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ДОКЛАДЫ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

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PROBLEMS AND WAYS TO SOLVE DIGITIZING OF SPATIAL DATA IN THE REPUBLIC OF KAZAKHSTAN

Abstract: This work has brought to light main problems faced in setting up and forming the National Spatial Data Infrastructure of the Republic of Kazakhstan (NSDI of the RK). The major ones are a proper formation of the executive structure; a short list of standards in force for setting up of the NSDI of the RK; casual generation and inappropriate development of spatial data; low levels of technology; a necessity for an advanced training of specialists. During the organization of the NSDI of the RK, it has been suggested to turn attention to the executive structure of the Federal Geographic Data Committee which has been mentioned as an example in a schematic format. It has been suggested to formulate new standards for the NSDI of the RK or arrangement of statutes and regulations tested through the practice of developed countries; to apply the recent advancements in spatial data generating and disseminating technology. The level of readiness and the development level for each of five spatial data groups of the NSDI of the RK such as fundamental, basic, industry, thematic and metadata group have been assessed. Lack of its own open coordinate system in the country that makes it impossible to set up the NSDI of the RK has been identified. It was noted that the structure of basic spatial data for the national spatial data infrastructure of the country has not been defined to this day. Casual generation and development of industry spatial data in the country by fewer than all government establishments and bodies have been acknowledged. In Kazakhstan, generating thematic spatial data was evolved very massively. However, there is no civilized control and follow-up exchange mechanism in the thematic data generation. This resulted in a situation where thematic spatial data often becomes a property of geodata producers and is not included in the general storage and dissemination system. In the area of technology, the authors believe that it is necessary to use the technologies of spatial data infrastructure 2.0 in order to set up, build and develop the NSDI of the RK.

It is suggested to improve the Automated Information System of State Land Cadaster (AIS SLC) as one of the ways to generate and build the NSDI of the RK by adding SDI 2.0 thereto. The AIS SLC is quickly developed and has already had more than 12 sub-systems and cartographic framework for the whole territory of Kazakhstan. The AIS SLC can integrate with other information systems relatively easily and has vertical and horizontal structure and defined professional staff in each region of the country. To use fully the AIS SLC for setting up the NSDI of the RK, it is certainly necessary to solve in advance organizational, technical and technological problems identified by the authors.

Keywords: digitalization, spatial data, complex information technology platforms, national spatial data infrastructure, collective mind, creating content by users, problems, solutions.

Digital spatial data being synonymic with geodata and geo-resources makes 80% of general digital information throughout the world [1]. Hence the developed countries being sensible of the fact that this 4/5 of digital information largely plays a pivotal role in economic growth and development of the country, the efficient activity of business entities and social satisfaction of the citizens, in particular, take a good care of own geodata. As a result, the National Spatial Data Infrastructures (NSDIs) have been set up by the developed countries as a high-priority measure for successful achievement of main goals of digitalization.

Kazakhstan has also fully acknowledged the necessity to enter the Digital Era, and to actively implement the complex IT Platforms for this purpose [2], one of which is the NSDI of the Republic of Kazakhstan (NSDI of the RK). Thanks to, mainly, our efforts [3], the NSDI of the RK, upon active discussions, was included into the Activity Plan for the implementation of the State Program "Digital Kazakhstan" [4,5].

The NSDIs of the developed countries have been built in such a way as to support, via collective intelligence of their participants, the innovative technology trends directed at generation, building and development of spatial data and the conditions in which business activity is developed to the fullest, at the levels such as Government to Government (G2G), Government to Business (G2B) and Government to Citizen (G2C) including Business to Business (B2B). Furthermore, the examples of particular countries suggest that a proper setup and formation of organizational structure and IT platform of the NSDI can be repaid quite quickly. In addition, a snowballing digitalization growth takes place and eventually leads to a digital transformation of the country's economy.

However, for a variety of reasons, some NSDIs are not always generated, built and developed according to requirements imposed to the modern SDI [6].

The purpose of this work is to present the most effective ways to generate, build and develop spatial data at all three government activity levels, G2G, G2B and G2C, using the National Spatial Data Infrastructure. The objective of the work is to identify the most serious problems faced in generating of the NSDI of the RK and the ways to solve them.

NSDI components. The NSDI generally consists of five main components: infrastructure, policies & institutional arrangements, technology, spatial data and people (specialists) who generate, build and develop geodata [3].

Organizing of spatial data at government level can be exemplified by the structure of the US Federal Geographic Data Committee (FGDC) [7] (Figure 1).

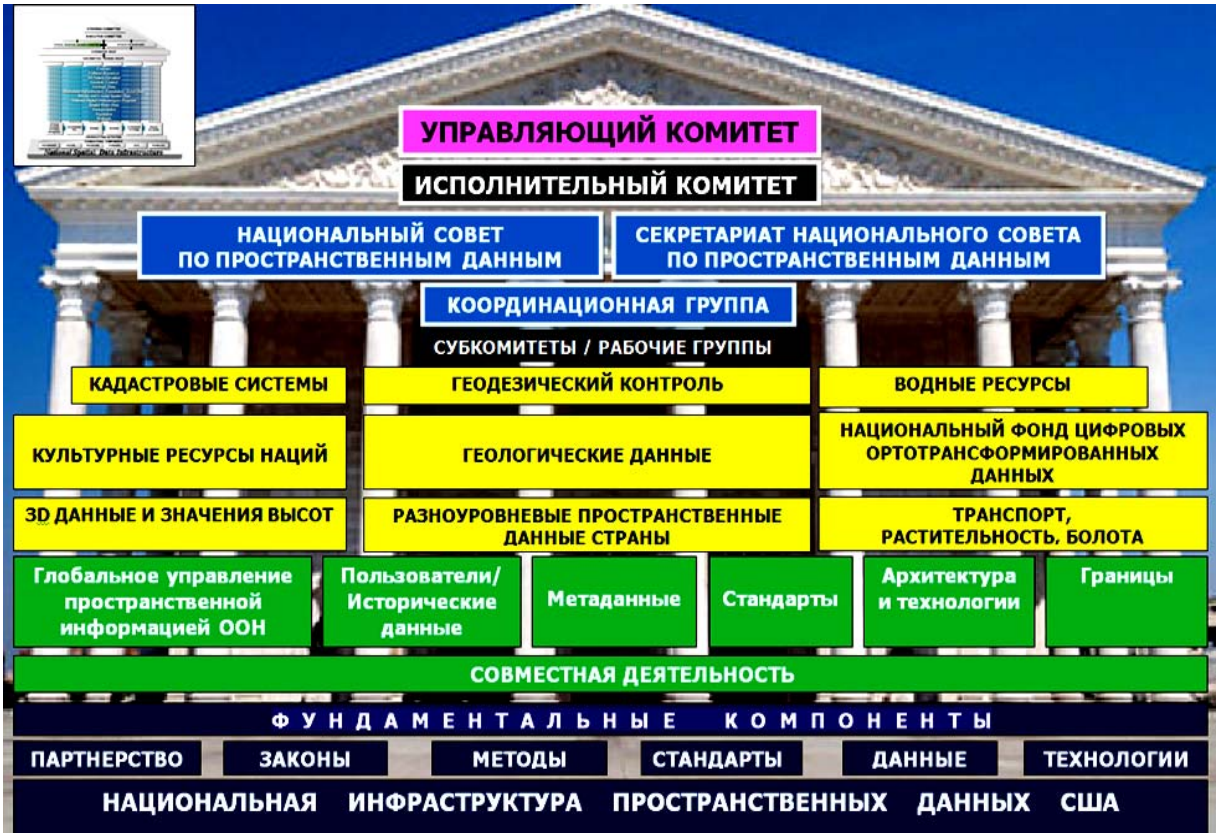

Figure 1 – The structure of the US Federal Geographic Data Committee [7]

The above structure consists of four large units such as control; spatial data; cooperation system; fundamental components intended to generate, form and develop the NSDI.

It is unfortunate that no organizational structure designed for maintenance of the NSDI of the RK has been set up in Kazakhstan. According to preliminary data, the responsibility for setup, formation and development of the NSDI of the RK will be placed on the Committee on Land Resources Management of the Ministry of Agriculture of the RK (CLM of the MA of the RK). The CLM is a governmental body responsible for generating and checking spatial data (cartographic and geodetic service); storage of spatial data (National cartographic and geodetic fund); registration, assessment, monitoring and zoning of the land fund of the country (The State Research and Production Centre for Land Management). Hence is perfectly reasonable to choose the CLM of the MA of the RK as a government body responsible for setting up the NSDI of the RK, according to the said functions: generation, check, storage, registration, assessment, monitoring and zoning of any and all spatial data.

However, during the setup of the NSDI, its authorization or provision of very determined existence conditions that should not fall under dilution of responsibility in changing the organizational structure of executive and political power in the country is a crucially important organizational point. The reliable existence of the NSDI is ensured by assignment of responsibility for its existence directly to the head of state or head of government. Such NSDIs are capable of being preserved and developed even in the acutest and critical situations (examples are the USA, EU countries, South Korea, etc.).

Standardization and legal framework for the NSDI of the RK have not been developed enough. Due to scientists' efforts, the notions of "spatial data" and "spatial data infrastructure" were introduced for the first time into the Law of the Republic of Kazakhstan "On Space Activities" [8]. But the Law "On Spatial Data of the RK" and respective by-laws, standards, rules and regulations and guidelines that properly ensure the implementation of regulatory standards of such legal document have not been established yet. Basically, these components of the NSDI of the RK can be provided without great effort since the standards of NSDI underwent long tests in more than 100 countries. Generally, these standards should be reset for an environment of Kazakhstan. Then, great opportunities can be opened for legal exchange of spatial data, with all that it implies.

Spatial data. The fundamental benefit of the NSDI is generation, building and development of spatial data on systemic and analytical basis [3]. They incorporate five types of spatial data.

1. Fundamental spatial data is the geometry of the country. Kazakhstan has not had open state geodetic coordinate system. To solve the problem it is impossible to proceed to set up the NSDI of the RK.

2. Basic spatial data are nonvolatile and typically medium-scale geodata (the borders of the country, regions, districts; large water bodies and rivers; roads of republican subordinance, etc.) that are always publicly available. By now, the structure of basic spatial data of the NSDI OF THE RK has not been defined yet.

3. Industry spatial data are usually large-scale geodata. They are compiled and updated on a systematic basis for the purpose of solving production industry problems. For now, the Automated Information System of State Land Cadaster is a unique and operational information system in the field of spatial data using [9]. The other information systems are in different stages of development [10].

4. Thematic spatial data are geographic information systems of different scales, designed for site of interest, with different complexity and orientation for all interested principals. In the country, they are mainly generated through budgetary funds. But despite this, systemization and storage of thematic data has not been established at an adequate level.

5. Meta-data is data that describes other data which specifies format, location and other information about spatial data. The country has not had meta-data to spatial data, systemized in a unified way.

The NSDI geoportal is the window to the world of users and producers of Digital Spatial Data (figure 2). Geoportal is designed to visualize systemized geodatabase and support the entire system. The next

function of geoportal is to carry out an elementary spatial analysis which will ensure data dissemination, data exchange between the participants and elementary analysis of visualized spatial data. For instance, expanded analyses of spatial data involving attribute data are not always available on geoportal. Hence one cannot either overestimate or underestimate the role of SDI geoprtal.SDI setting-up and formation *technology* underwent very serious changes over last 10 years. For example, the first NSDIs (NSDI 1.0) were set up completely at the expense of the government, from top to bottom, i.e. vertically. Now NSDI 2.0 are formed and developed, mainly, via collective intelligence of the whole geo-industry community for the country, regions and even the world [11]. Appropriate use of NSDI 2.0 highly facilitates digitization of the country.

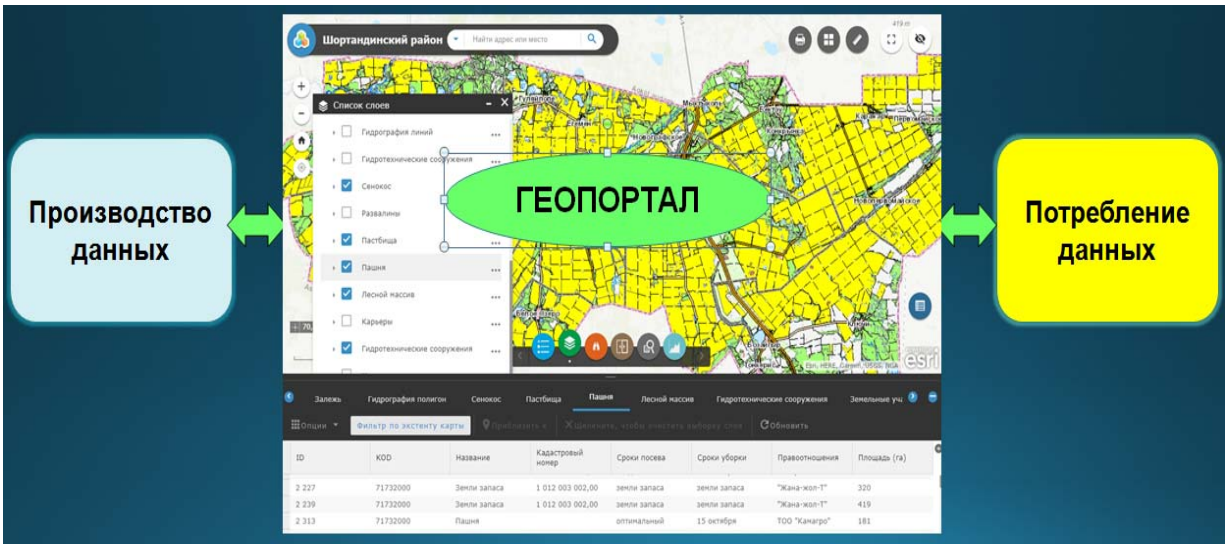

Figure 2 - The general scheme of its operation of the SDI through the geoportal

People or specialists. A number and qualification of specialists in the field of generating spatial data in the country expand at a fast rate. Virtually, setup of geographic information systems in the country reaches the user-declared phase. So for the time being, software for setting up geographic information systems became available almost for every reasonable person. Some software is publicly available for establishing multi-purpose geoservices [12]. This promotes a heavy expansion of opportunity for digitization of the country by excluding financial costs for the purchase of software.

Ways to solve the problems. In our opinion, setup and formation of the NSDI of the RK can be performed by improving AIS SLC and adding SDI 2.0 thereto. The AIS SLC is developed fast and has already had more than 12 subsystems and cartographic framework for the whole territory of Kazakhstan. AIS SLC is capable of integrating with other information systems relatively easy and has vertical and horizontal structure and defined professional staff in each region of the country that is at work in subject field that is Land Cadaster Service. To use fully AIS SLC for setting up the NSDI of the RK, it is certainly necessary to solve in advance the said organizational, technical and technological problems.

Therefore, we have specified some problems and ways to solve them when organizing the National Spatial Data Infrastructure of the Republic of Kazakhstan. At G2G level, this is own organizational structure of the NSDI of the RK as well as a correct articulation of the problem of state agency-level cadasters, based on AIS SLC. At G2B level, this is the provision of business entities with all unclassified spatial data implemented at the expense of the government. At G2C level, this is an involvement of large numbers of citizens and specialists for setup, building and development of the NSDI of the RK. Main problems faced in setting up and building-up the NSDI of the RK and the ways to solve them.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДА КІҢІСТІКТІК ДЕРЕКТЕРДІ САНДАНДЫРУ ПРОБЛЕМАРЫ МЕН ШЕШУ ЖОЛДАРЫ

Аннотация. Еңбекте Қазақстан Республикасының ұлттық кеңістіктік деректер инфрақұрылымын (ҚР ҰКДИ) дайындау және қалыптастыру проблемалары анықталған. Басты проблемалар қатарына мыналар жатады: атқарушы құрылымды дұрыс ұйымдастыру; ҰКДИ-ға қатысты мемлекеттік стандарттардың толық еместігі; кеңістіктік деректердің жүйесіз дайындалып нақтылы қалыптастырылмауы; технологиялар дәрежесінің төмендігі; мамандар дайындауды жетілдіру. ҚР ҰКДИ-ін ұйымдастырғанда АҚШ ҰКДИ-інің атқарушы құрылымына мән бере отырып дайындау ұсынылып ол мысал схема ретінде көрсетілген. ҚР ҰКДИ-іне байланысты жаңа стандарттар дайындалуы екерек. Немесе, дамыған мемелекеттердің тәжрибелерін еске ала отырып, олардағы жасалған нормативтік-құқықтық құжаттарды ауысымдау да жөн. ҚР ҰКДИ-інің кеңістіктік деректерін дайындауда экономкалық тұрғыдан пайдалы технологиялардың соңғы жетістіктерімен жұмыс істеу дұрыс. ҚР ҰКДИ-ің бес топтағы кеңістіктік деректерінің дайындығына және даму деңгейіне баға берілген. Олар: фундаменталдық, базалық, салалық, тақырыптық және метадеректер. Республикада ҰКДИ құру үшін ашық координаттық жүйенің жоқтығы нақтыланған. Онсыз ҚР ҰКДИ-ін құруға болмайтыны басып көрсетілген. Бүгінге дейін ҚР ҰКДИ-іне қажет базалық кеңістіктік деректер құрамы анықталмаған. Республикада салалық кеңістіктік деректерінің дайындлуы жүйесіз жүргізіліп кейбір мемлекеттік органдар белсенділік таныта алмай келеді.Қазақстанда тақырыптық кеңістіктік деректер дайындау жақсы дамыған. Бірақ тақырыптық кеңістіктік деректерді дайындауда өркениетті бақылау және кеңістіктік деректер алмасу жүйесінің механизмдері жеткілікті реттелмеген. Бұл құбылыс тақырыптық кеңістіктік деректердің жалпы мемлекеттік сақтау және алмасу жүйесіне ілікпей оларды дайндаушылардың меншігіне айналуына әкеліп соғуда.

Технология саласында, авторлар, ҚР ҰКДИ-ін жасау, қалыптастыру және дамыту кеңістіктік деректер инфрақұрылымын 2.0 технологиялары бойынша жүргізілуін қолдайды.

ҚР ҰКДИ-ін жасау, қалыптастыру және дамыту үшін мемлекеттік жер кадастрының автоматтандырылған ақпаратық жүйесін (МЖК ААЖ) негізге алып, оны КДИ 2.0 технологияларымен толықтыруды жетекшілікке алу керегін мақұлдайды.МЖК ААЖ жақсы дамыған 12-ден аса қосымшалары және бүкіл республиканы қамтитын картографиялық негізі бар жүйе. МЖК ААЖ республиканың барлық аудандарын қамтиды, басқа ақпараттық жүйелермен оңай интеграцияланады, вертикалді және горизонтальды құрылымымен жоғары дәрежелі мамандары бар. Әрине, МЖК ААЖ-ды ҚР ҰКДИ-ін жасау үшін пайдаланардың алдында, алдын ала жоғарыда көрсетілген кемшіліктерді реттеп алу керек.

Түйін сөздер: сандандыру, кеңістіктік деректер, кешендік ақпараттық-технологиялық платформа, ұлттық кеңістіктік деректер инфрақұрылымы, ұжымдық ақыл ой, кеңістіктік деректерді пайдаланушылардың өздері құруы.

О.А. Алипбеки[1], З.Д. Дюсенбеков[1], Ч.А. Алипбекова[1], А. Sterenharz[2]

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ПРОБЛЕМЫ И ПУТИ РЕШЕНИЯ ЦИФРОВИЗАЦИИ ПРОСТРАНСТВЕННЫХ ДАННЫХ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация. В работы выявлены основные проблемы создания и формирования Национальной инфраструктуры пространственных данных Республики Казахстан (НИПД РК). Главными из них являются: правильное формирование исполнительной структуры; неполный состав действующих стандартов для создания НИПД РК; бессистемное создание и неадекватное формирование пространственных данных; низкий уровень технологии; необходимость совершенствования подготовки специалистов. При организации НИПД РК предложено обратить внимание на исполнительную структуру Федерального комитета по геоданным США, которая приведена в качестве примера в схематической форме. Предложена выработка новых стандартов для НИПД РК или переложения нормативно-правовых документов, проверенных на практике развитых стран; применение последних достижений в области технологии создания и распространения пространственных данных. Оценены степень готовности и уровень развития каждой из пяти групп пространственных данных НИПД РК: фундаментальной, базовой, отраслевых, тематических и метаданных. Указано на отсутствие в республике собственной открытой системы координат, без которой невозможно создать НИПД РК. Отмечено, что до настоящего времени не определен состав базовых пространственных данных национальной инфраструктуры пространственных данных страны. Обращено внимание, что в республике отраслевые пространственные данные создаются и формируются бессистемно и не всеми государственными ведомствами органами. В Казахстане, наиболее массовое развитие получило создание тематических пространственных данных. Однако, в области создания тематических данных отсутствует механизм цивилизованного контроля и последующего обмена. Это привело к тому, что тематические пространственные данные часто превращаются в собственность производителей геоданных и не поступают в общую систему их хранения и распространения. В области технологии авторы считают, что для создания, формирования и развитие НИПД РК необходимо использовать технологии инфраструктуры пространственных данных 2.0.

В качестве одного из путей создания и формирования НИПД РК предлагается совершенствование Автоматизированной информационной системы государственного земельного кадастра (АИС ГЗК), дополнив её технологиями ИПД 2.0. АИС ГЗК динамично развивается и уже имеет более 12 подсистем и картографическую основу на всю территорию Казахстана. АИС ГЗК способна относительно легко интегрироваться с другими информационными системами, имеет вертикальную и горизонтальную структуру и сформированный штат квалифицированных сотрудников в каждом районе республики. Естественно, для полноценного использования АИС ГЗК для создание НИПД РК необходимо предварительно решить выявленные авторами организационные, технические, технологические проблемы.

Ключевые слова: цифровизация, пространственные данные, комплексные информационно-технологические платформы, национальная инфраструктура пространственных данных, коллективный разум, создание содержание пользователями, проблемы, пути решения.

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SCIENTIFIC METHOD OF CREATION CAPILLARY-POROUS COOLING SYSTEMS FOR ELEMENTS OF ENERGY BUILDING OF POWER STATIONS

Abstract. To create a scientific methodology, studies of the ultimate heat fluxes in metallic and poorly heat-conducting porous structures operating under the combined action of gravitational and capillary forces and cooling various devices of thermal power plants have been carried out. On the basis of the problem of thermoelasticity and experimental data, the mechanism of destruction of metal vaporising surfaces and poorly heat-conducting coatings of low porosity made of natural mineral media (granite) is described. On the basis of the analogy of the phenomena, the dependences of the heat fluxes on the time of their action and the depth of penetration of temperature perturbations are revealed. Capillary - porous systems have high intensity, high heat transfer ability, reliability, compactness.

Keywords: heat transfer crisis; capillary-porous structure; heat and power installations.

INTRODUCTION. Successful use of capillary-porous materials in engineering attracted many researchers and inventors to create different devices on their basis. The intensity of heat-eliminating systems and the forcing of processes taking place therein increased [1-3]. In addition to cooling systems, the use of porous materials allowed the creation of units which addressed the problems of explosion safety, labor protection and durability [4,6]. This was facilitated by the ability to control evaporation processes due to excess fluid in pores and capillary structures, formed by the combined action of capillary and mass forces [7-9].

In thermal power plants (TPPs), capillary-porous materials are used to cool highly-forced detonation burner units [3], to create steam coolers in steam boilers [9], oil coolers that prevent oil from entering cooling water and water from entering the bearing system [10] and labyrinth seals [11], and are used in other devices [10]. The main areas of practical application of capillary-porous systems are presented in [3,5,8-11]. Equipment and technological processes in the energy sector should be introduced from the ecological and economic positions primarily. The proposed development of capillary-porous systems will facilitate the implementation of processes, significantly improving and preserving the natural environment.

The main advantages of capillary-porous systems include high intensity, high heat transportability, reliability, compactness, simplicity in manufacture and operation. These systems improve operational and technological performance and have low capital and operating costs. Based on the study of capillary-porous systems, new technical solutions have been developed to improve the performance characteristics of the thermal power plant in relation to the powerful power units of combined heat and power plants.

The authors of [12] carry out a comparative analysis of methods for calculating the heat transfer, based on the water boiling with underheating in vertical channels, and they consider that the hot spot corrosion of fuel element claddings of nuclear reactor fuel elements is similar to the capillary-porous structure [13,14]. However, no studies of heat transfer through a regular structured surface have been carried out.

According to the authors' opinion [15,16], surface boiling on porous surfaces can influence the development of corrosion due to the erosive action on the heat exchange surface, when the bubbles of steam fall in an underheated liquid. Therefore, it is required to investigate the evaporation of liquid in capillary-porous structures in the field of capillary and mass forces, taking into account the velocity and underheating, which are formed by excess fluid.

An estimated intensity of heat transfer for liquid boiling in a large volume and thin films on a smooth surface showed equal possibilities [12-14] at high thermal flow and higher heat transfer parameters than that in systems with a capillary-porous coating [15-16]. It is required to carry out investigations of the heat transfer capabilities of capillary-porous coatings operating in the field of capillary and mass forces, and to establish ultimate (critical) load values leading to the destruction of the heating surfaces. Figure 1 presents a method for studying capillary-porous systems for various elements of power plants. The systems differ in the fact that they have predominantly a gravitational fluid supply and occupy an intermediate position between thin-film evaporators and porous evaporators with a predominantly capillary fluid supply (heat pipes) in terms of the intensity of heat transfer. Therefore, such systems should be identified in a separate class of heat-eliminating systems.

The performed researches make it possible to give recommendations on the selection of the heating-and-cooling medium, take into account the type of its circulation, determine the geometry and material of apparatuses and heat exchange intensifiers, taking into account the conditions and orientations of the system operation under pressure or underpressure, the energy supply and type and the system orientation. Generalization of the experimental results and calculation procedure for heat and mass transfer in capillary-porous systems in accordance with Figure 1 are presented in [17-21].

The investigation of various factors affecting the heat transfer in the structures shows that the critical states of the heating surface are of particular interest, when the system is capable of carrying the maximum flows of energy and substance. In this case, however, the values of thermal flows and thermal stresses are required to be known in order to ensure a reliable long-term operation of the unit. Consequently, the maximum energy and substance transfer can be obtained for the following conditions: a pure liquid circulating in a forced scheme in closed elliptical heat exchangers under pressure in perforated and profiled heating surfaces made of stainless steel is used.

The system operates with an excessed fluid, and the presence of mass forces ensures the forced flow of the heating-and-cooling medium with underheating. Energy is supplied to the vertical surface along the perimeter, with a supersonic high-temperature pulsating rotating torch [1,3,11,19].

AN EXPERIMENTAL METHOD

Experimental units allowing to investigate the following integral characteristics of heat transfer have been developed: ultimate thermal flows (q), up to critical ones; liquid (m_l) and vapor (m_v) flow rates; distribution of the temperature field along the height and the length of the heat exchange surface. Studies are carried out in a capillary-porous cooling system which can operate on the principle of a closed evaporative-condensation design, or to be open. Various heat exchange conditions are studied, including: method of the coolant supply; the extent of tightness of the capillary-porous structure; ability to feed up the micro-arterial structure along the height of the heat exchange surface; orientation of the surface relative to gravitational forces; geometry: flat, tubular and curved cooling surfaces; influence of pressure up to manifestations of crisis with wall burning (see Fig. 1). To study the mechanism of heat transfer, holography methods and the generalization of similar and analogous phenomena are used [1,3,11,20,21]. The heat exchange is controlled using the elliptical systems, by the combined action of capillary and mass forces [1,3]. The study of heat transfer is of a practical nature. It is intended for the creation of various thermal power plants: steam attemperators of steam boilers, porous coatings of poorly heat-conducting material, seals in steam turbines and a number of other power plants [1,3,7,10,19].

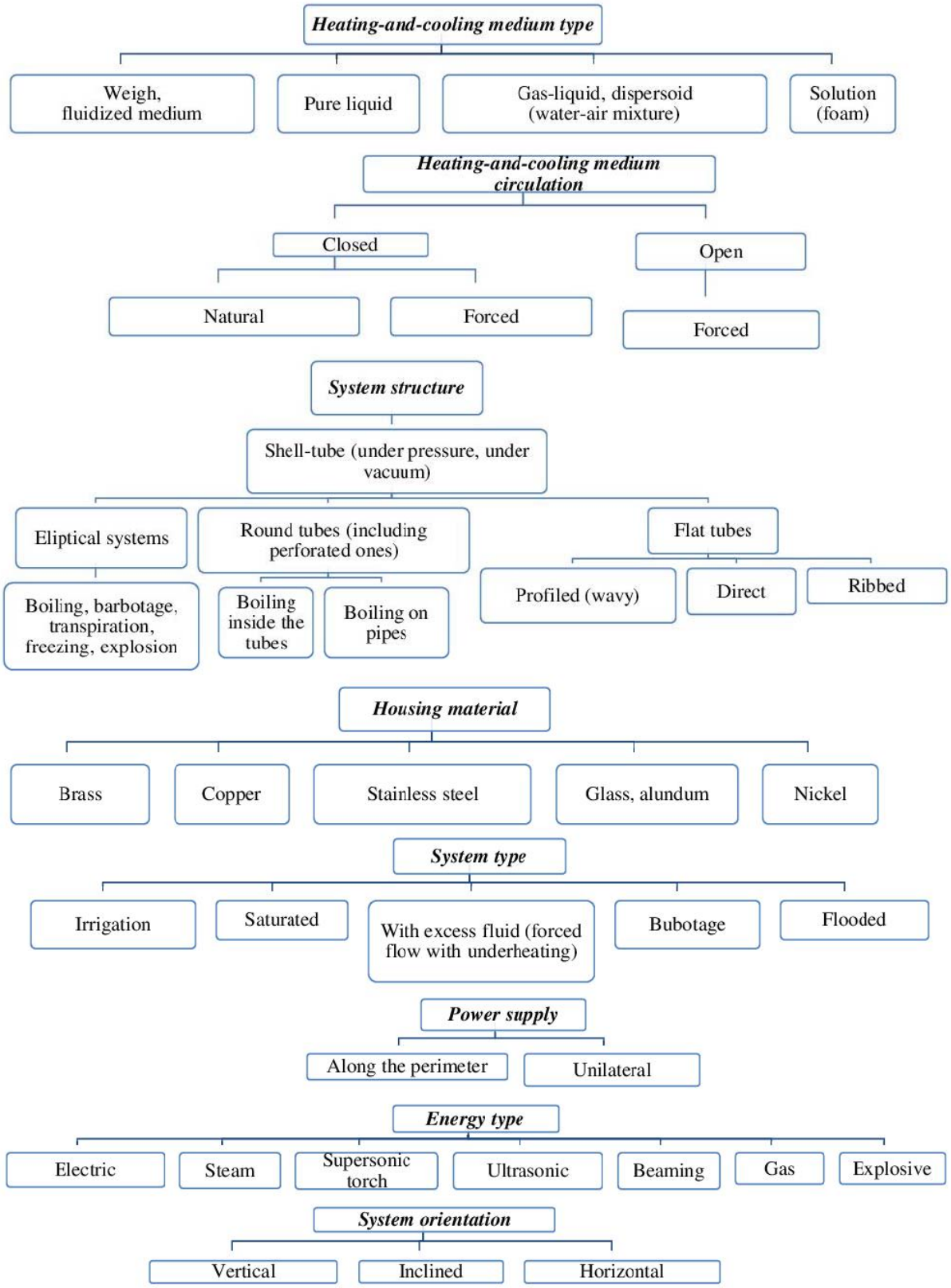

Figure 1 - A method for investigating various factors affecting the heat and mass transfer in capillary-porous systems of TPPs

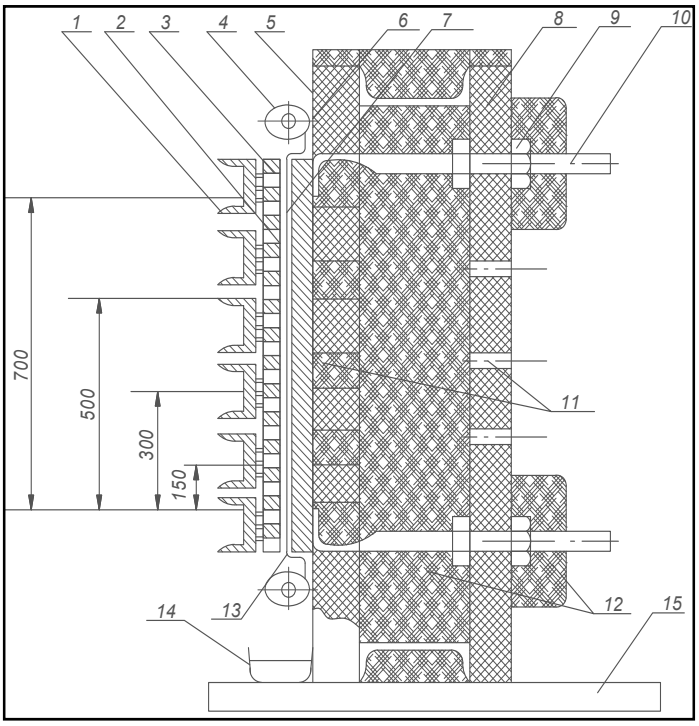

Figure 2 - Cross section of a flat experimental unit: 1 – pressing bar, 2 – capillary-porous structure, 3 – perforated pressure plate, 4 – tubular artery, 5 – asbestos cement plate, 6 – heater, 7 – insulation, 8 – plate, 9 – clamping nut, 10 – electrode, 11 – windows, 12 – heat insulation, 13 – coolable wall, 14 – collector, 15 – stand.

Figure 2 shows a cross section of a flat experimental unit with a perforated pressure plate 3 (Fig. 3), tubular arteries 4 and a capillary-porous structure 2.

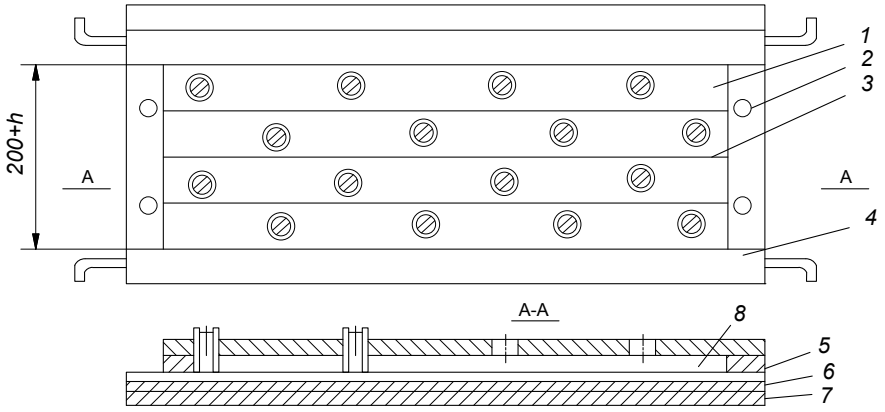

Figure 3 - Pressure scheme for the capillary-porous structure: 1 – plates, 2 – pressure screws, 3 – steam slots, 4 – fluid supply, 5 – pressure perforated plate, 6 – capillary-porous structure, 7 – heated wall, 8 – microartery

The maximum possible error:

A) ± 0.6%, when measuring current; ± 1%, when voltage is dropped; power is ± 1,6%,

B) ± 3%, when determining the liquid flow rate, using a rate-of-flow meter.

The imbalance of the current-supplied heat and the heat led to circulation and excess water, taking into account heat losses through the insulation, did not exceed ± 12%, and ± 11% through circulating water. The discrepancy between the material balance between the flow rate of the cooling liquid and drainage and condensate flow is no more than ± 10%. The measurement procedure and the processing of experimental data were published in [2,4].

To study the boiling crisis, we also assembled the units made in the form of a rocket-type flame-jet burner. The scheme of the experimental unit and the experimental conditions are presented in [3]. Ignition chambers and supersonic nozzles were cooled using a capillary-porous and water system (Fig. 4). The thermoreactive burner was also used to study the critical state of capillary-porous coatings made of natural mineral media (granite, quartz and teschenite coatings). The thermal effect was realized by a supersonic (up to 2000 m/s) high-temperature (up to 2500°C) pulsating torch (see Fig. 1, form of energy). Fig. 4 shows the results of the destroyed ignition chambers.

RESULTS OF THE HEAT TRANSFER CRISIS IN THE CAPILLARY-POROUS COOLING SYSTEM AND THE DISCUSSION THEREOF.

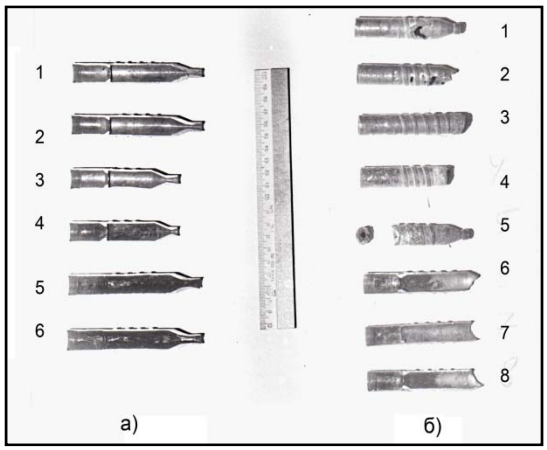

Figure 4 - Destroyed ignition chambers and supersonic burner nozzles:
a) nozzles are made without a wall thickening: 1, 2, 3, 4 – before operation; 5, 6 – after 40 hours of operation (the deflector rings are destroyed and nozzle cross-sections are enlarged); 1, 2, 5, 6 – α = 0,8; 3, 4 – α = 0,6; 4 – ignition chambers with a shortened nozzle (this ensured the detonation combustion condition). Cooling system is water - operated (q_{ccs} = 1x10^6 W/m^2;)
b) nozzles are made with a wall thickening: 1-8 – α = 0,6 ... 0,65, the destruction occurred as a result of the breakdown of gases into the water cooling system when the seals became depressurized; 5 – ignition chamber with a fused swirler.
Cooling system is capillary - porous (q_{ccs} = 1x10^6 W/m^2;)

MODEL OF A CAPILLARY-POROUS

To determine the critical thermal flows and stresses, the thermoelasticity problem [3,9,10] is solved under the secondary limiting conditions for the one-dimensional equation of nonstationary heat conductivity.

Let's consider a plate with the thickness of 2h. The constant ultimate thermal flow q is supplied to the surface z = +h, starting from the timepoint t = 0. The bottom surface z = -h and the plate side edges are thermally insulated.

Thermal conductivity equation with limiting and initial conditions can be written in the form:

$$\alpha_w \frac{\partial^2 T}{\partial z^2} = \frac{\partial T}{\partial \tau}, \; T = 0, \; \tau < 0; \tag{1}$$

$$\lambda_w \frac{\partial T}{\partial z} = q, \quad z = +h;$$

$$\lambda_w \frac{\partial T}{\partial z} = 0, \; z = -h.$$

The temperature distribution along the thickness depends on the thermophysical properties of the material, the thermal flow value and the feeding time:

$$T\left(\frac{z}{h};\tau\right)=q\left\{\frac{M}{2(c\lambda\rho)_w}\tau+\frac{\frac{3z^2}{h^2}+\frac{6^z}{h}-1}{12M}-\frac{4}{\pi^2 M}\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}exp\left[-n^2\frac{\pi^2M^2}{4(c\lambda\rho)_w}\tau\right]\cos\left[\frac{n\pi}{2}\left(\frac{z}{h}+1\right)\right]\right\}, \quad (2)$$

where = $M=\frac{\lambda_w}{h}$;; n – positive numbers.

Using the known temperature distribution in the plate, we can find the thermal tension and compression stresses arising at a certain time t at various depths from the surface $\delta_i = (h = z_i)$ for a given value of the thermal flow q, since the plate with a variable temperature is in the plain stress condition.

$$\sigma_{xx}=\sigma_{yy}\ =-\frac{\alpha E}{(1-\nu)}T\left(\frac{z}{h};\tau\right)+\frac{1}{(1-\nu)2h}\int_{-h}^{+h}\alpha 2'ET\left(\frac{z}{h};\tau\right)dz, \quad (3)$$

where the first term is the component of the compression stress, and the second term is the tension stress.

SOLUTION TO THE EQUATION (1).

If we are given the limiting values of tension and compression stresses for the rock (porous coatings from the natural mineral medium) and the metal, we obtain the dependence of the thermal flow required for destruction on the time of delivery and the depth of penetration. In addition, equating the temperatures on the plate surface to the rock and metal melting temperature, we find the values of the ultimate thermal flows necessary for melting the surface layer for a different period of their action:

surface melting:

$$q_1=\frac{T_f}{\left\{\frac{M}{2(c\rho\lambda)_w}\tau+\frac{2}{3M}-\frac{4}{\pi^2 M}\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}exp\left[-n^2\frac{\pi^2M^2}{4(c\rho\lambda)_w}\tau\right]cosn\pi\right\}}; \quad (4)$$

development of limiting compression stresses:

$$q_2=\frac{\frac{(1-\nu)\sigma_{ut}}{\alpha E}}{\frac{M}{2(c\lambda\rho)_w}\tau+\frac{\frac{3z^2}{h^2}+\frac{6^z}{h}-1}{12M}-\frac{4}{\pi^2 M}\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}exp\left[-n^2\frac{\pi^2M^2}{4(c\lambda\rho)_w}\tau\right]\left[cos\frac{n\pi}{2}\left(\frac{z}{h}+1\right)\right]}; \quad (5)$$

creating ultimate tension stresses:

$$q_3=\frac{\frac{(1-\nu)\sigma_{ut}}{\alpha E}}{\frac{M}{2(c\lambda\rho)_w}\tau}. \quad (6)$$

The dependences of q_1, q_2, q_3 on time for fixed particle size δ values for the coating, or the penetration depth of temperature perturbations for the metal, were calculated on a PC with respect to a plate made of quartz, granite and metal (copper and stainless steel).

Conclusion

Based on the conducted studies in the case of irradiation with a torch of a kerosene-oxygen burner of the porous coating in the working area, we have up to $4x10^7$ W / m^2, which corresponds to q coatings of $0{,}4x10^7$ W/m^2. The mechanism of the destruction of metals is fundamentally different from the mechanism of destruction of coatings from rocks.

A scientific method for studying and creating capillary-porous cooling systems and coatings for various heat and mass transfer conditions in power equipment elements has been developed.

Symbols

m – flow rate, kg/s;
q – thermal load, W/m^2;
h – film height, thickness, m;
– average velocity, m/s;
α – excess air factor;
T – temperature, K;
w – grid cell width, inside-light inspection (hydraulic pore size), m;
G – specific flow rate, kg/m^{2}s;
d – grain size (diameter) of the structure, m;
x – coordinate (direction of fluid motion), m;
y – coordinate (direction of fluid motion), m;
z – coordinate, m;
τ – time, s;
a – thermal conductivity factor, m^2/s;
λ– thermal conductivity factors, W/mK;
C – thermal capacity, J/kgK;
ρ – density, kg/m^3;
δ – thickness of the structure (depth of wave propagation, particles size), m;
σ –stress;
α – linear expansion factor, K^{-1};
ν– Poisson ratio (lateral contraction);
E – Young's modulus (elasticity modulus), Pa;
Q – specific crushing energy, J/m^3

Indexes

f, v – fluid, vapor; ccs- critical cross-section; h - hot; w - wall; h - hydraulic; s - saturation; f - fusion (film); us - ultimate shortening; ut - ultimate tension.

