
<b>M. Abdinag, Zh. Korganbaeva, D. Karazhanova</b> FEATURES OF CONTINUING EDUCATION IN THE TRAINING OF SPECIALISTS.....	18
<b>S.K. Abildina, A.O. Auken, I.D. Bakirova, K.J. Balapanova, J.U. Dagarova</b> DEVELOPMENT OF TRANSVERSAL SKILLS IN PRIMARY SCHOOL CHILDREN.....	28
<b>S.T. Aytbaev, S.V. Sumatokhin, A.A. Kitapbayeva, D.U. Seksenova, G.B. Atalikhova</b> FORMATIVE ASSESSMENT – AS A TOOL FOR MONITORING METASUBJECT EDUCATIONAL RESULTS AT SCHOOL.....	38

<b>M.B. Amanbayeva, A.D. Maimatayeva, S.A. Yessenturova, P.V. Stankeevich</b> INTEGRATING THE RESULTS OF BIODIVERSITY RESEARCH INTO THE EDUCATIONAL PROCESS FOR SUSTAINABLE DEVELOPMENT.....	52
<b>A. Amanzholova, R.K. Izmagambetova, O.S. Serikova</b> DEVELOPMENT OF COGNITIVE SKILLS OF OLDER PRESCHOOL CHILDREN BASED ON STEAM TECHNOLOGY.....	63
<b>A.G. Aubakir1, D.U. Seksenova, T.R. Ospanbek</b> THE IMPORTANCE OF MOOCS IN THE FORMATION OF DIGITAL COMPETENCIES IN THE PROCESS OF PROFESSIONAL TRAINING OF FUTURE BIOLOGY TEACHERS.....	76
<b>M. Ashirimbetova, D. Shayakhmetova</b> THE USE OF COGNITIVE STRATEGIES IN IMPROVING UNIVERSITY STUDENTS' LEVELS OF ENGLISH LANGUAGE PROFICIENCY.....	93
<b>P. Yelubayeva, M. Burkitbayeva, G. Kulzhanbekova, A. Khamidova</b> INCORPORATING MEDIA LITERACY IN LANGUAGE EDUCATION CURRICULUM FOR SUSTAINABLE DEVELOPMENT.....	102
<b>Zh.S. Yergobekova, A.A. Kuralbayeva, A.B. Sakulova</b> DIDACTIC SIGNIFICANCE OF TEXTS EMBEDDED IN THE TEXTBOOK OF THE KAZAKH LANGUAGE OF SECONDARY SCHOOL.....	112
<b>M. Erdenov</b> WAYS OF FORMATION OF SCIENTIFIC KNOWLEDGE OF STUDENTS THROUGH EXTRACURRICULAR TEACHING OF ETHNOBOTANICAL KNOWLEDGE.....	126
<b>G.Z. Iskakova, A.S. Yskak, N.A. Tasilov, R.ZH. Mrzabayeva</b> EMPLOYEES OF POSTAL AND TELEGRAPH INSTITUTIONS OF THE SEMIRECHENSK REGION (SECOND HALF OF THE 19TH - FIRST HALF OF THE 20TH CENTURY).....	142
<b>G.I. Issayev, D.ZH. Yussupova, A. Issayev</b> FORMING STUDENTS' RESEARCH SKILLS BY IMPLEMENTING STEM TECHNOLOGIES IN THE SUBJECT OF BIOLOGY.....	153
<b>R.I. Kadirbayeva, B.T. Alimkulova, A.M. Bazarbayeva, Kh.T. Kenzhebek</b> APPLICATION OF MIXED LEARNING TECHNOLOGY IN THE STUDY OF THE CONTENT LINE OF THE SCHOOL MATHEMATICS COURSE «EQUATIONS AND INEQUALITIES».....	169
<b>Zh.R. Karatayeva, G.M. Abildinova, Celal Karaca</b> LITERATURE REVIEW: INTERCONNECTION OF RENEWABLE ENERGY SOURCES AND INFORMATION TECHNOLOGY IN EDUCATION.....	185
<b>M. Kasimbekova, E.T. Kartabayeva, R.ZH. Mrzabayeva</b> THE PROBLEM OF PENETRATION AND STATEMENT OF ISLAM IN CENTRAL ASIA IN THE WORKS OF WESTERN RESEARCHERS.....	196
<b>B.Z. Kenzhegulov, Zh. Saidolkzyzy, R.K. Amangaliyeva</b> PROVING SOME FORMULAS USING TRIGONOMETRIC FUNCTIONS IN HIGH SCHOOL.....	212
<b>G. Kydyrbayeva, A. Stambekova</b> ATTITUDES OF FUTURE PRIMARY SCHOOL TEACHERS TOWARDS CLIL- TECHNOLOGIES IN MULTILINGUAL EDUCATION.....	229
<b>E.N. Noyanov, M.D. Baidavletova, B. Edil, R.ZH. Mrzabayeva</b> PROBLEMS OF TEACHING THE TOPIC OF THE "NATIONAL LIBERATION UPRISING LED BY SYRYM DATULY" IN THE DISCIPLINE OF HISTORY OF KAZAKHSTAN.....	242
<b>D. Shrymbay, E. Adylbekova</b> MASSIVE OPEN ONLINE COURSES (MOOCS) – A TOOL FOR IMPROVING THE PROFESSIONAL TRAINING OF FUTURE TEACHERS.....	254