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ЗЕРТТЕУ НӘТИЖЕСІ ҚУАТТЫЛЫҚ-БІРЖАБДЫҚ ЖҮЙЕСІ ЭНЕРГИЯ ҚҰРЫЛЫСЫНЫҢ ЭНЕРГЕТИКАЛЫҚ ҚҰРЫЛЫСЫНЫҢ ЭЛЕМЕНТІ

Аннотация. Ғылыми-зерттеу әдістерін жасау үшін гравитациялық және капиллярлық силдермен жұмыс істейтін металл және платформациялық поршенді құрылымдардағы жылу құятын жылу көздерін зерттеу және жылу қондырғыларының түрлі салқындатқыш құрылғыларын зерттеу жұмыстары жүргізілді.Негізінен минералдық ортадан (гранит) шығарылған металды парогенерирующих сырықтардан шығарылатын механизмдер мен оптикалық деректерді табу механизмі қажет.Осындай ұқсастықтар негізінде жылу алмастырулардың өздігінен өтетін температуралық және жылжымалы жылу алмастырулардың шығу тәсілдерін анықтайды.Бұл жүйе жоғары қарқындылықпен, үлкен жылумен, сенімділікпен ерекшеленеді.

Түйін сөздер: жылу тасымалдау дағдарысы; капиллярлық-кеуекті құрылым.

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НАУЧНАЯ МЕТОДИКА СОЗДАНИЯ КАПИЛЛЯРНО-ПОРИСТЫХ СИСТЕМ ОХЛАЖДЕНИЯ ДЛЯ ЭЛЕМЕНТОВ ЭНЕРГООБОРУДОВАНИЯ ЭЛЕКТРОСТАНЦИЙ

Аннотация. Для создания научной методики проведены исследования предельных тепловых потоков в металлических и плохотеплопроводных пористых структурах, работающих при совместном действии гравитационных и капиллярных сил, и охлаждающих различные устройства теплоэнергоустановок .На основе задачи термоупругости и опытных данных описан механизм разрушения металлических парогенирирующих поверхностей и плохотеплопроводных покрытий малой пористости, выполненных из естественных минеральных сред (гранита).На основе аналогии явлений выявлены зависимости тепловых потоков от времени их действия и глубины проникновения температурных возмущений.Капиллярно – пористые системы обладают высокой интенсивностью, большой теплопередающей способностью, надежностью, компактностью.

Ключевые слова: кризис теплопередачи; капиллярно-пористая структура; тепловые энергоустановки;

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THE ANALYSIS OF INFLUENCE OF MINING-GEOLOGICAL FACTORS ON EDGES STABILITY ON THE EXAMPLE OF THE SARBAI PIT

Abstract: Conditions complication of mining operations production because of increase in depth of development and involvement in field exploitation with the composite mining-and-geological conditions is characteristic of the modern pits. In these conditions, the great significance is gathered by questions of geomechanical ensuring stability of pit edges and boards. In practice of conducting open mining operations educe several groups of the factors influencing stability, depending on vision of authors, these factors can be consolidated in two and more groups [1-5].

Research work results of rock mass jointing, influence of queries systems on stability of boards and edges are given in the article, carried out by the Institute of Mining named after D.A.Kunaev. As an example was chosenSarybaiiron-ore pit which development is characterized with significant depth increase and transition to development of deep lying ores. The certain sites of pit boards requiring special attention when conducting mining operations are defined.

Keywords: open pit mining, pit, board, edge, deformations, stability, jointing, rock mass.

The demand for mineral raw materials increase from year to year and leads an increase in production capacities of mining facilities. Fields which have simple mining-and-geological conditions and high content of the useful component in ores are already fulfilled or close to completion of works. Therefore, the modern development of mining industry is characterized by complication of conditions of mining operations production due to the depth increase of development and involvement in operation of fields with the complex mining-and-geological conditions. As depth of operating pits increase, questions of pit edge stability turn into problems of big economic significance for the mining enterprises.

Prediction of deformation processes is possible on the basis of the comprehensive approach including study of structural and tectonic composition and strength properties of the rock mass, instrumental observations on deformation of various sites of the edge-side rock mass, level assessment and the direction of tectonic forces actions and also conduction of geomechanical calculations of stability [1, 6, 7].

Production of mining operations in pit according to the project documentation not always guarantees lack of pit edge deformations, local sites of boards and edges, especially when forming the limiting pit outline. The reasons for the arising stability violations of edge-side rock masses are various depending on geological, engineering-geological, hydrogeological conditions and board parameters on the concrete site of the quarry field [1, 8].

In practice of conducting open mining operations, all factors influencing stability of pit boards can be divided into four groups: engineering-geological, hydrogeological, physical-geographical, mining [2].

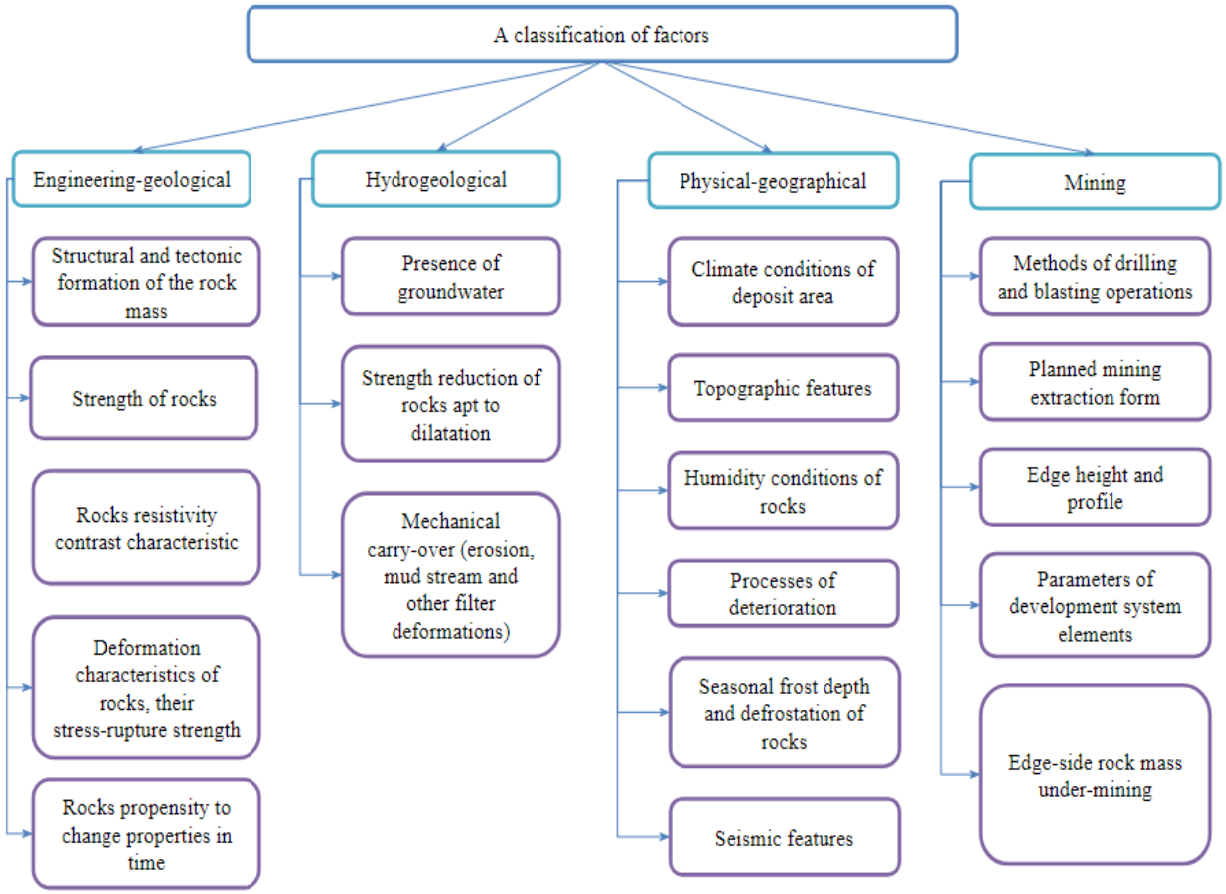

Figure 1 – A classification of factors, which influence stability of pit boards and edges

To the most essential engineering-geological factors refer a structural and tectonic features of the rock mass, stability and deformation characteristics of rocks, tendency of rocks in slopes to change properties over time (dilatation, density softening, decay, leaching) (Figure 1) [2, 9, 10].

Deformations of boards in rock mass can happen both in the form of sudden rockburst and in the form of slow straining process with periodic stages changes of tectonic and gravity deformation [1].

The main reasons for deformations of the edge-side rock mass inherent in all pits, are:

- discrepancy of parameters of edges and boards to actual engineering-geological conditions of the deformation site;
- insufficient knowledge of the massif on peripheral areas of the field in which massifs the limiting pit edges build up;
- change of engineering-geological, hydrogeological conditions and physical-mechanical properties of rocks and their contacts during the development of in-pit space;
- the impact on the massif of tectonic forces which is followed by change of a structural composition and mobility of edge-side rock mass;
- activity of higher tension, in comparison with near-surface, which changed by straining and strength properties of rock mass and human-induced disturbance.

Let's consider on the example of the Sarybai field of magnetite ores influence of various factors on change of pit boards parameters as mining depth increase. The field is developed by the Sarybai open-pit since 1960. The pit is opened with two trenches: on southeast to the mark of 125 m (depth of 70 m) connecting a pit with factory and a dump, and on northern trench to the depth of 15 m on which only rock is transported in a dump .

Pit parameters for the end of 2017 and the projected parameters for the end of mining taking into account working off of ore reserves on the deep levels are presented in table 1.

Table 1 – Parameters of the Sarbay pit

Parameters	Currentparameters	Design parameters factored in sinking
Pit-bedlevel, m	minus 390 m	minus 500 m
Width, m	2400 m	2400 m
Length, m	3450 m	3450 m
Height of bench: Friable rocks Hard rocks	 10-13 m 40 m	 10-13 40 m
Angle of bench slope: Friable rocks Hardrocks	 25-50° 55°-65°	 25-50 55-70°

Key feature of the field is its two-level structure. Paleozoic (mainly, coal) deposits form the folded basement, and horizontal friable mesozoic-cainozoic deposits blocking the paleozoic with angular divergence - the sedimentary cover with capacity of 150 ÷ 230 m.

The field have thick mass of friable sand-argillaceous deposits of a mesocainozoic age lying on hard rocks presented by various effusive and sedimentary, intrusive, metasomatic rocks and ore bodies. Thuswise, the Sarybai iron-ore field refers to stratified field with discernable and naturally located weak planes of big extent in the form of a bedding, contacts of layers or foliation.

Breeds of cover mass in the conditions of preliminary drainage have quite sufficient stability in pit slopes. However, there is a mud stream and the slopes collapse folded by cretaceous sands, neogene clays and quaternary loams in their consequent waterlog.

In general, engineering-geological conditions of Sarybai pit mining are composite caused by rocks strength properties, structure of the massif (higher power of friable rocks up to 140 m, existence of weak planes: bedding of friable rocks, jointing, foliation of hard rocks), tendency of rocks to decay, hydrological factors - water content of hard and friable rocks.

Following factors affect stability of boards and edges of the Sarybai pit - existence of weak planes (jointing, bedding of friable rocks, foliation of hard rocks), water content, low strength properties of rocks. A major factor is the intensive jointing of certain sites. Study of jointing was made by methods of results processing of geotechnical well-drilling (figure 2) and data processing of field researches. During drilling of straight wells which are up to 7 meters long was made teleinspection of wells for definition of active stresses in the massif [11].

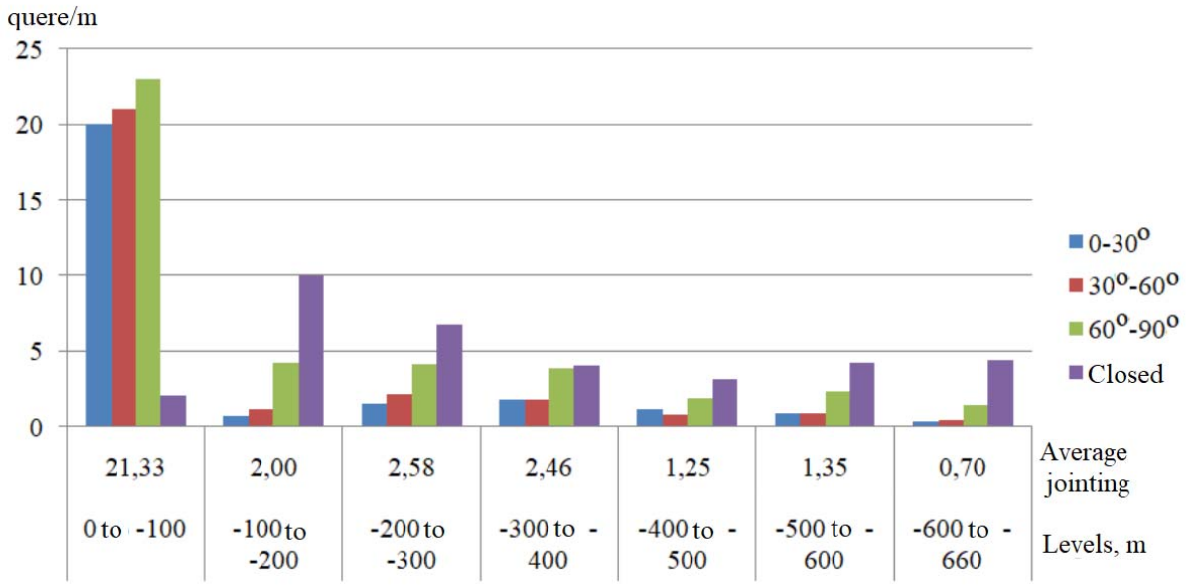

Figure 2 – Results of determination of rock mass jointing by geotechnical drilling

By results of geotechnical drilling the tendency of block massif growing with depth, on the deep levels from a mark of minus 400 m (600 m from a surface) there are revealed zones of rocks with a slight jointing upcoming to monolithic rocks. In general rocks jointing of the Sarybai pit is developed nonuniformly from the soft jointing (1-3 queres/meter - within a zone of unaltered rocks) to intensively jointing (up to 20 queres/meter – within zones of tectonic violations).

The main quantity of open queres (more than 60%) is focused in the subvertical direction with an degree of deep from 60° to 90°, without filler, opened due to the decay. The dominating part of closed type of queries - steeply sloping east-west trending [12-16]. Increase of rocks jointing degree of a dip with a depth is noted. Blebs of the closed queries are usually filled with unstable calcite-chlorite material and rare filled with hematite, magnetite and pyrite.

For construction of precise model of structural violations and inhomogeneities taking into account the main regularities of distribution and relationship of different systems jointing in field conditions, preliminary photographing of pit edges and multiple parameter documentation of elements of jointing and structural heterogeneities was carried out. For determination of jointing of hard rocks, the most informative pictures of photo documentation were chosen to characterize lithologic and petrologic rock types within east and southern boards of the Sarybai pit towards which further conducting mining operations is directed (table 2).

The jointing significantly defines strength and straining properties of the massif and connected development of the dangerous geological and engineering-geological phenomena [17-20]. On the Sarybai pit during the period from 30.03.2009 to 27.04.2016 happened 4 collapses, 3 of them in the northwest during setting of a board in terminating situation, and the last within the levels minus 110 ÷ minus 140 m on east board.

Table 2 - Characteristic of key parameters of queres systems
of the southern and east boards of the Sarbay pit

	1 system	2 system	3 system	4 system	5 system	6 system
Genesis	Tectonicqueresofdetachment					
Numberofqueres	223	280	91	85	26	42
Dipazimuth	277,28-301,53 289,41	321,4-334,73 328,02	38,73-64,43 52,99	358,8-359,5 357,24	175,36-180,1 177,24	186,15-210,0 198,09
Strikeazimuth	7,28-31,53 19,41	51,41-64,73 58,06	128,73-155,4 142,99	88,8-89,47 89,2	85,36-90,15 87,24	96,15-120,02 108,09
Degreeofdip	41,04-60,68 52,68	28,83-64,05 36,8	60,35-88,23 77,95	18,0-54,3 19,42	1,00-5,00 2,53	52,42-90,0 78,33
Length, m	0,14-15,45 1,07	0,14-3,90 0,83	0,20-4,25 1,18	0,11-4,12 0,88	0,15-1,68 0,64	0,10-3,14 0,53
Width	0,50-5,00 2,50	1,00-10,00 3,00	1,00-7,00 2,00	2,00-12,00 2,50	0,50-10,00 2,00	1,00-25,00 2,00
Queresspacing, m	0,09-1,40 0,61	0,16-1,25 0,56	0,25-1,96 0,78	0,23-1,60 0,70	2,50-5,21 3,43	0,11-1,46 0,58
Form	Flat	Stepped	Hogbacked	Stepped	Hogbacked	Stepped
Surfaceofwalls	Harsh					

The existence of the tuffites which compose edges of pit boards is characteristic to all cases. They are peculiar with well expressed foliated texture with a power of laminas from several millimeters to tens of centimeters and the first meters (Figure 3). Within a skarn-ore zone of the field, tuffitesare intensively changed up to transition into metasomatites and skarns.

As the surfaces of bedding are initially weakened, therefore further queres of tension and shear are formed on them. Dependence of jointing on foliation of rocks 1 is well shown on system of queres, which is coinciding with a banding, and foliation of ores and rocks (table 3).

Teleinspection of walls was made on the drilled horizontal wells on three experimental sites. The first experimental site is located in the western part of a pit (level -240 m), the second and third sites settle down in a northeast part of a pit (level -240 m and level -320 m). Each experimental site includes three measuring stations on three wells. The preliminary analysis has shown that the rock mass in pit boards is characterized by high jointing of the enclosing rocks. The main quantity of open queresis focused in the

subvertical direction. The distance between queres varies in the range from 5-10 to 300-400 mm. Exceptsubvertical jointing at pit boards, there is also a subhorizontal jointing. On average 3 - 4queres are accounted for linear meter of the well.

Figure 3 - Foliated texture of tuffites of Southern pit board, level 0 m

Table 3 - Jointing of various rocks lithotypes of eastern and southern boards of Sarbaysky pit

№	Rocks	Averagequeresspacing,m	Foliationmodulus, queres/meter
1	Tuffs	0.98	1.02
2	Limestones	0.81	1.23
3	Tuffites	0.30	3.33

Account of jointing effect on properties of the massif is made by means of coefficient of structural weakening λ which allows to pass from values of rocks coupling in a sample to rocks coupling in the rock mass [3]. By results of natural measurements of jointing parameters, the logarithmic dependence of coefficient of structural weakening on coupling size in a sample is received (figure 5).

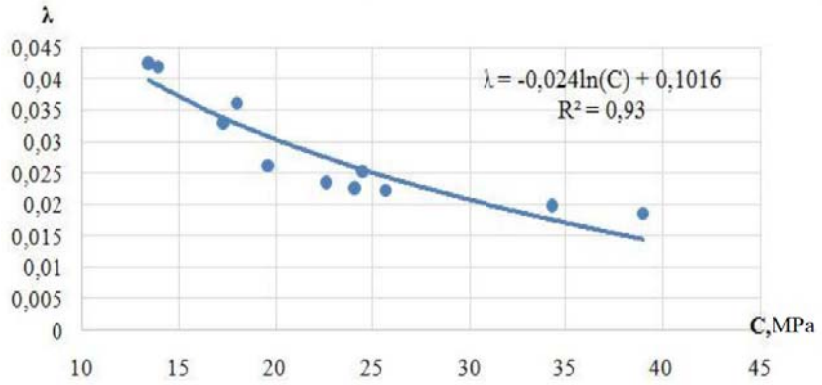

Figure 5 - Dependence of structural weakening coefficient (λ) from coupling value in a sample (*C*)

Basic physical-mechanical data for calculation of stability of pit boards taking into account jointing parameters are presented in table 4 [21].

Table4 – Estimated strength characteristics of rocks according to tests of core material

Mainrockscomplex	Blocksize l, m	Structuralweakeningcoefficient, λ	Sampleindicators		Estimated indicators in the rock mass, n=1,3			Densit, t/m^3
			Specificcoupling Co, МПа	Internalfrictionangle	Coupling, Cm, MPa	Coupling, Cm, t/m2	Internalfrictionangle	
Tuffs	0,61	0,0219	30,08	37,06	0,65	66,04	37,06	2,77
Diorites	0,82	0,02	43,50	35,00	0,88	89,60	35,00	2,84
Tuffites	0,26	0,03	18,53	36,10	0,54	54,83	36,10	2,84
Ore	0,66	0,02	20,57	38,00	0,47	47,90	38,00	3,61
Limestones	0,63	0,0361	18,00	35,00	0,65	66,30	35,00	2,81
Metasomatites	0,28	0,04	15,60	35,00	0,58	58,95	35,00	2,86

During a pit sinking to a mark minus 500 m on the Sarybai field, it is possible to carry the I system of queres which is intensively shown in the circum-ore tuffites into the natural surfaces of weakening. The most adverse engineering-geological conditions will be observed in east part of a pit as degree of rock dip which compose east board and showed the 1 system of queres are close to angles of bench slopes (table 5) that can lead to emergence of local deformations, not defiant losses of the general stability of the board.

Table5 – Jointing data on the East board

№ ofwells	Openjointing						Total quantity of open queres	Closedjointing
	0-30^o		30-60^o		60-90^o			
	Quantityofqueres	%	Quantityofqueres	%	Quantityofqueres	%		
3	193	14,5	279	21	858	**64,5**	1330	797
4	125	18,7	110	16,4	432	**64,7**	667	1095
5	355	14	629	25	1535	**61**	2519	1926

For ensuring stability of design parameters for East board edges is necessary to:

- to make bank slope work on agreed queres by means of cutoff stopes, detonation of inclined wells at degree of queres dip (60^o);

- use of the antideformation (seismic-preserving) technology of a bank slope work on a limit contour in hard rocks;

- timely create a cutoff stope when approaching mining operations to a slope-side zone. Parameters of a cutoff stope have to adequately reduce dynamic action of explosion .

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САРБАЙ КАРЬЕРІ МЫСАЛЫНДА КЕН ОРЫНДАРЫНЫҢ ТҰРАҚТЫЛЫҒЫН КЕН-ГЕОЛОГИЯЛЫҚ ФАКТОРЛАРДЫҢ ӘСЕРІН ТАЛДАУ

Аннотация: Заманауи карьерлер үшін күрделі тау-геологиялық шарттармен кен орындарды жүзеге асыруға өндеу және тартудағы кен қазбаларын өндірудің күрделілігімен сипатталады. Мұндай жағдайда ойық шеттерінің және траптардың тұрақтылығына геомеханикалық қолдаудың маңыздылығына ие болады. Ашық тау-кен өндіру тәжірибесінде авторлардың пікірлеріне байланысты тұрақтылыққа әсер ететін факторлардың бірнеше тобы анықталған, бұл факторлар екі немесе одан да көп топтарға біріктірілуі мүмкін **[1-5].**

Мақалада Д.А.Қонаев атындағы Тау-кен істері институтымен жүргізілген тау жыныстарының массивін сынықтылығы, сыну жүйелерінің ойық пен борттардың тұрақтылығына әсері ғылыми-зерттеу жұмыстарының нәтижелері көрсетілген. Мысал ретінде Сарбай темір карьері алынған, оның дамуы үшін тереңдіктің артуымен және терең кендерді игеруге көшуімен сипатталады. Тау-кен жұмыстарын жүргізу кезінде назар аударуды қажет ететін карьер траптарының нақты учаскелері анықталды.

Түйін сөздер: ашық тау-кен жұмыстары, карьер, борт, ойық, түрдің өзгеруі, тұрақтылық, сыну, массив.

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АНАЛИЗ ВЛИЯНИЯ ГОРНО-ГЕОЛОГИЧЕСКИХ ФАКТОРОВ НА УСТОЙЧИВОСТЬ БОРТОВ НА ПРИМЕРЕ САРБАЙСКОГО КАРЬЕРА

Аннотация. Для современных карьеров характерно усложнение условий производства горных работ из-за увеличения глубины разработки и вовлечения в эксплуатацию месторождений со сложными горно-геологическими условиями. В этих условиях большое значение приобретают вопросы геомеханического обеспечения устойчивости уступов и бортов карьера. В практике ведения открытых горных работ выявляют несколько групп факторов, влияющих на устойчивость, в зависимости от видения авторов эти факторы могут быть объединены в две и более группы [1-5].

В статье приведены результаты научно-исследовательской работы по изучениютрещиноватости массива горных пород, влияния систем трещин на устойчивость бортов и уступов, выполненные Институтом горного дела им. Д.А. Кунаева. В качестве примера выбран Сарбайский железорудный карьер, для развития которого характерно значительное увеличение глубины и переход к разработке глубоко залегающих руд. Определены отдельные участки бортов карьера, требующие повышенного внимания при проведении горных работ.

Ключевые слова: открытые горные работы, карьер, борт, уступ, деформации, устойчивость, трещиноватость, массив.

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NONSPECIFIC PROTECTION OF THE ORGANISM OF COWS-MOTHERS AND CALVES IN REALIZATION OF REPRODUCTIVE AND PRODUCTIVE QUALITIES

Abstract. Improvement of reproductive qualities of the white-and-black cattle and realization of the productive potential of calves during the remote periods of growing and fattening by activation of nonspecific resistance of an organism by biological products is an urgent problem of the modern zootechnical science and practice. For the first time, on the basis of complex researches, the expediency of application of the Prevention-N-A developed biological product on the basis of the Saccharomyces cerevisiae polysaccharide complex of yeast cells and germicide of Aminoglycosides group in technology of receiving and growing of calves in comparison to earlier approved PS-2 medicine is evidence-based and experimentally proved It was established that the immunocorrection of the organism of down-calving cows and newborn calves under pressure of environmental and technological stress factors with new generation biopreparations prevents cows from gynecological diseases in the birth and postnatal periods, improving reproductive qualities, and in calves - promotes the prevention of diseases of the respiratory and digestive organs, activates growth and development, ensuring a more complete realization of the productive potential of the young stock in the periods of growing and fattening, with more expression effect of Prevention-N-A. The purity of meat carcasses by organoleptic, biochemical and spectrometric indicators and, consequently, the safety of the tested preparations were proved.

Keywords. Cows, calves, biological products, nonspecific resistance, gynecologic state, reproductive and productive qualities.

Introduction. In the Russian Federation, dairy cattle breeding is one of the most profitable animal breeding sectors, and the need for its further development is dictated by the satisfaction of the population's needs for food products of its own production, which plays an important role in the country's food security.

One of the most important factors determining the achievement of the genetic potential of productivity, reproductive ability, disease resistance, productive longevity of animals of modern highly productive breeds, enhancing their forage-conversive capacity, and therefore, the successful development of animal breeding, is the observance of zoohygienic requirements chain "forage → housing conditions → protection of farms from pathogens invasion → getting and preservation of calves → quality and processing of production → environment → human health". However, modern technologies often violate the relationships of the animal's organism with the environment and the traditional conditions of keeping, feeding and servicing that have developed during phylogenesis, tearing them away from the natural habitat and bringing them closer to a biological machine which task is to produce the target products. Animals cannot avoid the effects of stress factors, which leads to a decrease in the nonspecific resistance of the organism to various functional disorders and, as a consequence, to diseases. The organism is especially

sensitive to the effects of unfavorable environmental factors in the first and last months of intrauterine development, and the first months of the newborn. The physiological status of the maternal organism is reflected in fetal development and postnatal ontogeny of the newborn [1, 3, 7, 8, 9].

In the context of the foregoing, at the present stage of the development of cattle breeding, the problem of preventing the adverse effects on the organism of technological and environmental factors that cause a decrease in the reproductive and productive qualities of animals is of particular importance [2, 12, 16, 17, 18]. One of the ways of preventing the negative influence of stress factors, improving the reproductive and productive qualities of black-and-white cattle is the immunoprophylaxis of the organism with biological preparations [4, 5, 6, 10, 11, 13, 14, 15, 19, 20, 21], along with the improvement technologies for breeding work and raising young cattle [22 - 26].

The research was carried out within the framework of international cooperation of scientists of the Russian Federation (headed by Doctor of Biological Sciences, Professor Vladimir Grigoriyevich Semenov) and the Republic of Kazakhstan (headed by the corresponding member of the National Academy of Sciences of the Republic of Kazakhstan, Doctor of Agricultural Sciences Dastanbek Asylbekovich Baimukanov) in the period 2015 -2017 on priority branches of productive animal husbandry.

The aim of this work is to improve the reproductive qualities of black-and-white cattle and to realize the productive potential of calves in remote periods of growing and fattening by activating nonspecific resistance of the organism with PS-2 and Prevention-N-A biological preparations.

To achieve the aim, the following ***objectives*** were set:

1. To study the hygienic conditions of keeping and feeding of nonmilking (incalvers) and milking cows, calves from birth to 180 days (including the prophylactic period up to 25 days), the young stock in the periods of growing up to 360 days and fattening up to 540 days.

2. To conduct studies of the gynecological condition and reproductive qualities of black-and-white cattle against the background of immunocorrection of the organism with PS-2, previously approved, and Prevention-N-A, developed and tested for the first time.

3. To reveal the influence of biological preparations on the growth and development, morbidity and safety of calves.

4. To evaluate the meat productivity of young stock and the quality of beef.

5. To characterize the physiological state, morphological and biochemical profiles of blood, the nonspecific resistance of the organism in the biological chain "cow - calf - young stock".

6. To determine the economic feasibility of the use of the PS-2 and Prevention-N-A biopreparations in the technology of obtaining and growing calves.

Materials and methods of research. Experimental studies were carried out in the conditions of the commercial-dairy farm of the Ulyanov IAPC, Alikovsky district, the Chuvash Republic, in accordance with the plan of scientific research of the Chuvash State Agricultural Academy, and the processing of materials was carried out in the Chuvash Republican Veterinary Laboratory of the State Veterinary Service of the Chuvash Republic, in the bio- and nanotechnology laboratory of the Department of Morphology, Obstetrics and Therapy at the Chuvash State Agricultural Academy in the period from 2012 to 2016.

The subjects of the research were the incalvers (45 days before calving) and the newly calved (3-5 days after calving) cows of the black-and-white breed, calves from birth and young stock up to 540-days old. In the scientific and economic experience, three groups of nonmilking cows were selected according to the principle of para- analogues, taking into account the clinical and physiological state, age and live weight of 10 animals in each group. A similar principle was used to select groups of newborn calves.

In order to improve the reproductive qualities of black-and-white cattle and realize the productive potential of calves, the biopreparations developed by scientists from the Chuvash State Agricultural Academy: PS-2 and Prevention-N-A (V.G. Semenov, etc.) were used in remote periods of growth and fattening of young animals. Cows of the 1st experimental group were injected intramuscularly with PS-2 at a dose of 10 ml three times for 45-40, 25-20 and 15-10 days before calving, of the 2nd test group - Prevention-N-A at the indicated dose and time, of the control group - no biopreparations were injected. The calves of the 1st and 2nd groups were injected intramuscularly with PS-2 and Prevention-N-A, respectively, two times on the 2nd ... 3rd and 7...9th days of life in a dose of 3 ml.

PS-2 – a preparation for increasing non-specific resistance and immunogenesis of animals, is an aqueous suspension containing a polysaccharide complex of yeast cells immobilized in an agar gel with the addition of a benzimidazole derivative (2,3,5,6-tetrahydro-6-phenylimidazo-(2,1, -β)-tiazole hydrochloride). On the PS-2 biopreparation, the patent of the Russian Federation for invention No. 2332214 was received, registered in the State Register of Inventions of the Russian Federation on August 27, 2008, published in the official bulletin "Inventions. Useful Models", 27.08.2008, № 24.

Prevention-N-A – complex preparation for activation of nonspecific resistance of the organism of cattle, it is a 2.5% aqueous suspension of saccharomyces cerevisiae immobilized in agar gel with the addition of benzimidazole derivative and bactericidal preparation of aminoglycoside group - (S)-0-3-Amino-3-deoxy-alpha-D-glucopyranosyl-(1-6)-0- [6-amino-6-deoxy-alpha-D-glucopyranosyl-(1-4)-N1-(4-amino-2-hydroxy-1-oxobutyl)-2-deoxy-D-streptamine. On the Prevention-N-A biopreparation, a patent of the Russian Federation for invention No. 2602687 was received, registered in the State Register of Inventions of the Russian Federation on October 26, 2016.

Results of the research. Research work was carried out in accordance with the zoohygiene standards for the main parameters of the microclimate in cowsheds and maternity ward, premises for growing calves, growing and fattening of young stock (Table 1).

Table 1 - Microclimate in the premises for animals

Indicator	Premises					
	cowshed	maternity ward	preventative clinic	calfshed	growing premise	fattening premise
T, ^{o}C	10.1±0.25	15.0±0.39	15.6±0.18	13.9±0.10	12.7±0.14	10.9±0.15
R, %	70.3±1.14	67,3±0.76	73.4±0.89	76.1±0.4	75.6±0.51	74.6±0.50
ν, m/s	0.31±0.02	0.28±0.02	0.19±0.01	0.21±0.01	0.22±0.01	0.24±0.01
CK	1:14	1:13	1:13	1:13	1:13	1:15
KEO, %	0.63±0.04	0.68±0.02	0.75±0.02	0.80±0.02	0.81±0.04	0.73±0.04
NH_3, mg/m^3	13.5±0.60	8.7±0.52	6.0±0.19	8.8±0.21	8.6±0.37	9.4±0.30
H_2S, mg/m^3	7.2±0.26	4.8±0.29	3.2±0.16	5.6±0.18	4.7±0.23	5.0±0.17
CO_2, %	0.20±0.01	0.14±0.01	0.16±0.00	0.22±0.00	0.16±0.01	0.18±0.01
BC, thous/m^3	43.7±1.56	30.3±1.02	23.1±0.72	34.0±0.79	28.6±0.63	30.9±0.55
Dust, mg/m^3	4.2±0.31	2.7±0.25	1.3±0.09	2.9±0.12	2.3±012	2.5±0.15

Thus, the parameters of the air pool in the autumn-winter period in the maternity ward and the winter period in the preventative clinic had correspondingly the following values: temperature - 15.0 and 15.6 °C, relative humidity 67.3 and 73.4%, air velocity - 0.28 and 0.19 m/s, bacterial contamination - 30.3 and 23.1 thousand/m3, the content of ammonia - 8.7 and 6.0 mg/m^3, hydrogen sulphide - 4.8 and 3.2 mg/m^3, carbon dioxide - 0.14 and 0.16%, no carbon monoxide was detected, dust - 2.7 and 1.3 mg/m^3. The luminous coefficient was 1:13 with the coefficient of natural illumination of 0.68 and 0.75%.

Animals were fed on the rations accepted in the farm, their balance in energy and nutrients, mineral elements and vitamins were coordinated with detailed feeding standards.

The daily ration for sterile nonmilking cows included 6.0 kg of hay from the alfalfa-rump, 7.5 kg of hay from timothy-clover, 12.5 kg of corn silage, 5.0 kg of beet fodder, 3.0 kg of mixture of concentrates, 0.3 kg treacle, 0.7 kg of PVMC for cattle (nonmilking) K+. The diet for dairy cows with a live weight of 500 kg and a yield of 20 kg during the winter period included 3.5 kg of hay from the alfalfa-rump, 9 kg of hay from timothy-clover, 21 kg of corn silage, 10 kg of beet fodder, 5.0 kg of mixture of concentrates, 0.9 kg of feed treacle, 0.8 kg of PVMC for cattle (milking herd).

The calf feeding scheme is designed to achieve live weight at the 90-day-old age of 90 kg at a consumption of 175 kg of pure milk and 120 kg of calf starter. Granulated starter-concentrate for calves K+ includes grain part (70%), oilseed concentrate (15%), fodder yeast (5%), monocalcium phosphate (1%), vitamin-mineral premix (1%), chalk (1.5%), a substitute for low-fat milk (6%) and table salt (0.5%), as well as carotenoids. In the diet for calves, hay and haylage are also provided.

When growing calves of 90 to 180 day-old age, growing and fattening of young stock, a mixed fodder consisting of 80% of ground grain and 20% of PVMC was used. PVMC contains 87.4% of dry matter,

274.2 g of crude protein, 10.2 MJ/kg of exchange energy, 80.8 g of crude fiber, 31 g of calcium, 20.4 g of phosphorus, 250 mg/kg of carotene, 19.5 g of lysine, 13.7 g of methionine. Vitamin and mineral composition is as follows: 80 thousand IU of vitamin A, 8 thousand IU - D3, 8 mg - E, 1.2 mg - B1, 40 mg - B2, 80 mg - B3, 80 mg - B5, 0.08 mg of vitamin B12, 60 mg of Fe, 40 mg of Mn, 20 mg of Cu, 80 mg of Zn, 2.0 mg of Co, 2.4 mg of J, 80 mg of Mg, 0.4 mg of sodium selenite, 20 mg of oxynyl, 2000 mg of Bio-Mos.

The supply of rations in energy and protein is presented in Table. 2.

Table 2 - Provision of diet in energy and protein

Indicator	In practice	Norm	Provision, %
	av. dly	av. dly	
interlactation period			
EFU	14.6	13.2	110.3
Crude protein, g	1931.3	1845.0	104.7
Digestible protein, g	1289.5	1265.0	101.9
Days in milk period			
EFU	18.97	17.0	111.6
Crude protein, g	2312.9	2320.0	99.7
Digestible protein, g	1551.1	1560.0	99.4
Under 90 days old calves growing period			
EFU	3.01	2.65	113.4
Crude protein, g	472.9	470.5	100.5
Digestible protein, g	407.5	390.0	104.5
90 to 180 days old calves growing period			
EFU	4.07	3.9	104.3
Crude protein, g	525.2	581.0	90.4
Digestible protein, g	341.4	392.0	87.1
180 to 360 days old young animals growing period			
EFU	6.04	5.9	103.2
Crude protein, g	841.2	796.0	105.7
Digestible protein, g	507.1	515.0	98.5
360 to 540 days old young animals fattening period			
EFU	8.15	8.0	101.9
Crude protein, g	1117.5	979.0	114.1
Digestible protein, g	676.1	691.0	97.8

Thus, the conditions of keeping and feeding during periods before calving and days in milk of cows, calves management, growing and fattening of young stock corresponded to zoohygienic standards and detailed feeding standards.

The results of studies of the gynecological state of cows are given in Table. 3.

Under the influence of PS-2 and Prevention-N-A, in cows, the time for membrane sweep was reduced by 6.0 and 6.4 h, the retention of placenta was eliminated, postpartum complications and breast diseases were prevented. The risk of subinvolution of uterus and endometritis during intramuscular injection of PS-2 decreased by 3.0 and 2.0 times, respectively, and at Prevention-N-A, it was excluded ($P<0.05$). Against the background of immunoprophylaxis, the cows were reduced in terms of the onset of heat on 11.6 and 14.2 days, the conception rate decreased in 1.6 and 1.8 times, the service period was shortened on 22.4 and 28.4 days, and fertilization was increased in 1 heat in 2.5 and 3.0 times ($P<0.05$-0.01).

In such a way, intramuscular injection of cows with biopreparations prevented gynecological diseases and increased reproductive function, with a more pronounced effect of Prevention-N-A.

It was established that the body temperature, pulse rate and respiratory movements in cows of the experimental groups were within physiological norms. Increase in the number of erythrocytes and hemoglobin concentration in the blood of animals of the experimental groups against the background of

intramuscular injection of PS-2 and Prevention-N-A preparations on the 3-5 day after calving by 0.56 and 0.62x1012/l and by 4.4 and 6.4 g/l (P<0.05-0.01) indicates the improvement in hemopoiesis in them, and an increase in the number of leukocytes by 0.26 and 0.42x109/l (P>0.05), respectively, on the activation of cellular protective factors organism. In this case, the CI and CHC in cows of the experimental groups did not change significantly.

A decrease in the number of eosinophils in the blood of cows 10-5 days before calving and 3-5 days after calving indicates that they experienced stress, and an increase in these granulocytes in the blood of animals under the influence of PS-2 and Prevention-N-A biopreparations 10-5 days before calving by 0.8 and 0.6% and 3-5 days after calving by 0.6 and 0.8% is caused by the activation of nonspecific resistance of the organism.

If the number of stab neutrophil forms in the blood of cows of the 1st and 2nd test groups was lower than in the control, for 35-30 days before calving - by 1.2 and 1.6%, 15-10 days - by 2.2 and 2.4%, 10-5 days before calving - by 1.4 and 1.6% and on the 3-5th day after calving - by 1.8 (P<0.05) and 1.8% (P<0.05), then segmented neutrophils turned out, on the contrary, to be higher for 30-25 days before calving by 0.6 and 1.0%, for 15-10 days - by 0.6 and 0.4%, for 10-5 days before calving - by 0.4 and 0.2%, but 3-5 days after calving was lower by 0.2 and 0.6% (P>0.05), respectively. Considering that neutrophils have a pronounced phagocytosis, the established qualitative changes in the stages of development of these granulocytes and the shift of the neutrophilic nucleus to the right indicate activation of the nonspecific resistance of the organism. Biopreparations stimulate the production of lymphocytes by hematopoietic organs, i.e. cellular factors of nonspecific resistance. The amount of this type of agranulocytes in the blood of the animals of the experimental groups was higher by 0.2-1.0 and 0.6-1.4% (P<0.05) than in the control.

It was established that PS-2 and Prevention-N-A increase protein metabolism, production of albumins (plastic material) and γ-globulins (humoral factor of nonspecific resistance). These biochemical parameters in animals of the 1st and 2nd experimental groups on 3-5th day after calving were higher than the control values by 3.2 and 2.8 g/l, 1.4 and 1.3 g/l, 2.7 and 2.1 g/l, respectively (P<0.05-0.01). The decrease in the γ-globulin fraction of protein in the blood serum of the experimental cows after calving may be assumed to be due to the production of colostrum lactoglobulins, which is aimed at the formation of colostral immunity in newborn calves. A significant increase in γ-globulins in the blood serum of cows in experimental groups during nonmilking and milking periods testifies to the activation of the humoral link of the nonspecific resistance of the organism under the influence of biological preparations.

Table 3 - Indicators of gynecological condition of cows

Indicator	Groups of animals		
	Control	1st experimental	2nd experimental
Number of animals	10	10	10
Terms of expulsion of afterbirth, h	13.2±1.02	7.2±0.58*	6.8±0.66*
Retention of placenta	4	-	-
Subinvolution of uterus	3	1	-
Endometritis	2	1	-
Mastitis	2	-	-
Beginning of the 1st estrus, days	43.2±1.36	31.6±0.93*	29.0±0.71*
Conception rate	2.6±0.43	1.6±0.24*	1.4±0.19**
Сервис-период, сут	87.0±3.05	64.6±1.94**	58.6±1.50**
Fertilized cows:			
during the 1st estrus	2	5	6
during the 2nd estrus	3	4	4
during the 3rd estrus	5	1	-

* P≤0.05; ** P≤0.01.

Intramuscular injection of PS-2 and Prevention-N-A to down-calving cows increased the alkaline blood reserve by 3.8 and 5.2 vol% of CO2 (P<0.05-0.01) due to activation of buffer systems, glucose level

by 0.36 and 0.30 mmol/l (P<0.05-0.01), total calcium by 0.18 and 0.20 mmol/l (P<0.05) and inorganic phosphorus by 0.27 and 0.19 mmol/l (P<0.05), respectively. It should be noted that PS-2 had a more pronounced stimulating effect on protein and carbohydrate metabolism, and Prevention-N-A normalized the acid-base state of the organism and mineral metabolism. It was revealed that the preparations did not affect the metabolism of provitamin A.

The dynamics of the main hematological indices of the nonspecific resistance of the cow's organism is graphically shown in Fig. 1-4.

It was found that the phagocytic activity of blood leukocytes in cows of the control group varied during the final period of pregnancy from 48.0 ± 2.35% to 49.2 ± 1.50%. In the first and second experimental groups, it consistently increased from 48.2 ± 2.31 to 52.8 ± 1.93% and from 51.2 ± 0.86 to 53.2 ± 1.46%. After calving, the activity of phagocytes decreased in the control group to 44.6 ± 1.69%, in the 1st and 2nd experimental groups - up to 50.8 ± 2.22% and 51.6 ± 1.69%, respectively. The level of the investigated indicator of nonspecific resistance was higher in cows of the 1st and 2nd experimental groups by 6.2 and 7.0% compared to the control (P<0.05), respectively.

If the phagocytic index of the blood of the control group cows was reduced before calving from 8.8 ± 0.37 to 7.8 ± 0.37, in the 1st experimental group, on the contrary, it increased steadily from 9.0 ± 0.32 to 10, 0 ± 0.32. In animals of the 2nd group, the specified index of the cellular link of the nonspecific resistance of the organism also increased from 9.2 ± 0.37 to 10.2 ± 0.49 when observed in the period from 35-30 to 15-10 days before calving; however, for 10-5 days before calving, its reduction was established to 9.8 ± 0.80. It should be noted that the phagocytic index was higher in cows of the 1st and 2nd experimental groups by 1.4 (i.e., 16.6%) and 1.5 (or 21.4%) for 15-10 days before calving and by 2.2 (ie by 28.2%) and 2.0 (or by 25.6%) for 10-5 days before calving, respectively, compared with the control (P<0.05-0.01). After calving, the phagocytic index was higher in animals of the experimental groups than in the control group by 1.8 (ie, by 23.7%) and 2.0 (or by 26.3%), respectively (P<0.05).

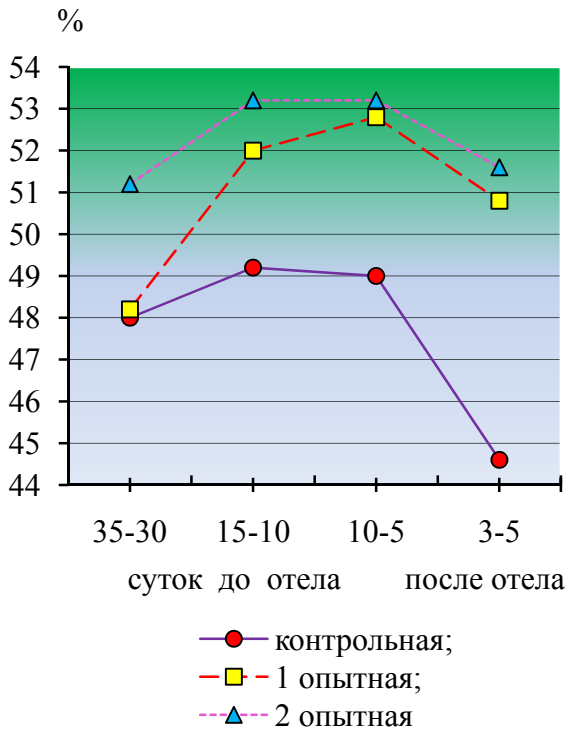

Figure 1 - Dynamics of phagocytic activity

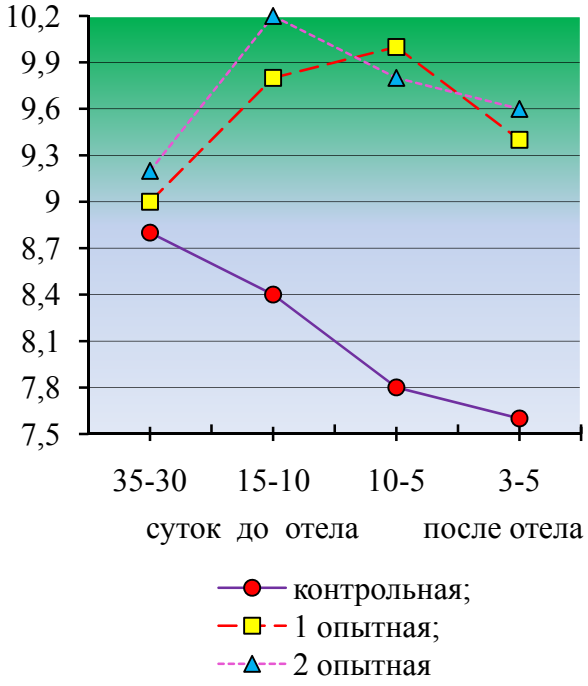

Figure 2 - Dynamics of the phagocytic index

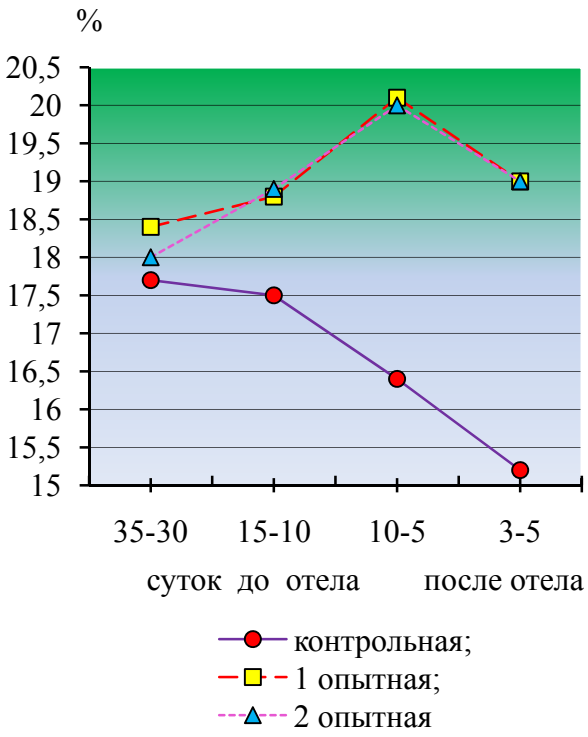

Figure 3 - Dynamics of lysozyme activity

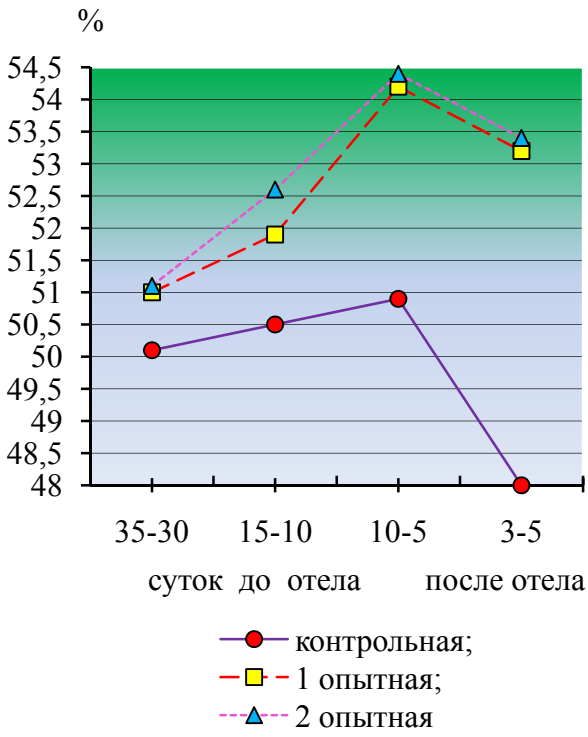

Figure 4 - Dynamics of bactericidal activity

The activity of lysozyme in the blood plasma of down-calving cows of the control group decreased, while in animals of the 1st and 2nd experimental groups it increased, and 10.4 days before calving it was 16.4 ± 0.27%, 20.1 ± 0.24 and 20.0 ± 0.54%, respectively. The indicated activity in animals of the experimental groups was significantly higher by 3.7 and 3.6% compared to the control (P<0.001). After calving, the lysozyme activity of the blood plasma decreased both in the control and in the 1st and 2nd experimental groups of animals and amounted to 15.2 ± 0.37%, 19.0 ± 0.21 and 19.0 ± 0.66%, respectively, that is, it was higher in both experimental groups by 3.8% (P<0.001).

The bactericidal activity of the blood serum of down-calving cows was increased both in the control and in the accepted variants of the experiments, and for the 10-5 days before calving it was 50.9 ± 0.90%, 54.2 ± 1.30 and 54.4 ± 1.11% respectively. It was higher in animals of the 1st and 2nd experimental groups by 3.3 (P>0.05) and 3.5% (P<0.05). After calving, bactericidal activity of blood serum of animals decreased and on the 3-5th day it was: 48.0 ± 0.85% in the control, 53.2 ± 1.07% in the first group, and in the 2nd experimental group - 53.4 ± 1.43%. That is, in cows of experimental groups it was significantly higher by 5.2 and 5.4% (P<0.05).

Based on the conducted studies, it can be generalized that intramuscular injection of PS-2 to cows, tested even earlier, and Prevention-N-A, developed and approved for the first time, in a dose of 10 ml for 45-40, 25-20 and 15-10 days before calving contributed to an increase in the nonspecific resistance of the body.

As a result of intramuscular administration of calves, PS-2 and Prevention-N-A have been found to increase their growth and development.

By the end of the growing period, the animals of the 1st and 2nd experimental groups exceeded the control peers in live weight by 4.6 and 7.0 kg, in growing - by 13.8 and 17.0 kg and in fattening - by 19.4 and 24.2 kg respectively (P<0.05-0.01). The average daily growth in animals of the experimental groups was higher than in the control group, during the growing period by 22.3 and 34.5 g, in the complete growing period - by 52.0 and 55.0 g and fattening by 31.0 and 40.0 g respectively (P<0.05-0.001). It should be noted that the most pronounced growth-stimulating effect was provided by the Prevention-N-A developed and tested by us, rather than the previously tested PS-2.

Exterior measurements of young stock in dynamics are presented in Table. 4.

Table 4 - Dynamics of exterior measurements of young stock

Group of animals	Age, days	Measurements, cm			
		oblique body length	height at withers	chest girth behind the shoulder blades	girth of pastern
Control	1	69±0.93	68±0.71	72±0.73	10.0±0.09
	30	80±0.92	77±0.93	85±0.86	10.3±0.08
	60	92±0.92	85±1.12	91±0.40	12.4±0.10
	90	102±1.03	86±1.07	100±0.24	13.0±0.10
	120	111±0.37	88±0.86	106±0.24	13.5±0.07
	150	115±0.51	92±0.86	111±0.45	14.1±0.09
	180	122±0.68	97±1.08	117±0.51	14.9±0.04
	360	146±0.84	113±0.93	147±0.60	15.2±0.07
	540	168±1,.16	125±0.86	170±0.80	15.9±0.07
1st experimental	1	71±0.89	69±0.66	73±0.58	10.1±0.13
	30	82±0.68	80±0.86	87±0.93	10.6±0.10
	60	94±0.75	86±0.93	92±0.55	12.6±0.10
	90	103±0.81	87±0.97	101±0.60	13.2±0.10
	120	111±0.63	90±0.68	106±0.58	13.6±0.10
	150	117±0.93	94±0.68	112±0.51	14.1±0.07
	180	123±0.51	99±0.58	118±0.51	15.1±0.09
	360	147±1.16	116±1.30	150±0.51**	15.4±0.08
	540	172±0.66*	128±1.14	172±0.20*	16.0±0.05
2nd experimental	1	71±0.97	69±0.71	73±0.68	10.1±0.14
	30	83±1.03	80±0.71	87±0.98	10.6±0.11
	60	95±0.66*	87±1.02	92±0.49	12.7±0.13
	90	105±0.51*	88±0.86	101±0.49	13.2±0.11
	120	112±1.21	90±0.66	107±0.55*	13.7±0.06
	150	117±1.41	94±0.71	113±0.75	14.3±0.08
	180	123±0.97	99±0.87	120±1.03	15.2±0.09*
	360	150±0.75*	117±0.86**	151±0.75**	15.4±0.07
	540	172±1.29	130±0.71*	173±0.51*	16.1±0.14

* P≤0.05; ** P≤0.01.

The characteristics of the exterior and constitutional features of experimental animals allow us to conclude that under the influence of biological preparations zootechnical measurements were increased. An analogous regularity is revealed in the character of changes in the growth rate of animals of the compared groups.

In calves of the experimental groups, the respiratory and digestive diseases were reduced in 2.3 and 7.0 times, recovery time - on 1.3 and 4.3 days, and the Mellenberg coefficient by 2.8 and 15.4 times, respectively, compared with the control (P<0.05), that indicates a pronounced prophylactic effectiveness of the tested drugs for these diseases.

It was established that the increase in the body weight of animals of the 1st and 2nd experimental groups at the age from 1 to 540 days was higher by an average of 18.8 and 23.4 kg, while the feed costs per 1 kg of the increase in live weight, conversely, were lower by 0.36 and 0.45 EFU, respectively, than in the control.

Slaughter qualities of young animals are presented in Table. 5.

Against the background of the use of biopreparations, the pre-slaughter weight of young animals increased by 20.3 and 24.4 kg, the weight of the hot carcass increased by 12.9 and 16.8 kg, the slaughter weight by 13.8 and 17.5 kg, and the weight of internal fat by 0.9 and 0.7 kg. Thus, improved fattening and slaughter qualities of young animals (P <0.05-0.001) were established under the influence of biological preparations.

Indicators of meatiness of half-carcasses of young animals are presented in Table. 6.

The mass of the half-carcasses of the young stock of the 1st and 2nd experimental groups was higher in comparison with the control by 6.8 and 9.2 kg, the pulp weight - by 5.33 and 7.25 kg and bones - by 1.0

and 1.38 kg respectively (P<0.01-0.001). However, the yield of bones from the half-carcasses of young animals of the tested groups was lower by 0.4 and 0.5%, respectively. The results of these studies indicate that as the weight of the half-carcasses of the experimental animals increased, the specific weight of the pulp increased, and, on the contrary, of the bones decreased.

Table 5 - Slaughter qualities of young stock

Indicator	Group of animals		
	control	1st experimental	2nd experimental
Live weight at removing from fattening, kg	426.6±2.50	446.0±3.17**	450.8±2.28***
Preslaughter live weight, kg	416.8±2.17	437.1±2.61***	441.2±2.05***
Weight of carcass, kg	211.3±1.95	224.2±2.11**	228.1±1.83***
Yield of carcass, %	50.7	51.3	51.7
Weight of internal fat, kg	7.4±0.25	8.3±0.19*	8.1±0.15*
Output of internal fat,%	3.50	3.70	3.55
Skin weight, kg	29.4±0.31	30.1±0.27	30.2±0.25
Skin output,%	7.05	6.90	6.85
Slaughter weight, kg	218.7±2.21	232.5±2.47**	236.2±2.17***
Slaughter yield, %	52.5	53.2	53.5

* P≤0.05, ** P≤0.01, *** P≤0.001.

Table 6 - Meatiness of half-carcasses of young stock

Indicator	Group of animals		
	control	1st experimental	2nd experimental
Weight of half-carcasses, kg	103.6±1.27	110.4±1.05**	112.8±1.07***
Pulp, kg	77.80±0.95	83.13±0.76**	85.05±0.89***
Pulp yield, %	75.09	75.29	75.39
Bones, kg	21.85±0.63	22.85±0.21*	23.23±0.27**
Bone output, %	21.09	20.69	20.59

* P≤0,05, ** P≤0,01, *** P≤0,001.

According to organoleptic, biochemical and spectrometric indicators, beef met the requirements of the Technical Regulations of the Customs Union "On food safety" TR CU 021/2011 and the Technical Regulations of the Customs Union "On the safety of meat and meat products" TR CU 034/2013, which indicates the good quality of meat carcass [27].

It was established that the body temperature, pulse rate and respiratory movements in calves during the growing period and in young stock in the process of complete growth and fattening were within physiological norms.

Biopreparations activated erythropoiesis and increased the concentration of hemoglobin in the blood (P<0.05-0.01), but did not affect CI, CHC, and leukopoiesis. Hemopoiesis was more pronounced under the influence of Prevention-N-A.

The revealed fact of relative eosinophilia in the blood of animals of experimental groups allows us to conclude that the tested preparations caused an anti-stress effect on the body, especially during the calving period, with a higher Prevention-N-A effect.

In the blood of the experimental newborn calves, the stab neutrophil forms predominated, and in the subsequent periods of research - segmented ones. And the number of segmented neutrophils was higher in the blood of animals in the experimental groups than in the control (P>0.05). The established qualitative changes in the stages of development of neutrophils indicate a shift of the neutrophilic nucleus to the right, i.e. the activation of cellular factors of nonspecific protection of the animal organism under the influence of preparations.

Against the background of intramuscular injection of calves, biopreparations have been shown to increase the production of the main cellular elements of the immune system, lymphocytes, by the bone

marrow, which testifies to stimulation of cellular (contact interaction with the cells-victims) and humoral (development of antibodies) immunity.

The content of total protein, albumins and γ-globulins in the blood serum of the first and second experimental groups was significantly higher than in the control, for example, by the end of the growing period - by 3.8 and 5.0 g/l, 3.3 and 4.5 g/l, 3.5 and 3.7 g/l, respectively (P<0.05-0.01). These changes in the blood serum of animals were caused by the activation of the mechanism of nonspecific resistance of the organism under the influence of biological preparations.

After intramuscular administration of PS-2 and Prevention-N-A in calves, buffer systems, exchange of glucose, total calcium, inorganic phosphorus and provitamin A were activated in the organism.

The state of humoral resistance of the young organism most fully characterizes the lysozyme activity of the plasma and the bactericidal activity of blood serum (Figures 5, 6).

The lysozyme activity of the blood plasma of animals in the control, 1st and 2nd experimental groups increased in the experimental period from 6.1 ± 0.36 to 24.2 ± 0.41%, from 6.4 ± 0.40 to 25.4 ± 0.45 and from 7.0 ± 0.44 to 26.0 ± 0.23%, respectively. This activity of the humoral link of nonspecific protection of the organism of animals in the 1st and 2nd experimental groups was higher than in the control: during the growing period, by 1.5-3.1 and 2.0-4.1% (P<0, 05-0,001), in the complete growing period by 1.8 (P<0.05) and 2.8% (P<0.001), fattening by 1.2 (P>0.05) and 1.8% (P<0.001).

The bactericidal activity of the blood serum of the control and experimental animals on the 1st day after the setting the experiments did not differ significantly and amounted to 32.0 ± 1.10%, 32.1 ± 1.24 and 32.8 ± 1.02%, respectively. Subsequently, the values of this indicator consistently increased and by the end of the observation period were 58.0 ± 0.40%, 59.0 ± 0.48 and 60.1 ± 0.23%, i.e. increased by 1.81, 1.84 and 1.83 times. It should be noted that the bactericidal activity of the blood serum of animals of the 1st group was significantly higher than in the control: at the age of 15 days by 4.6%, 30 days - by 2.8%, 60 days - by 5.0%, 90 days - by 3.7%, 120 days - by 3.3% and 180 days - by 3.4% (P<0.05-0.01). At the same time, the difference between the data of animals of the 2nd experimental and control groups turned out to be reliable in 15, 30, 60, 90, 120, 180 and 540 days after intramuscular injection of the Prevention-N-A biopreparation. The corresponding values for the young stock in the 2nd group were 5.4%, 4.8, 6.8, 6.0, 5.1, 5.6, 2.8, and 2.1%, respectively (P<0.01-0.001).

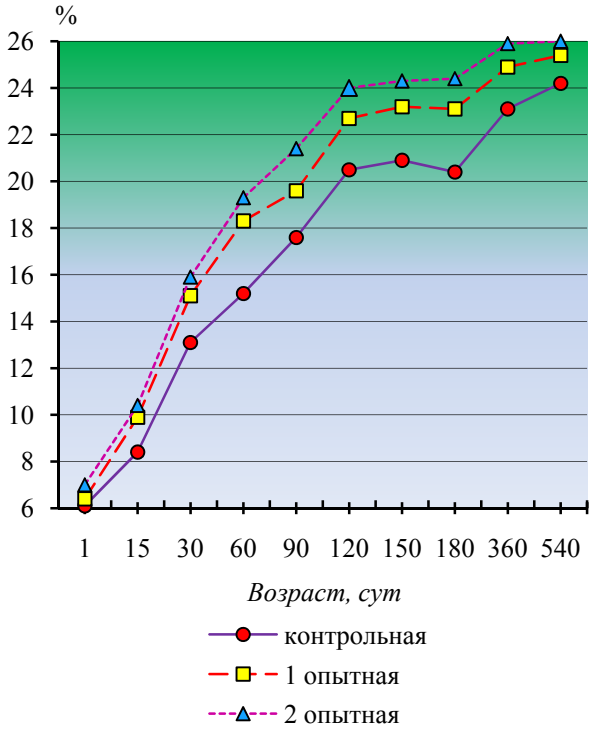

Figure 5 - Dynamics of lysozyme activity

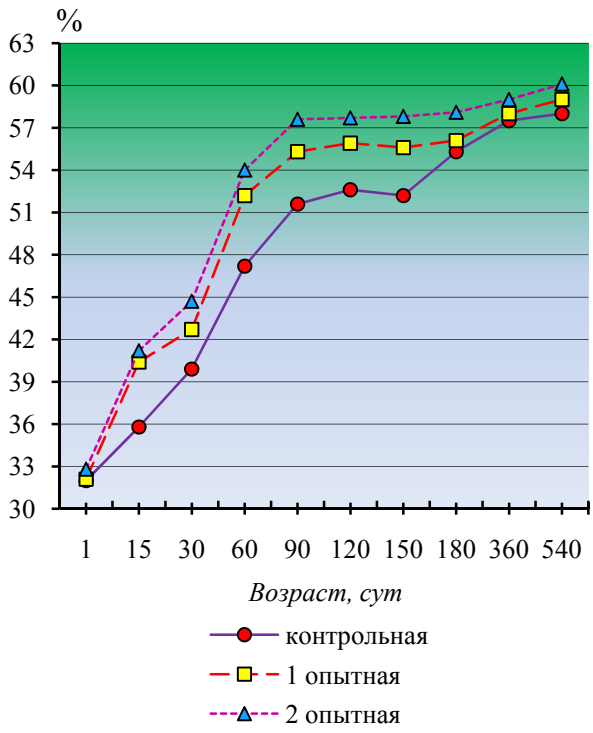

Figure 6 - Dynamics of bactericidal activity

In addition, the drugs used in the experiments stimulated the production of immunoglobulins.

It was established that the phagocytic activity of leucocytes was higher in young animals grown with the use of PS-2 and Prevention-N-A than in the control by the end of the growing period by 4.0% and by 4.6%, of the complete growing period - by 4.0 and 6.4%, fattening - by 2.8 and 3.4% (P<0.05-0.01). A similar pattern was also observed in the dynamics of the phagocytic index.

Consequently, biopreparations activate both humoral and cellular links of unspecific resistance of the organism.

The economic effectiveness of the use of PS-2 and Prevention-N-A in the technology of obtaining and growing calves in order to improve the reproductive qualities of black-and-white cattle and fattening qualities of young animals was 1 rub. additional costs of 6.0 and 7.48 rubles respectively.

Conclusion. Thus, PS-2 and Prevention-N-A biopreparations, activating the nonspecific resistance of the organism of cows-mothers and newborn calves to the effect of environmental and technological factors of the habitat, prevent postpartum complications and gynecological diseases of cows and improve their reproductive qualities, and in calves contribute to prevention of respiratory and digestive diseases, intensify growth and development, improve fattening and slaughter quality of young animals.

Proposals to production. In order to improve the reproductive qualities of black-and-white cattle and realize the productive potential of calves in remote periods of growing and fattening, we recommend:

1) to inject intramuscularly the Prevention-N-A biopreparation in sterile nonmilking cows three times for 45-40, 25-20 and 15-10 days before calving in a dose of 10 ml;

2) to inject intramuscularly the Prevention-N-A biopreparation in calves twice on 2...3 and 7...9th day of life in a dose of 3 ml.

It should be noted that PS-2 and Prevention-N-A improve the reproductive qualities of cows, fattening and slaughter qualities of young stock by activating the nonspecific resistance of the organism, preventing the incidence of cows and calves, with a more pronounced corresponding effect of Prevention-N-A.

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ӨНІМДІЛІК САПАСЫ ЖӘНЕ ҰДАЙЫ ӨСІРУДІ ЖҮЗЕГЕ АСЫРҒАНДА АНАЛЫҚ СИЫР МЕН БҰЗАУ ОРГАНИЗІМІНДЕ ӨЗГЕШЕ ҚОРҒАНЫС

Аннотация. Мүйізді ірі қара (қара – ала сиыр) малдың репродуктивтік қасиеттерін жақсарту және биологиялық препараттармен организмге тән емес қарсылықты белсендіру арқылы бұзауды бордақылау қазіргі заманғы зоотехникалық ғылым мен практиканың өзекті мәселесі болып табылады. Бұрын бекітілген PS -2 препаратымен салыстырғанда, Saccharomyces cerevisiae ашытқы жасушалары және Prevention-N-A бактерицидтік полисахаридтер

кешенінің негізінде дайындалған препараттарды қолданудың тиімділігі ғылыми негізделіп, алғашқы рет тәжірибие негізінде дәлелденді. Жаңа биопрепараттармен (Prevention-N-A) көп төлдеген сиырлардың және туылған төлдердің ағзасын иммунокоррекциялау эколого – технологиялық стресс- факторлар жағдайында сиырларда төлдеу және төлдеуден кейінгі уақыттарда гинекологиялық сырқаттарды алдын алуға, ал бұзауларда тыныс алу және асқорту ағзаларының сырқаттарын болдырмауға, өсіп – жетілуді ынталандырады, өсіру және бордақылау кезінде өнімділік потенциалының толық ашылуына мүмкіндік береді. Сыналып отырған препараттардың қауіпсіздігі еттің органолептикалық, биохимиялық және спектрометриялық көрсеткіштерінің оң нәтижелері бойынша дәлелденді

Түйін сөздер. Сиырлар, бұзау, биопрепараттар, тән емес қарсылық, гинекологиялық күй, репродуктивтік және өнімділік қасиеттері.

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НЕСПЕЦИФИЧЕСКАЯ ЗАЩИТА ОРГАНИЗМА КОРОВ - МАТЕРЕЙ И ТЕЛЯТ В РЕАЛИЗАЦИИ ВОСПРОИЗВОДИТЕЛЬНЫХ И ПРОДУКТИВНЫХ КАЧЕСТВ

Аннотация. Улучшение воспроизводительных качеств черно-пестрого скота и реализация продуктивного потенциала телят в отдаленные периоды доращивания и откорма активизацией неспецифической резистентности организма биопрепаратами является актуальной проблемой современной зоотехнической науки и практики. Впервые на основе комплексных исследований научно обоснована и экспериментально доказана целесообразность применения разработанного биопрепарата Prevention-N-A на основе полисахаридного комплекса дрожжевых клеток Saccharomyces cerevisiae и бактерицидного препарата группы аминогликозидов в технологии получения и выращивания телят в сопоставлении с ранее апробированным препаратом PS-2. Установлено, что иммунокоррекция организма глубокостельных коров и новорожденных телят в условиях прессинга эколого-технологических стресс-факторов биопрепаратами нового поколения предупреждает у коров гинекологические заболевания в родовой и послеродовой периоды, улучшая воспроизводительные качества, а у телят – способствует профилактике заболеваний органов дыхания и пищеварения, активизирует рост и развитие, обеспечивая более полную реализацию продуктивного потенциала молодняка в периоды доращивания и откорма, при более выраженном эффекте Prevention-N-A. Доказана доброкачественность мясных туш по органолептическим, биохимическим и спектрометрическим показателям и, следовательно, безопасность испытуемых препаратов.

Ключевые слова. Коровы, телята, биопрепараты, неспецифическая резистентность, гинекологическое состояние, воспроизводительные и продуктивные качества.

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DEFLATION PROCESSES AS DUST STORMS IN THE SANDY DESERTS OF THE SOUTHERN BALKASH REGION

Abstract. Study of deflationprocesses as dust storms are important in arid environments such as deserts. The deserts of Kazakhstan mostly cover lowlands and extend from the eastern coast of the Caspian Sea to the piedmonts of the Tien-Shan Mountain. Deserts are one of the major sources of dust storm activities. On the basis of generalization and analyses of the numerous cartographic materials, meteorological observations data were identified seats of the powerful sources of dust storms within Kazakhstan, including the Southern Balkash sandy deserts. The Taukum, Moiynkum deserts, Ile river deltas and valleys, and southern coast of Lake Balkhash are most prone to dust storms. The most frequent storms were observed in the Ile river valley (Bakanas meteorological station).In general, duststorm outbreaks are common in the spring, summer and autumn seasons: April through August andApril through September and October.

Dust storms have a great negative impact on soil conditions and they are particularly dangerous for theenvironment.Thus, our study deflation processes as dust storms in the southern Balkhash sandy deserts has great importance towards aiding in the prediction andmonitoring of dust and sand storms and movement patterns.

Keywords: Deflation processes, dust storms, deserts, desertification, Kazakhstan.

Introduction. Destruction of soil surfaces as a result of wind impact is mostcommonly referred to as deflation process. This process includesremoval, transportation, and re-deposition of the soil mass.

The deflation processes are very common in Kazakhstan and it has differing soil and climatic conditions, topography,and geology[1-4].Deflation processes in deserts and dust deposits occur dueto physical–geographical and climatic conditions of the region[2, 5]. Theprocess is especially intensive in areas of Aral, Caspian Seas; man-madeAralkum and southern Balkhash deserts as well as Karakum and Kyzylkum deserts in Central Asia are the mainsource areas of deflation process as dust storms, whichaffect the entire region [6-7]. Central Asian and Kazakhstan deserts are characterized by strong winds, scarcity of vegetation cover, continental and Mediterranean climate with long dry summers, lack of soil moisture, relatively low air moisture, and frequent repletion of soil and atmospheric droughts [8]. Deserts are dry fragile areas with little or no vegetation. Therefore, winds can remove sand-, silt-, and clay-sized particles from the surface and transport them during dust and sand storms over great distances [9]. The main persistent sources of dust storms of Central Asia and Kazakhstan are located in the large "dust belt" that extends from west to east over the southern deserts, north of Caspian Sea deserts, Aral Sea region (Kyzylkum, Aralkum deserts), and Southern Balkash deserts. The highfrequency of dust storms occurs mainly in the sandy deserts, and other types of deserts where sensitive ecosystems have suffered substantially from human impact [8, 10-11].

The vastexpanse of deserts across Central Asia experience duststorms of different frequencies, intensities, and durations. Dueto the great variety and abundance of loose material availablefor transportation, the frequency of dust events in Kazakhstan variesover a wide range of 5–146 days of dust

storms per year[7, 12-13]. Almost all major sources of dust storms are located over topographical lows or on landsadjacent to strong topographical highs, where the fluvial action isevident by the presence of ephemeral rivers and streams, alluvial fans, playas, and saline lakes [14]. The long-term and seasonal variability of dust storms is affected by various parameters including climate, geomorphology, and human activities [15-17].

Dust and Sand storms are both a symptom and cause ofdesertification. Desertification due to wind erosion (deflation process) hastouched the semi-desert and desert landscapes of Central Asiaand Kazakhstan [18-19]. Theproblem of desertification in Central Asia is more serious;75 % of the territory in Kazakhstan, 60 % of Uzbekistan, and66 % of the territory in Turkmenistan are prone to anthropogenicdesertification[20]. Processes of land/soil degradation and desertification are especially intensive in areas of Aral, Caspian seas, and southern Balkhash deserts [21]. Unsustainable land practices and irrational use of natural (water and land) resources and environment pollution lead to land degradation and desertification in almost every Kazakhstan region, including Southern Balkash region. Water resources of the rivers flow to Balkashlake are mainly used for irrigation, and also for water supply and electric energy production. Reduction and regulation of Ili and Karatal rivers flow led to the drying of many lakes, including salty lakes in deltas of these rivers [4, 22-23]. As a consequence, the new sources of soil deflation and sources of dust storms have appeared in the Southern Balkhash deserts that lead to high concentration of salts and sands in the atmospheric flows. These salts and dustsprovoke deterioration of pastures, reduction of biodiversity, salinization, and desertification of soils.

From this review, it is clear investigations of soil deflation as dust storms and desertification process are importantand required.

Study area. The research was conducted in the southern Balkashsandy deserts. Specific features of general lithological–edaphic conditions in the formation of Central Asian and Kazakhstan deserts are classified into six groups as follows: sandysandy-gravel and gravel, crushed stone-gypsum, loess, clay, and solonchak [19]. The southern Balkash deserts belong to sandy deserts. The sandy deserts are located in southeast Kazakhstan, within vast (by size of about 70,000 km^2) shallow southern Balkhash Depression. This depression is bordered by Shu-Ili Mountains in the west, by Balkhash Lake in the north, and by Arganty, Arharly, Saikan mountains, and northeastern spurs of Zhetysu (Dzhungar) Alatau in the east [22, 24]. Taukum and Moiynkum deserts are stretched along the left bank of Ili river; Saryesikatyrau, Bestas, Irizhar, and Zhamankum deserts are located between Ili and Karatal rivers. Zhalkum sands are located between Karatal and Aksu rivers (Fig. 1). Erosion processes are most intensive in piedmont areas composed mainly of poorly cemented sandstones, loess loams, and similar ground subject to easy scouring and weathering. After the demise of the ancient river system, the alluvial plains were gradually subject to deflation and Aeolian dissection. Therefore, in Central Asia, most widespread are sandy deserts that were largely formed in areas of development of ancient or modern alluvial or lacustrine–marine loose deposits [19]. The Balkhash Depression is formed in the Neogene period. The Paleogene rocky deposits are found mainly in the periphery [25]. The climate of the southern Balkashregionis continental, arid, characterized by large daily and annual variations of air temperature, and high levels of solar radiation. Mean air temperature during the coldest month (January) is −16 °C in the northern part and −5 °C in the southern part of the plain territory. Mean air temperature during the hottest month (July) is about 20–25 °C. Distribution of precipitation over the region is very variable: about 150 mm falls on the north, northwest (coast of Balkhash Lake), and 200–300 mm in the southeast. Precipitations during the warm time of the year on the plain are almost completely spent through evaporation. The biggest monthly amount of precipitations falls during spring months (April–May) and the smallest during February and August–September [26].

Materials and methods. Dust storm observations were made at meteorological stations located in particular areas of interest in Kazakhstan.A long-term observation data from meteorological stations (Taldykorgan, Matay, Kapshagai, Bakanas, Kyzylorda, Aral Sea and Zhusaly) and numerous cartographic materials [12, 27] were used in this study for the detection of strong dust storm sources within Kazakhstan and their causes.

For the analyses about dust storms and to show the dynamics of dust storms, the long-term observations data of dust storms in the deserts of the Southern Balkash region from four meteorological stations (Taldykorgan, Matay, Kapshagai, Bakanas) for the period between 1971 and 2010 were used. As

well as the seasonal frequency of dust storms in the desert zone of Kazakhstan have been analyzed according to an average number of days with dust storms in different months for the period of 1966–2003 from seven weather stations (Taldykorgan, Matay, Kapshagai, Bakanas, Kyzylorda, Aral Sea and Zhusaly). These data were provided by the Dust Storm Climatology for Kazakhstan databases. This database comprises the archive data collections contained in the Reference Books of Kazakhstan Climate (2003). This database contains the monthly 39-years average number of days with dust storm for each weather station (30 weather stations) as well as their frequencies.

Arc Map software was used as the main tool to analyze the regional distribution of dust-storm events as well as for sketching the map of dust-storm frequency. Using this map, we may identify the sources of dust, sand, and salt storms, and estimate their area.

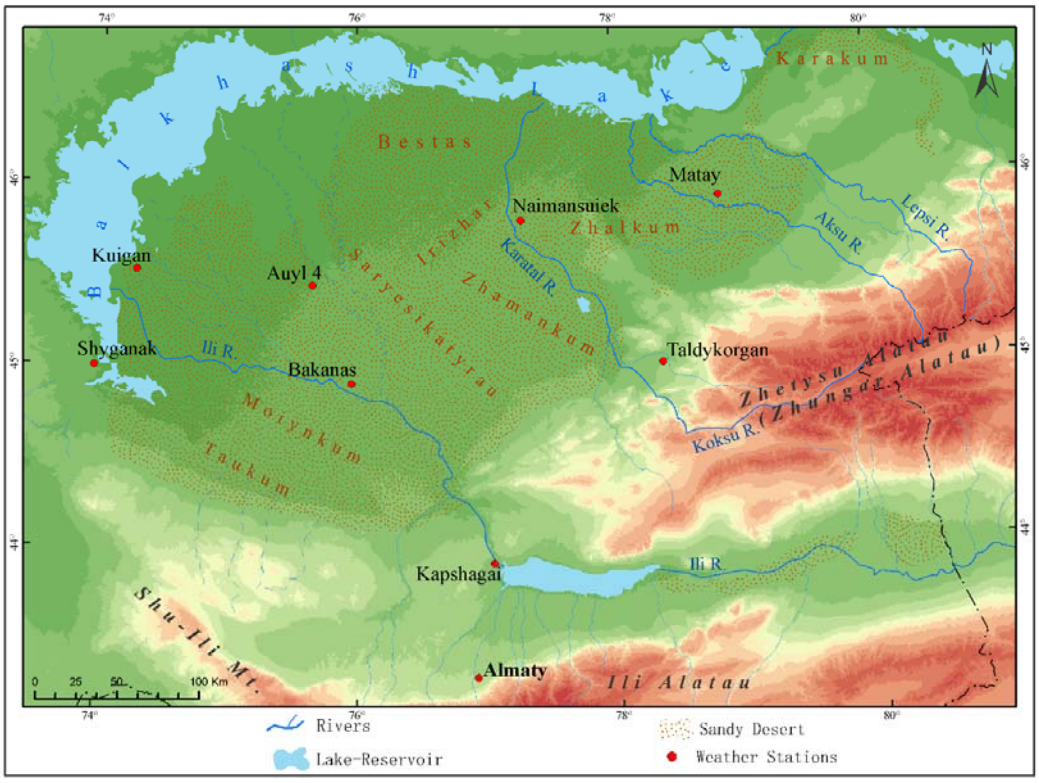

Figure 1– Sandy deserts of the Southern Balkash region

Results and discussion. A dust storm starts within Kazakhstan with a wind speed >6 m/s. The dust storm is considered “strong” when the wind speed reaches 10–14 m/s with visibility between 500 and 1000 m. Usually such wind lasts from 3 to 12 h. “Very strong” dust storms last ≥12 h with wind speeds >15 m/s and decreased visibility ≤50 m [12, 28].

Dust storms appear under the conditions of some critical thresholds of wind speed, topography and soil structure when unrelated particles are <250 μm, high soil dryness, and scarcity of vegetation cover, these thresholds vary from region to region.Large areas of strong and very strong dust storms (lasting >4 days) cover mostly the western Kazakhstan and Atyrau oblasts, part of the Aktobe and Karaganda oblasts, the northern half of the right bank of the Ertis River in thePavlodar oblast, the Ili River valley, Sam sands, Kyzylkum sands in the territory of the Syrdarya River ancient delta, and two sources in the Shu River valley (Fig.2). These areas are used for agricultural or industrial production. In addition, such factors as high wind speed (exceeding 8–10 m/s), light-textured soils (soil particle size <250 μm), dry soils, and sandy deserts with sparse vegetation promote the formation of strong dust storms [29].Due to their variable frequency, dust storms are further divided into four groups covering areas with the following frequencies: category 1 = >4 days (19%), category 2 = 3.1–4 days (5%), category3 = 1–1.3 days over (53%), and category 4 = <1 day (23%).

Meteorological features (temperature and dryness) of the Southern Balkhash deserts and its landscape with sparse vegetation are prone to dust and sand storms because winds blow the soil particles from the ground surface very easily [30]. Dust and sand storms are common events and often happen simultaneously with hot dry winds in the region. The number of days with deflation processes as dust and sand storms in the Southern Balkhash deserts reaches 30–40 days (Taukum Desert) in the Ili River deltas and valley and on the southern coast of Balkhash Lake and decreases to 10–20 days in the Saryesikatyrau Desert and the foothills of Zhetysu (Zhungar) Alatau.The duststorm dynamics in the region are shown on Fig.3. According to long-term meteorological data, we found areas that experience dust storms more frequently. There are large numbers of dust and sand storms in the Bakanasweather station because the takyr-like soils contain many silty–sand sediment and clay particles and development of agricultural activities [22].The takyr-like soils are distributed in most areas of Bakanas and the Akdala ancient dry delta plains along the left bank of Karatal River and the northeast outskirts of Zhusandala. The takyr-like soils have a mostly fine structure [31].

The grain size (>100 μm) of the sands in most areas of this region belongs to the categoryof easily deflated soils [22]. Consequently, in this region the natural landscape has a major role in the origin of dust and sand storms.