#### EKONOMICS

<b>A.A. Abdikadirova, Zh.T. Temirkhanov</b> RESEARCH OUTPUT EFFECTIVENESS: A PUBLIC AUDIT PERSPECTIVE.....	271
<b>Ye.B. Aimagambetov, M.K. Zholamanova, Ye.A. Stavbunik</b> ANALYSIS OF THE STATE OF STATE MANAGEMENT OF SUSTAINABLE ENVIRONMENTAL DEVELOPMENT OF THE REGION (ON THE EXAMPLE OF THE KARAGANDA REGION).....	288

<b>A. Alibekova, L. Sembiyeva, Z. Bashu, S. Ydyrys, C. Christauskas</b> ASSESSMENT OF THE EFFECTIVENESS OF NATURAL RESOURCES IN THE FRAMEWORK OF THE DEVELOPMENT OF STATE AUDIT .....	302
<b>E. Balapanova, R. Arzikulova, A. Issaeva, M. Nurgabylov, K. Tastanbekova</b> ASSESSMENT OF THE EFFECTIVENESS OF FINANCIAL LITERACY PROGRAMS IN KAZAKHSTAN.....	316
<b>M. Bolsynbek, R. Yeriyazov, A. Auyesbekova, M. Zhumazhanova, K. Baidairova</b> ARTIFICIAL INTELLIGENCE IN ACCOUNTING: ADVANTAGES AND CHALLENGES.....	333
<b>A. Ibrasheva, K. Kamali, A. Sugurova, Sh. Igenbayeva, Demeuova K.</b> WAYS TO DEVELOP INNOVATIVE ACTIVITY IN THE DIVISION OF SECTORS OF THE ECONOMY OF THE REPUBLIC OF KAZAKHSTAN.....	345
<b>Z. Imanbayeva, Y. Kunyazov, D. Bekniyazova, G. Bekenova, M. Nurgabylov</b> LOGISTICS AS A KEY FACTOR OF BUSINESS EFFICIENCY.....	358
<b>A. Kazamyayeva, S. Yessengaliyeva, K. Nursapina, N. Ibadildin, A. Saiakbaeva</b> INTEGRATED APPROACHES TO IMPROVING THE EFFICIENCY OF AGRICULTURAL PRODUCTION: THE ROLE OF COOPERATION BETWEEN SCIENCE AND BUSINESS.....	376
<b>G. Kenges, R. Berstembayeva, G. Mukasheva, G. Orynbekeva, D.T. Zhumanova</b> ECONOMIC AND SOCIAL IMPACT OF THE TRANSITION TO ORGANIC AGRICULTURE IN THE REPUBLIC OF KAZAKHSTAN.....	393
<b>A. Kizimbayeva, A.K. Kadyrbergenova, G.T. Akhmetova, A.T. Zhanseitov</b> FOREIGN DIRECT INVESTMENT IN DEVELOPING COUNTRIES (THE CASE OF THE GREAT LAKES COUNTRIES OF AFRICA).....	413
<b>B.S. Korabayev, G. Abuselide, B. Kadyrov, B. Yespenbetova</b> PROBLEMS OF ACCOUNTING AND ANALYSIS MODELS OF THE EFFECTIVENESS OF ENVIRONMENTAL AND ECOLOGICAL COST SYSTEMS .....	426