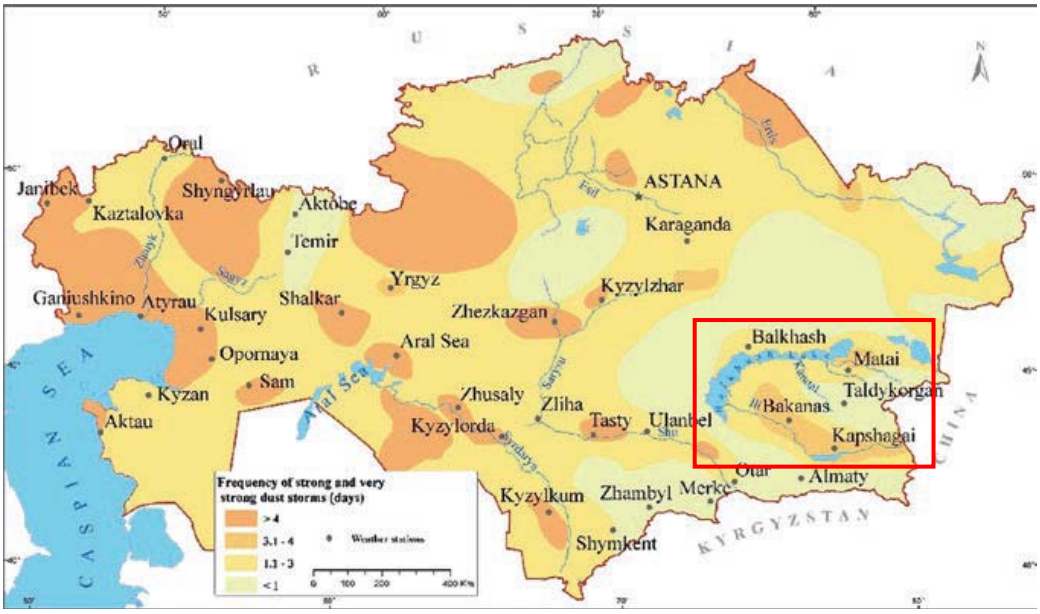

Figure2 –Distribution of strong and very strong dust storms within Kazakhstan

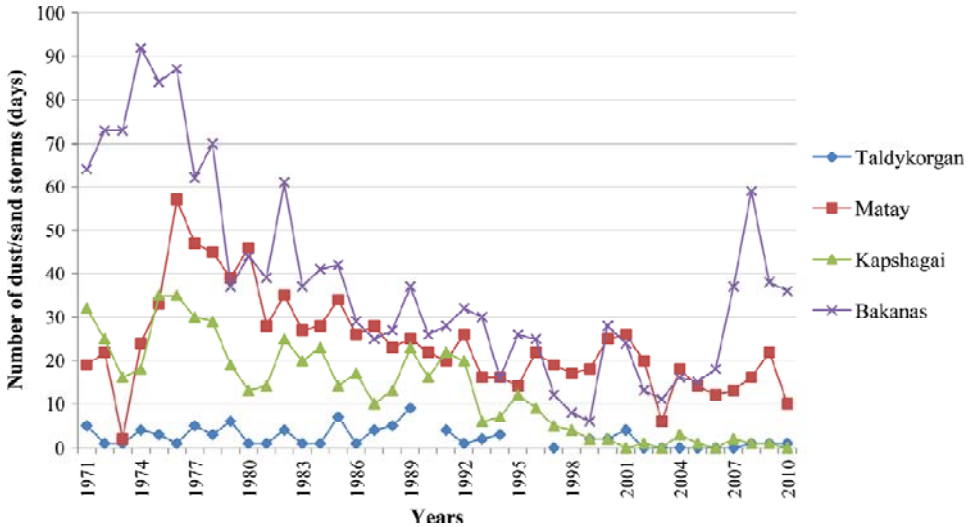

Figure 3 –Long-term dynamics of dust storms in the sandy deserts of the Southern Balkash region for the period 1971–2010

However, the sandy deserts of the southern Balkash region undergo intensive human activity. The Balkash Lake is a narrow and shallow large terminal lake in southeastern Kazakhstan. In the 1970s, the creation of the Kapshagai water reservoir and the intensive use of water from the Ili, Karatal, and Lepsi rivers (for irrigation, electric energy production) led to the decreased in water level in Balkash Lake. Since 1970, it has been rapidly desiccated because of construction of a dam on the Ili River and water diversion for irrigation from the major tributary and most other streams draining into the lake. As a result, a considerable part of the land in the coastal area of the Balkash Lake undergoes soil salinization and degradation processes. In addition, the salinity of the Balkhash lake has rapidly increased. Respectively, reducing and regulating the flow level of the Ili and Karatal rivers led to the drying of many lakes, including salty lakes, in the deltas of these rivers [4, 22-23]. As a consequence, new sources of soil deflation and sources of dust and sand storms have appeared in the southern Balkhash deserts, which haslead to high concentration salt in the atmospheric flows.These salts provoke the deterioration of pastures, reduction of biodiversity, salinization,and desertification of soils.

Seasonal dynamics. Kazakhstan is a large region of variable geographical and climatic features; therefore, dust- and sand-storm activities vary on annual and inter-annual scales. In general, dust- and sand-storm outbreaks are common in the spring and summer seasons. We found two peaks among the average number of days with dust storms in different months for the period 1966–2003: April through June and August through September (Fig. 4). Due to the drastic increase in temperatures and high wind speeds in the spring, desert surfaces suffer from rapid evaporation of precipitation,which together with strong winds favors the development of dust and sand events. The Kyzylkum, Pre-Aral Karakum, and Southern Balkash deserts are the main regions of Kazakhstan where dust and sand storms are common, especially during the periods April through October and April through August, respectively (according to the Aral Sea and Bakanas weather stations) (Figs.3-4). This is due to the dryness of the surface of sandy and clayey deserts during the summer and autumn seasons along with synoptic processes, which bring strong winds and extremely active dust storms.

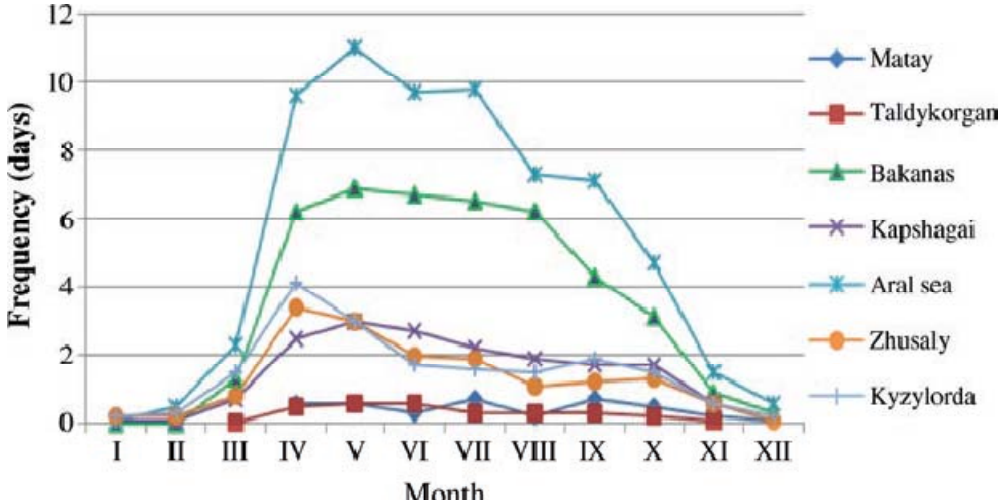

Figure4 – Monthly average frequency of storms for the period 1966–2003
inthe southerndesert zone of Kazakhstan

Almost 80% of the annual duststorm outbreaks in the southern desert zone of Kazakhstan are registered during April through September with highest values in April through July (Fig.4). In addition, the seasonal distribution, amount, and type of atmospheric precipitation significantly influence the seasonality and frequency of dust storms.

Conclusion. The deflation process as dust storms is typical for the sandy deserts in the southern Balkashregion with sparse vegetation cover and availabilityofeasywind-blown sand particles on the surface. According to the variable geographical and climatic features of the Southern Balkash deserts, storm activities vary on annual and inter-annual scales. They are common in the spring, summer and autumn seasons.

The sandy deserts of the region are most affected by the deflation processes as storms. The Taukum, Moiynkum deserts, Ili river deltas and valleys, and southerncoast of the lake are most prone to dust storms. Thisarea is the main source of aerosols, which move with windflow and have a greateffect on the climate and environmentalsituation in the south-eastern Kazakhstan. These aerosols canseriously pollute the air and water and lead to the soil salinizationand vegetation/soil degradation.

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ОҢТҮСТІК БАЛҚАШ ҚҰМДЫ ШӨЛДЕРІНІҢ ШАҢДЫ ДАУЫЛДАРТҮРІНДЕГІ ДЕФЛЯЦИЯЛЫҚ ПРОЦЕССТЕРІ

Аннотация. Шөл сияқты құрғақ орталарда шаңдыдауылдартүріндегі дефляциялық процесстерді зерттеу маңызды. Қазақстанның шөлдері негізінен ойпаң жерлерді қамтып, Каспий теңізінің шығыс жағалауынан бастап,Тянь-Шанның тауалды аймақтарына дейін созылып жатыр. Олар шаңды дауылдардыңнегізгі көздерінің бірі болып табылады. Көптеген картографиялық материалдарды және метеорологиялық бақылаулар мәліметтерін талдау және жалпылау негізінде Қазақстан территориясындағы, соның ішінде Оңтүстік Балқаш құмды шөлдеріндегі белсендішаңды дауылдардыңкөздері анықталды. Тауқұм, Мойынқұмқұмды шөлдері, Іле өзені аңғары мен атырауы және Балқаш көлінің оңтүстік жағалауы шаңды дауылдарға бейім. Ең жиі дауыл Іле өзені аңғарында байқалды (Бақанас метеостанциясы). Шаңды дауылдар негізінен, көктемгі, жазғы және күзгі кезеңдердеболады: сәуірден бастап тамызға дейін және сәуірден бастап қыркүйек, қазанға дейін.

Шаңды дауылдар топырақ жағдайларына теріс әсер етеді және олар қоршаған орта үшін өте қауіпті. Сонымен, шаңдыдауылдар түріндегі дефляциялық процесстердізерттеу-шаңдыдауылдарды және олардың қозғалыс заңдылықтарын болжау мен бақылау кезінде үлкен маңызға ие.

Түйін сөздер: дефляциялық процесстер, шаңды дауылдар, шөлдер, Қазақстан.

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ДЕФЛЯЦИОННЫЕ ПРОЦЕССЫ В ВИДЕ ПЫЛЬНЫХ БУРЬ В ПЕСЧАНЫХ ПУСТЫНЯХ ЮЖНОГО ПРИБАЛКАШЬЯ

Аннотация. Изучение дефляционных процессовв виде пыльных бурьимеет важность в аридных средах, таких как пустыни. Пустыни Казахстана в основном покрывают низменности и простираются от восточного побережья Каспийского моря до предгорий Тянь-Шаня. Они являются одним из основных источников пыльных бурь. На основе обобщения и анализа многочисленных картографических материалов и данных метеорологических наблюдений были определены источники активных пыльных бурь в Казахстане, в том числе в песчаных пустынях Южного Прибалкашья. Песчаные пустыни Таукум, Мойынкум, дельты и долины реки Иле и южное побережье озера Балкаш наиболее подвержены пыльным бурям. Наиболее частые бури наблюдались в долине реки Иле (метеостанция Баканас). Бури в основном возникают в весенний, летний и осенний периоды: с апреля по август и с апреля по сентябрь и октябрь.

Пыльные бури оказывают большое негативное воздействие на почвенные условия, и они особенно опасны для окружающей среды. Таким образом, наше исследование дефляционных процессовв виде пыльных имеет большое значение в прогнозировании и мониторинге пыльных и песчаных бурь и закономерности их движения.

Ключевые слова:дефляционные процессы, пыльные бури, пустыни, Казахстан.

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RESEARCH ON THE WHEAT MARKET POTENTIAL IN THE REPUBLIC OF KAZAKHSTAN

Abstract. The article defines potentials of wheat for the Republic of Kazakhstan. Moreover, recommendations for developing the wheat market in Kazakhstan are offered in this work. The research purpose is to define theoretical bases and practical recommendations that may help to use economic mechanisms for developing the agrarian sector of the Republic of Kazakhstan. The research methodology is based on statistic, analytic, comparative and econometric methods. The research practical significance is to define the current state of the wheat market in the Republic of Kazakhstan. The research results show that Akmola and Zhambyl provinces hold strong positions in the internal market of wheat.

Keywords: wheat, winter wheat, spring wheat, harvested area, yielding capacity, Kazakhstan.

The global population is expected to grow by 8.6 billion by the middle of 2030-s [1]. Moreover, the number of people living in Kazakhstan is also expected to grow: by 2035 it may be more than 20 million residents [2]. Therefore, in both internal and external market it is expected to observe a rise in the demand for food commodities [3].

Growing wheat has high economic potentials as it may have many different options of usage [4]. For instance, wheat may be used as the raw material for producing different goods and commodities, e.g. bread, flour, etc.

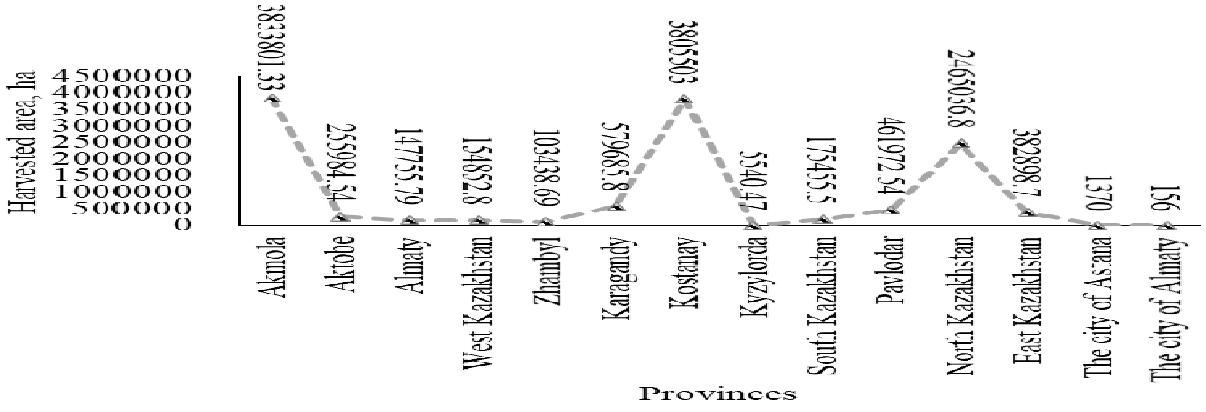

Figure 1 – The harvested area of grain in Kazakhstan by provinces in 2016.

Note: from the source 5.

The figure above illustrates that the highest harvested area in the Republic of Kazakhstan belongs to Akmola province - 3833801.33 ha.

On the other hand, wheat has been subject to selective domestication [6, 7]. Therefore, dietary value and bioactive components of the ancient types of the weed should have a difference with the modern ones [8]. The figure below shows contents of fibre in wheat cultivars.

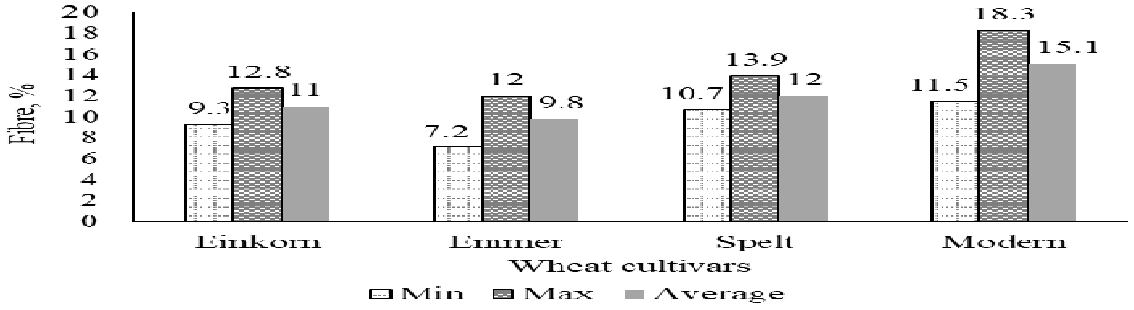

Figure 2 – Contents of fibre in wheat cultivars, %

Note: from the source 9.

The figure above shows that the average level of fibre in the modern cultivars of wheat is around 15.1% which is nearly 162.36% higher than in einkorn. There are two examples of the ancient wheat that have high potential for selective improvement of the modern wheat: Verna (soft wheat) and Kamut (Khorasan wheat) [10, 11]. The figure below illustrates how much fibre was on wheat cultivars. Phenolic acid is another important factor while considering dietary and agricultural perspectives of growing wheat. The figure below illustrates consistence of this component for the same wheat cultivars as in the figure above.

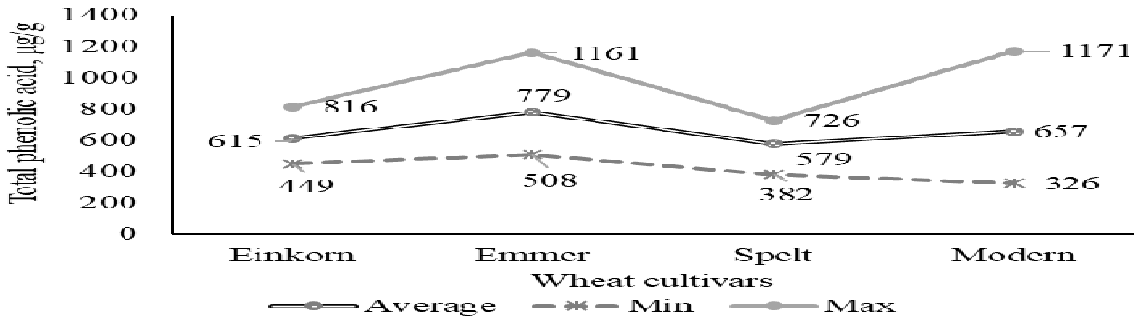

Figure 3 – Total phenolic acid content in wheat cultivars, µg/g

Note: from the source 9.

The figure above illustrates that maximum content of phenolic acid for einkorn was 816 µg/g. The figure below shows folate concentration for the same type of wheat cultivars as in two figures above.

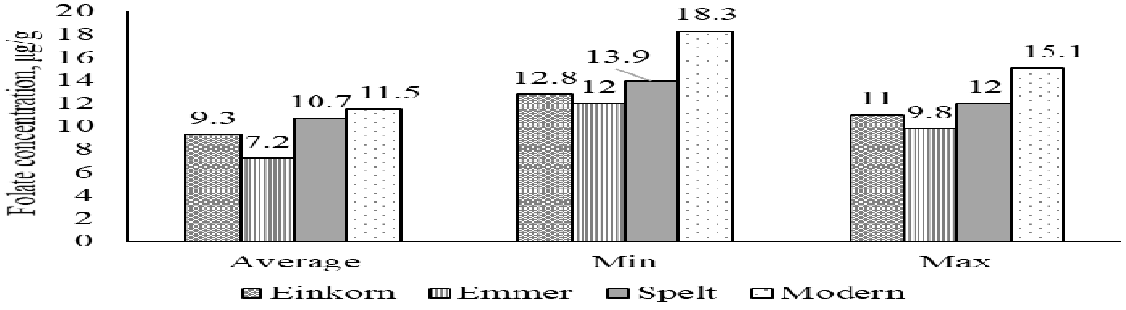

Figure 4 – Folate concentration in wheat cultivars, µg/g

Note: from the source 9.

The figure above illustrates that the highest average concentration of folate is in modern cultivars– 15.1 µg/g.

The figure below defines phytosterol content of four different wheat cultivars.

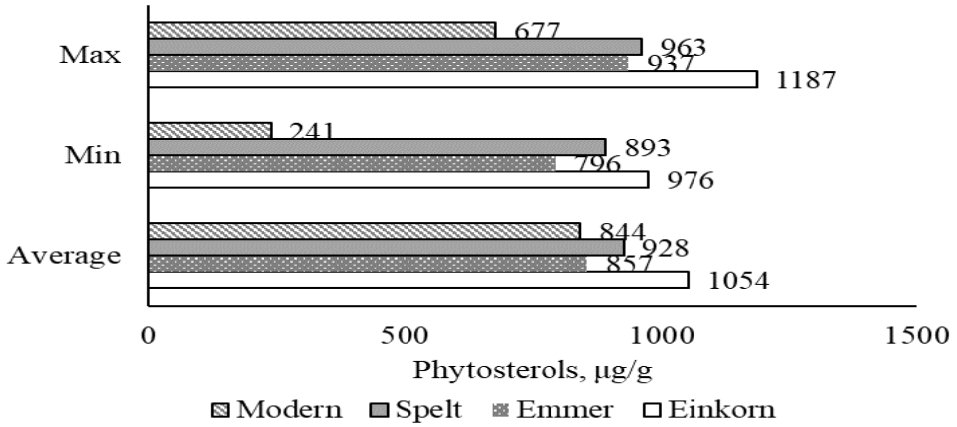

Figure 5 – Phytosterol in wheat cultivars, µg/g

Note: from the source 9.

The figure above shows that the highest average level of phytosterol belongs to the einkorn – 1054 µg/g. On the other hand, the lowest minimum value belongs to the modern wheat cultivars – 241 µg/g.

The figure below illustrates concentration of alkylresorcinol for the same cultivars of wheat as in the figure above.

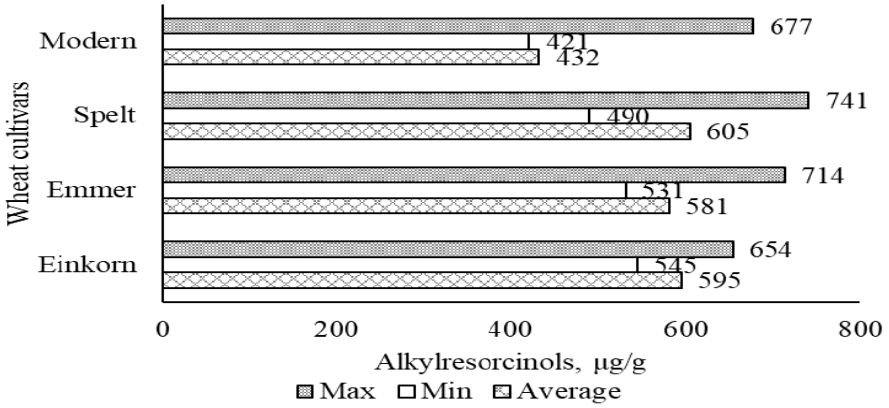

Figure 6 – Alkylresorcinol concentration in wheat cultivars, µg/g

Note: from the source 9.

The figure above states that the lowest alkylresorcinol content if found in the modern wheat cultivars – 421 µg/g on average.

The figure below illustrates how much area of agricultural land was harvested for spring wheat in 2016

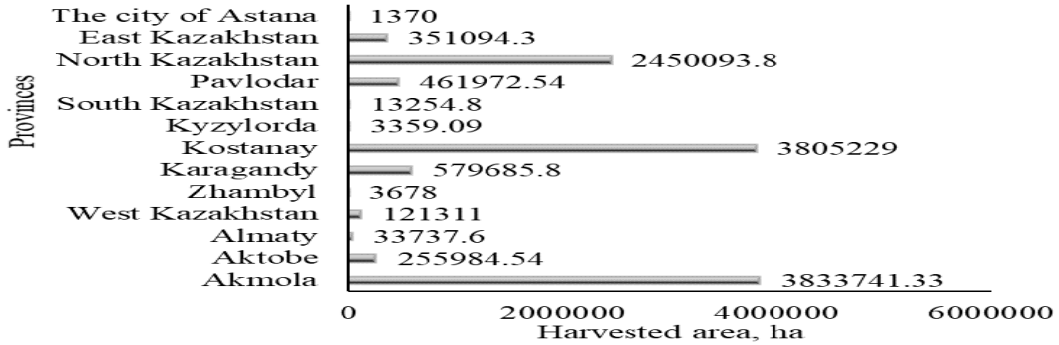

Figure 7 – The area used to harvest spring wheat in Kazakhstan in 2016.

Note: from the source 5.

The figure above shows that Akmola province is the leader for agricultural area dedicated to harvesting spring wheat - 3833741.33 ha. The second place is taken by Kostanay province – 3805229 ha.

The figure below illustrates the same indicator as in the figure above but for winter wheat.

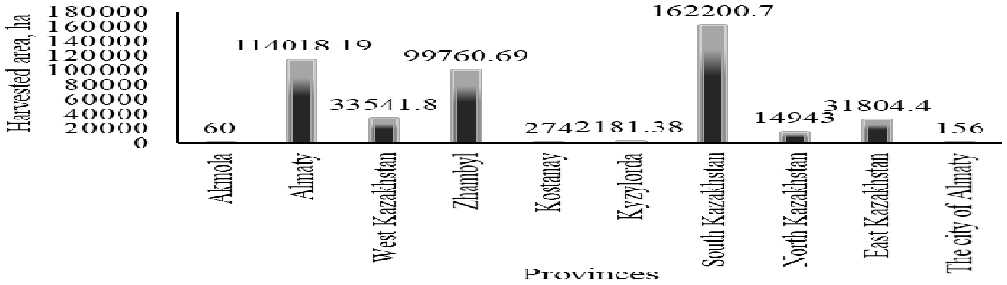

Figure 8 – The area of agricultural lands dedicated to harvesting winter wheat in 2016 for the Republic of Kazakhstan

Note: from the source 5.

The figure above shows that Almaty province had the biggest area of lands dedicated to harvesting winter wheat in 2016 - 114018.19 ha.

The figure below illustrates how much grain was available on 1 December 2017 by types of usage in the Republic of Kazakhstan.

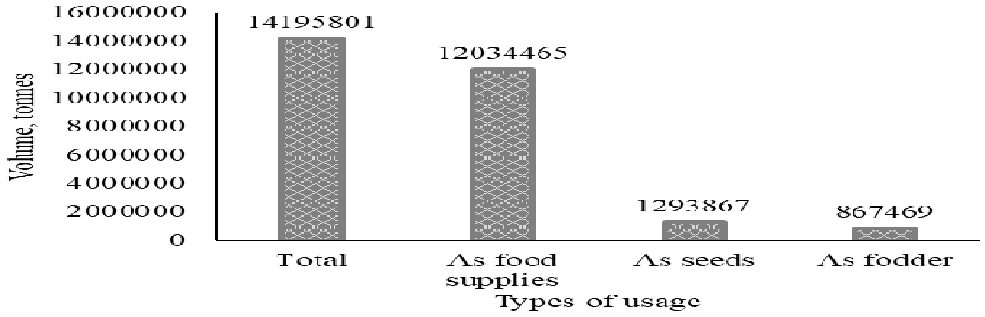

Figure 9 – Total volume of available wheat by types of usage on 1 December 2017.

Note: from the source 12.

The figure above states that 1293867 tonnes of wheat were available to be used as seeds for the first of December 2017.

The figure below illustrates the same indicator but only for enterprises in the milling sector of the Republic of Kazakhstan.

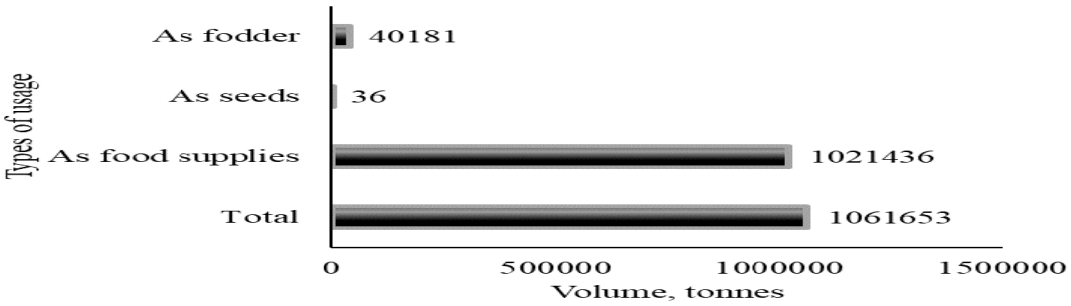

Figure 10 – The volume of wheat among legal entities of the milling industry by types of usage on 1 December 2017.

Note: from the source 12.

The figure above illustrates that 40181 tonnes of wheat were considered to be as fodder on 1 December 2017.

The figure below illustrates the yielding capacity of spring wheat in 2016.

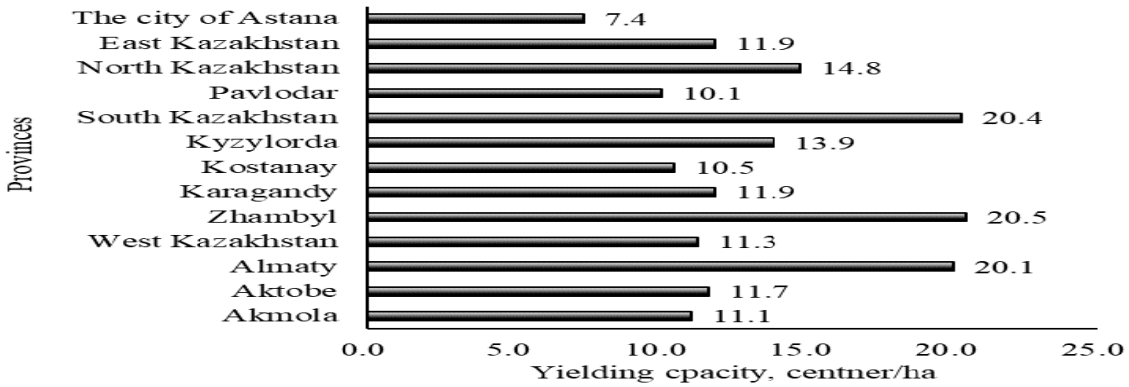

Figure 11 – The overall yielding capacity spring wheat in 2016 for different provinces of Kazakhstan, centner/ha.

Note: from the source 5.

The figure above shows that Zhambyl province has the highest indicator – 20.5 centners of wheat per every hectare on average. On the other hand, the lowest indicator is illustrated by the city of Astana – 7.4 centner/ha.

The figure below illustrates the yielding capacity of wheat for 2016 in different provinces of the Republic of Kazakhstan.

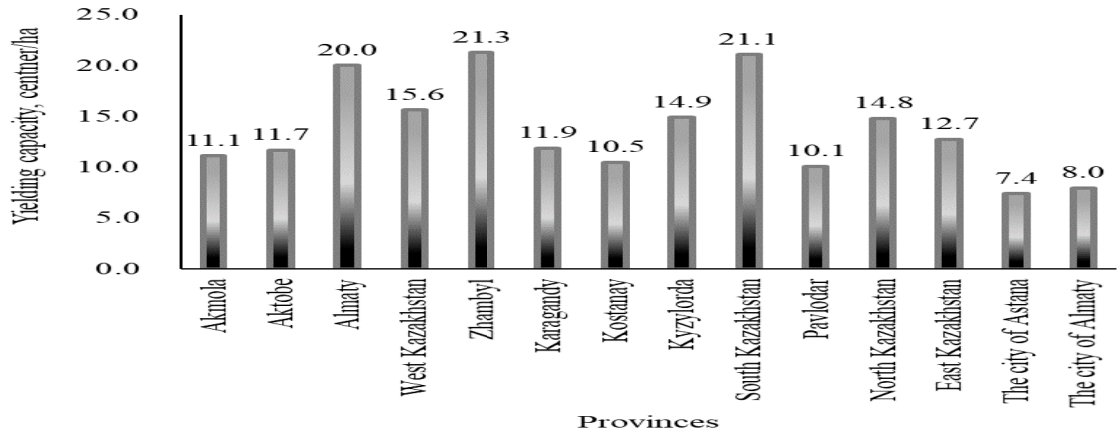

Figure 12 – The overall yielding capacity of winter and spring wheat by provinces of the Republic of Kazakhstan in 2016.

Note: from the source 5.

The figure above illustrates that the highest crop yield in 2016 is noticed in Zhambyl province – 21.3 centners per hectare. The second place is taken by South Kazakhstan province – 21.1 centners per one hectare. The next place is occupied by Almaty province – 20 centners of wheat is collected from one hectare on average.

On the other hand, the lowest indicator is shown by the city of Astana, the capital of Kazakhstan – 7.4 centner/ha. The lowest indicator for the overall yielding capacity is 65.258% less than the highest indicator

Figure 13 illustrates that the first quartile for the overall spring and winter wheat yield in 2016 for Kazakhstan equals to 10.28795 centners per hectare. On the other hand, the third quartile for the same indicator is 15.276 centner/ha.

The interquartile range for the yielding capacity of winter and spring wheat is 4.98805 centners per each hectare.

The figure above illustrates that the value of median for the yielding capacity equals to 12.735 centners per hectare.

The figure below illustrates how much wheat was produced by agricultural cooperatives in Kazakhstan for the period between January to September 2017.

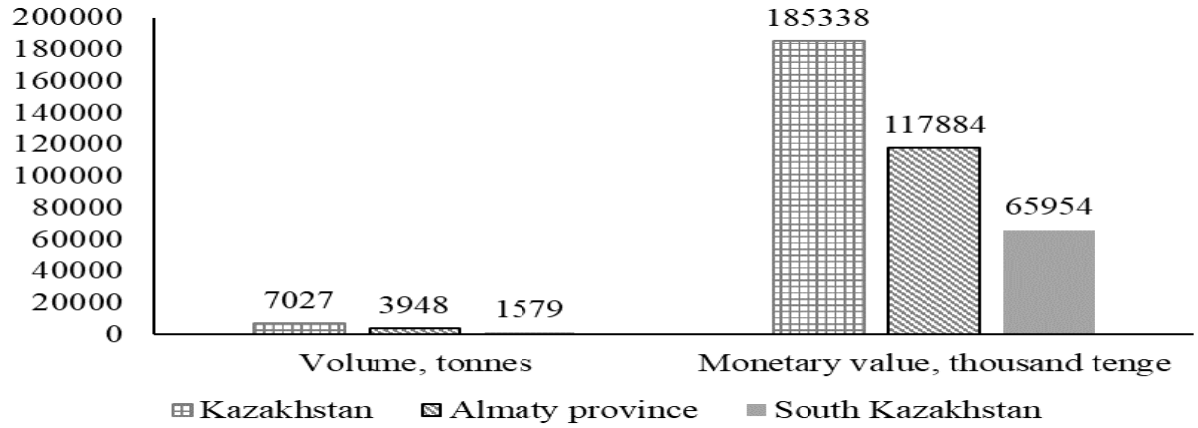

Figure 13 – The overall productive capacity of agricultural cooperatives in Kazakhstan for January-September 2017

Note: from the source 13.

The figure above shows that 7027 tonnes of wheat were produced by agricultural cooperatives in the period from January to September 2017 which equals to around 185338 thousand tenge in the monetary value in the Republic of Kazakhstan. The figure below illustrates the yielding capacity of spring and winter wheat by different types of entities in 2016.

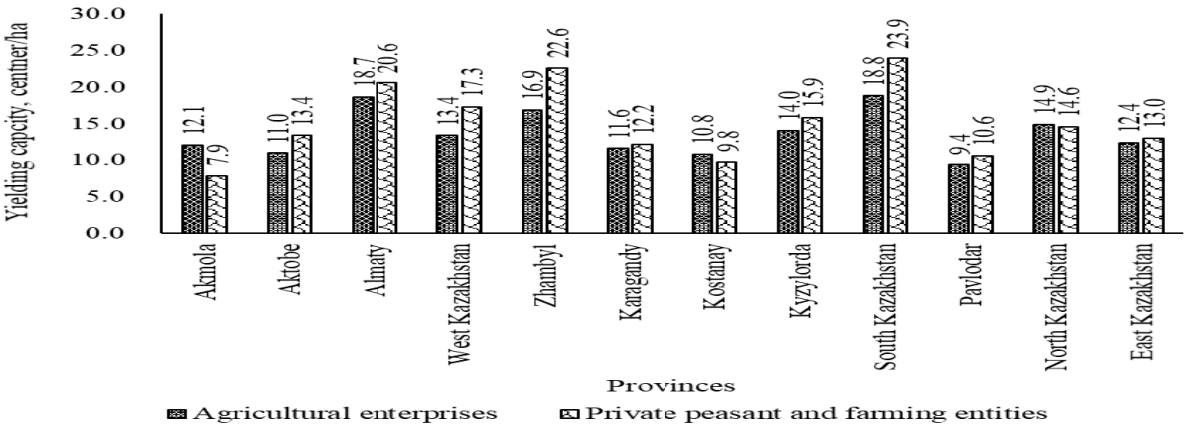

Figure 14 – The yielding capacity of spring and winter wheat by types of entities in Kazakhstan in 2016

Note: from the source 5.

The figure above shows that South Kazakhstan province has the highest yielding capacity – 20.5 centners per ha. The table below illustrates macro environment analyses of the wheat industry in the Republic of Kazakhstan.

Table 1 – Summary of the main trends facing the wheat industry

Aspect	Trend
Political	On 1 January 2015 Kazakhstan has joined the Eurasian Economic Union [14]. Members of this union are currently planning to enhance economic-political cooperation [15].
Economic	Tenge, the national currency of the Republic of Kazakhstan since the end of August 2015 has free-floating currency rate which caused its devaluation [16, 17]. The lower exchange of tenge gives the price advantage for wheat exporters [18].
Social	The population of Kazakhstan is expected to grow in the future which may increase demand for wheat in the internal market [19, 20]. Moreover, further growth of cattle breeding and poultry sector may increase use of wheat as fodder [21].
Technologic	Development in biotechnologies opens new horizons to improve wheat cultures [22].
Competitors	Russia, the biggest neighbours of Kazakhstan, is among top exporters of wheat [23]. Moreover, the European Union has a strong agrarian sector with the system of financial, legal and scientific support [24].
Customers	The world population is expected to grow in the near future [25].
Suppliers	Soil degradation, desertification, urbanization and worsening of the global ecology is decreasing the area of arable lands for wheat [26, 27, 28].
Labour force	Reforms of the President of the Republic of Kazakhstan has helped to create a new class of young and educated specialists [29]. Therefore, it is expected to have better educated labour force in the future.
Note: from the sources 14-29.	

The figure below illustrates stakeholders of the wheat industry.

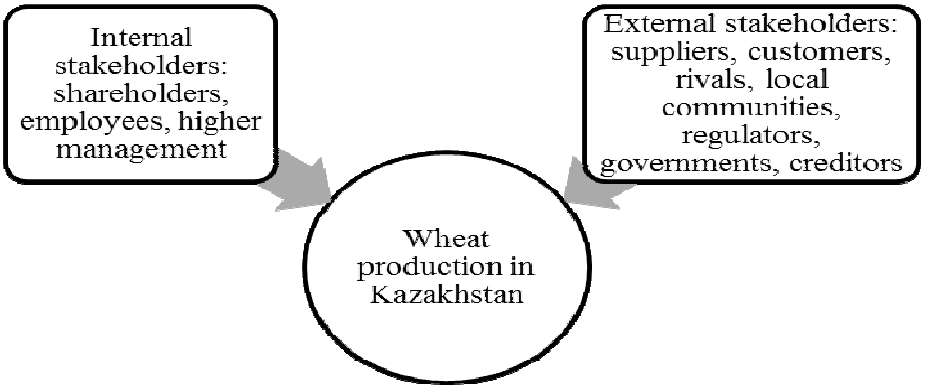

Figure 15 – Internal and external stakeholders of the wheat industry in Kazakhstan.

The figure above illustrates that internal stakeholders in the wheat industry of Kazakhstan are shareholders, employees, higher management in agricultural entities.

In conclusion, Akmola and Zhambyl provinces have strong positions in the wheat market. Moreover, the following actions can be taken to strengthen the wheat production in Kazakhstan:

- development of more efficient wheat cultures;
- investment in biotechnology;
- investing in the agrarian educational system;
- land recultivation;
- subsidies for farming entities.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДАҒЫ БИДАЙ НАРЫҒЫНЫҢ ӘЛЕУЕТІН ЗЕРТТЕУІ

Аннотация. Мақала Қазақстан Республикасы үшін бидай әлеутін түсіндіреді. Бұдан басқа осы жұмыста Қазақстанда бидай нарығын дамытуына арналған ұсыныстар келтірілген. Зерттеу жұмысының мақсаты – бұл Қазақстан Республикасының аграрлық секторын дамытуына арналған экономикалық механизмдерді қолдануымен көмектесуі мүмкін теориялық базасын және тәжірибелік ұсыныстарын түсіндіру. Зерттеу әдістемесі статистикалық, талдау, салыстырмалы және эконометриялық әдістері негізінде құрылған.

Зерттеудің тәжірибелік маңызы – бұл Қазақстан Республикасындағы бидай нарығының қазіргі жағдайын бейнелеу. Зерттеу нәтижелері Ақмола және Жамбыл облыстары бидайдың ішкі нарығында күшті орындарды ұстап тұрғанын көрсетеді.

Түйін сөздер: бидай, күздік бидай, жаздық бидай, астық жиналатын танап, астық өнімділігі, Қазақстан.

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ИССЛЕДОВАНИЕ ПОТЕНЦИАЛА РЫНКА ПШЕНИЦЫ В РЕСПУБЛИКЕ КАЗАХСТАН

Аннотация. Статья описывает потенциал пшеницы для Республики Казастан. Кроме того в данной работе даны рекомендации для развития рынка пшеницы в Казахстане. Целью исследования являются описание теоретической базы и практических рекомендаций, которые могут помочь использовать экономические механизмы для развития аграрного сектора Республики Казахстан. Методология исследования основана на статистических, аналитических, сравнительных и эконометрических методах. Практическая значимость исследования – это описание нынешнего состояния рынка пшеницы в Республике Казахстан. Результаты исследования показывают, что Акмолинская и Жамбылская области удерживают сильные позициии во внутреннем рынке пшеницы.

Ключевые слова: пшеница, озимая пшеница, яровая пшеница, уборочная площадь, урожайность, Казахстан.

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PROSPECTS FOR THE DEVELOPMENT OF AGRICULTURAL GREEN TOURISM

Abstract. According to the authors, the impact of the development of green tourism on the territory of rural areas, insofar as it is observed at the moment, as an additional type of entrepreneurial activity and economic sphere of activity, in general, is not sufficient for the inflow of a permanent population, without which the development of green tourism in full the same way it is impossible. At the same time, there is an increase in social and economic benefits for the population of the rural areas of the Akmola region and comprehensive development of the territories not only for a comfortable stay of tourists, but also for the life of the resident population of the region. Also, changes in the main trends in the provision of rural green tourism services in rural areas and key indicators of the development of tourist accommodation.

Keywords: green tourism, agriculture, sustainable development, potential, prospects.

Introduction. Interest in rural green tourism is high and stable in all countries of the world. However, each country seeks to create its own national development model, inherent only in it. Green tourism can actively develop only in environmentally friendly regions. Foreign statistics show that 35% of urban residents of EU countries prefer annual leave in the village [1, p.84]. In Kazakhstan, this percentage is much lower, but has a stable positive dynamics.

Against the backdrop of the rapid development of green tourism, the question naturally arises of the role of the Akmola region in the market of these tourist services. It should be noted that the region has all the prerequisites for intensive development of internal and external green tourism, namely:

- Features of geographical position and relief, water resources. So, on the territory of the Akmola region there are large rivers - Chaglinka and Ishim, and there are healing lakes Balpashor and Maybalyk;
- favorable climate, low population;
- a wealth of natural, historical and cultural and recreational potentials - there are 15 specially protected natural areas on the territory of the region, the total area of which is more than 828 thousand hectares; there are three state national natural parks: Kokshetau, Burabai, Buiratau, Korgalzhyn State Nature Reserve, Burabai Damu LLP, as well as the Korgalzhyn State Ornithological Reserve, listed in the UNESCO Natural Heritage List [3];

However, over the past 5 years, the goals and objectives, as well as the forecast indicators planned by the aforementioned program, to the Akmola region's management bodies were not fully achieved in full. The positive trend is the last reporting period.

In accordance with this, based on the data presented, it is advisable to analyze how effectively the Akmola oblast administration realizes its potential in the sphere of rural green tourism. To do this, let us first of all look at the main trends in the development of rural green tourism in dynamics with the help of the figures in Figure 1, presented below.

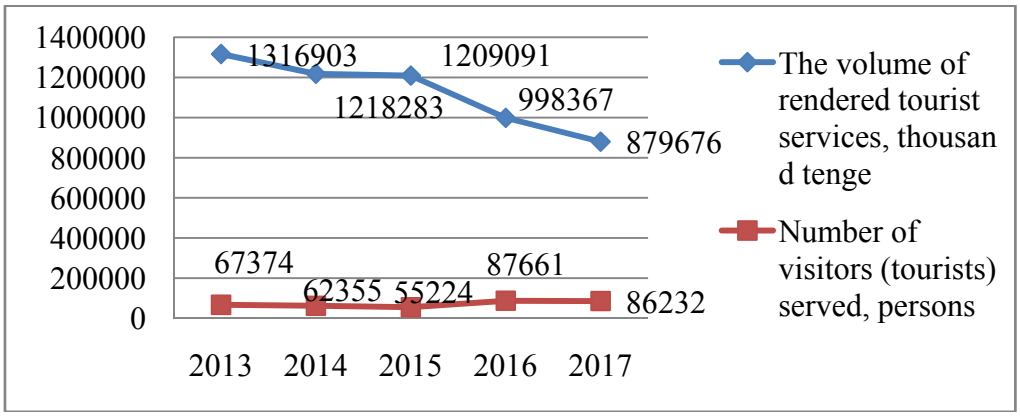

Figure 1 - Diagram of the changes in the main trends of rural green tourism services in the territory of Akmola region for the period 2013 – 2017

Thus, based on the data provided, it should be noted that over the past 5 years there has been a steady increase in the number of tourists arriving to the territory of the Akmola region in order to obtain green tourism services. In 2017, in comparison with the 2013 reporting period, there was an increase in the number of adherents of green rural tourism Akmola region by 27.99%.

However, at the same time, there are 2 recessions in the analyzed period of time. The first decline in the annual number of "green" tourists arriving in the rural part of the Akmola region occurred in 2015 and was characterized by a decrease in the number of serviced visitors by green tourism enterprises by 11.45% compared to the previous period. Such changes were primarily related to the rise and recovery of the world economy and, in particular, the economy of Kazakhstan, which increased the consumption capacity of some of the population. Tourists who choose green tourism in rural areas of Akmola region in view of its cheapness, having access to more comfortable rest, prefer to leave the part of consumers of the researched tourist services. The second decline is less significant in percentage terms and refers to 2017, accounting for only 1.63% compared to the previous period.

Comparing the same change in the annual influx of "green" tourists into the rural areas of the Akmola region with the amount of money spent by tourists, there is quite an interesting trend. Despite the almost constant increase in the influx of tourists to the Akmola region, tourist spending on green rural tourism services is steadily decreasing. As of the end of 2017, this decline in accordance with the 2013 reporting period was 33.2%. A significant drop in tourist spending on rural green tourism in the region studied began in 2015. This suggests that every year the number of tourists with an average level of income and higher is constantly declining. In this regard, entrepreneurs engaged in green tourism in the rural areas of the region in question are forced to focus their attention on tourists in the segment of incomes below the average and constantly reduce prices for their services. Of course, such a factor has an extremely negative image on the socio-economic state of the entire region and requires the adoption of measures on the part of the region's governing bodies in the development of infrastructure and green tourism facilities in rural areas that can attract a more affluent segment of tourists.

In addition to researching the basic trends in the development of green rural tourism in the Akmola region, it is also expedient to analyze the main indicators of the development of green tourism tourist places in the rural areas of the Akmola region for the period 2013 - 2017, which are shown using the data in Table 1.

Based on the data presented, it should be noted that, at the end of the analyzed period, there is an increase in virtually all indicators of the development of green tourism tourist accommodation in rural areas of the Akmola region, except for the provided bed-days, which decreased by 55.99%. The reason for such changes is related to the main factor that reduces the demand for rural green tourism, as described above.

At the same time, there is an active development of tourist infrastructure in the aspect of tourist reception places in rural areas of the Akmola region. There is also not only an increase in existing places of reception, an increase of 59.32% over the past five years, but an expansion of existing ones.

Table 1 - Analysis of the main indicators for the development of tourist accommodation for green tourism in the rural areas of the Akmola region for the period 2013 – 2017

Index	2013	2014	2015	2016	2017	Absolute. deviation.	Rate of increase
Number of placements, units.	118	163	179	179	188	70	159,32
Number of rooms, units	1179	1523	1620	1554	1618	439	137,23
One-time capacity of accommodation, beds	4172	5087	5382	4959	5178	1006	124,11
Number of rooms given, units	64080	66389	67740	46685	67885	3805	105,94
Brought to bed	396173	229880	237122	177215	174336	-221837	44,01
Occupancy of places of accommodation (beds),%	17,01	27,13	23,29	49,47	49,46	32,45	290,77

The creation and development of recreation areas (places) and the reception of tourists directly depends on the level of development of the tourism destination in the region. In accordance with this, consider the development trends of recreation areas for tourists of green tourism in rural areas of the Akmola region by regions using Table 2.

Table 2 - Trends in recreation areas for green tourism tourists in rural areas of Akmola region by region for the period 2013 - 2017

Name of rural region	2013	2014	2015	2016	2017	Absolute. deviation.	Rate of increase
Kokshetau	-	-	-	-	-	-	-
Stepnogorsk	-	-	-	-	-	-	-
Akkol	-	-	-	-	1	1	-
Arshaly	3	5	5	5	5	2	166,67
Astrakhan	1	1	1	1	1	0	100,00
Atbasar	1	1	1	1	1	0	100,00
Bulandy	-	-	-	-	-	-	-
Burabay	79	121	133	127	131	52	165,82
Enbekschilder	1	1	-	2	-	-1	-
Ereimentau	-	-	-	-	-	-	-
Esil	-	-	-	-	-	-	-
Zhaksy	6	6	6	-	6	0	100,00
Zharkain	1	-	-	6	1	0	100,00
Zerendy	11	12	15	-	22	11	200,00
Korgalzhyn	3	4	3	16	3	0	100,00
Sandyktau	4	6	6	3	5	1	125,00
Tselinograd	4	4	6	6	10	6	250,00
Shortandy	2	3	3	9	3	1	150,00
TOTAL	118	163	179	179	188	70	159,32

To get a more vivid picture of the development of green rural tourism in the rural regions of the Akmola region, we will map the structure of the availability and change in the number of recreation areas for tourists by regions using figure 2.

Thus, on the basis of the data presented, it should be noted that the most developed from the point of view of rural green tourism of the Akmola region, throughout the analyzed period, can be considered the Burabay region, which is the undisputed leader of the industry in question. The second place is shared by the Astrakhan and Tselinograd regions. In other regions, green rural tourism is practically not developed and is in its infancy.

Let's investigate the preferences of tourists of green rural tourism of Akmola region and their changes in the type of preferred recreation in the areas of rural tourism. Visually, the data for the analysis are presented in Table 3 of this paper.

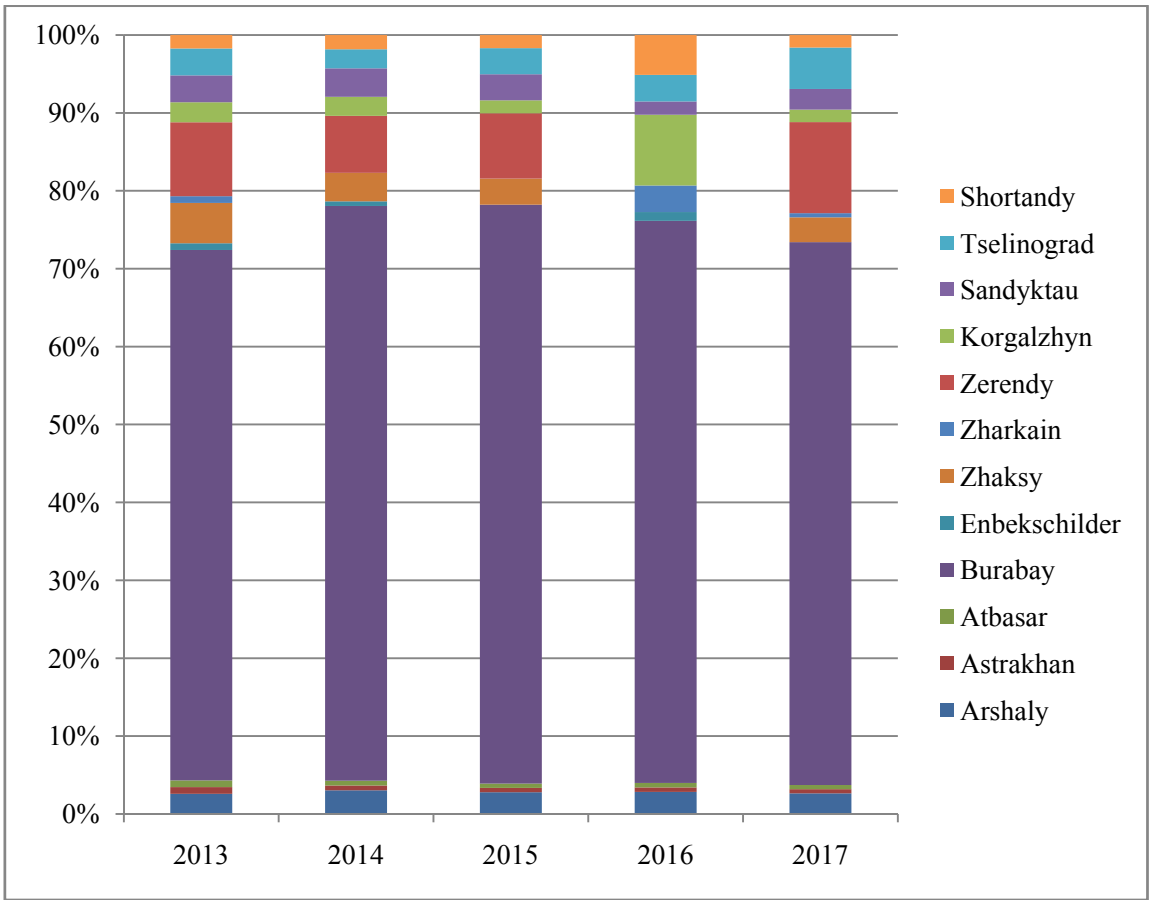

Figure 2 - Diagram of the change in the structure of recreation zones for green rural tourism tourists by region for the period 2013 – 2017

Table 2 - Analysis of preferences of tourists of green tourism in the Akmola region and their changes in the type of preferred recreation in the areas of rural tourism

Type of recreation area	2013	2014	2015	2016	2017	Absolute. deviation	Rate of increase, %
	Number of tourists accepted					.	
Bungalow, cottage	828	894	2468	1234	1281	453	154,71
Tourist base	44	200	-	-	-	-44	-
Camp (for children, sanatorium and health)	38272	23766	19200	47314	31883	-6389	83,31
Holiday hotel	3165	3488	3253	3245	3885	720	122,75
Holiday House	171	104	67	666	1178	1007	688,89
Rural houses (chalets), small houses	18517	24587	22241	20742	31073	12556	167,81
Camping	2703	240	310	290	560	-2143	20,72
Other types of accommodation	3845	9076	7685	14170	16372	12527	425,80

The greatest growth was shown by the preferences of tourists regarding holiday homes, as the most comfortable type of green tourism for most, having increased almost 6 times. The growth of preferences of "green" tourists visiting the rural areas of the Akmola region with a tourist purpose, as well as there was a rest in respect of boarding houses, amounting to 22.75%, as well as bungalows and cottages, making 54.71% and other types of green tourism - 3 times.

At the same time, it should be noted the decrease in consumer preferences of "green" tourists with respect to tourist services provided by camping, namely by 79.28%, children's and sanatorium-health camps by 16.69%. Demand of "green" tourists to the services of recreation centers located on the territory of rural areas of Akmola region for the last 5 years has absolutely come to naught.

To get a more complete picture of the preferences of "green" tourists in the rural areas of the Akmola region, let's consider clearly the structure of such and its change using figure 3 of this work.

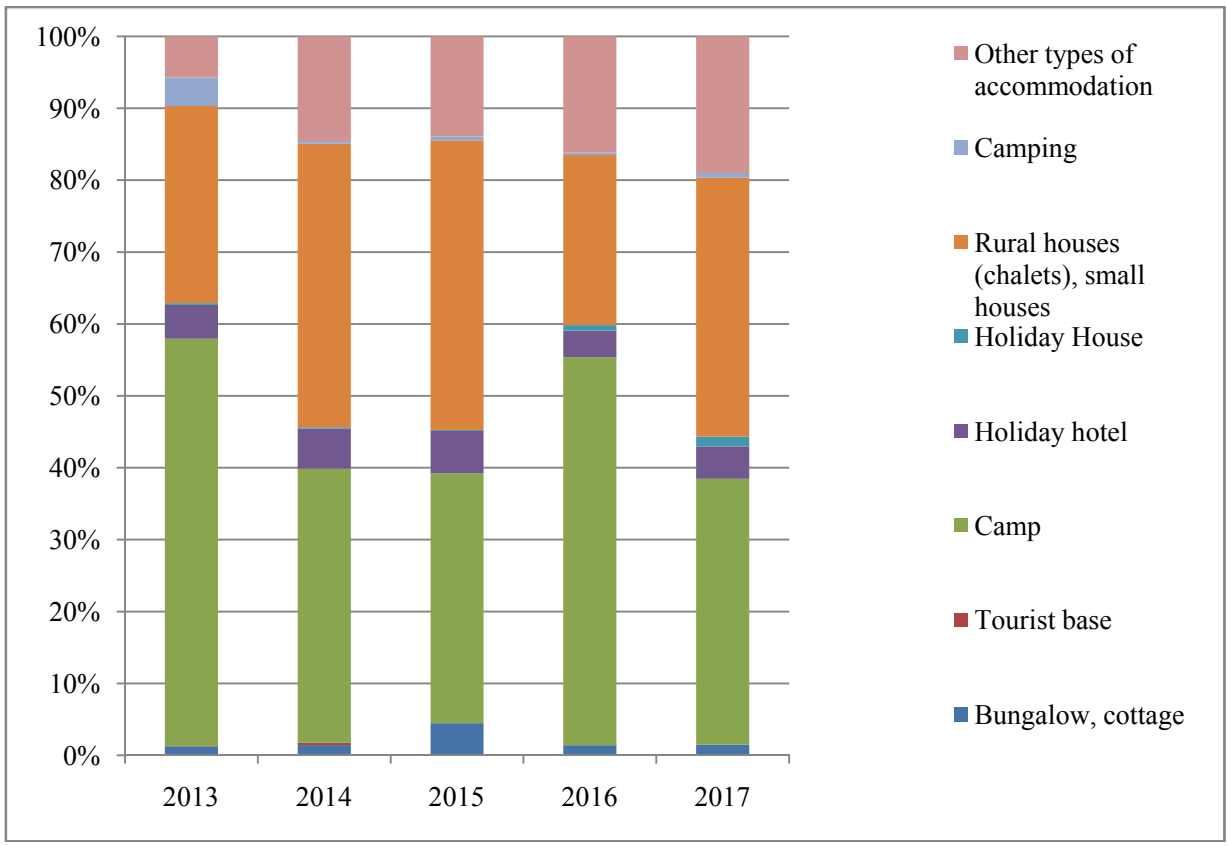

Figure 3 - Diagram of changes in the structure of preferences of "green" tourists in rural areas of the Akmola region by types of stopping places for overnight (recreation areas)

Based on the presented data, it can be noted that rural houses, small rural houses, bungalows and cottages are the undisputed leader among the "green tourists" of rural areas of the Akmola region. The main part of tourists also chooses these recreation zones due to the fact that in rural areas of Kazakhstan the majority. All other recreation areas are relatively small.

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АУЫЛДЫҚ ЖАСЫЛ ТУРИЗМ ДАМУЫНЫҢ КЕЛЕШЕГІ

Аннотация. Авторлардың ойы бойынша, орналасқан аумағына қарай жасыл туризм ауыл аймақтарының, өнеркәсіптік қызмет пен экономикалық аумақтың дамуында тигізетін үлесіне қарамастан, ол өз алдына оның өркендеуіне қажет тұрақты тұрғындардың ағымын қамтамасыз ете алмайды. Алайда Ақмола облысының ауыл аумағындағы тұрғындары үшін жасалып жатқан әлеуметтік-экономикалық үрдістердің оңтайлы өсімі байқалуда. Ол жағдай тек саяхатшылардың келуі үшін ғана емес, тұрғылықты халықтың қолайлы өмір сүруі үшін жасалып отыр. Сонымен бірге ауылдық жасыл туризмнің негізгі қызмет көрсету тенденциялары мен саяхатшыларды орналастыруға арналған орындардың даму көрсеткіші зерттелді.

Түйін сөздер: жасыл туризм, ауыл шаруашылығы, тұрақты даму, әлеует, келешек.

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ПЕРСПЕКТИВЫ РАЗВИТИЯ СЕЛЬСКОГО ЗЕЛЕНОГО ТУРИЗМА

Аннотация. По мнению авторов, влияние развития зелёного туризма на территории сельских районов, в том объёме, в котором оно наблюдается на данный момент, как дополнительного вида предпринимательской деятельности и экономической сферы деятельности, в общем, не достаточно для притока постоянного населения, без которого развитие зелёного туризма в полной мере так же невозможно. При этом отмечается рост социально-экономических благ для населения сельских территорий Акмолинской области и всестороннее обустройство территорий не только для комфортного пребывания туристов, но и жизни постоянного населения данного региона. Так же были исследованы изменения основных тенденций предоставления услуг сельского зелёного туризма на сельской территории и основных показателей развития мест размещения туристов.

Ключевые слова: зеленый туризм, сельское хозяйство, устойчивое развитие, потенциал, перспективы.

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SOME PECULIARITIES OF SOCIAL INSURANCE IN EUROPE (ON THE EXAMPLE OF GREAT BRITAIN, GERMANY AND SWEDEN)

Abstract. In thisarticle we would like to research theEuropean experience in the field of regulation of the social insurance system, mechanism of ensuring interests of all sides in functioning of this system, organization of voluntary pension savings. There are some peculiarities and special characteristics of the social insurance in the different European countries, such as equal contribution, equal pension and grant. Today the pension system of Great Britain, Germany and Sweden is presented by the multilevel system of pensions, which consists from:

1. state;
2. professional;
3. additional (personal pension insurance).

The system of European pension insurance provides issue of old-age pensions, disability and occasion of loss of the supporter, sick pays, unemployment, pregnancy and childbirth, labor mutilation or occupational disease, funeral grant. Contributions to the national system of social insurance are paid by the employer and the worker, or independently by the people in case of self-employment or lack of the constant place of work. Insurance through the enterprises (production social insurance) belongs mainly to the system of provision of pensions and temporary disability benefits. The businessmen, who are carrying out production,usually receive the social insurance tax benefits.

Keywords:pension insurance, social risks, social payments, retirement age, insurers, employers, social fund, pension savings, fixed contributions, pension system.

In our article we would like to explore some peculiarities of social insurance in Europe (on the example of Great Britain, Germany and Sweden),extent to which those in need of income support, the unemployed and others not in work in particular, are both entitled to social benefits and in receipt of them as well as the adequacy of the benefits concerned in the sense of providing an acceptable level of income. The economic and financial crisis, which has now affected most parts of Europe for the past 5 years, or so and which has seen unemployment rise to high levels in many countries and attempts by governments to contain the upward pressure on social welfare expenditure has given added importance to this issue. The analysis focuses, in particular, on those of working age with income 60% of the median, which is the conventional indicator of those at risk of poverty. These are not necessarily the people to whom social support is directed in EU Member States. Even though minimum income schemes intended to prevent the income of households from falling below a particular level operate to varying degrees in all countries, the level in question is not typically the same as defined for the indicator and will tend to take account of other resources available to the household in addition to their annual income. While such resources, in the form especially of accumulated savings, are difficult to identify from the data available, it is possible to distinguish those households which appear to be materially deprived and which, accordingly, can be assumed to have limited access to other sources of purchasing power to supplement their income.

The central concern, therefore, is with those aged 18-59 with (equalized household) income the at-risk-of-poverty threshold and who live in households identified as being materially deprived, according to the indicator. It should be noted that the age group is defined to exclude those below 18, most of who are

children or if not in full-time education or initial vocational training, and those over 59, many of whom are retired and in receipt of pensions. It should also be noted that although not identified explicitly almost all children at risk of poverty are implicitly covered too insofar as they have parents in the 20-59 age group. These are divided further to distinguish those with income below 40% of the median and who with income closer to the threshold at 40-60% of the median. The key issue examined is the relative number of the two groups who are not in receipt of social benefits intended to provide support to those with low income - or more precisely; those who report not being in receipt of such benefits - and who, accordingly, appear not to be assisted by the social welfare system. The characteristics of the people in question are then investigated, along with those, who are in receipt of benefits but for whom the amount received is not enough to raise their income above the two thresholds defined, the aim being to try to identify why this is the case [1, P.45].

There are four potential reasons:

-lack of coverage by design (individuals and households are excluded from benefits, because they fail to meet the eligibility conditions, even though they may be in need of support);

-support provided fails to ensure that income is above 60% of the median or even 40% of the median;

-failure on the part of households to claim the benefits they are entitled to;

- problems with the income data in the sense that they fail to reflect the true amount of resources that households have available to spend.

The last is a particular possibility in respect of the self-employed, whose income is taken to be equivalent to their net trading income, which in many cases, especially in respect of small businesses, is likely to understate the resources they have access to. This is not only because of a tendency to under-report income, especially if what is reported is based on tax returns but, also because the trading costs reported may well include some personal expenditure, which for the non-self-employed would be met from their net income. While the data doesn't not indicate directly, which of the other three possible reasons for the income, the thresholds identified are at work, they, at least, enable the characteristics of the households concerned to be distinguished, which can then be checked against the regulations, governing entitlement to benefits and the level of these. Examining these data is, therefore, a necessary first step to assessing the relative importance of these various reasons and, accordingly, the nature and extent limitations of the social welfare system in place.

The Labor Force Survey (LFS) provides a further insight into the possible reasons for income thresholds in respect of the unemployed. While it does not include data on household income, it does include data on the unemployed in receipt of benefits, together with details of their previous employment. This, accordingly, enables them to be distinguished in terms of the reasons, why they left their job and their professional status at the time, both of which can potentially affect their eligibility for benefit. The analysis begins with an examination of the scale of the problem, by identifying the relative number of people of working age in each country with income below 60% of the median and below 40% and the proportion of the total population with these levels that they account for [2, P.17].

In 2010, just over 16% of people aged 18-59 had disposable income below 60% of the median in the EU - slightly over 17% in the EU13 and 16% in the EU15. Of these, a little more than half had income below 40% of the median, the relative split being much the same in the EU13 as the EU15. The relative number of people in this age group with income below 60% of the median, however, varied from 22% in Romania and over 20-21% in Greece, Spain, Latvia and Lithuania to 10-11% in Cyprus, Austria and the Netherlands and less than 10% in the Czech Republic. The proportion with income below 40% of the median varied even more widely, with most of those with income below 60% of the median having income below 40% in most of the countries where the former was largest and a minority in countries, where it was lowest. The proportion with income below 60% of the median increased between 2008 and 2010 - a period of economic recession - in all but two Member States, Luxembourg and the UK, the size of the increase ranging from almost 4 percentage points in Spain and around 3 percentage points in Slovakia to under 0.5 of a percentage point in Sweden, Germany and the Great Britain.

Focusing on those aged 18-59 with low levels of income, the first step is to examine the extent to which this income comes from self-employment, given the possibility Employment, Social Affairs and Inclusion The coverage rate of social benefits February 2014 that this understates their true income in terms of purchasing power and the standard of living it can support. It is also relevant to consider the

relative number of people, reporting negative levels of income, which can be the case either because they are self-employed or make trading losses or because the taxes they pay exceed the income for the year in question. Either way, the income reported is clearly not a measure of their purchasing power. In the first case, trading costs may include a large amount of personal expenditure and/or may follow many years of trading profits, in the second case because high tax levels could denote a high level of income in the preceding year, or years. Accordingly, the fact that household disposable income in any year can be negative highlights the fact that annual income is not necessarily a good measure of long-term income and the command over resources that households enjoy.

Most of these countries also had a relatively large proportion of households reporting negative 'other' - non-self-employment - income, which implies that the taxes paid in the year exceeded the gross income received. It further implies that the income in previous year(s) may have been relatively high - though not necessarily - which suggests that their access to resources and spending power may have been greater than other households with income below 40% of the median.

Beveridzh's modelof social insurance in the Great Britainexistssince 1942 on the basis of the report, prepared on the instructions of the government by Beveridzh. At the same time it should be noted that inclinations of social insurance in England were known since 1911, when insurance due to illness has been entered and disability it is possible to refer the following which was key separate the features of the social insurance, entered by Beveridzh, from which are relevant and today:

A) equality of citizens in questions of social assignments, irrespective of social risks, financial position inherent in the specific individual;

B) equality practically all social payments - doles, disability pensions, pensions on achievement of a retirement age, grants or so-called grants to vocational training, etc.;

C) accounting of comprehensive family income;

D) obligation of the social contributions insured, carried out by insurers, employers and the state;

E) formation of the uniform social fund separate of the state budget [3, P.222].

Most we accept the English experience in the field of regulation of system, the mechanism of ensuring interests of all interested sides in functioning of system and also the organization of voluntary pension savings. It is expressed in characteristics of the approach to social insurance.The Concept of social insurance, offered by the English scientist Beveridzh, has received the legislative embodiment in the Act of National Insurance in 1946 "for an equal contribution, equal pension and grant". However, in 1988 the system has undergone global adjustment where the main social benefits (old-age pensions and disability, doles) have to be the public benefits. For this purpose it is necessary that their financing was provided at the expense of the fixed contributions, and the sizes were defined in an identical size.

The system of national pension insurance provides issue of old-age pensions, disability and on the occasion of loss of the supporter, sick pays, unemployment, pregnancy and childbirth, labor mutilation or occupational disease, grant to burial. Contributions to the national system of social insurance are paid by the employer and the worker, or independently in case of self-employment or lack of the constant place of work.

Pension insurance in the National system of social insurance includes two types of pensions:

A) basic state pension which is paid in the established (identical) size for all insured having income above the established lower mark of income (since which insurance premiums are raised) and which made appropriate contributions to the National system of insurance (or received release from them payments during the periods of unemployment, diseases);

B) insurance additional or professional state pension (over basic pension), which size is established in proportion to the size of average income of the recipient for the entire period of his professional activity Fund of national insurance of Great Britain is created at the expense of contributions of workers, businessmen and state grants. Contributions to needs of social insurance are differentiated depending on the class.

As noted above, although there is no direct way of identifying the access of household with low income to other resources, and accordingly their spending power - or lack of it - the indicator used to denote material deprivation provides some guide to this. Focusing on those reporting positive income, this indicates, first, that the proportion of the people living in households with income below 40% of the median in 2010 was smaller for those reporting income from self-employment than for those with no

income from this source. This was especially so in the EU15 countries - the only exceptions are the Netherlands and Sweden, where the proportions and the number of people concerned are relatively small - so tending to confirm the possibility noted above that for the self-employed, the income they report (i.e. their net trading income) is not in many cases a good indicator of their spending power. In most of the EU13 countries, however, there is much less difference: the main exceptions are Poland, Slovenia, Hungary and Slovakia; the materially deprivation rate was higher for those with self-employment income than those without [4, P.57].

Having distinguished the households with low levels of (positive) income indicated as being materially deprived, the next step is to examine the extent to which they are in receipt of social benefits and accordingly receive income support from the social security system in place. In 2010, some 70% of those aged 18-59 living in the households concerned, with no income from self-employment, received unemployment benefits, social exclusion benefits, housing allowance, disability benefits or pensions or some combination of these. In the EU on average, the figure was 72%, some 6 percentage points above that in the other countries. The coverage rate, however, varies markedly between countries. In Greece, only just over a quarter (28%) of the people in the households concerned was covered, much less than anywhere else, while in Cyprus, the proportion was only 30%. In all the countries, the coverage rate was over half, though in Bulgaria, Romania and Luxembourg, less than 60% and in Poland and Portugal, less than two-thirds. By contrast, in Slovakia, Slovenia, France and Finland, the rate was over 85%. In these countries, therefore, only a relatively small proportion of the people living in the low income households identified were not in receipt of benefits. Nevertheless, it was still the case that the benefits they received were not sufficient to raise their income to above 40% of the median. In the EU, most of the people concerned received unemployment benefits, while in the different countries, more received social exclusion benefits than unemployment and almost as many were in receipt of disability benefits or pensions as were in receipt of unemployment benefits. This to some extent reflects the underlying causes of low income in the two country groups, unemployment being the most important cause in many EU countries, much more so than in the USA. This is particularly the case in Germany, Great Britain, Sweden, entitlement to benefit applies only for the relatively short period and significant number of the unemployed then becomes dependent on social allowances and housing allowances for support.

Accordingly, the social security system in all Member States succeeded in covering more of those, who appear to have been the most in need of support than others with low income, which suggests that the transfers made were targeted relatively effectively, though still leaving a significant number in many countries without support, at least, in monetary terms. It also lends weight to the approach adopted here of identifying those most in need of support.

Pension insurance in the National system of social insurance includes two types of pensions:

A) basic state pension, which is paid in the established (identical) size for all insured having income above the established lower mark of income (since which insurance premiums are raised) and which made appropriate contributions to the National system of insurance;

B) insurance additional or professional state pension (over basic pension), which size is established in proportion to the size of average income of the recipient for the entire period of his professional activity. Fund of national insurance of Great Britain is created at the expense of contributions of workers, businessmen and the state grants.

Summing up the results of the characteristic of the organization of system of social insurance in Great Britain it is possible to note a large number of the positive moments:

1. Existence of multilevel pension system;
2. Rigid differentiation of contributions to social insurance on classes;
3. Financial participation in formation of fund of national social insurance of the state, employers and workers;
4. Possibility of a delay and also possibility of early retirement;
5. Existence of tax preferences at additional personal social insurance of workers.

Bismarck's social insurance model has received system completeness in the Federal Republic of Germany. The modern system of social protection of Germany consists of four parts:

- obligatory social insurance;
- additional provision of pensions, realized by the enterprises employers;

- personal pension insurance;
- institute of social pensions.

The main role in the German system of social protection belongs to obligatory social insurance. It is possible to refer independence of the state budget and self-government to the distinctive advantages [5, P.58]. The special place in the system of social insurance of Germany is taken by pension insurance, which covers all types of material security in cases of temporary disability, pregnancy and childbirth, on an old age and disability, at loss of the supporter, delivery of health care by the worker, including payment of drugs, unemployment, family grants and some other types of the social help.

Insurance premiums in Germany are paid insured and businessmen in equal shares. The sizes of insurance tariffs represent the total value of the insurance premium paid insured and the businessman from the salary of the worker. Earnings for charge of insurance premiums and payment of grants are limited to a certain maximum.

In the conclusion we would like to stress, that one more important compound pension system of European countriesis the institute of social pensions and the monthly allowances provided on the basis of check of needs is.The German model of social insurance and provision of pensions is characterized by democratic character of management, transparency of financial flows, and the noncommercial nature of the insurance companies, which are under the state legal and financial control. In Germany there is no concept “maximum and minimum” the size of pension.

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ЕУРОПАДАҒЫ ӘЛЕУМЕТТІК САҚТАНДЫРУДЫҢ КЕЙБІР ЕРЕКШЕЛІКТЕРІ (ҰЛЫБРИТАНИЯ, ГЕРМАНИЯ ЖӘНЕ ШВЕЦИЯ МЫСАЛЫНДА)

Аннотация. Зейнетақыны сақтандыру, әлеуметтік тәуекелдер, әлеуметтік төлемдер, зейнеткерлік жас, сақтанушылар, жұмыс берушілер, әлеуметтік қор, зейнетақы қорланымы, тиянақталған жарналар, зейнетақы жүйесі.Бұл әлеуметтік сақтандыруға қатысты айрықша тәсілдемеде сипатталады: «зейнетақы мен жәрдемақы үшін тең жарна».Қазіргі таңда Ұлыбритания, Германия және Швецияның зейнетақы жүйесі көпдеңгейлі зейнетақы жүйесі ретінде белгілі, оның құрамына кіреді:

1. мемлекеттік;
2. кәсіби;
3. қосымша (жеке зейнетақылық сақтандыру).

Ұлттық зейнетақымен қамсыздандыру жүйесі қарттық, мүгедектік пен зейнеткерлік, асыраушысынан айрылу бойынша, ал жәрдемақы сырқат, жұмыссыздық, жүктілік пен босану, еңбекке жарамсыздық немесе кәсіби ауру, жерлеу бойынша қамтамасыз етеді.Әлеуметтік сақтандырудың ұлттық жүйесі жарнаны жұмыс беруші және қызметкер өзі немесе өзін-өзі жұмыспен қамтыған немесе тұрақты жұмыс орны болмаған жағдайда төлейді.Кәсіпорындар желісі бойынша сақтандыру (өндірістік әлеуметтік сақтандыру) негізінен зейнетақылар және уақытша еңбекке жарамсыздық бойынша жәрдемақы жүйесіне жатады.Өндірістік әлеуметтік сақтандыруды жүзеге асыратын кәсіпкерлер айтарлықтай салықтық жеңілдіктер алады.Зейнетақыға шыққанна кейінгі жинақталған қаражат жұмысшыға ренттік кіріс ретінде бірте-бірте төленеді.

Түйін сөздер: Еуропалық тәжірибе жүйені реттеу, барлық мүдделі тараптардың мүдделерді қамтамасыз ету тетігіндегі жүйе қызметі, сондай-ақ зейнетақы қорланымы ұйымдастыру саласында ең қолайлы болып табылады.

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НЕКОТОРЫЕ ОСОБЕННОСТИ СОЦИАЛЬНОГО СТРАХОВАНИЯ В ЕВРОПЕ (НА ПРИМЕРЕ ВЕЛИКОБРИТАНИИ, ГЕРМАНИИ И ШВЕЦИИ)

Аннотация. Европейский опыт наиболее приемлем в области регулирования системы, механизма обеспечения интересов всех заинтересованных сторон в функционировании системы, а также организации добровольных пенсионных накоплений. Это выражается в характерных особенностях самого подхода к социальному страхованию: «за равный взнос, равную пенсию и пособие». На сегодняшний день пенсионная система Великобритании, Германии и Швеции представлена многоуровневой системой пенсий, которая состоит из:

1. государственной;
2. профессиональной;
3. дополнительной (личное пенсионное страхование).

Система национального пенсионного страхования предусматривает выдачу пенсий по старости, инвалидности и по случаю потери кормильца, пособий по болезни, безработице, беременности и родам, по трудовому увечью или профессиональному заболеванию, пособие на погребение. Взносы в национальную систему социального страхования уплачиваются работодателем и самим работником, или самостоятельно в случае самозанятости или отсутствия постоянного места работы. Страхование по линии предприятий (производственное социальное страхование) относится главным образом к системе пенсионного обеспечения и пособий по временной нетрудоспособности. Предприниматели, осуществляющие производственное социальное страхование, получают значительные налоговые льготы. Образовавшиеся сбережения после выхода на пенсию постепенно выплачиваются работнику в качестве рентного дохода.

Ключевые слова: пенсионное страхование, социальные риски, социальные выплаты, пенсионный возраст, страхователи, работодатели, социальный фонд, пенсионные накопления, фиксированные взносы, пенсионная система.

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THE PROSPECTS OF ADAPTATION AND DEVELOPMENT OF FINANCIAL ACTIVITY OF ISLAM BANK OF DEVELOPMENT IN THE RUSSIAN FEDERATION AND TATARSTAN IN THE CONDITIONS OF ECONOMIC SHOCKS

Abstract. The Islamic economic system recognizes as the private property, based on the personal labor, public-state and cooperative. A basis of productive activity work was considered. Deprivation of property is inadmissible, except the extreme cases, condition of payment of full-sizeand fair compensation. In Islamic economic system banks perform the same function as in traditional western: compensation of negative factors of the financial markets, spatial and temporary demand and offer, distortion of information. Function of banks also consists from ensuring work of the national payment service, providers and financial mediation. The first and main distinctive feature of tools of Islamic bank from traditional consists in its fundamental divergence with the work of the western bank in financial mediation. Carrying out the role of the financial intermediary, any bank accumulates money of investors, which didn't used by their managers, and forms the liabilities in the source of finance. In Islamic model process happens slightly more difficult. The investor and the borrower, for instance, act as the agent and the principal respectively.

Keywords:securities market sukuk, investment market, insurance market takaful, financial services, financial institutions Islamic business structures, consulting, trainings, Islamic finance, issue, banks.

The potential possibility of financial and investment activities of Islam Bank of Development in the Russian markets can develop in three directions:

- securities market sukuk;
- investment market;
- insurance market takaful.

Diversification of security of the Russian Federation issues of securities the sukuk, the most effective strategic program in securities market of the Russian Federation. Infrastructure of subjects of securities market of the Russian Federation is very difficult system of interaction between many institutions (see Figure 1). Difficult process of regulation of securities market in the Russian Federation carries outnot only public authorities, but also the self-regulating bodies and various associations and societies. In 2010 in the Russian Federation the non-profit organization namedthe Fund of Development of Islamic Business for Acceleration of Developments, Strengthening of Islamic Financing in the Russian Federation was created. FRIB providesthe financial institutions by the following services:

- design and realization of Islamic financial services;
-organization of Islamic financial institutions;
- support financial Islamic business structures;
- consulting and trainings on Islamic finance;
- conducting examination on Islamic financial products;
- development of communications with Islamic financial bodies of regulation of business;
- choice of business partners and investors;
- organization and structuring issue sukuk.

Sukuk is classified as the alternative certificate of securities of equal cost, which certifies possession share of the property and the right to income from the realized investment project. Sukuk in the Russian

Federation doesn't need serious amendments of the law on securities to the Russian Federation; so it has the character of security and intended for temporary placement of assets in the market. Sukuk in the Russian Federation is dictated by the complicated geopolitical conditions in the market and for the realization of providing the 28th article of the Civil Code of the Russian Federation about the right to religion of the citizen of the Russian Federation (see the figure 1).

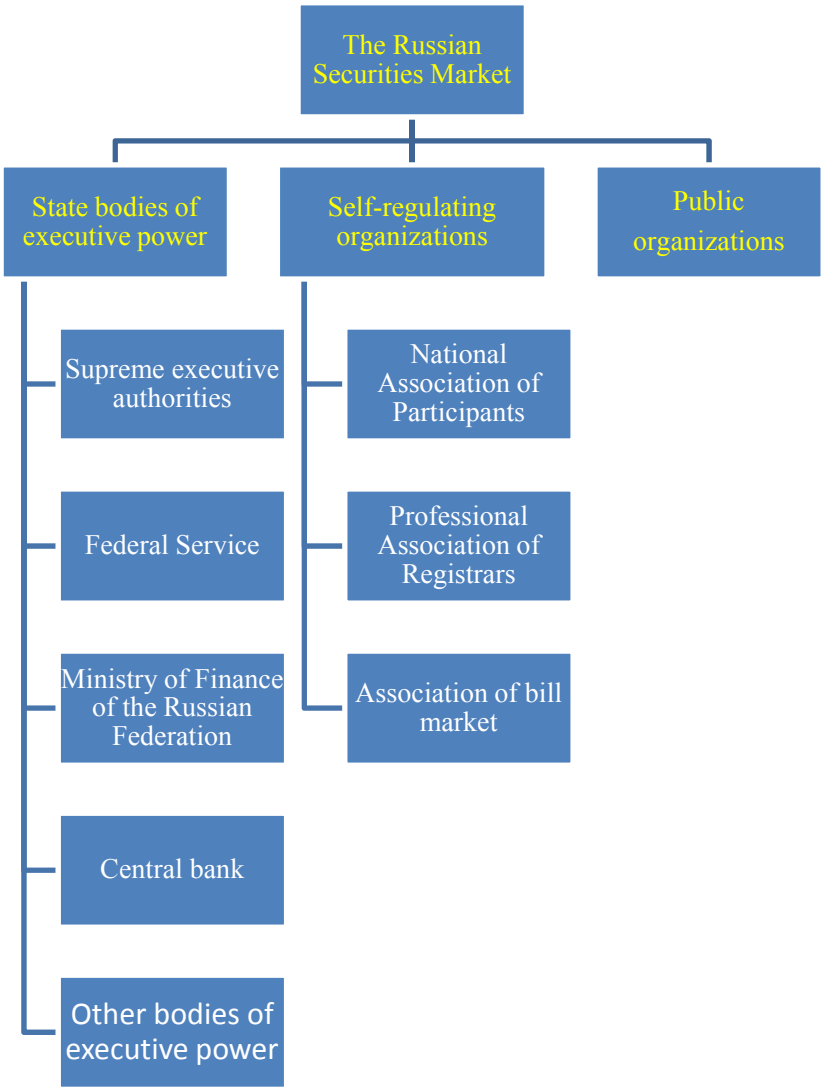

Figure 1 - Infrastructure of subjects of Securities Market of the Russian Federation

It is necessary for achievement of goals of IBD: "In 2020 to become world-class development bank" [1]. The external environment for IBD in the Russian market is characterized by difficult geopolitical processes since 2014 and economic shocks, which don't promote stability of macroeconomic as well.

Sanctions of the USA have influenced development of 90% of the Russian oil companies and gas production sector of Russia Federation:

- since 2014 were forbidden the USA deliveries to Russia in processing equipment for deep oil production more than 152 meters in depth;
- were forbidden the USA deliveries of the innovative equipment with nonconventional energy carriers;
- were forbidden the USA deliveries the equipment of horizontal drilling;
- were forbidden deliveries of drilling platforms;
- were suspended issues of licenses for export of goods in the Russian Federation.

The EU economic sanctions were also imposed:

- restriction for debt financing of many Russian banking institutions;
- military export of goods was forbidden;
- exporterswere obliged to obtain new licenses for activity now.

The Russian Federation as self-sufficient country, has huge raw potential, in turn in 2014 were introduced the requirements in response to sanctions:

- the ban of import of agricultural products from the USA;
- ban of raw materials and products of the USA;
- ban of food products of the EU, Norway, Australia, Canada.

Macroeconomic shocks of the external environment of IBD accelerated the adaptation processes in the Russian market as the restrictions, delivered to the EU and the USA; the Russian issuers force found the alternative systems of crediting of economyin the Russian Federation. Not application of alternative credit facilities of economy of the Russian Federation is fraught with deterioration the condition of the balance of payments, because of lack of inflows of the foreign capital. Counteraction of Russia to economic shocks has characterized by three ways:

- inflow of the private capital to the Russian Federation across the alternative EU to channels;
- expenditure of currency reserve of the Central Bank of Russian Federation;
- increase the account of the current operations.