<b>A. Kultanova, X. Kusainov, B. Zhakupova, N. Kalyuzhnaya, A. Rakhmanova</b> IMPROVING THE EFFECTIVENESS OF MIGRATION POLICY AS A FACTOR IN THE SUSTAINABLE DEVELOPMENT OF KAZAKHSTAN.....	444
<b>D.S. Makhmetova, E.B. Tlessova, L.B. Gabdullina, A.T. Karipova, M. Nurgabylov</b> THE STATE AND PROSPECTS OF DIGITALIZATION OF THE AGRO-INDUSTRIAL COMPLEX OF THE REGION.....	462
<b>Y. Mengdikul, G. Kenges, Zh. Bashieva, E. Balapanova, R. Aitmanbetova</b> AGRICULTURAL COMPLEX AND ITS ROLE IN ENSURING COMPETITIVENESS OF THE NATIONAL ECONOMY .....	483
<b>B.B. Mubarakova, N.C. Kaftunkina, M.M. Mukhamedova, M.S. Kayumova, Dyrka Stefan</b> THE ROLE OF SMALL AND MEDIUM BUSINESS IN PROVIDING EMPLOYMENT OF THE POPULATION.....	500
<b>D. Muratova, K. Abdykulova, J. Tenizbaeva, B. Sergazieva, G. Kozhamzharova</b> KAZAKHSTAN'S FINANCIAL STABILITY AND RISK ASSESSMENT CRITERIA.....	514
<b>G. Nassyrova, Sh. Aitimova</b> RETROSPECTIVE ANALYSIS OF THE EVOLUTION OF THE SYSTEM OF SOCIAL PROTECTION OF THE EMPLOYED POPULATION.....	532
<b>G.Rakhimzhanova, A. Maidyrova, A.A. Kocherbayeva, L. Shayakhmetova</b> ECONOMIC ASSESSMENT OF THE QUALITY OF HUMAN CAPITAL (ON THE EXAMPLE OF THE EAST KAZAKHSTAN REGION).....	546
<b>A. Sadvakassova, A. Xembayeva, G. Demeuova, A. Mukatay, Il. Bordiyanu</b> CURRENT STATE AND DEVELOPMENT TRENDS OF ACCOUNTING SYSTEMS AND ASSESSMENT OF INVESTMENT ATTRACTIVENESS OF AN ENTERPRISE.....	563
<b>K. Satymbekova, Zh. Taibek, D. Zhakipbekova, B. Satenov, Ye. Nesipbekov, Y. Uzun</b> WAYS TO IMPROVE THE PROCESSES OF IMPLEMENTING INNOVATIVE PROJECTS AND DETERMINING THEIR ECONOMIC EFFICIENCY.....	581
<b>K.E. Shertimova, M.K. Seidakhmetov, Zh.K. Taibek, G.Ye. Maulenkulova, V. Seitova</b> THE ECONOMIC MECHANISM OF INCREASING THE INNOVATION POTENTIAL OF THE AGROINDUSTRIAL COMPLEX OF THE REPUBLIC OF KAZAKHSTAN WITH THE USE OF TECHNOLOGY TRANSFER.....	593

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