Thus, the increasing geopolitical tension and growth of financial risks for the companies of the EU around the Russian Federation is for IBD an incentive for the accelerated adaptation of investor activity in Russia and its regions: Tatarstan, etc. Successful identification of the Russian Federation on geopolitical space in the international division of labor will lead Russia to growth of economic development. Need of stop large-scale ruble depreciation depends on falling of energy costs. The forecast for 2018 is provided in table 23.*Table source: bank reporting, calculations of the Center of development and Committee of Civil Initiatives [1].*

Table1 - The economic forecast of development of THE Russian federation in 2018

	Economy parameters in Russia Federation	2014	2015	2016	2017	2018
1	2	3	4	5	6	7
2	The oil price in US dollars for barrel	98	60	60	60	60
3	Growth rate of GDP in %	0,4	-4,1	1,0	1,0	1,4
4	Growth rate of investments into fixed capital in %	-1,3	-17,5	3,3	1,9	3,1
5	Balance of the account of the current operations in % GDP	3,1	8,0	2,8	3,1	2,6
6	The rate of inflation in %	9,9	11,0	6,3	5,2	4,5
7	Exchange rate of ruble to dollar	37,2	58,6	51,03	52,2	52,1
8	Increase in budget revenues in %	0,0	-14,8	-12,1	-2,4	-2,1
9	Reserve fund in billion dollars	90	69	35	17	9
10	Net capital inflow	-143	-130	-69	-71	-54

According to the economic forecast till 2018 the economy of the Russian Federation expects long crisis and devaluation of ruble, which needs to be neutralized due to inflow of the alternative private capitals. The external environment for IBD in the Russian financial market is characterized also by bank crisis and process of sanitation of commercial banks: the credit institution BTA-Kazan is transferred to sanitation to TatFondBank, the Baltic Bank to Alfa Bank, RostBank the BIN to Bank. The Central Bank of Russian Federation has made monetary issue in 110 billion rubles for rehabilitation of the banks. Bank crisis of Russia is characterized by decrease in business activity. Algorithm of operation of the mechanism of adaptation and development of IBD in the Russian financial market is based on the economic forecasts (figure 2):

- strategic objectives of IBD unclaimed by other subjects of the banking system of the Russian Federation;
- sufficient level of studying of scenarios of development of economy of the Russian Federation until 2018;
- reforming of the IBD internal environment in the direction of training and consulting in the conditions of the Russian Federation and Tatarstan;

- activity of IBD has to answer the purpose of the Central Bank of the Russian Federation on stabilization of economic shocks of the last years.

The organizational structure on realization of activity of IBD is offered by the state private partnership as a type of the independent organization, assumes symbiosis of public administration with business activity. In case of acceptance of IBD all necessary rights are provided in:

- issuessukuk;
- performing insurance services - takaful;
- organizations of advance Islamic Financial Products (see the Figure 2).

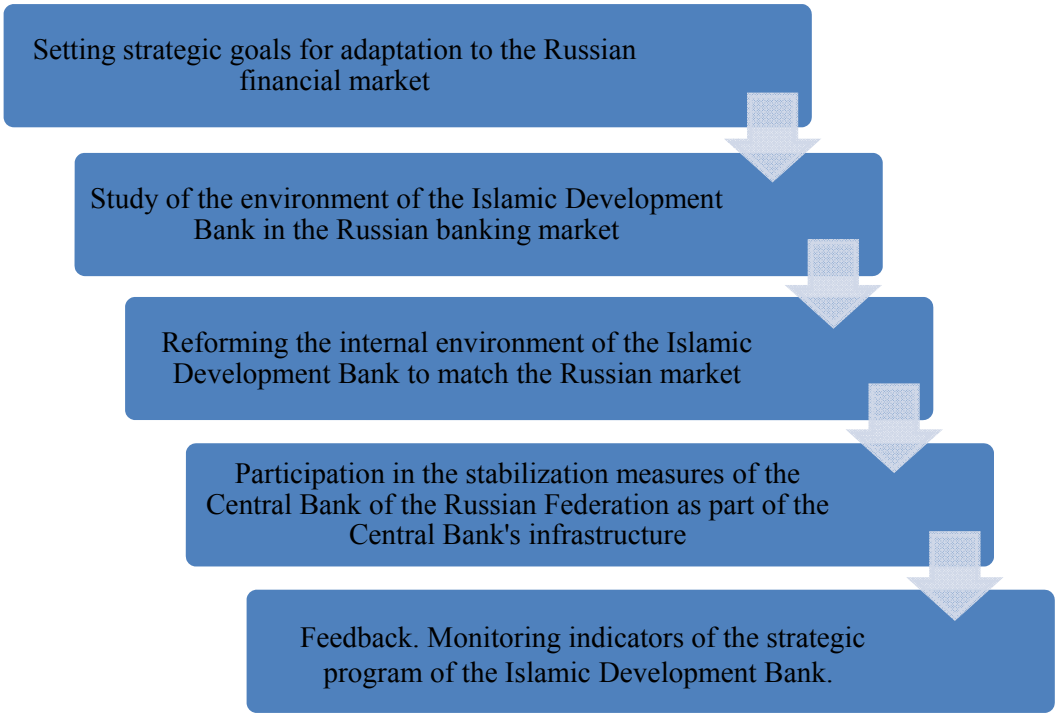

Figure 2 - Algorithm of Operation of the Mechanism of Adaptation and Development of IBD in the Russian Financial Market

Thus, development and adaptation of financial activity of IBD in Tatarstan and other regions of the Russian Federation seems as the strategic program for realization of goals (see Table 2):

Table 2 - The strategic program of adaptation of ibd IN Tatarstan

	Name ProgramActions	Aim	Functions	Tool Market
1	Statement of Strategic Objectives on Adaptation to the Russian Financial Market	Definition Market niches	Goal-Setting	StrategicMarketing
2	Studying of the external environment of IBD in the Russian market of banking services	Fixation risks	Planning actions	Forecasts Scenarios of Development of IBD
3	Reforming of the IBDInternal Environment for Compliance to the Russian Market	Development and Improvement IBDInternal Standards	Organization Quick Changes	Regulations
4	Participation in Stabilization Actions of the Central Bank of the Russian Federation as a Part of Infrastructure of the Central Bank of the Russian Federation	SelectionofInvestment Projects	Organization Financings of Investment Projects	Sukuk Takaful Mudarab Vakala
5	Feedback. Control of Indicators of the IBDStrategic Program.	Definition Effect of Realization Strategic Programs	Compliance Control Actual and Planned Indicators	FactorialAnalysisof IBD Audit.

An implementation of the IBD strategic program it is necessary to carry out three directions (see the

Figure 3):

- activity of securities market with the help the sukuk;
- activity in the market of insurance services on the basis takaful;
-activity of implementation of the state investment programs.

Infrastructure of insurance services in the Russian Federation can be diversified takaful insurance, according to the following economic sense:

- takafulis an alternative type of insurance activity with active participation of insurers in the investment market.

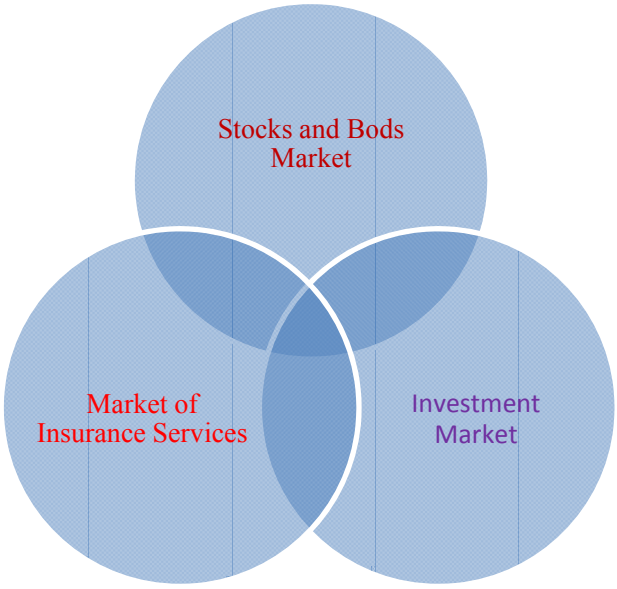

Figure 3 - IBDActivities in the Market of Tatarstan

On the basis of studying of Islamic economy in the sphere we would like to compare takaful insurance with the existing schemes of insurance in the Russian Federation (Table 3):

Table3 - Advantages of TakafulInsurance in Relation to Existing Market of the Russian Federation

	ComparisonParameter	**Takaful**	**Traditional Insurance**	**Mutual Insurance**
1	InsurancePurpose	MutualAid	Profit Effect	MutualAid
2	RisksofInsurance	SpreadRisk	Insurer CarrierofRisks	SpreadRisk
3	Function	CoordinationTakafulFund	Insurance Protection by the Insurer	Coordination InsuranceFund
4	Relation	Partner	Sale and Purchase of Services	Partner
5	Invest	Yes	No	Yes
6	Management	FullParticipation	No Participation in Management	PartialParticipation
7	ActivityControl	State ShariaCouncil	State	State
8	ConsumersofServices	Ethnic Muslims and no Muslims	Traditional Client of Insurance Services	Traditional Client of Insurance Services

"Takafulin Russia expects great success than in the USA. The era of globalization and tolerance promotes strengthening of Islamic financing around the world, where Islamic business has become a norm[2, P.4]. Prerequisites of development of IBD in the Russian Federation existed and ripened rather recently:

- experience of ethical finance is studied by the experts of Islamic economy;
- readiness of IBD for diversification of business for production, according to the standards Halal;

- readiness of the banking sector to accept liquid means of the Islamic countries;
- profitability of deposits of "Amal" of-15%;
- the system of ATMs for the Visa cards;
- demographic growth of ethnic Muslims up to 27 million people in the Russian Federation;
- political factors.

In the conclusion we would like to note, thatextent of the development of Islamic banking system in the Russian Federation is at the level of services of microfinance in a range of the Muslim population. Transition to higher investment step of Islamic banking systemto the Russian Federation is caused by timely creation of large investment Islamic banks for the purpose of sanitation of the current economic shocks. It is necessary to agree with opinion of erudite economists of Russia: "The large companies can be compared to "diamonds in a crown of the developed countries" [3].Investment has to be made in the sphere of production of goods and construction for strengthening of real economy of the Russian Federation and in Tatarstan.

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С. С. Каирденов, Бартоломью Дейа Тортелла

ЭКОНОМИКАЛЫҚ ТАЛЫҚСЫТПА ЖАҒДАЙЫНДАҒЫ РЕСЕЙ ФЕДЕРАЦИЯСЫНДА ЖӘНЕ ТАТАРСТАНДАҒЫ ИСЛАМ ДАМУ БАНКІ ҚАРЖЫ ҚЫЗМЕТІНІҢ ДАМУЫ МЕН БЕЙІМДЕЛУІНІҢ БОЛАШАҒЫ

Түйін сөздер: сукук бағалы қағаздар нарығы, инвестициялық нарық, такафул сақтандыру нарығы, көрсетілетін қаржы қызметтері, исламдық бизнес құрылымдарының қаржы мекемелері, консалтинг, тре-нингтер, исламдық қаржыландыру, эммиссия, банктер.

УДК336.712

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ПЕРСПЕКТИВЫ АДАПТАЦИИ И РАЗВИТИЯ ФИНАНСОВОЙ ДЕЯТЕЛЬНОСТИ ИСЛАМСКОГО БАНКА РАЗВИТИЯ В РОССИЙСКОЙ ФЕДЕРАЦИИ И ТАТАРСТАНЕ В УСЛОВИЯХ ЭКОНОМИЧЕСКИХ ШОКОВ

Аннотация. Исламская экономическая система признает как частную собственность, основанную на личном труде, так и общественную: государственную и кооперативную. Основой производительной деятельности считается труд, а не капитал. Лишение имущества кого-либо недопустимо, за исключением крайних случаев, при условии выплаты полноразмерной, справедливой компенсации. В исламской экономической системе банки выполняют ту же функцию, что и в традиционной западной - компенсация негативных факторов финансовых рынков: пространственной и временной неравномерности спроса и предложения, искажения информации. Функция банков также заключается в обеспечении работы национальных платежных систем и финансовом посредничестве. Первая и главная отличительная особенность инструментов исламского банка от традиционного заключается в его фундаментальном расхождении с работой западного банка по части финансового посредничества. Выполняя роль финансового посредника, любой банк аккумулирует денежные средства вкладчиков, которые в данный момент не используются их распорядителями, и формирует за их счет пассивы в источник финансов для тех лиц и предприятий, которые испытывают дефицит средств. В исламской модели процесс происходит несколько сложнее. Вкладчик и заемщик, в сущности, выступают как агент и принципал соответственно.

Ключевые слова: рынок ценных бумаг сукук, инвестиционный рынок, страховой рынок такафул, финансовыеуслуги, финансовые учреждения исламских бизнес структур, консалтинг, тренинги, исламские финансы,эммиссия, банки.

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SOCIAL RESPONSIBILITY OF BUSINESS: PROBLEMS AND PROSPECTS OF DEVELOPMENT

Abstract. The company's social responsibility (or corporate social responsibility, CSR) is its contribution to economic, environmental and social activities that ensure and support sustainable development, both of the company itself, and of its region of presence and society as a whole. Describing the current state of the theory of sustainable development, it should be noted that at present there is no generally accepted approach to interpreting the essence of this phenomenon and the content of the corresponding concept. Discussions continue on the principles and factors of sustainable development, the legality of using the notion of "sustainable development" in relation to business and a separate business organization, the place of the concept of sustainable development in the system of concepts associated with the issues of corporate social responsibility, the relationship between the concepts of "sustainable development of the company" and "Corporate sustainability".

Keywords: social responsibility, economics, science, security, problems, corporations.

Introduction. The social responsibility of companies does not contradict their desire for maximum profit, but this is not a current, but a promising profit. The participation of the corporation in solving social and environmental problems, in social partnership, in accelerating the development of regions of presence, changes the world for the better and thereby, first, creates better business conditions, increases the purchasing power of consumers, and second, reduces political and social risks, capable to destroy the company, and, thirdly, increase the value of its brand, i.e. market capitalization.

Methods of research. The research was compiled by the works of domestic and foreign leading economists. During the research, the author used methods of system, comparative, factor analysis, as well as methods of statistical analysis of economic processes. In the course of the work, the author used the general methodological principles that enabled him to fully and objectively study the problems. The basis of the research is the system approach, the logic of application, the historical approach, the comparative method, the content analysis of documents and research materials.

The discussion of the results. The social responsibility of private business, non-governmental and charitable organizations, and private individuals is particularly important in the sphere of education. First of all, it concerns helping young people who do not have the opportunity to pay for their education on their own, in order to get a decent education.

Required:

• Create a network of public-private partnerships for the development of higher and secondary education.

• Develop a multi-level system of grants for training.

• Create a system of specialized educational institutions of research and applied education that take into account regional specialization throughout the country.

• Legally enforce compulsory production practices at enterprises, starting with the second year of study at the university.

The social responsibility of a Russian company is determined in accordance with legally stipulated and voluntary actions that are in a constant process of improvement as a result of regular dialogues of the company with stakeholders within the company and outside it. Socially responsible is a company that complies with all the statutory rules and obligations included in the minimum set of attributes of corporate social responsibility, which includes:

- production of high-quality and safe goods and services;
- full payment of all types of taxes;
- payment of regular wages to their employees and making their contribution to their social security;
- compliance with antimonopoly legislation requirements;
- Observance of legislative norms in the field of environmental protection and state requirements for environmentally friendly production;
- ensuring the safety, health and safety of employees, compliance with labor law;
- observance of human rights provided by the Constitution of the Republic of Kazakhstan.

Currently, there are about 30 international standards in the field of CSR in the world. They are designed to assess and manage CSR activities, as well as to report in this area at the corporate level. For more adequate perception and for implementation at the corporate level, these standards should be grouped, for example, into four main groups, depending on the scope and purposes of their use:

- Guidelines and codes of conduct (Amnesty International Guidelines for the Observance of Human Rights for Companies and OECD for Multinational Enterprises, UN Global Compact and others);
- Management systems and certification schemes (Environmental Management and Audit Scheme EMAS, eco-standards ISO 9000 and 14001, standard for assessing social aspects of SA 8000 management systems and others);
- Rating indices (Dow Jones index for sustainable development DJSI, "ethical" indices FTSE4Good, etc.)
- Reporting systems (GRI Global Sustainability Reporting Initiative and AA1000S Reporting Processes)
- Being a voluntary activity of the company, social and environmental reporting and reporting in the field of sustainable development represent a technology and a tool of corporate governance that allows to systematize the company's activities in the non-financial sphere (social, environmental and other programs and initiatives) and improve the quality of strategic and operational management that leads to an increase in the sustainability and manageability of the organization as a whole. Such voluntary open reporting allows the company to demonstrate its commitment to the principles of CSR and sustainable development, to become transparent to society and to provide meaningful information for it in the framework of corporate environmental, social and ethical performance.

The company should create principles and standards (a collective agreement, a code of corporate conduct, etc.) that would take into account the interests of employees, for example, pay staff costs in the event of sickness or injury at work. Such a way of creating enterprises of high social responsibility will be most effective in the conditions of an unformed social security system. Responsibility for the social issues of their own employees will be borne by enterprises, and the state's expenses will be distributed among the poorest layers of the population. Such an approach, although not profitable for business in the short term, but in the long term this will benefit not only business, but the state and the whole society as a whole.

In China, there are government programs to eradicate poverty, help people affected by natural disasters and disasters, sponsorship in education, etc. The Chinese leadership is confident that companies should adopt the state's initiative and take responsibility for financing charitable programs. In countries such as China and Russia, the existence of social programs forces companies to spend money, and enterprises, in turn, write these expenses in balance as expenses for charity, i.e. non-earmarked costs. Unlike the target expenses, charity does not bring profit, which means that shareholders receive less dividends. The question arises: if companies perceive charity as additional costs and do not realize the benefits of their investments, do they correctly understand the phenomenon of social responsibility? And can a company turn social responsibility into a core business and, at the same time, have good financial indicators at the end of the year?

The social responsibility of the enterprise opens up the following perspectives:

1. Improvement of financial indicators - active social policy, transparency of the enterprise in relation to environmental protection and relations with personnel can influence financial indicators. The study showed a direct link between the quality of corporate social responsibility policies and the improvement of its financial performance. The financial indicators of enterprises carrying out an active social policy turned out to be 10% higher than those of other enterprises. The study evaluated eight key indicators, including turnover growth, sales growth, and increase in gross profit for the periods of 1 year and 3 years. The increase in net profit was also estimated.

2. Reduction of operating expenses - in addition to improving financial indicators, the social responsibility policy allows reducing operating expenses. In particular, such results lead to initiatives aimed at improving the environmental safety of production.

3. Improving the image and reputation of brands - great opportunities in the market create conditions in which the choice of consumers of a product or brand is influenced not only by the price of the product and its quality, but also by dozens of other factors. One of the factors of influence, as the research shows, is the reputation of the enterprise as a socially responsible subject. Factors most influencing public opinion about the enterprise: social responsibility of the enterprise (49%), quality and reputation of the brand (40%), business indicators of the enterprise (32%). Social responsibility came to the forefront as a factor shaping the opinion of consumers.

4. Increased sales and customer loyalty - a successful and well-considered policy of social responsibility can significantly affect the level of sales of enterprises and customer loyalty. It should be noted the emerging relationship between the behavior of consumers and the reputation of the enterprise as a socially responsible.

5. Reducing staff turnover, increasing staff loyalty, increasing staff motivation - enterprises that pursue an active policy of social responsibility, attract professionals more easily, reduce staff turnover, and reduce the cost of training employees due to low turnover. In 2010, more than half of graduates of prestigious universities preferred to choose companies that are known for their responsible attitude to society, significant social programs.

6. Reducing pressure from inspection bodies - the publication of principles and policies for employees, the environment, in relations with suppliers, gives an answer to state bodies, which is the approach of the enterprise to these issues. An important role is played by regular social audit.

7. Access to capital - one of the trends of recent years - the growth of so-called socially responsible investments. Summing up, it should be noted that in Russia there are distinct trends in the sphere of small business that in the near future socially responsible enterprises will receive significantly greater competitive advantages in the market than enterprises with a traditional approach to the relationship with society. The impact of social responsibility on competitiveness is constantly increasing.

Thus, social responsibility is a powerful and comprehensive management tool. Moreover, managers and owners of enterprises need to already carry out social investments to get a decent effect in the future and strengthen their competitive positions in the market.

Describing the current state of the theory of sustainable development, it should be noted that at present there is no generally accepted approach to interpreting the essence of this phenomenon and the content of the corresponding concept. Discussions continue on the principles and factors of sustainable development, the legality of using the notion of "sustainable development" in relation to business and a separate business organization, the place of the concept of sustainable development in the system of concepts associated with the issues of corporate social responsibility, the relationship between the concepts of "sustainable development of the company" and "Corporate sustainability".

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БИЗНЕСТІҢ ӘЛЕУМЕТТІК ЖАУАПКЕРШІЛІГІ: МӘСЕЛЕЛЕРІ ЖӘНЕ ДАМУ КЕЛЕШЕГІ

Аннотация. Компанияның әлеуметтік жауапкершілік (немесе корпоративтік әлеуметтік жауапкершілік, КӘЖ) - компанияның және тұтас алғанда аймақтағы және оның қоғамдағы қатысуымен екі тұрақты дамуын қамтамасыз ету мен қолдау, экономикалық, экологиялық және әлеуметтік іс-шаралар, оның үлес болып табылады. тұрақты даму теориясының қазіргі жағдайын сипаттау, ол құбылыстың түсіндіру және тиісті ұғымдардың мазмұнына ешқандай ортақ көзқарас, қазіргі уақытта бар екенін атап өткен жөн. тұрақты даму принциптері мен факторлары туралы дебаттарға, бизнес және жеке бизнесті ұйымдастыру қатысты «тұрақты даму» концепциясын қолдану заңдылығы, корпоративтік әлеуметтік жауапкершілік мәселелеріне байланысты ұғымдардың жүйесін тұрақты даму тұжырымдамасын орны, «компаниясының тұрақты даму» ұғымдары арасындағы қарым-қатынас және «Корпоративтік тұрақтылық».

Түйін сөздер: әлеуметтік жауапкершілік, экономика, ғылым, қауіпсіздік, проблемалар, корпорациялар.

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СОЦИАЛЬНАЯ ОТВЕТСТВЕННОСТЬ БИЗНЕСА: ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ

Аннотация. Социальная ответственность компании (или корпоративная социальная ответственность, КСО) – это ее вклад в экономическую, экологическую и социальную деятельность, обеспечивающий и поддерживающий устойчивое развитие, как самой компании, так и региона ее присутствия и общества в целом. Характеризуя современное состояние теории устойчивого развития, следует отметить, что в настоящее время отсутствует общепринятый подход к трактовке сути этого явления и содержания соответствующего понятия. Продолжаются дискуссии о принципах и факторах устойчивого развития, правомерности использования понятия «устойчивое развитие» применительно к бизнесу и отдельной бизнес-организации, о месте концепции устойчивого развития в системе концепций, ассоциируемых с проблематикой корпоративной социальной ответственности, о соотношении понятий «устойчивое развитие компании» и «корпоративная устойчивость».

Ключевые слова: социальная ответственность, экономика, наука, безопасность, проблемы, корпорации

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NEW APPROACHES OF THE PROTECTION OF THE WOMEN'S AND CHILDREN'SRIGHTS IN THE REPUBLIC OF KAZAKHSTAN

Abstract. At the beginning of the new third millennium the special attention was paid to the problem of women'srights. There are many reasons. Processes of democratization of the society, political and economic transformations in the countries of Central Asia have created both new opportunities, and obstacles in the sphere of achievement of gender equality. From the point of view of law,the feminism represents the special interest as the theory of gender equality, which is the base of the women'smovement. We would liketo note, that in the late 70-th of the XX century the feminist movements have gained mass character. The feminism, inspired by the socialist ideals, proclaimedthe struggle against all forms of exploitation, including the exploitation of women. Now it is quite necessary to createthe democratic law-abiding state, withthe functioning of the stable non-governmental sector, which will provide, together with the public authorities, free and real participation of citizens in decision-making processes and management of social policy. We would liketo note, that the special role in the development of civil society belongs to women's non-governmental organizations as the real public power, capable to influence on the legal policy of the country today. That's why the strong legal baseis quite necessary, with the stable legislation, which will allow to the women's organizations to develop and participate in the political life of the society.

Keywords:feminism movement, children's and women's rights, gender equality, Central Asia, Kazakhstan, women's non-governmental organizations,gender statistics,Strategy of Gender Equality,institutionalizationof gender policy, realization of children's rights.

In the beginning of our article we would like to list the international documents in the field of the protection of women's and children's rights. There are: Convention of the United Nations "On elimination of all forms of discrimination against women", it was ratified in 1998; Convention "On the political rights of women", it was ratified in 2000; Convention "On nationality of the married women", it was ratified in 2000; Convention of the International Labor Organization "On equal remuneration of men and women for work of equal value", it was ratified in 2000.

In the Republic Kazakhstan was adopted the Law "About the State Guarantees of the Equal Rights and Equal Opportunities of Men and Women", itwas adopted in 2009. In Article 10 of this law was fixed the participation of employers in ensuring the equal rights and equal opportunities of men and women in the sphere of work, job. The equal rights and equal opportunities in the sphere of the labor relations are guaranteed to men and women, including:

- execution of an employment agreement;
- equal access to vacant workplaces;
- questions of professional development, retraining and promotion.

Adoption of this law has transferred Kazakhstan to the new level of gender policy and achievement of gender equality.

The famous researcher of the feminist movement I.V. Krykova has studied the peculiarities of the provision of women's rights during the pre-revolutionary period, formation of the legal status of women in the Central Asia and Kazakhstan [1, P.15].

In our country the question of maintenanceof the gender statistics means the division of statistical data through the position of men and women in all important spheres, regulated relatively recently. In the Republic Kazakhstan has published annual collection of the statistical information named "Men and women".

Besides, in Kazakhstan in the cases of violence against the women was created the new form of the statistical report, which allows to analyze and generalize not only the types and forms of violence, but also the persons, victims of violence, their appearance, etc.

Seventeen years ago, in 2001, the Department of Public Safety was created in the Ministry of Internal Affairs of the Republic of Kazakhstan. It has an automatic database about the women's violence. It obtains the information on many parameters: reasons and consequences of commission of violence, age, physical health, etc.

Also in Kazakhstan was created the mechanism of public monitoring of the situation in this field. The purpose of public monitoring is definition of an assessment of the results of the regular process of collecting and analysis of comparative information about the situation. This allows answeringthe following questions: how effectively governmental bodies work in such specific sphere, how do they planned to eliminate the homicide,how the real requirements of the population correlated to new realities, how effectivethey spend the budget for the struggle with domestic violence.

In November 29, 2005, № 1677Strategy of Gender Equality in the Republic of Kazakhstan for 2006-2016 was adopted by the Decree of the President of the Republic of Kazakhstan N.A. Nazarbayev.It is the fundamental document, which directed to the realization of long-term gender policy of the state, the instrument of its realization and implementation of monitoring from the state and civil society, as an important factor of formation of democracy. Each section of Strategy of Gender Equality in the Republic of Kazakhstan has included the indicators, developed at the same time with the regional office of UNO Women's fund (UNIFEM) for the achievement of gender equality in policy, economy, education, family, healthcare and prevention of the violence against the women and children.

Strategy of Gender Equality in the Republic of Kazakhstan consists of 9 sections, in which were fixed: the strategic actions for achievement of gender equality in the social and political life, economy; implementation of legal and gender education; strengthening of reproductive health of men and women; prevention of violence in the society; achievement of gender equality in family; strengthening of family and increase the role of education in family; development of gender-sensitive public consciousness.

Each section of Strategy of Gender Equality in the Republic of Kazakhstan contains considerable descriptive part on the different problems, with the indication of the purpose, analysis of the situation, possible risks and strategic tasks and actions. Certainly, the value of this document consists from the detailed study of each problem in the field of gender equality.The basic concepts, such as "discrimination on the basis of sex", "direct and indirect discrimination", concepts of "the equal rights" and "equal opportunities" wereanalyzed in this document [2].

In 1995 in the Republic of Kazakhstan was created Advisory Body - Council for Problems of Family, Women and Population Policy by the President of the Republic of Kazakhstan N.A. Nazarbayev.In 1998 was created National Commission on Affairs of Family and Women bythe President of the Republic of Kazakhstan N.A. Nazarbayev.In 2006 was created NationalCommission on Affairs of Women and Family Population Policy by the President of the Republic of Kazakhstan N.A. Nazarbayev.In the Republic of Kazakhstan,in the first state of the CIS,such regulations in the sphere of gender policy were adopted.

Later, in 2009, Law of the Republic of Kazakhstan"About Prevention of Domestic Violence" was adopted. With adoption of this Law "About Prevention of Domestic Violence" the Republic of Kazakhstan was recognized as the state, which pays larger attention to this problem and elaborates the mechanisms of the effective protection of the women's and children's rights.

Gender equality and the protection of women's and children's rights, especially in the developing countriesare most vulnerable. There arethe fundamental principles of the United Nations Organization. These rights cut across all aspects of the UNO's work and are crucial to long-term progress, including achievement of the Millennium Development Goals. The rights of women's and children's have often been promoted in isolation from one another. Separate international treaties have been forged and specialized UNO agencies, government ministries and non-governmental organizations, created for whom women or children are the primary focus. It is quite necessary to explore the human rights links between these two groups (women andchildren), the practical implications of considering them together [3].

In this article we would like to explain, howto provide the conceptual framework for understanding human rights. That's why we need to make a brief look at the evolution of the women's and children's rights movements and explains why an emphasis on women in development eventually gave way to a

focus on gender equality. Moreover, we need to describe the legal instruments and mechanisms, which have been created to protect and promote women's and children's rights.First of all, it is necessary todistinguish among them the Convention on the Elimination of All Forms of Discrimination against Women and the Convention on the Rights of the Child. Theyshow where the rights of women and children intersect and how both conventions and the committees that monitor them can be successfully employed to safeguard these important rights.

Every person has rights simply by virtue of being human. These rights - universal legal guarantees that represent the minimum standards required for individuals to live in dignity and with equal opportunity - cannot be taken away. Since the Universal Declaration of Human Rights was adopted in 1948, human rights have become codified in international, regional and national legal systems. Human rights law obliges states to do certain things and to refrain from doing others. For example, states have an obligation to provide every individual with the opportunity for education. At the same time, they have the duty to reject any action that may result in discrimination against a group of individuals in exercising that right on the grounds of race, colour, sex, language, political or other opinion, national or social origin, property, birth or other status. Under international human rights law, states have the obligation to respect, protect and fulfil human rights. The obligation to respect means that states must refrain from interfering with or curtailing others' enjoyment of their human rights through laws, policies, programmers or practices. The obligation to protect requires them to safeguard individuals and groups against human rights abuses by others. The obligation to fulfil means that states must take positive action to facilitate the enjoyment of basic human rights through the creation of relevant procedures and institutions, the adoption of laws and policies, and by ensuring enforcement and adequate funding.

In 2005 in the Republic of Kazakhstan was adopted the Law "About the State Social Order", in whichwas fixed the mechanism of budget financing of NGO's, including women's organizations and movements, support of the important programs and projects in this field.

There are two sidesin estimationof the value of Kazakhstan into the mechanism of the state social orders and its influence on development of gender NGO's: positive and negative. The positive side means, that the Kazakhstan's NGO'shave receivedthe stable financing of their activity and participation in the social state programs. It allows to the different NGO'staking part in grants, foreign trips, etc.The negative side means the suspicious financing of some foreign NGO's with the meansof so called"dirty money".

Human rights are universal. They apply equally to men and women, girls and boys. Women, for example, are entitled to the same rights to life, education and political participation as men. However, in practice, these rights are violated every day in multiple ways - in virtually every country in the world. Gender equality and women's rights are key elements in the Universal Declaration of Human Rights. Yet it was later recognized that certain rights are specific to women, or need to be emphasized in the case of women. These rights are outlined in subsequent international and regional instruments, the most important of which is the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW).

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)was adopted about forty years ago, in 1979, and entered into force two years later, in 1981. It defines the right of women to be free from all forms of discrimination and sets out core principles to protect this right. It also establishes an agenda for national action to end discrimination and provides the basis for achieving equality between men and women. It does so by affirming women's equal access to - and equal opportunities in - political and public life as well as education, health and employment. The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) is the only human rights treaty that affirms the reproductive rights of women.

By February 2010, The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) had been ratified by 186 States - more than most other international treaties. The Optional Protocol to The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), which entered into force in December 2000, lays out procedures for individual complaints on alleged violations of the Convention by States parties. It also establishes a procedure that allows the Committee that monitors implementation of the Convention to conduct inquiries into serious and systematic abuses of women's human rights in countries.

Gender roles and expectations are often identified as factors hindering the full realization of women's and girls' rights, with adverse consequences for entire families.Understanding how gender plays out in

specific situations is therefore a necessary first step in addressing certain problems, and should generally be carried out when planning and implementing any development project. Such an analysis does not focus on women or men per se, but rather on the relationship and power dynamics between them - their differing roles, responsibilities, opportunities and needs.

By the way, the Declaration of the Rights of the Children in its sixth principle says:"The child for his comprehensiveand harmonious development needs love, respect and understanding. He has the possibility togrew upin the good conditions, with the parents and in the atmosphere of love, moral and material security.

I.I. Lukashukwrote: "The International Law has provided the following principles: a) no illegal intervention in implementation of human rights and freedoms, private life; b) all forms of physical or mental violation abuse; c) economic and labor exploitation are prohibited; d) no illegal drugs and psychotropic substances; e) prohibitionof all forms of sexual exploitation and pressure; e) nohumiliatingpunishment. Thus, the child has to be protected from all negative both physical, and moral influences" [4, P.133].

Recognition of children's rights grew out of the wider crusade for human rights, specifically those of women. Indeed, perceptions of the two groups were largely similar early on. In the 18-th century, for example, both women and children were generally regarded as a form of property.The 19-th century marked the birth of the 'child-saving' movement, which spurred the growth of orphanages, the development of schooling, and the construction of separate institutions, including juvenile courts for children in conflict with the law. Still, children were perceived largely in terms of their usefulness to adults: their purpose was to carry on the family name and to look after the elderly.

Every individual has rights. However, as with women, certain rights are specific to children or need to be reinterpreted in the case of children. These rights are outlined in the Convention on the Rights of the Child. The Convention was adopted in 1989, ten years later after The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)- and entered into force in 1990. The framers of the Convention recognized that those under 18 years of age have specific needs. Moreover, they wanted to make certain that the world recognized that children have human rights, too. The Convention on the Rights of the Child spells out the basic human rights of children worldwide: the right to survive; to develop to the fullest; to protection from harmful practices, abuse and exploitation; and to participate fully in family, cultural and social life. The four core principles of the Convention are non-discrimination; the best interests of the child; the right to life, survival and development; and respect for the views of the child. Every right spelled out in the Convention is inherent to the human dignity and harmonious development of every child.

There are the followingnon-governmental children's organizations in the Republic of Kazakhstan: "Center of support of children", "Childhood without borders", "Association of mothers having many children Gibrat", "Public association Dostar", etc.The mission of these organizations is to activate and involve the children and teenagers in different sport sections, school clubs in order to createthe civil society.

Activity of such centers is directed into: the analysis of position of children and teenagers in Kazakhstan, reform of juvenile justice and protection of the child, educational seminars (economic, psychological, legal) for the development of potential of children, development of the persons, talents and physical abilities of children, and also work with their parents.

The lives of women and children are tightly knit, as are their rights. Women and children have both been subjected to discrimination, so they share that experience. But it is also true that women's health and social and economic status - even before a child is born – is directly related to a child's prospects for survival and development. Historically, women have been the primary caregivers of children, and resources put in their hands are more likely to be used to benefit children than those given to men. Discrimination against women is thus detrimental not only to women themselves, but also to the next generation. Protecting women's rights is important in itself. But it also tends to reap benefits for their children. Conversely, protecting the rights of children - particularly girls - is the first step in promoting gender equality for women. The stereotyping of gender roles and gender-based discrimination begins in childhood. Efforts to support gender equality must start there and address the roles of girls and boys, men and women, in the household. Advocating for women's rights has been essential to advancing the situation

of women worldwide. The same holds true for the promotion of children's rights and improvements in their ability to survive and thrive. However, if the rights of women and children are considered together, they can reinforce each other and make mutually supportive demands on society.

N.M. Rimashevskaya notes: "The cultural rules and social norms that influence the behavior of females and males are often felt most acutely as a young person moves into adulthood. The double burden of being both young and female relegates millions of adolescent girls to the margins of society where their rights are disregarded and their safety is denied. Girls, in general, face a host of disadvantages. Although many more girls are receiving a basic education, they are often denied the same opportunities as boys, treated as inferior and socialized to have low self-esteem. The damage is often compounded by the fact that girls across the globe are more likely than boys to experience sexual abuse. Addressing gender discrimination faced by adolescent girls is crucial to their development and to the realization of their rights" [5, P.10].

Women's rights are also closely linked to those of their adolescent daughters. Empowered women who enjoy the same rights as their husbands or partners are important role models and are more likely to safeguard their daughters' rights. Typically, it is economic, social and cultural subordination within the family that inhibits many women from claiming even their most basic civil and political rights. Thus, the importance of eliminating discrimination against women is paramount, especially in the private sphere of the home.

In the conclusion we will note that motherhood, the childhood, family represent the complex system of the social factors of the society.Protection of motherhood and childhood is one of the priority problems inthe Republic of Kazakhstan, especially in the recent 26 years of the sovereign development through the planned economy to the market economy.

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З.К. Аюпова, Д.Ө. Құсайынов

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДАҒЫ АНА МЕН БАЛА ҚҰҚЫҒЫН ҚОРҒАУДЫҢ ЖАҢА ҚЫРЛАРЫ

Аннотация.Үшінші мыңжылдықтың басында әйелдер құқығы мәселесін қамтамасыз етуге деген баса көңіл аударушылық байқалады. Әріне, ол кездейсоқ емес. Орталық Азия елдерінде қоғамның демократизациялау процессі, саяси-әлеуметтік реформалар қоғамды жетілдіруге жаңа мүмкіндіктер әкелді, сонымен қатар олардың барлығы гендерлік тепетендікті жүзеге асыруға жол ашты. Құқықты қамтамасыз ету жағынан феминизм жыныстар тепе-тендігі теориясы ретінде белгілі дәрежеде өзекті мәселе, оның негізінде әйелдер еркіндігі үшін жасалатын іс-әрекеттер жатыр. Егерде еске түсірсек, феминистік қозғалыс XX-сы ғасырдың 70- жылдары жалпылық сипат алды.Социалистік идеалдармен қаруланған феминизм, өзінің мақсаты ретінде қанаудың барлық түрлеріне қарсы күрес бағытында қалыптасты, сонымен бірге әйелдерді қанаудың жалпылама түрі ретінде көрініс тапты. Қазіргі кезеңде, құқықтық демократиялық тұрақты мемлекет құрудың аса қажетті жағдайы ретінде біз мемлекеттік емес секторды қалыптастыру әдістерін айтамыз, бұл қозғалыстар мемлекеттік ұйымдармен бірге азаматтардың еркін және реалды құқықтарын қорғап, мемлекеттік басқару ісіне, шешімдер қабылдауға қатынаса алу мүмкіндігі туады. Көңіл аударатын жай, азаматтық қоғам даму барысында басты рольге әйелдер қозғалысы ие, олар қоғамдағы реалды күш болып саналады, елдің құқықтық саясатына тікелей әсер етеді. Сондықтан да әелдер қозғалысының еркін дамуы үшін, қоғамның саяси өміріне қатысуы үшін, оның заңнамалық және құқықтық негізі қалануы қажет.

Түйін сөздер: феминистікқозғалыс, ана мен бала құқығы, гендерлік тепетендік, Орталық Азия, Қазақстан,мемлекеттік емес әйелдер ұйымы, гендерлік статистика, гендерлік тепетендіктің стратегиясы, гендерлік саясатты институционализациялау, балалар құқығы жүзеге асыру.

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НОВЫЕ ПОДХОДЫ ЗАЩИТЫ ПРАВ ЖЕНЩИН И ДЕТЕЙ В РЕСПУБЛИКЕ КАЗАХСТАН

Аннотация. В начале нового третьего тысячелетия наблюдается особое внимание к проблеме обеспечения прав женщин. И это не случайно. Процессы демократизации общества, политические и экономические преобразования в странах Центральной Азии создали как новые возможности, так и препятствия на пути достижения гендерного равенства. С точки зрения права феминизм представляет определенный интерес как теория равенства полов, лежащая в основе движения женщин за освобождение. Отметим, что в конце 70-х гг. XX века феминистические движения приобрели массовый характер. Феминизм, вдохновляемый социалистическими идеалами, основной целью провозглашает борьбу со всеми формами эксплуатации, в том числе с эксплуатацией женщин, понимаемой весьма широко. В настоящее время необходимым условием построения демократического правового государства является формирование и развитие устойчивого неправительственного сектора, который позволит обеспечить, наряду с государственными органами, свободное и реальное участие граждан в принятии решений и управлении социальными процессами. Отметим, что особая роль в развитии гражданского общества принадлежит женским неправительственным организациям, которые сегодня являются реальной общественной силой, способной влиять на правовую политику страны. В связи с этим необходима прочная правовая база, стабильное законодательство, позволяющее женским организациям самостоятельно развиваться и участвовать в политической жизни общества.

Ключевые слова:феминистское движение, праваженщинидетей, гендерноеравенство, Центральная Азия, Казахстан, неправительственные женские организации, гендерная статистика,стратегия гендерного равенства, институционализация гендерной политики, реализация прав детей.

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CLUSTERING DIRECTIONS OF INNOVATIVE DEVELOPMENT AND ITS PRIORITY DEVELOPMENT IN KYZYLORDA OBLAST

Abstract: In this article the prior directions of innovative development of Kazakhstan economy are identified, the study of present situation of innovative activity is examined and also the cluster directions of regional innovative development is thoroughly discussed.

Clusters are the agglomeration of the managing and controlling agencies in real economic space, research institutions, services and goods. clusters represent partnerships between companies and organizations in which they are interconnected, in a vertical and horizontal communications. In economic science the term "cluster" received the greatest popularity thanks to works of the author of the theory of competitiveness of professor of Harvard University Michael Porter. Also in article were noted the countries where clusters already successfully work and are given the reasons of creation of a cluster. The author gave the main directions of creation and development of a cluster in the Kyzylorda region. These include clusters such as the fish cluster, the rice cluster, the oil and gas cluster, the construction cluster and the tourism cluster.These spheres are the most priority for our region.

Keywords: innovation, know-how, cluster, competitiveness.

It is known that in the modern world there are three models of development: innovation, technological and raw materials. The goal of innovation is to get new knowledge (know-how). So the final product will be extraordinary and expensive. The technological model allows quick return, as the finished products of "others" are taken and money is invested in new progressive processes and products. At the same time, the technological model and, accordingly, the development of a particular national economy will depend on the know-how of other countries. Raw material exports focus on commodity exports, which leads to economy stabilization and poverty reduction [1].

At present many countries, which have turned into leaders of the world economy, which have shown vivid examples of the development of innovative systems and high technology. These countries have gone through all the industrial stages, which include the extraction of raw materials, its primary processing, and the receipt of finished products, and are now engaged in the formation of a post-industrial economy based on high technology and innovation. In other words, they completely formed a chain of a benefit and provided the market with knowledge-intensive and innovative products.

Countries have different ways of innovative development, depending on the level of socio-economic development and on national cultural peculiarities.

The global innovation index is a global study and the accompanying rating of the countries of the world according to 80 indicators of innovative development.

The Global Competitiveness Index (Global Competitiveness Index) is a global study and the accompanying rating of the countries of the world in terms of economic competitiveness. The competitiveness index assesses the ability of countries to ensure a high level of well-being of their citizens, which primarily depends on how effectively the country uses their resources. Common accessible statistic data is worked out using the results of global questionnaire of company managers, worldwide economic forum resolutions, cooperative collectives, scientific-research institutes and analytical organizations. At the same time, to maintain a standard of living in a free market, it is usually necessary to improve constantly labor productivity and quality of goods and services. Kazakhstan has been participating in these studies since 2012.

As a result of research conducted within the framework of the Global Competitiveness Index in 2017, Kazakhstan ranks 84th place in the rating of the innovation factor at 25 positions. This is one of the most

important indicators of the country's competitiveness. In my opinion, this case is connected with a reduction in the costs of research and development and practical works on the factor of innovation and a reduction in government purchases of high-tech products. In this regard, it is important to analyze the current state and prospects of innovative development of Kazakhstan. At present, Kazakhstan has left the raw material economy on the path of innovative development, and has moved to the stage of the formation of an industrial and innovative economy. For modern countries that seek to master the best practices of the world economy and rationally use it, the key issue is the formation of an industrial and innovative economy. We rely on several quantitative and qualitative indicators to determine how the state successful in innovation policy. Indicators of the current level of global innovations and technologies in Kazakhstan indicate that our country is much lower than the global level. However, considering that Kazakhstan has a relatively recent path of innovative development, these figures should be guided in the future. The following elements of industrial and innovation infrastructure in Kazakhstan are presented in accordance with the Law of the Republic of Kazakhstan "On State Support of Industrial and Innovative Activity" dated January 9, 2012 No. 534-IV:

- Special economic zones;
- Industrial zones;
- Techno parks;
- Joint-stock investment funds for risky investments;
- Centers for the commercialization of technologies;
- Branch design bureaus;
- International technology transfer centers;
- Innovative clusters.

As for the institutional structure, which is a key element of the innovation infrastructure, currently there are 8 oblast technology parks, 9 special economic zones, 4 industrial design bureaus, 4 international technology transfer centers, 21 commercialization offices, 18 international and 4 domestic venture funds [2].

In addition, on August 1, 2014, by the Resolution of the President of the Republic of Kazakhstan, the State Program "Industrial and Innovative Development of the Republic of Kazakhstan for 2015-2019" was adopted and implemented.

The program analyzed economic sectors using a two-factor model method. First, the market prospects of each sector in the private market, including the macroeconomic market, and the potential economic consequences of the sector development are taken into account. Secondly, the opportunities of this sector of the Republic of Kazakhstan are taken into account, including the current level and development prospects.

According to the analysis, six main manufacturing sectors were selected: metallurgy, chemistry, petro chemistry, engineering, building materials, food industry, which were divided into 14 sectors:

1) ferrous metallurgy;
2) non-ferrous metallurgy;
3) oil refining;
4) oil and gas chemistry;
5) food production;
6) agro chemistry;
7) production of chemicals for industry;
8) manufacture of motor vehicles, their parts, spare parts and engines;
9) production of electrical machines and electrical equipment;
10) production of agricultural machinery;
11) manufacture of railway equipment;
12) manufacture of machinery and equipment for the mining industry;
13) manufacture of machinery and equipment for the oil refining and oil industry;
14) production of building materials [3].

At present, the number of enterprises in the innovative sector of the Republic of Kazakhstan is growing. The following figure shows the level of innovative enterprises in the Republic of Kazakhstan (Figure 1).

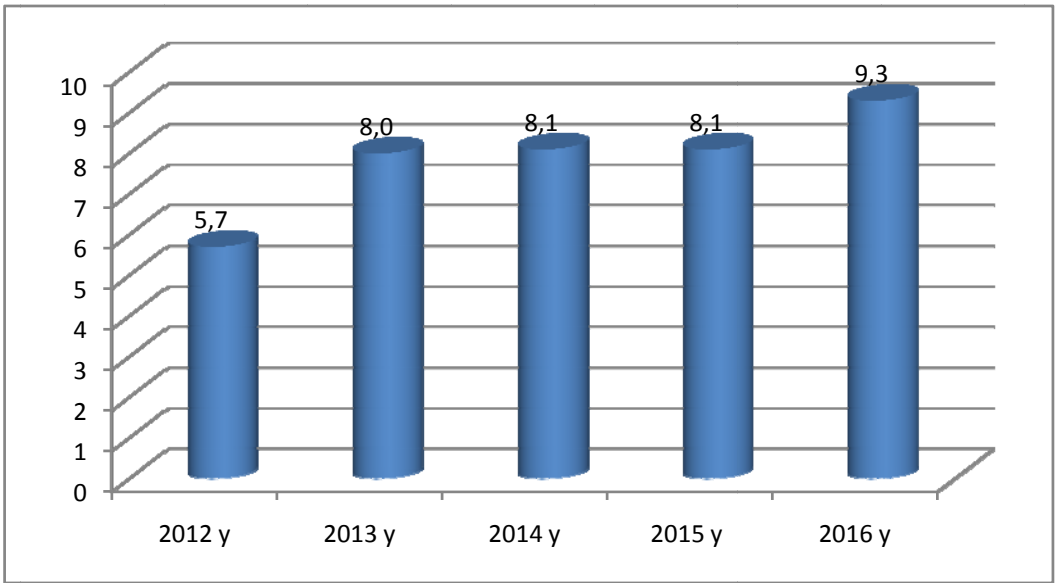

Figure 1 - The level of innovation-active enterprises in the Republic of Kazakhstan,%

As can be seen from the figure, in recent years the level of innovative enterprises in Kazakhstan has increased significantly. It should be noted that in 2012 the number of active innovation enterprises was only 5.7%, and in 2013 the growth was 9.3% in 2016.

The following table shows the level of innovation in the oblasts of the Republic of Kazakhstan (Table 1).

Table 1 - Level of innovative enterprises in the Republic of Kazakhstan by oblast, in%

Name of the oblast	**2012**	**2013**	**2014**	**2015**	**2016**
The Republic of Kazakhstan	**5,7**	**8,0**	**8,1**	**8,1**	**9,3**
Akmola oblast	4,6	7,1	7,3	6,8	7,0
Aktobe oblast	4,0	6,5	7,6	7,0	9,3
Alma-Ata's oblast	5,4	9,5	9,4	6,9	7,8
Atyrau oblast	4,4	5,1	8,1	8,0	8,5
West-Kazakhstan oblast	7,5	5,3	6,6	4,1	3,6
Jambyl Oblast	7,9	10,2	12,2	10,6	10,8
Karaganda oblast	3,8	7,6	8,4	9,2	10,6
Kostanay Oblast	7,1	11,8	13,6	14,5	11,2
Kyzylorda Oblast	5,3	12,0	10,1	11,7	11,2
Mangistau oblast	1,1	2,4	3,4	4,0	4,1
South-Kazakhstan oblast	5,0	6,4	7,0	6,9	6,6
Pavlodar oblast	4,1	6,4	6,9	4,8	6,5
North-Kazakhstan oblast	10,4	10,9	11,6	10,6	11,3
East Kazakhstan oblast	6,2	5,6	7,6	11,5	14,9
Astana city	6,8	11,1	10,7	13,2	13,6
Almaty city	6,7	8,0	5,0	4,7	7,6
Footnote - based on the data [4]					

When analyzing the table data, the share of innovatively active enterprises in Zhambyl, Kostanay, Kyzylorda, North Kazakhstan oblasts and Astana is constantly high. The share has increased over the past two years in East Kazakhstan and Karaganda oblasts. The smallest share of innovative active enterprises belonged to the West Kazakhstan and Mangistau oblasts.

The following figure shows the contribution of innovative products to GDP (Fig. 2).

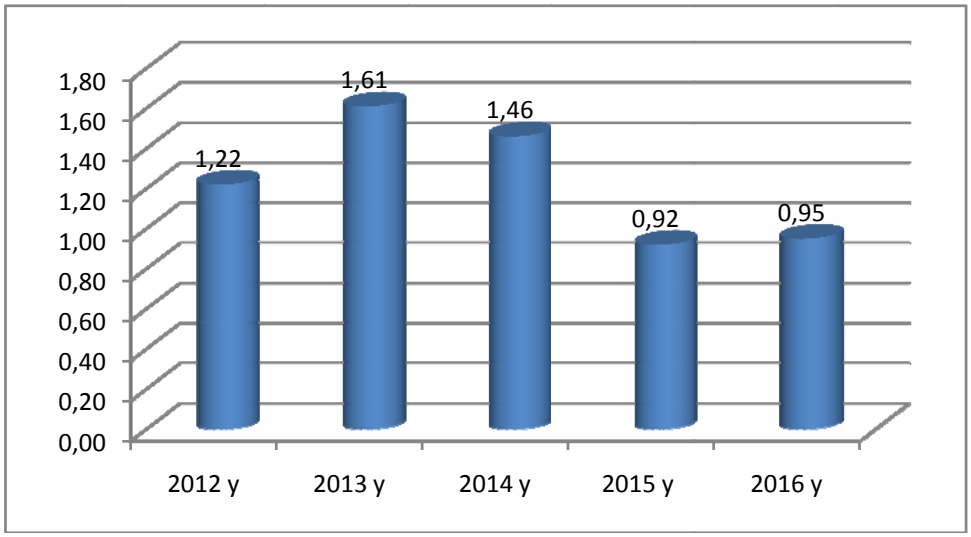

Figure 2 - Share of innovative products in GDP,%

As can be seen from the figure, the share of innovative products in GDP in the last two years of the analyzed period slightly decreased to 0.92% in 2015 and 0.95% in 2016.

The following figure shows the dynamics of internal costs for research and development (Figure 3).

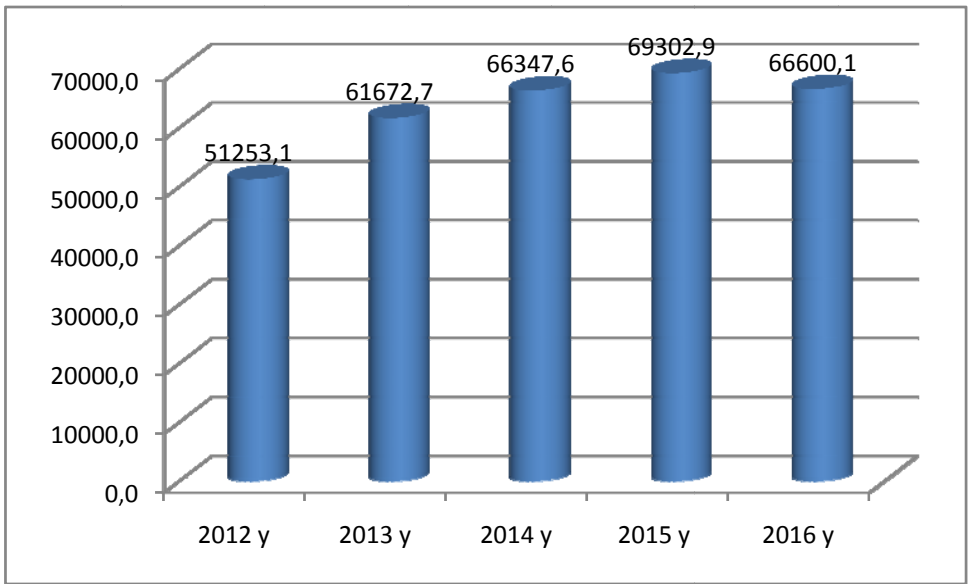

Figure 3 - Dynamics of internal costs for research and development, shown in million tenge.

Domestic spending on research and development in 2012 amounted to 51.2 billion dollars. In 2015, KZT 18.0 billion tenge of 69.3 billion tenge. In 2016, domestic expenses increased by 14.8 billion compared to 2012. 2,7 billion tenge in comparison with 2015, which is 66.6 billion tenge.

The following figure shows the dynamics of technological innovation in the industry (Figure 4.)

As can be seen from the figure, the cost of technological innovation in the industry over the reporting period has significantly increased compared to previous periods. In 2012, the volume of expenditures for this indicator was 168.5 billion KZT. In 2015, 503.4 billion KZT, gradually increasing in subsequent periods. In 2016 – 1390.5 billion tenge.

The following table shows the innovation performance of manufacturing enterprises in the field of technological innovation.

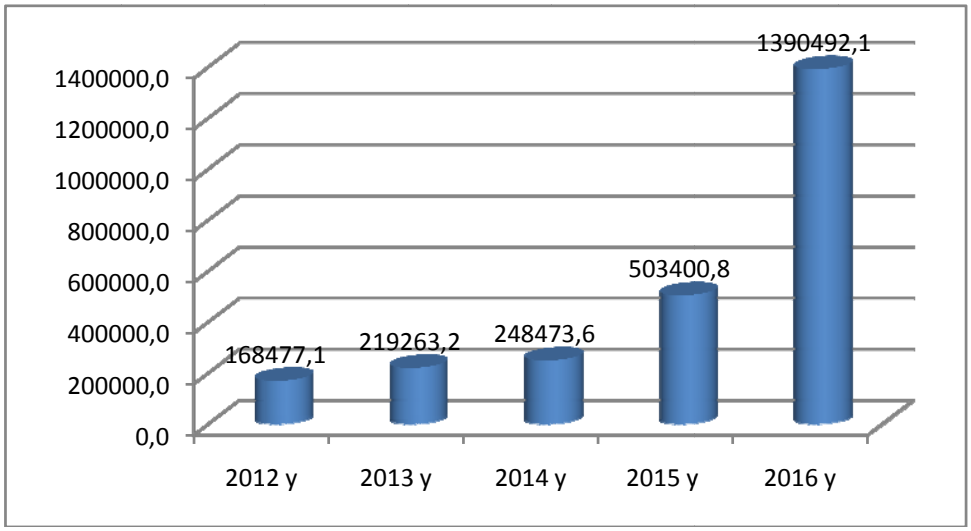

Figure 4 - Dynamics of technological innovation in industry, in million tenge.

Table 2 - Indicators of innovation activity of manufacturing enterprises on technological innovations

	Number of enterprises - total, in units	including innovations	Level of activity in innovation,%
Republic of Kazakhstan	4 367	460	10,5
Akmola oblast	189	20	10,6
Aktobe oblast	153	25	16,3
Almaty oblast	345	47	13,6
Atyrau oblast	80	10	12,5
West Kazakhstan oblast	116	13	11,2
Zhambyl oblast	138	16	11,6
Karaganda oblast	434	24	5,5
Kostanay oblast	218	24	11,0
Kyzylorda oblast	71	7	9,9
Mangystau oblast	104	5	4,8
North Kazakhstan oblast	375	49	13,1
Pavlodar oblast	262	23	8,8
South Kazakhstan oblast	129	23	17,8
East Kazakhstan oblast	359	59	16,4
Astana city	350	26	7,4
Almaty city	1 044	89	8,5
Footnote– based on data [4]			

If we analyze the data of the table, we will see that in the reporting period 10.5% or 460 companies from 4 367 enterprises are innovative. Almaty (89), East Kazakhstan (59), South Kazakhstan (49) and Almaty oblast (47), occupies leading positions.

According to the results of recent analyzes, the share of innovative products in GDP in recent years has decreased, and the level of innovative active enterprises is growing. This, of course, demonstrates the country's potential for innovative development.

In this regard, innovation development is important in the context of the country's economic development. One of the priorities of the innovation policy is the cluster principle. At the moment, it is important to consider the economy as a cluster rather than a traditional classification of companies in sectors or sectors.

Clusters are the agglomeration of the managing and controlling agencies in real economic space, research institutions, services and goods [5].

In the economy, the cluster concept includes a group of businesses and research centers, universities, and other organizations that have a regional affiliation with a particular industry. Also, businesses and

organizations owned by a particular cluster are in close contact. Thus, in general, clusters represent partnerships between companies and organizations in which they are interconnected, in a vertical (buyer-seller) and horizontal (technologies, services, knowledge) communications [6].

In the economic science, the term "cluster" is widely recognized by the work of Michael Porter, the author of the theory of competitiveness of Harvard University professor.

The cluster system of economic development is successfully developing in the following countries: Denmark, Germany, Great Britain, Japan, France, USA, Malaysia, Singapore, Ireland, Morocco and others.

According to Michael Porter, "Competitiveness is a productive one. Ability to produce high quality products. However, as no state can be productive in all spheres, it is necessary to find areas that are the strong points of the country. That is, find the industry where you can create a cluster. However, one cluster can not be considered as important than the other. Choosing the potential clusters is important. "

Close partnerships between cluster companies can be reflected in the exchange of resources, information and technology, and joint issues. This is primarily due to the fact that companies are encouraged to increase their productivity and improve product quality. As a result, they attract more customers and increase profits. World practice shows that cluster companies are successfully operating more than businesses that are truly isolated [7].

Clusters can be created by state-owned companies without the intervention of the cluster, or by government support. At the same time, the clusters are owned by the government, with the participation of or participation in government involvement. Government agencies are involved as business partners.

The following can be the pushed power to create clusters:

- Access to natural resources;
- access to qualified workforce;
- proximity to markets;
- availability of necessary infrastructure and supporting industries (suppliers);
- proximity to research centers.

State authorities, in turn, can encourage the creation of clusters by means of the following state measures [8]:

- creation of favorable conditions for general development of industry;
- creation of necessary infrastructure;
- development of research and development work;
- creating conditions for the development of information exchange;
- elimination of administrative barriers;
- to encourage the creation of clusters through financial and economic methods.

Cluster development is important. In our region, there are several possible ways to create and develop clusters. Among them are fish cluster, rice cluster, oil and gas cluster, construction cluster and tourism cluster. Cluster clusters are key areas for our region.

When creating a fishery cluster you can add the following components [9]:

- irrigation of lake systems;
- expansion of fishery places;
- protection and proper use of fish stocks;
- industrial fishery;
- production of glass boats;
- processing of fish products;
- network of finished products;
- development of scientific potential;
- Training of personnel.

Kyzylorda region is the main producer of rice in our country. The development of the rice cluster may include:

- machine-technological station, agricultural credit associations, subsidies;
- training of personnel;
- development of scientific potential;
- manufacturers of elite cereals;

- producers of rice products;
- rice processing industry;
- processing of basic waste;
- Network for the production of products [10].

The construction industry is dynamically developing due to the increase in the volume of housing construction in the private sector and the possible increase in loans for housing construction. In this regard, it is proposed to create a construction cluster in our region. For this purpose in the region there is a sufficient material and material base for the development of housing, natural resources (construction, glass sand, limestone, dolomite, etc.).

In addition, it is possible to propose creating a cluster of tourism in our region. In the creation of a tourism cluster in the region we can focus on the following preconditions:

- Rich and unique culture of the population;
- the location of historical objects of architecture and culture in our region;
- activity of the joint foreign companies in our region;
- Interstate relations and cultural exchange between countries.

There are a lot of historical monuments, cultural and historic buildings in the region that are of interest to tourists. The region has high natural potential, hunting and fishing. Baikonur cosmodrome, Kambash lake located in Kazaly district, memorial complex "Korkyt Ata" located in Karmakshy district, "Barsa zhere" nature reserve located in Aral district, Karatau slopes in Zhanakorgan region, and sanatorium healing with healing properties - all these are the tourist attributes of Kyzylorda region it's getting worse.

In conclusion, it can be said that the priorities of the creation and development of clusters in the above-mentioned Kyzylorda region are a positive change in the socio-economic development of our region.

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ИННОВАЦИЯЛЫҚ ДАМУДЫҢ КЛАСТЕРЛІК БАҒЫТЫ ЖӘНЕ ҚЫЗЫЛОРДА ОБЛЫСЫНДА ДАМЫТУДЫҢ БАСЫМДЫЛЫҚТАРЫ

Аннотация. Мақалада Қазақстан экономикасын дамыту тұрғысында инновациялық дамудың басымды бағыттары анықталып, инновациялық қызмет дамуының ағымдағы жағдайына талдау жасалған, сондай-ақ аймақты инновациялық дамытудың кластерлік бағытына толығырақ тоқталған. Кластерлер – нақты

экономикалық кеңістіктегі басқару агенттіктерінің, ғылыми – зерттеу мекемелерінің, қызметтер мен тауарларды жеткізуші және өндіруші компаниялардың агломерациясы. Кластерлер өзара тігінен және көлденең байланыстармен байланысқан, белгілі бір орында шоғырланған компаниялар мен ұйымдардың серіктестігін білдіреді. «Кластер» термині экономикалық әдебиеттерде ең үлкен танымалдығын Гарвард университетінің профессоры, бәсекегеқабілеттілік теориясының авторы Майкл Портердің еңбектерінің негізінде алды. Сондай-ақ кластерлер сәтті жұмыс жасап отырған елдер нақты аталып, кластерлерді құру себептері көрсетілген. Авторлар тарапынан Қызылорда облысында кластерлерді құру және дамытудың негізгі бағыттары келтірілген. Олардың қатарында балық кластерін, күріш кластерін, мұнайгаз кластерін, құрылыс кластерін және туризм кластерін айтуға болады. Кластерлер құру тұрғысында аталмыш кластерлер біздің аймағымыз үшін басымды салалар болып есептеледі.

Түйін сөздер: инновация, ноу-хау, кластер, бәсекегеқабілеттілік

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КЛАСТЕРНОЕ НАПРАВЛЕНИЕ ИННОВАЦИОННОГО РАЗВИТИЯ И ПРИОРИТЕТЫ РАЗВИТИЯ В КЫЗЫЛОРДИНСКОЙ ОБЛАСТИ

Аннотация. В статье определены основные направления инновационного развития экономики, проанализировано текущее состояние развития инновационной деятельности, также изучено кластерное направление инновационного развития региона. Кластеры - это агломерация управленческих агентств, научно-исследовательских учреждений, поставщиков товаров и услуг и компаний производителей на экономическом пространстве. Также кластеры это объединение компаний и организаций, которые взаимосвязаны между собой вертикально и горизонтально. Наибольшую популярность термин «кластер» в экономической науке получил благодаря трудам автора теории конкурентоспособности профессора Гарвардского университета Майкла Портера. Также были отмечены страны где кластеры уже успешно работают и причины создания кластера. Автором приведены основные направления создания и развития кластера в Кызылординской области. В их числе можно назвать такие кластеры, как рыбный кластер, рисовый кластер, нефтегазовый кластер, строительный кластер и кластер туризма.Эти сферы являются наиболее приоритетными для нашего региона.

Ключевые слова: инновация, ноу-хау, кластер, конкурентоспособность

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QUALITY OF HUMAN CAPITAL AS A FACTOR OF PROFESSIONALIZATION

Abstract. To date, in a competitive economy, its transformation and modernization, the main indicator is the accumulated and realized human capital. It is the human capital that has good health, worthy education, qualifications, life experience and determines the level, opportunities for economic, social and technological growth of society.

Since man is the main creative subject, the factor of creating material wealth, the criterion of progress is a measure of the integral development of man and the satisfaction of his needs.

Keywords: human capital, valuation, modernization, policy, competitiveness, potential.

Introduction. One of the topical problems of the economy of the Republic of Kazakhstan is the formation and maintenance of a high level of its competitiveness through the formation of competitive human capital. National competitiveness is an instrument in the struggle for a place in the world economic system. The issue of increasing the competitiveness of the economy of the republic is key in the development of the Strategy "Kazakhstan-2050" [1], Strategy-2030 [2], the Strategic Development Plan of the Republic of Kazakhstan until 2020 [3] and other programs aimed at modernizing the economy. The successful modernization of the republic's economy is predetermined achievements in the formation of human capital as the main factor in enhancing the competitiveness of the national economy.

The urgency of the problem of the formation of human capital is conditioned by the objective needs of the current stage of the world social and economic development, the specificity of the current situation in the country. These circumstances require the adoption of not only investment but integrated solutions that form new resources in the state, society and individual companies that ensure both sustainable economic growth and the achievement of a higher level of the well-being of the population and a decent quality of life. Mankind has entered a new century in the process of increasing global changes, among which the change in a person and his development sharply lags behind changes in the techno-economic sphere. Overcoming this lag and creating a modern system that forms and develops a person, and thus increases human capital, requires global processes, among which the main:

- the ongoing modernization of public administration and the socio-political state of society, improving its livelihoods;
- Acceleration of the processes occurring at the level of social organization for a shorter period of a person's life-the period of renewal of knowledge, key technologies and the formation of technological structures is drastically reduced, so that for a generation there are several shifts in technology, theoretical knowledge and practical skills necessary to achieve and the development of a person's social status;
- coming to the fore, the ratio of the two components of state development: social justice and economic efficiency;

All these issues exacerbate the problem of human capital in the country. In the presented article results of research of the human capital of the employed in various spheres of economy are resulted. 10 groups of respondents were investigated, the subject of the study were social, economic, political relations influencing the formation of human capital.

Methods of research. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction. The variety of goals, objectives

and areas of activity in agriculture predetermines various criteria for assessing the effectiveness of economic entities.

The discussion of the results. Competitive advantages of the national economy associated with cheap labor, which, nevertheless, has a high educational level, are largely lost. In addition, the engineering potential of the country has significantly decreased; there is a "brain drain" from the state. Every year, there are fewer so-called "blue collars" and skilled workers. On the one hand, there is an acute need for business in specialists and a large number of vacancies, and on the other hand, there is a large mass of people who for various reasons are not such specialists and are not ready to become them.

One must really see that Kazakhstan now does not have a modernized industrial economy. The lack of serious scientific potential in the country makes the implementation of proposals on attracting foreign advanced companies to the country, inclusion of the country's economy into the global technological system more promising.

Recently, in strategic documents, along with the term "industrial-innovative development", the term "modernization" has become widely used. Scientists rightly point out that it is necessary to clearly distinguish these concepts. In this regard, we quote the statements of the well-known Russian economist V.L. Inozemtseva, who writes: "Modernization is a movement from the existing state of things to a more perfect, but not necessarily the most advanced one." The way to an innovative economy lies through the stage of modernization of the existing economy. Proof of this are classic examples of successful modernization of the economies of Japan, South Korea and China. Their experience has shown that innovations are on a mass scale possible when the main tasks of modernization are fulfilled, the economy is built into the world division of labor, the main driving motive for its development is competition, and the need for knowledge becomes natural for a large part of workers and managers. Moreover, in countries that artificially stimulated innovation, but did not form modern methods of economic development, innovation and modernization remained divided.

Scientists and experts rightly raise the issue of irrational use of savings available to the state in the form of state funds, gold and currency reserves, which are not transformed into domestic investments in industrial development. But at the same time, in a modern innovative economy, one can not rely only on economic incentives. The scale of financial investment itself does not guarantee the success of certain projects. With a low level and quality of human capital, investments in high-tech industries do not give the proper return. Modern innovative activity requires awareness, modern knowledge, corresponding to the requirements of the profession, that is, the role and significance of the human factor is growing. Human capital is becoming an important factor in economic growth.

Western countries, creating new technologies, seek to multiply their own human capital. According to some estimates, in developed countries only the increase in the duration of education for one year leads to an increase in the gross domestic product (GDP) by 5-15%. In all developed countries, human capital is estimated at times higher than physical capital.

The low quality of training is due to the low level of funding for education and science, as well as the narrow range of its sources, the shortage of qualified personnel, the separation of the system of training personnel from real practice, the limited motivation of teachers' work and the teaching staff of higher education institutions, production and education, inadequate participation of employers in the formation of the content of educational programs, ineffective use of it scientific potential and others.

The experts studied 10 groups of respondents, the subject of the study were social, economic, political relationships affecting the formation of human capital, the results are shown in Figure 1.

The indicators of the assessment of the human capital of the first group show that among the respondents of the central executive body of the Republic of Kazakhstan the aggregate share of the "average", "above average" and "high" levels prevails, 57.2%, "low" and "below average" 42.8%.

Wages in one of the world's leading groups in the extraction and processing of mineral resources, with integrated extractive, processing, energy and logistics enterprises are very different from those of budget and government structures. The average monthly nominal wage of the respondents was 115.9 thousand tenge, which is 4% more than the average for Astana (110.8 thousand tenge) and 25.5% of the average republican level (92.3 thousand tenge) . At the same time, 91% of respondents have wages above the regional level and suggest a wide range of differentiation of purchasing power. The results of the answers give an opportunity to reveal an approximate salary that allows a certain monthly expenditure on health

support. This estimated amount implies the costs of visiting sports centers, the purchase of health-giving vitamins, irregular, to support themselves in good physical condition.

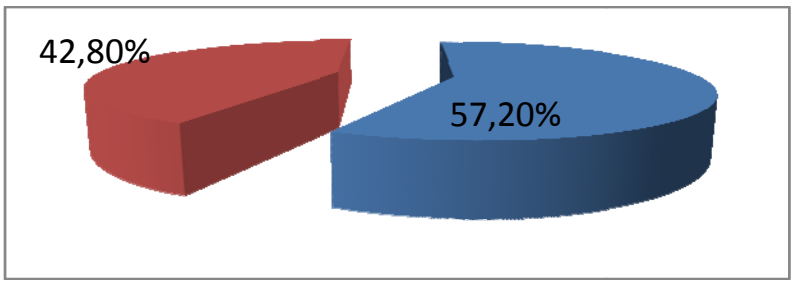

Figure 1 - Indicators of human capital assessment

The human capital of the majority of bank employees (65.3%) can be estimated as "medium" and "high". The average monthly nominal salary of the respondents amounted to 105.4 thousand tenge, which is 4.9% of the average level in Astana (110.8 thousand tenge) and 14.1% of the average republican level (92.3 thousand tenge) . At the same time, 100% of respondents have wages above the regional level and suggest a wide range of differentiation of purchasing power. Not a high level of costs for maintaining health for 85% of the women surveyed is due to the fact that bank employees are promptly undergoing professional examination and medical examination in respectable medical institutions under insurance policies.

Based on the annual income, 69% of respondents have the opportunity to expand the food basket and diversify purchasing power, and 31% have no such opportunity.

Along with this, more than 90% of respondents, health care costs vary from 40 to 10% of the monthly income level. This correlation assumes high costs for medical care and purchase of medicines, which is typical for environmentally unfavorable living conditions, 38% of respondents refuse preventive screening surveys motivating high workload and elementary lack of time.

It should be noted that in the respondents' life position, there is a pronounced desire to build a career, actively expressing public interest in the problem of society. However, a disappointing result is a low interest in the culture of a healthy lifestyle. After all, only 4.4% of respondents adhere to preventive screening surveys.

The above data show that there is a potential for the development of the nation's human capital, all this requires huge investments in the education, health and culture of the people. Since, in accordance with the basic concepts of the concept, human capital - education, improvement of health care - is one of the important areas of industrial investment. Analysis of known approaches to assessing the effectiveness of human capital shows that the area of analysis of investment efficiency is lent. Given the completeness of factors, investment levels, estimates of the contribution of human capital to economic growth will significantly increase, therefore, the prospects for studying the process of the formation of the human capital of the nation are at an early stage.

Conclusions. In the transition to an innovation economy, the role of a person with his education, qualifications and experience in ensuring economic growth and improving the competitiveness of the state. The major component of the human capital is labor, its quality and performance. In its turn quality of work is determined by the mentality of the population and quality of life. Unfortunately, the work in Kazakhstan remains a traditionally poor quality, as demonstrated by production of the majority of domestic enterprises, which is uncompetitive on world markets. Low-performance and low-quality labor significantly reduces the accumulation of human capital of Kazakhstan. The idea and practice of reproduction and functioning of the human capital become more complex and filled with new content. This human capital is gaining recognition and development in a rather wide sense - from the individual to the world community. Human capital is becoming a mass phenomenon, it corresponds to the type of innovative reproduction. Perhaps this is why in recent years the Government of Kazakhstan addressed to the problem of formation of national human capital, since the country needs tools that can make the transition to the innovative type of reproduction.

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КӘСІБИШІЛІКТІҢ ФАКТОРЫ РЕТІНДЕ АДАМ КАПИТАЛЫНЫҢ САПАСЫ

Аннотация. Бүгінде бәсекеге қабілетті экономикада оны трансформациялау және модернизациялау басты көрсеткіш - жинақталған және жүзеге асырылған адам капиталы. Бұл жақсы денсаулық, лайықты білім, біліктілік, өмірлік тәжірибесі бар және қоғамның экономикалық, әлеуметтік және технологиялық даму деңгейін, мүмкіндіктерін айқындайтын адами капитал.

Адамның басты шығармашылық мәні болғандықтан, материалдық байлықты құру факторы, прогресс шарасы адамның ажырамас дамуының шарты және оның қажеттіліктерін қанағаттандыру болып табылады.

Түйін сөздер: адами капитал, бағалау, жаңғырту, саясат, бәсекеге қабілеттілік, әлеует

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КАЧЕСТВО ЧЕЛОВЕЧЕСКОГО КАПИТАЛА КАК ФАКТОР ПРОФЕССИОНАЛИЗАЦИИ

Аннотация. На сегодняшний день, в условиях конкурентоспособной экономики, её трансформации и модернизации, главным показателем является накопленный и реализованный человеческий капитал. Именно тот человеческий капитал, который имеет хорошее здоровье, достойное образование, квалификацию, жизненный опыт и определяет уровень, возможности экономического, социального и технологического роста общества.

Поскольку человек является главным творческим субъектом, фактором создания вещественного богатства, критерием прогресса выступает мера целостного развития человека и удовлетворение его потребностей.

Ключевые слова: человеческий капитал, оценка, модернизация, политика, конкурентоспособность, потенциал.

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A ROLE OF ECONOMIES OF POPULATION IN PROVIDING OF FOOD SAFETY OF KAZAKHSTAN

Abstract. This article reveals the essence and significance of the population's economies in providing foodstuff.

During the research, the following methods were used: scientific abstraction, statistical economical, analysis and synthesis.

During the implementation of scientific research, the following results were received: firstly, functions and role of economies of population were considered; secondly, the analysis of structure of gross products was conducted on the categories of economies and in the cut of industries; thirdly, the prospects of development of economies of population and the necessity of concentration of agricultural production were proved with the purpose of increase of competitiveness of the agro-industrial complex of Kazakhstan.

Keywords: security, economy, population, food, agrobusiness, physiological needs.

Personal subsidiary plots of the population function in all socio-economic formations. This is due to the fact that vital food products are produced here that satisfy the physiological needs of people.

The study of economic literature has shown that at all times personal subsidiary plots have performed many functions related to the income generation, the employment, the formation of a rural healthy lifestyle, the upbringing of youth, observance of traditions and customs, the improvement of material well-being, the preservation of labor potential[1-6].

It should be noted that even under the administrative-planned economy, personal subsidiary farms successfully functioned alongside the public sector. This combination was based on the following principles: voluntary management of PSP; mandatory participation in the public sector; increase in the share of incomes from maintaining PSP in total revenues of the population; equality of all sectors of public agricultural production; economic assistance to PSP from agricultural enterprises [7].

Village workers not only provided their families with the necessary foodstuff, but also implemented surplus, significantly supplemented the family budget. Young people constantly participated in agricultural work, mastered rural professions from childhood, learned to cultivate crops and take care of animals.

Table 1 - Structure of gross agricultural output by branches and categories of farms (in percent)

Indicators	1995	2000	2005	2010	2015	2016
Gross output in all categories of economies	100	100	100	100	100	100
including						
agricultural enterprises	50.8	20.9	28.6	19.2	20.6	23.3
peasant farms	3.2	19.0	22.9	24.0	27.3	28.3
population economies	46.0	60.1	48.5	56.8	52.1	48.4
crop products						
agricultural enterprises	60.3	33.0	44.0	29.4	27.5	30.7
peasant farms	3.6	32.3	35.2	41.7	38.0	38.9
population economies	36.1	34.7	20.8	28.9	34.5	30.4
animal products						
agricultural enterprises	32.8	8.4	8.1	9.9	11.4	13.1
peasant farms	2.3	5.1	6.4	8.9	14.4	15.2
population economies	64.9	86.5	85.4	81.2	74.2	71.7
Note: it is based on sources 8,9,10,11						

However, the role of the economies of the population varied depending on the socio-economic situation in the country. According to Table 1, it can be seen that the share of economies of the population in 1995, in gross output, was 46.0%. In 2000, this indicator increased by 14.1% and reached 60.1%. Then, in 2005, the share of economies of the population decreased significantly and the share of peasant farms increased. If considered in the context of industries, then in crop production the share of households is lower than in livestock. Thus, in 2005, 85.4% of the total animal production was produced by the economies of the population. In 2016, the share of households accounted for 71.7% of animal products.

Table 2 - Crop production in all categories of farms and households in Kazakhstan, thousands of tons

Indicators	1990	1995	2000	2005	2010 г	2015	2016
All categories of households							
grain	28488	9506	11565	13781	12185.2	18672.8	20634.4
sugarbeet	1044	371	273	311	152.0	174.1	345.0
sunflower	126	99	105	267	328.9	534.0	754.9
potato	2324	1720	1693	2521	2554.6	3521.1	3545.7
vegetables	1136	780	1544	2169	2576.9	3564.9	3795.2
gourds	302	162	422	684	1118.2	2087.6	2070.9
fruits and beries	301	97	202	244	164.6	216.2	259.6
grape	139	68	62	52	56.4	63.4	75.0
Economies of the population							
grain	18	11	132	99	39.1	30.2	30.2
sugarbeet	-	2	28	13	1.6	0.2	0.0
sunflower	3	2	9	17	3.1	1.4	1.0
potato	1246	1453	1431	2062	1829.3	2067.6	2047.7
vegetables	391	502	1108	1423	1365.3	1531.0	1543.1
gourds	88	92	194	267	192.2	192.4	210.2
fruits and beries	169	70	146	204	102.9	110.6	121.7
grape	18	8	19	13	11.6	12.3	15.0
Note: it is based on sources 8,9,10,11							

The analyzed structure of gross output by branches and categories of economies reflects all the fundamental transformations that have taken place in the country. After the collapse of large agricultural enterprises, the ratio between overall production by farm categories changed radically. The economies of the population have become the main producers of agricultural products.

In the crisis conditions, when large agricultural enterprises disintegrated, the economies of the population turned out to be more flexible and dynamic business patterns. Over the years, they provide Kazakhstan people with fresh, environmentally friendly food. Moreover, thus, the problem of employment of local rural population is solved.

As many researchers noted, personal subsidiary plots of the population are an integral part of the agricultural sector [3,4,5,6,7]. Without them, it is impossible to imagine the successful functioning of agrobusiness. In the food market, the economies of the population have its own niche. With increasing solvency of the population, the demand for environmentally friendly products is increasing. Until now, the share of households in the gross agricultural output is significant.

According to the Committee on Statistics of the Ministry of National Economy of Kazakhstan, in 2016, the economies of the population produced 57.8% of potatoes; 40.7% of vegetables; 10.2% of gourds; 20% of grapes from the overall production for all categories of households.

As for animal products, in 2016, 55.6% of meat, 77.4% of milk, 25.5% of eggs and 59.5% of wool were produced by economies. The production level of agricultural products in economies of the population in 2016 compared with 1990 declined slightly. The production of milk increased from 2.6 to 4.1 million tons.

At the same time, the production level of agricultural enterprises decreased significantly during the analyzed period. Thus, meat production in 2016 was 0.2 million tons in slaughter weight. In 1990, this figure was 1.1 million tons in slaughter weight. The production of grain decreased from 28463 thousand tons in 1990 to 13202.3 thousand tons in 2016 [8,11].

Table 3 - Production of animal products in all categories of households and in economies of the population of Kazakhstan, in thousands of tons

Indicators	1990	1995	2000	2005	2010	2015	2016
All categories of households							
meat (in slaughter weight), mln.t.	1.6	1.0	0.6	0.7	0.9	0.9	0.9
milk,mln.t.	5.6	4.6	3.7	4.7	5.3	5.1	5.3
eggs, billion pieces	4.2	1.8	1.7	2.5	3.7	4.7	4.7
wool (in gross weight), thous.t.	107.9	58.3	22.9	30.4	37.6	38.0	38.5
karakul, thousand pieces	1720.7	1145.2	129.9	191.9	49.4	7.1	4.3
Economies of the population							
meat (in slaughter weight), mln.t.	0.5	0.6	0.5	0.6	0.7	0.5	0.5
milk,mln.t.	2.6	3.2	3.4	4.3	4.8	4.1	4.1
eggs, billion pieces	1.3	0.7	0.8	1.2	1.3	1.2	1.2
wool (in gross weight), thous.t.	29.5	28.3	18.5	23.5	25.5	23.1	22.9
karakul, thousand pieces	22.6	43.3	55.6	118.4	29.3	-	-
Note: it is based on sources8,9,10,11							

Consequently, it can be stated that the economies of the population play an important role in the country's food security. As already noted, during difficult times they delivered foodstuffs to the market, solved problems of employment in the countryside, replenished the family budget of the agrarians.

However, at present, there is a tendency in Kazakhstan to reduce the proportion of households in the total gross agricultural output. This is due to the following reasons: first, the capacity of economies of the population is limited; secondly, the processes of cooperation and integration take place in the development of agricultural production.

Economies of the population, in order to provide themselves with foodstuff and realize excess of provisions, are engaged simultaneously in crop growing and animal husbandry: cultivate potatoes, vegetables, rear animals. Many operations are performed manually. Labor productivity is low.

Many farms have problems with the sale of products. This position is used by resellers, dictating their terms of the business transaction. Moreover, the problem of financial support and introduction of innovative technologies in production is acute.

The agro-industrial complex of Kazakhstan faces strategic tasks to increase its competitiveness, import substitution and saturation of the domestic market with environmentally friendly domestic products. The economies of the population cannot significantly increase production volumes. Their capabilities are limited. For this reason, the villagers themselves understand the need for cooperation and pooling of efforts in such an important for all Kazakhstani people's business as providing physical and economic access to foodstuffs for wide sections of the country's population.

Kazakhstan has accumulated rich experience in the creation of integrated and cooperative enterprises. Practice convincingly shows the advantages of large formations in front of small farms, also the cooperation of personal subsidiary plots is necessary [12,13]. At a concentration of production, the problems of creating production and social infrastructure, the use of resource potential, employment, the introduction of innovative technologies are better solved.

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ҚАЗАҚСТАННЫҢ АЗЫҚ-ТҮЛІК ҚАУІПСІЗДІГІН ҚАМТАМАСЫЗ ЕТУІНДЕ ХАЛЫҚ ШАРУАШЫЛЫҚТАРДЫҢ РӨЛІ

Аннотация. Аталған мақалада азық-түлікпен қамтамасыз етуінде халық шаруашылықтардың мәні мен маңызы қарастырылады.

Зерттеу жүргізу кезінде келесі әдістері пайдаланылған: ғылыми абстракция, статистикалық - экономикалық, анализ және синтез.

Ғылыми зерттеулерді орындау кезінде келесі нәтижелер алынды: біріншіден, халық шаруашылықтардың функциялары мен рөлі қарастырылған; екіншіден, салалар бөлісінде және шаруашылықтың категориялары бойынша жалпы өнімнің құрылымының талдауы жүргізілді; үшіншіден, халық шаруашылықтардың даму перспективалары және Қазақстанның аграрлық - өнеркәсіптік кешеннің бәсекеге қабілеттілігін арттыру мақсатында ауыл шаруашылық өндірісінің шоғырландыру қажеттілігі дәлелделген.

Түйін сөздер: қауіпсіздік, шаруашылық, халық, азық-түлік, агробизнес, физиологиялық қажеттіліктері

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РОЛЬ ХОЗЯЙСТВ НАСЕЛЕНИЯ В ОБЕСПЕЧЕНИИ ПРОДОВОЛЬСТВЕННОЙ БЕЗОПАСНОСТИ КАЗАХСТАНА

Аннотация. В данной статье раскрывается сущность и значение хозяйств населения в обеспечении продуктами питания.

При проведении исследований использованы следующие методы: научной абстракции, статистико-экономический, анализа и синтеза.

При выполнении научных исследований получены следующие результаты: во-первых, рассмотрены функции и роль хозяйств населения; во-вторых, проведен анализ структуры валовой продукции по категориям хозяйств и в разрезе отраслей; в-третьих, обоснованы перспективы развития хозяйств населения и необходимость концентрации сельскохозяйственного производства с целью повышения конкурентоспособности аграрно- промышленного комплекса Казахстана.

Ключевые слова: безопасность, хозяйство, население, продовольствие, агробизнес, физиологические потребности.

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PECULIARITIES OF AGRETURISM IN FOREIGN COUNTRIES

Abstract. To date, agrotourism has become an important component of socio-economic development in the world, since it transfers parts of the agrarian population from the production sphere to the service sector. Giving impetus to the formation of agrarian regions and their population through the organization of a new sector of the local economy. The development of agro-tourism allows in developed countries to prevent unemployment, migration, a decline in the standard of living of the population and other negative phenomena leading to the degradation of the village. In many countries, agro-tourism is a complementary and interconnected concept and becomes a means of leisure in rural areas for townspeople, naberia is increasingly popular in the recreational regions of our country, subject to state support in accordance with rural development programs, facilitating the transfer of surplus labor in agrarian regions to an alternative sector for the production of services, the development of small and medium-sized businesses and the creation of new jobs in rural areas.

Keywords: price policy, efficiency, cattle breeding, meat industry, agriculture.

Introduction. Agro tourism is an entertaining tourism that involves the use of a rural (farm) economy. Agro tourism can manifest itself in various forms, but always includes the removal of the agro-life.

There are two basic forms of agro tourism: a manor with a service to be rented directly within the household or a self-catering accommodation on land belonging to the household, for example, in camping and tents. Agro tourism, thus, is a form of rural tourism. In agro-tourism, the household (farm) is at the same time a lodging house and the main object of interest for the tourist.

Methods of research. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction. The variety of goals, objectives and areas of activity in agriculture predetermines various criteria for assessing the effectiveness of economic entities.

The discussion of the results. The development of agrotourism in the world began in the second half of the 20th century, when the concept of "Bed & Breakfast" became popular in England and the USA - living for about 7 days in empty rooms of houses regardless of their location (Table 1).

Table 1- Classification of recreation centers belonging to the "Bed & Breakfast" type

Name	Characteristic	Features
Bed & Breakfast cottage	Rent a cottage in the resort and recreational zone, in a territory that has the status of a rural area or refers to a resort area	Location by the sea, lake or in the mountains
Bed & Breakfast farm vacation	Family holidays with children in rural areas, characterized by attractive recreational resources	The possibility of rest in rural conditions of children of different age groups separately from their parents
Bed & Breakfast homestay	Accommodation in the owner's house of a rural manor together with his family in separate guest rooms	Familiarity with the traditions, culture and way of life of the seven, in which the guests live
Bed&Breakfast farmstay	Accommodation in a farmer's house or in a specialized camping on the territory of a farm	The use of products grown by the owner of the homestead, participation in agricultural work on the farm

At the beginning of the XXI century. the agrarian tourism industry is recognized by WTO experts as an essential, most dynamically growing sector of the world tourist industry. Today, the volume of agro-tourist services in post-industrial countries almost exceeds the growth in the number of hotels and resort services in these countries [2].

At the present stage, all the national agrarian tourism organizations of European countries have joined the European Federation for Farm and Village Tourism ("European Federation for Farm and VillageTourism") or abbreviated "EuroGites". The main objectives of this organization are: to promote the development of agrarian tourism and targeted investment in rural tourism development projects. Features of the organization of agricultural tourism in European countries are provided in Table 2.

Table 2 - Features of the organization of agro-tourism in European countries

Country	Features of the organization of agro tourism
Italy	Agro touristic business is closely connected with the resort, international specialization - gastronomic and tasting tourism
France	The seaside agritourism, horse farms, wine agroundings, ski chalets, agro cottages, castles, and other forms of agrotourism are characteristic
United Kingdom	Affordable prices, special discounts for children, wide application of advertising, specialization - horseback riding
Spain	There are rural hotels in the Canary and Balearic Islands, as well as in converted monasteries and historic castles
Germany	Most tourists come to participate in international fairs and trade shows
Austria	Attracting tourists to harvesting herbs, preparing dairy products, pasturing livestock, active mountain and ecological tourism
Finland	Rent houses without owners, located on the shores of protected lakes and rivers
Romania	The National Association of Rural and Cultural Tourism operates, specialization - ethnographic and gastronomic tourism
Hungary	Tax privileges are extensively applied, international specialization is equestrian tourism
Poland	Characteristic of the lack of a close relationship with the traditions of the country - only accommodation and meals
Denmark	There is the National Association of Agrotourism, specialization - bicycle tourism
Iceland	Categorization of rooms into three categories, categorization of guest houses (A, B, C, D, T, F, G)

Since 1972, agro tourism in world practice has emerged as a separate industry providing income equal to the gross domestic product of a country such as Hungary. At the moment, more than 2 million beds have been registered for tourists in rural European estates.

Unconditional leaders in the development of the industry of agrarian tourism in Europe are France and Spain. In these countries, agrotourism has long grown into a highly profitable industry of international specialization. The prerequisites for this were the development of the agro-tourism as part of the state protectionist policy in the 1980s, when a quota system was introduced in Europe, which sharply reduced the volume of agricultural production. Accordingly, there was a need to create new jobs in rural areas. The main task, which was set before the development of agro-tourism, was to stop the mass outflow of the rural population to the cities, with the help of which it was required to avoid serious social conflicts. However, this type of tourism quickly turned into a low-cost and competitive business.

The interests of the development of agrarian tourism in these countries are represented by the National Organization of Holiday and Green Homes, which offers agro-tourism for every taste and type of recreation, certified according to high national standards of service.

Classical European traditions of the development of agricultural tourism for many decades, professes the United Kingdom, in which the system of regional tourism organization was formed in 1969 with the adoption of the Law on the development of tourism. English agro tourism is all-season: it is very popular in this country not only to spend the summer holidays, but also to meet Christmas. In the UK, the interests of the owners and the infrastructure of agribusiness are protected by the National Organization of Rural Tourism and Agro tourism, which provides accreditation of guest houses and other accommodation for agro tourists. The current popularity and demand for rural tourism services has prompted English farmers to unite homesteads and guest houses in order to offer more diverse services. So, for example, in the south-west England, the restoration of old farms, in which an increased level of comfort is combined with original or partially preserved old furniture, is very popular.

Italy, as an object of agro tourism infrastructure, on the world market of tourist services, focuses guests on the historical traditions of rural recreation in the mountains and foothills of the Alps, the Apennines and along the strip of the sea coast. Agro tourism in Italy since its inception began to be considered by the rural population as the main form of entrepreneurial employment. Therefore, in this country agro touristic business is closely intertwined with the resort service. A significant factor in the international agro tourism specialization of Italy has gradually become wine and gastronomic tourism. Despite the fact that the services of rural recreation in Italy are almost twice as large as Spain or France, they annually enjoy up to 2 million people. (of which - 77.9% of Italians). Annually, the profit from rural tourism is more than 350 million dollars.

A special place in the development of agro tourism belongs to Germany, which is visited annually by many one-day guests from Eastern European countries within the framework of shopping tours, especially from neighboring Poland. In the early 1980s, Germany developed a concept for the development of agro-tourism in peripheral regions for the distribution of cheap recreation on the tourist market, without the use of expensive infrastructure and the provision of comfortable living conditions [5, p. 73].

In Switzerland, tourism revenues amount to more than $ 15 billion annually, of which $ 10 billion falls on farmers in mountainous areas.

In the near future, Turkey takes the initiative to actively develop agro tourism. This will not only help attract more foreign tourists to the country, but will also help preserve the environment and support agricultural areas in accordance with the project "Turkey for All" [5, p. 74].

The experience of such European countries as Hungary, Romania and Poland deserves to be studied. The legislation of Hungary agro-tourism is referred to the sphere of personal farming, in this connection, appropriate preferential tax instruments are formed. Among the most popular places include the southwestern region of Vash, the eastern region of Szolnok (the Tis region) and the famous Hortobad steppe. Specialization of agrarian tourism in this country is its combination with national traditions of horse breeding.

Thus, the popularity of agro tourism in the West grows from year to year, and tired of beach holidays and crowded hotels, customers prefer their inexpensive tours in the province, where one can feel like a simple villager who is far from the hustle and bustle of civilization. Many agrarian tourism specialists in these countries are sure that it is agro tourism that will become the most privileged type of recreation in the modern world. The majority of agro tourism hotels have their own farms, where ecologically clean local products are grown, which are extremely popular today in the developed world. Successful Western experience can find interested structures in the development of domestic agrarian tourism.

It is worth noting the significant state support for programs to attract rural communities to agro tourism in European countries, as many countries see agrarian tourism as the main lever for economic recovery of their rural areas. So, according to specialists' calculations, the income received from one bed is equivalent to the annual income of a farmer from one cow [5, p. 74].

Conclusions. The development of agrarian tourism has a zonal character - the areas of development of this type of tourism are traditional. Now the market distinguishes three types of green tourism:

First, agro tourism is a kind of rural green tourism, both cognitive and entertaining, connected with the use of subsidiary farms of the population or land of agricultural enterprises that are temporarily not used in the agrarian sphere. This species may not have restrictions on the load on the territory and the regulation of the types of recreational recreation.

Secondly, rest in the village. The basis of its development is the capital housing fund on the manors of the owners and the available natural, recreational, historical and architectural, cultural and household and other achievements of this or that area.

Thirdly, this ecotourism is a scientific-cognitive kind of agro tourism, characteristic for rural areas and villages located within the territories of national parks, protected areas, parks, etc., where appropriate restrictions on the loads on the territory and the types of entertainment rest are regulated .

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ШЕТЕЛДІК ЕЛДЕРДЕГІ АГРЕГАТТАРДЫҢ ЕРЕКШЕЛЕКТЕРІ

Аннотация. Бүгінгі таңда, әлемдік аграрлық-туристік қызметтерге өнеркәсіп ауыл шаруашылығы халық трансферттер бөлігі ретінде, әлеуметтік және экономикалық дамудың маңызды құрамдас бөлігі болды. жергілікті экономиканың жаңа секторын ұйымдастыру арқылы аграрлық өңірлер мен олардың популяцияларының қалыптастыруға серпін беру. Агро-туризмді дамыту өмір сүру деңгейін және ауылының азып жетекші басқа да теріс құбылыстарды құлап, дамыған елдер жұмыссыздық, көші-қон болдырмауға мүмкіндік береді. Көптеген елдерде, Агротуризм - бірі толықтыратын және өзара байланысты ұғымдар мен ауылдық жерлерде азаматтар демалыс нысандары болуға, елдің барған танымал рекреациялық аймақтарды теру, ауылдық аймақтарда артық жұмыс күшінің аудармасын жәрдемдесу арқылы ауылдық даму бағдарламаларына сәйкес мемлекеттік қолдау көзделген баламалы қызмет көрсету саласы өндіріс, шағын және орта бизнесті дамыту және ауылдық жерлерде жаңа жұмыс орындарын құру.

Түйін сөздер: агротуризм, тәсілдер, ауыл шаруашылығы, орнықты даму, құралдар, функциялар.

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ОСОБЕННОСТИ АГРОТУРИЗМА В ЗАРУБЕЖНЫХ СТРАНАХ

Аннотация. На сегодняшний день в мире агротуризм стал важным компонентом социально-экономического развития, так как переводит части аграрного населения из сферы производства в сферу услуг. Придавая импульс формированию аграрных регионов и их населения путем организации нового сектора местной экономики. Развитие агротуризма позволяет в развитых странах предотвратить безработицу, миграцию, падение жизненного уровня населения и другие негативные явления, ведущие к деградации села. Во многих странах агротуризм – взаимодополняющие и взаимосвязанные понятия и становится горожанам средством проведения досуга в сельской местности, наберия все большую популярность в рекреационных регионах нашей страны, при условии государственной поддержки в соответствии с программами развития сельских территорий, содействуя переводу избытка трудовых ресурсов в аграрных регионах в альтернативный сектор производства услуг, развитию малого и среднего бизнеса и созданию новых рабочих мест в сельской местности.

Ключевые слова: агротуризм, подходы, сельское хозяйство, устойчивое развитие, средства, функции

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METHODS OF PRICING ON INDUSTRIAL ENTERPRISES

Abstract. According to the authors, in the context of economic integration of the world economic system, price is a key tool for regulating the economy and social support of the population. Therefore, pricing and its regulation are one of the most important foundations of a market economy, acting as a regulator of the ratio of commodity supply and demand, as well as a factor in the formation of inflation in the country. Pricing is an instrument for regulating consumer purchasing behavior. Thus, any regulation in a market economy is reduced to regulating the price of goods and services through a balanced monetary policy. The article highlights the methods of pricing industrial enterprises, its features of functioning within the framework of legislation, addresses problems and offers foreign experience in solving these problems and objectively forms a market price.

Keywords: pricing, industry, methods, price.

Introduction. In the conditions of the commodity market, the most important factor in the competitiveness of the commodity is its price of consumption. The price of consumption of goods includes the purchase price and the cost of operating the goods for the entire period of their service. In the service sector, the indicator of the price of consumption of goods loses its decisive importance.

Being a monetary form of the value of the commodity, the price carries information about the amount of socially necessary labor for its production and is the conductor of objective information on costs in the production sphere, on the one hand, and solvent consumer demand, on the other [1].

When selling goods (works, services) on the market, there is a transaction between the seller and the buyer, in which the rights to ownership of the subject of sale and purchase and the relations connected with them are usually precisely defined. In accordance with this, the seller has a guarantee of payment of the transaction amount by the buyer. In the event that one of the standard terms of the transaction is not observed, the process becomes more complicated, and additional costs arise.

Methods of research. The variety of goals, objectives and areas of activity in agriculture predetermines various criteria for assessing the effectiveness of economic entities. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction.

The discussion of the results. Industry prices:

a) wholesale prices of the enterprise - at these prices the enterprise realizes production production to other enterprises and marketing organizations.

b) wholesale prices of industry - at these prices products enters the retail trade.

Methods of pricing in industry.

The following stages of the pricing process at the industrial enterprise stand out:

• determination of the base price; prices without discounts, extra charges, transportation, insurance, service components;

• determination of the price taking into account the above components, discounts, mark-ups.

The following basic methods of calculating the base price are applied, which can be used in isolation or in various combinations with each other:

1. Full Cost Method, or Full Cost Pricing, Cost Pricing. To the full amount of costs (fixed and variable) add a certain amount, corresponding to the rate of profit. If the production cost is taken as a basis, the surcharge should cover the implementation costs and ensure profit. In any case, the overhead

includes indirect taxes and customs duties transferred to the buyer. It is applied at the enterprises with clearly expressed commodity differentiation for calculation of the prices for traditional goods, and also for setting prices for brand new products that do not have price precedents. This method is most effective in calculating the prices for goods of reduced competitiveness.

The method of production cost (Conversion Cost Pricing). The total amount of costs for purchased raw materials, materials, semi-finished products is increased by a percentage corresponding to the company's own contribution to the increase in the cost of the goods. The method is not applicable to long-term price decisions; It does not replace, but complements the full cost method. It is used in specific conditions and decision-making cases:

• about increasing the mass of profit by increasing production;
• refusal or continuation of competition;
• on changing the assortment policy in determining the most and least cost-effective products;
• for one-time (individual, non-mass) orders.

3. The method of marginal costs (Direct Costing System) involves an increase in variable costs per unit of output by a percentage that covers costs and provides a sufficient rate of return. There are more opportunities for pricing: full coverage of fixed costs and maximization of profits.

4. The return on investment pricing method is based on the fact that the project must ensure a profitability of at least the cost of borrowed funds. To the total costs per unit of output, the amount of interest for the loan is added. The only method that takes into account the payment of financial resources necessary for the production and sale of goods. Suitable for enterprises with a wide range of products, each of which requires its variable costs. It is suitable both for traditionally produced goods with an established market price, and for new products. It is used successfully in making decisions about the amount of production of a new product for the enterprise.

Methods of marketing estimations (Pricing based on Market Considerations). The company tries to find out the price at which the buyer definitely takes the goods. The prices are focused on increasing the competitiveness of the goods, and not on meeting the enterprise's need for financial resources to cover costs.

For example, Kazakhstani uranium and titanium have special pricing methods for transfer pricing that are publicly available. In addition, work is underway to create a pricing methodology for crude oil, this method will be introduced in the next 3 years. Uranium products already have a developed methodology for pricing, which makes it possible to clarify the order of taxation and reduce the risks of additional charges. Companies from the oil industry also received significant amounts of tax-related additional charges related to transfer pricing issues, and work is under way to create a methodology for pricing crude oil. At the same time, the methodology for calculating the prices of uranium products, in contrast to the current project methodology for crude oil, directly provides for the size of the discount can be presented to the trader. Perhaps this is justified by the fact that contracts for the sale of uranium products are of a typical nature and are limited to a much smaller number of supply channels.

Transfer pricing is an objective phenomenon that emerged as a result of de-centralization, representing trade within the organization between its structural sub-divisions. The transfer pricing system is created to minimize transaction costs. The transfer pricing system also allows you to effectively manage the organization, allocate resources, develop strategic solutions.

The problem of improving legislation in this area is that the issues of transfer pricing are a real stumbling block in the relationship between taxpayers and authorized bodies. The unsettledness of this issue is to some extent an obstacle to the formation of a system of effective international trade and in some cases creates the prerequisites for double taxation in the export of Kazakhstani goods.

Kazakhstan's authorized bodies traditionally use three methods for this:

• The method of comparable uncontrolled price;
• The "cost plus" method;
• The method of the subsequent sale price.

The most widely used method is a comparable uncontrolled price (SSC). The SSC method is applied when there are goods (works, services) transactions in identical market (in their absence - homogeneous) goods (works, services) and establishes a market price, proceeding from the prices for identical goods (in their absence-homogeneous) goods (works , services) sold under comparable conditions to a buyer who is

not associated with the seller. In other words, it is customary to call the principle of "outstretched hands", ie, the comparison of transactions between dependent and independent companies.

When independent companies interact with each other, the conditions of their commercial and financial relations are determined by market factors, because an independent seller usually wants to sell more expensively, and an independent buyer to buy cheaper, i.e. The market price is determined on the basis of demand and supply. When dependent companies interact with each other, their commercial and financial relations can not be directly influenced by external market factors, although dependent companies often tend to model market dynamics. The methods "costs plus" or "subsequent sale prices" can be applied if there are no transactions in the relevant market for goods (works, services) for identical (if they are not homogeneous) goods (works, services) or because there is no supply in this market such goods (works, services), as well as when it is impossible to determine the relevant prices due to the lack or inaccessibility of information sources.

In the "cost plus" method, the market price of goods (works, services) is defined as the sum of the costs (expenses) and margins incurred. In this case, the confirmed direct and indirect costs (expenses) for the production (acquisition) and (or) the sale of goods (works, services), costs (expenses) for transportation, storage, insurance and other costs (expenses) are taken into account. The mark-up is determined in such a way as to ensure the average rate of profitability established for this field of activity.

In turn, the method of "subsequent sale price", in which the market price of the goods (work, services) is determined as the difference in price at which such goods (work, services) are sold by the buyer at subsequent sale (resale) and confirmed costs (expenses), (without taking into account the price at which the goods (works, services) were purchased by the specified buyer from the seller, as well as its mark-ups. The mark-up is determined in such a way as to ensure the average standard of rent for the given sphere of activity of the state.

As for the Kazakh law, it is right in the definitions that the transfer price is the price that deviates from the objectively forming market price. That is, the concept of a "transfer price" has been given a negative connotation.

Conclusions. In general, in international practice transfer prices are the prices used in transactions between associated, related companies. In itself, the fact that a transaction occurs between related companies does not in any way say that the price should not initially correspond to the market price and then , that the parties involved in the transaction violated the law or underpaid taxes. In fact, there is nothing wrong with transactions between related companies, because many companies now have very extensive business around the world, and it is inevitable that they sell and buy goods, works or services within the group.

State regulation of pricing, in our opinion, does not contradict the established requirement of "reducing the regulatory function of the state", as the object of direct regulation will be the prices for products of monopolists, as well as certain strategic and socially important goods. The development of a scientifically based, systemic approach will help to restrain the unjustified growth of prices for products (services) of the relevant economic entities, which will become an effective factor in ensuring the stability of the entire price system. Effective state influence on pricing will create a business environment in which the role of prices in the implementation of innovative and social policies, as well as in achieving resource saving and environmental sustainability of production, increases.

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ӨНЕРКӘСІПТІК КӘСІПОРЫНДАРДАҒЫ БАҒА БЕЛГІЛЕУ ӘДІСТЕРІ

Аннотация. Авторлардың пікірі бойынша, әлемдік экономикалық жүйенің экономикалық интеграциясы жағдайында баға халықты әлеуметтік қолдау және экономиканы реттеудің негізгі құралы болып табылады. Осылайша, баға белгілеу және оны реттеу нарықтық экономиканың ең маңызды негізі болып табылады, ол тауар мен сұраныс арақатынасын реттеуші, сондай-ақ елдегі инфляцияның қалыптасу факторы болып табылады. Баға белгілеу - бұл халықтың тұтынушылық сатып алу мінез-құлқын реттейтін құрал. Сонымен, нарықтық экономикадағы кез-келген реттеу теңгерімді ақша-несие саясаты арқылы тауарлар мен қызметтердің бағасын реттеуге әкеледі. Мақалада өнеркәсіп кәсіпорындарының баға белгілеу әдістері, заңнама шеңберінде оның жұмыс істеу ерекшеліктері айтылады, баға белгілеудегі мәселелер қозғалып, осы мәселелерді шешудегі шетелдік тәжірибе ұсынылады және нарықтық бағаны объективті түрде қалыптастырады.

Түйін сөздер: баға белгілеу, өндіріс, әдістер, баға

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МЕТОДЫ ЦЕНООБРАЗОВАНИЯ НА ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЯХ

Аннотация. По мнению авторов, в условиях экономической интеграции мирохозяйственной системы цена является ключевым инструментом регулирования экономики и социальной поддержки населения. Поэтому ценообразование и его регулирование являются одной из важнейших основ рыночной экономики, выступая как регулятор соотношения товарного предложения и спроса, а так же фактором формирования инфляции в стране. Ценообразование является инструментом регулирования покупательского поведения населения. Таким образом, любое регулирование в рыночной экономике сводится к регулированию цены на товары и услуги путем сбалансированной денежно-кредитной политики. В статье освещаются методы ценообразования промышленный предприятий, его особенности функционирования в рамках законодательства, затрагиваются проблемы и предлагается зарубежный опыт в решении данных проблем и объективно формирует рыночную цену.

Ключевые слова: ценообразование, промышленность, методы, цена

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LEGAL AND ORGANIZATIONAL BASIS OF THE FINANCIAL SYSTEM OF THE REPUBLIC OF KAZAKHSTAN

Abstract. The authors of this article considered the functioning of the financial system of the Republic of Kazakhstan, as public finance is one of the main spheres of the financial system and the state budget is one of the largest of them, such as tax, budget, financial plans (forecasts), budget financing, financial indicators ...

Thus, the article presents the prospects for the development of the financial system at the stage of market economy construction and the ways of its personnel and professional provision should be considered in the context of their role and influence on the functioning of our society. And as the basis for increasing the efficiency of the financial system as an important regulator of market relations, the authors propose to break away from oil dependence, to switch to a diversified and import-dependent economy.

Keywords: finance, legal framework, system, budget, state, revenues and expenditures

Introduction. The financial system is an integration type system, characterized by a close connection of its constituent elements (subsystems) and the fact that none of its subsystems can exist independently: finance, on the one hand, expresses part of the production relations and therefore is an element of the system of these relations, with another - represent a system consisting of interrelated elements that have their own functional properties. In finance, you can name as functional subsystems such as tax, budget, financial plans (forecasts), budget financing, financial indicators, etc.

The financial system consists of a large number of spheres and links and only by analyzing it can one understand how such a complex mechanism can function. And the source and regulator of the financial system are legislative and legal acts. It is on the basis of them that one can trace the mechanism of the functioning of the financial system, understand how financial resources are accumulated and distributed and redistributed. Public finance is one of the main spheres of the financial system and the state budget is one of the largest of these. It is in it that the most important revenues and expenditures of the state are combined. The budget combines such basic financial categories as taxes, expenses, state credit and others, in their interaction and dynamics.

Methods of research. Three well-known elements of the triangle of knowledge - education, scientific research, innovation - are often underestimated for the development of a successful economy. In addition, the combination and synchronization of these three different industries form the basis for economic success.

The discussion of the results. Considering the socio-economic nature of the state budget, it should be noted that it is determined:

The way of production

• The existence of a form of ownership of the means of production

• Functioning of the basic economic laws of the state

• Nature of the production relationship

• Nature, goals and objectives of the state

• The content of the socio-economic essence of the state budget is manifested in the fact that it is simultaneously

• Restatement of LP
• The instrument of state regulation and stimulation of the economy
• A tool for effective exposure to the processes of extended reproduction
• The leading link in the state's financial and budgetary system

In the budget in the modern world, a significant part of the monetary resources is centralized, which is a necessary condition for the state to fulfill its functions, such as economic, social, political. The budget is a composite budget system. And the budget system is regulated by the "Law of Kazakhstan on the budget system"

A sound financial system is the key to the development and successful functioning of a market economy and a necessary prerequisite for the growth and stability of the economy as a whole. This system is the basis that mobilizes and distributes the savings of society and facilitates its daily operations. Consequently, although the structural transition of a centrally planned and controlled economy to an economy functioning in accordance with market principles includes many elements, the most important is to create a reliable financial system. Once a sound financial system is created, the money and capital markets can develop, especially the primary and secondary markets of national government securities.

According to many experts, Kazakhstan has already overcome the most painful peak of structural economic reforms after achieving financial stabilization and achieved notable successes, realizing its own strategy and tactics of economic reforms.

The main priorities of the state investment program are the development of social and industrial infrastructure, as well as the activation of housing construction. B. The list of investment projects includes projects for the rehabilitation of the education system, the development of the road network, the reconstruction of irrigation systems and water supply systems. Financing of projects is provided at the expense of the state budget, as well as from funds provided by foreign donors.

Prospects for the development of the financial system at the stage of market building of the economy and the ways of its personnel and professional provision should be considered in the context of their role and influence on the functioning of our society. It is common knowledge that finances in the economy are equal in value to the circulatory system of the organism. They create a close intertwining of specific financial spheres, such as - budget, treasury, taxation, social protection, banking or credit, if they are even brought to an ideal state, cannot positively influence the economy, since these are separate links in a single chain. They need to be improved simultaneously. [2]

The main problem in the financial sphere, in my opinion, is that the quantitative growth of the revenue side of the budget of Kazakhstan and all other important financial indicators is achieved due to the fall in the tenge rate against the dollar, and from revenues from the oil industry, which can lead to a deep economic recession, since the entire financial and economic system depends on the quotation of this raw material in the world market.

In Kazakhstan, the development of such important financial instruments as credit, deposit and leasing has already begun. In a market economy, their role is to accelerate the formation of seed capital, which is very important in Kazakhstan, where there is a shortage of investments. In addition, despite multiple increases in wages for workers in the budgetary sphere, the differentiation of the monetary incomes of the population continues to be strong in our republic. The settlement of this issue in the future may lead to an increase in tax revenues to the budget of the Republic of Kazakhstan. Once a sound financial system is established, the money and capital markets can develop, especially the primary and secondary markets of national government securities. Following this system, we will develop the possibility of improving the legal regulation of the financial system in the Republic of Kazakhstan

Structured ness of the space of economic interactions in the financial system is defined by the "institutional matrix", by which in modern institutionalism is understood the historically formed system of basic institutions governing the functioning of the main social spheres (economy, politics, ideology, etc.). Differences in the functioning and level of development of financial systems of different countries are largely due to differences in the nature of institutional norms and the effectiveness of their compliance, and the nature of institutional changes determines the historical evolution of financial development. The separation of the institutional aspect of the development of the financial system is of great methodological importance, primarily due to the existence of certain stable behavioral models of economic entities that

directly affect the nature of the functioning mechanism and the development processes of the financial system.

In the center of the study of the institutional characteristics of financial development, the formation and development of the institutional environment for the activities of financial institutions and the implementation of financial agreements, namely the study of formal and informal forms of organization and regulation of the relationship between economic entities in the financial sphere.

Following the methodology of D. North [10], the institutional structure of the financial system can be defined as a combination:

• official rules (political and economic, which have the status of law and serve to restrict certain aspects of the functioning of the financial system, and contracts that specify the terms of agreements);

• Informal norms (customs and codes of conduct aimed at coordinating repeated interactions between participants in financial markets);

• mechanisms to ensure the implementation of financial contracts and agreements (which are legalized by official rules and can transform informal norms).

Together they form a system (set) of incentives and constraints for decision-making, which determines the potential development of the financial system. Thus, laws regulating the financial sphere are part of the legal system of the country and are usually treated as going beyond the financial system. However, changes in these laws are often the result of changing needs that economic entities put forward to the functions of the financial system. The financial needs of the economy are constantly changing, so more flexible legal systems better stimulate financial development than the more stringent.

Conclusions. At the same time, informal regulations and rules form a socially recognized sustainable model of behavior of economic entities, which determines compliance with the terms of exchange in the process of concluding and implementing financial agreements. The mechanism for securing these agreements is based on a common financial infrastructure that develops on an institutional basis.

In the conditions of the forthcoming third technological revolution and the transition of the world economy to the sixth technological order, the one who will be the first to commercialize scientific achievements on the broadest scale will benefit. Therefore, along with science, the advanced country needs managerial flexibility and adaptability, the ability to rapidly introduce scientific and engineering resources into production: from the factory shop to the top echelons of public administration.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ҚАРЖЫЛЫҚ ЖҮЙЕСІН ЗАҢДЫ ЖӘНЕ ҰЙЫМДАСТЫРУ НЕГІЗІДЕРІ

Аннотация. Осы мақаланың авторлары Қазақстан Республикасының қаржы жүйесінің жұмыс істеуін қарастырды, өйткені мемлекеттік қаржы - бұл қаржы жүйесінің негізгі салаларының бірі және мемлекеттік бюджет - салық, бюджет, қаржы жоспарлары (бюджет), бюджеттік қаржыландыру, қаржы көрсеткіштері сияқты өздерінің ең үлкен байланыстарының бірі.

Осылайша, мақалада нарықтық экономиканың құрылысы кезеңінде қаржы жүйесін дамыту перспективалары, оның персоналының жолдары мен кәсіби қамтамасыз етуі олардың қоғамның қызметіне деген рөлі мен ықпалы тұрғысынан қарастырылуы керек. Қаржылық жүйенің тиімділігін нарықтық қатынастардың маңызды реттеушісі ретінде арттыру үшін негіз ретінде, авторлар мұнайға тәуелділіктен арылуға, әртараптандырылған және импортқа тәуелді экономикаға ауысуды ұсынады.

Түйін сөздер: қаржы, бюджет, мемлекет, кірістер мен шығыстар.

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ПРАВОВЫЕ И ОРГАНИЗАЦИОННЫЕ ОСНОВЫ ФИНАНСОВОЙ СИСТЕМЫ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация. Авторы данной статьи рассмотрели правовые и организационные основы финансовой системы Республики Казахстан, так государственные финансы выступают одной из главных сфер финансовой системы и государственный бюджет - одно из самых больших их звеньев, таких, как налоговая, бюджетная, финансовых планов (прогнозов), сметного финансирования, финансовых показателей…

Таким образом, в статье представлены перспективы развития финансовой системы на этапе рыночного построения экономики и пути ее кадрового и профессионального обеспечения должны рассматриваться в контексте их роли и влияния на функционирование нашего общества. А так же основы повышения эффективности финансовой системы как важнейшего регулятора рыночных отношений, то авторы предлагают оторваться от нефтяной зависимости, перейти на диверсифицированную и импорто независимую экономику.

Ключевые слова: финансы, правовые основы, система, бюджет, государство, доходы и расходы

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IMPROVEMENT OF ACCOUNTING FOR LEASING OPERATIONS UNDER (IFRS) 16

Abstract. The authors of the article investigated the method of accounting leasing operations, prescribed by domestic regulatory documents and international standards of financial reporting. The conducted research showed the existence of serious differences in the accounting interpretation, in particular, "General provisions"; "Assessment of leased property"; "Depreciation of leased property"; "Accounting for leasing payments"; "Accounting for costs when repairing leased property"; "Disposal of leased property"; "Disclosure of information on leasing in financial statements". The definitions of the entire complex of leasing relations, given in the domestic accounting system and foreign countries, differ in connection with the absence of regulatory documents, and therefore it is proposed to introduce the internal Regulation "Accounting for leasing transactions", which will increase the transparency of leasing accounting and will improve the regulatory and legislative base in parts of leasing operations.

Keywords: leasing, IFRS, accounting, operations, depreciation of leased property, disposal of leased property

Introduction. 1994 was the starting point for the broad development of leasing infrastructure. Leasing companies began to be intensively established in the country. This was a consequence of the policy of favoring development of leasing, declared by the Government of the Republic of Kazakhstan. This was reflected in the set of normative acts that provide all kinds of benefits to the subjects of leasing relationships.

To date, there are a number of problems in Kazakhstan that negatively affect both the development of domestic leasing and the implementation of the most important state programs in the field of small business development. For example, Kazakhstan tax legislation lacks incentives for depreciation of leased assets, which reduces the economic efficiency of leasing in comparison with other forms of property acquisition. The issue of accelerated depreciation for tax purposes is very important for the formation of the leasing market.

Methods of research. The methodological basis of the study was the scientific works of domestic. The methodological basis of the study was the scientific works of domestic and foreign scientists in the field of constitutional, criminal, criminal procedure and international law. As methods, general and particular methods were applied, including system-legal, historical-legal and other, system analysis of the phenomena and results studied. In the process of work, a set of methods of economic and statistical analysis, methods of synthesis and analysis of economic information were applied. Also in our study, the modern concepts of various schools of financial management were applied. As a basis for optimization of the current activities of the enterprise, the limit analysis methodology.

Results. An example of this is the countries of Europe and the United States, where leasing was viewed as a highly effective financial mechanism in the 1950s due to the introduction of accelerated depreciation for tax purposes. In Russia, the leasing sector also began to develop rapidly after the application of accelerated depreciation of leased property with a coefficient of 3. Another problem in the implementation of a number of leasing transactions (for example, international or return leases) is a double taxation of the subject of leasing in terms of VAT. It lays a heavy burden on the lessee, increasing the value of the leased asset by 32%, which, naturally, does not stimulate the development of small and medium-sized businesses in the country.

Summarizing the experience of Western European countries and the United States, we can draw the following conclusions:

- in the main, leasing operations are carried out not by commercial banks, but by specialized companies;

- The developed market of leasing services strengthens the production sector of the economy, creating conditions for the accelerated development of strategically important industries, stimulating the inflow of capital into the production sphere;

- There is a presence of certain tax incentives aimed at developing leasing relations that stimulate production growth. An analysis of foreign experience in the development of leasing allows us to identify the basic conditions necessary for leasing to actually influence the activation of investment processes in the economy, to which the following elements can be attributed:

- legal framework;
- normative base;
- tax treatment of leasing transactions;
- Accounting of leasing operations.

Analysis of international experience shows that the leasing services market can not develop effectively without a legal framework that defines the basic principles of leasing activities. The leasing legislation should define the structure of the leasing transaction, involving the participation of three entities, and the rights and duties of each of them should be spelled out. In the event of a bankruptcy of the lessee, the law should protect the lessor's ownership rights to the leased property from claims against him by the other creditors of the lessee company. Since leasing property, in fact, is a security for the transaction, leasing legislation should guarantee the right of the lessor to withdraw the subject of leasing in the event that the lessee fails to fulfill its payment obligations. International experience, however, shows that the legislative consolidation of the lessor's right to seize leased property is not enough, this right must be backed up by the executive system. For example, the legislation of some countries recognizes the right of the lessor to indisputably withdraw the subject of leasing in the event of non-fulfillment of payment obligations by the lessee, but in practice, the return of leased property is extremely difficult, or simply unworkable. Therefore, the legally fixed ownership of the lessor for leasing before the end of the leasing agreement must be clearly enforced.

The new leasing accounting standard IFRS 16 Lease has made fundamental changes to the accounting for leases in Kazakhstan and can have a significant impact on the business. Almost all leases will be recognized in the balance sheet by reflecting the asset that is the right to use and the financial liability. The amortization of an asset that is a right to use and the accumulation of interest on a financial liability are likely to result in an increase in the amount of expenses recognized in profit or loss during the first years of the lease. All this will affect the key accounting indicators, and therefore it will be necessary to clearly and clearly explain to the stakeholders that this result is due to the impact of the changes that have occurred.

In leasing operations, most organizations in the real estate sector will act as lessors. The appearance of the new standard has practically not changed the accounting procedure for landlords, but will have a significant impact on the customer base of the industry, that is, tenants. For example, one of the sectors for which the new standard will have the most noticeable influence is likely to be the retail sector, as it has a high volume of leased premises used to store stores. The PwC Global Rental Lease Study, published in February 2016, notes that retail stores will increase the median debt ratio by 98% (due to recognition of lease obligations), and the median EBITDA will increase by 41% (due to the exclusion of all rental costs). In a broader context, real estate rental for retail and commercial property rentals may have a number of common characteristics, such as the possibility of extending the lease and variable rental payments. Historically, leaseholders accounted for such a lease as an operating lease, reflecting lease payments as operating expenses by a straight-line method, without any significant impact on the balance sheet. The new lease accounting standard will have an impact not only on the balance sheet of the tenants, but also on operating expenses, which should now be divided into operating and financial costs. From the perspective of the lessor, it is important to understand the impact of all these changes on tenants, since they can affect the behavior of market participants who will prefer short-term leases or leases with more flexible conditions for different types of contingent payments in order to reduce the amount recognized as a liability for renting.

The standard applies to all leases, except for exploration rights for non-renewable resources; rights under the license agreements; lease of biological assets and concession agreements on the provision of services. For landlords, the granted licenses for intellectual property are excluded from the scope of IFRS 16, and tenants are not required to apply IFRS 16 to certain rights owned by them in accordance with license agreements.

In accordance with the rules of accounting, the subject of leasing can be recorded on the lessor's balance sheet, the owner of the asset remains with the lessor, who is carrying out depreciation of the asset's value.

Therefore, in this case the lessor considered these assets as being in the operating lease, and the lessee as the tenant. This accounting method is inconsistent with IFRS.

The lease was defined as a finance lease, and not as an operating lease. In this case, in connection with the lease, all risks and rewards incident to ownership of the asset were transferred to the lessee.

Besides:

• Under the lease agreement, the right to own the asset passes to the lessee at the end of the lease term;

• The lessee has the right to purchase the asset at an attractive price;

• The lease term includes the majority of the asset's life.

• The present value of the minimum lease payments is basically the entire fair value of the leased asset.

• Leased assets have such specific characteristics that only the tenant can use them without serious modification.

It is necessary to solve the problem as follows:

• Analyzed the lease.

• I discussed with the accountants alternative methods of accounting and the principle of the predominance of the entity over the form.

• Carried out an analysis of existing accounting policies and accounting practices.

• Provided recommendations on an alternative method for accounting for leased assets.

• Explained to the accountants of the landlord company about the benefits of this new method.

It is necessary to take into account equipment as an asset and make appropriate depreciation charges. The landlord must do the following:

1. Set the value of the asset, including the initial direct costs - it was known.

2. Calculate the useful life of the asset - presumably, 4 years.

3. Select the depreciation method and make accruals during the useful life of the asset.

4. To allocate capital and percentage components from all sum of leasing payments - it as was known.

5. Make a schedule of payments broken down by principal and interest - this was established.

6. Calculate payments for the principal amount during the first year. They should be reflected as short-term liabilities.

7. Calculate and display the remaining principal payments as long-term liabilities.

Conclusions. Thus, if we do not follow such a complicated procedure, and in connection with the lack of regulatory documents, we propose to introduce an internal Regulation "Accounting for leasing transactions", which will increase the transparency of leasing accounting and will improve the regulatory and legislative framework in terms of leasing operations. The Regulations contain the following sections: "General Provisions"; "Assessment of leased property"; "Depreciation of leased property"; "Accounting for leasing payments"; "Accounting for costs when repairing leased property"; "Disposal of leased property"; "Disclosure of information on leasing in financial statements". The conducted research showed the existence of serious differences in the accounting interpretation of the entire complex of leasing relations, given in the domestic accounting system and foreign countries.

Many auditors believe that, for all the shortcomings of the imposition of IFRS on our legislation, the tax base of Kazakhstan should be based, nevertheless, on international standards. Ideally, perhaps, it would be to create a separate accounting accounting from tax accounting, but taking into account the experience of the Big Four, it is hardly possible to completely abandon accounting as such. Therefore, for today, it seems to me, it would be of fundamental importance to take existing accounting and, on its basis, minimize differences, otherwise it will be very difficult to envisage any trends that are taking place on the market today. After all, the more Kazakhstan integrates into the world economy, the more questions will arise in our country. Therefore, I am of the opinion that the tax base in our country should be based on international financial reporting standards.

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16 ҚЕХС (IFRS) БОЙЫНША ЛИЗИНГТІК ОПЕРАЦИЯЛАР БОЙЫНША ЕСЕПКЕ АЛУДЫ ЖЕТІЛДІРУ

Аннотация. Авторлар ішкі ережелерге және халықаралық бухгалтерлік есеп стандарттарына сәйкес лизингтік операцияларды есепке алу әдісі, зерттелген. зерттеу, атап айтқанда, «Жалпы ережелер» бухгалтерлік емдеу елеулі айырмашылықтар барын көрсетті; «Жалға алынған мүлікті бағалау»; «Жалға алынған активтердің амортизациясы»; «Лизинг төлемдерін есепке алу»; «Жалға алынған мүлікті жөндеу құны бухгалтерлік есеп»; «Жалға алынған мүлікті жою»; «Қаржы есептілігінде лизинг туралы ақпаратты ашып көрсету». лизинг есепке ашықтығын арттырады және нормативтік және заңнамалық базаны жақсартуға мүмкіндік береді, ол «лизингтік операциялар бойынша есепке алу» байланысты ережелерге болмауына бөліп ұлттық бухгалтерлік есеп жүйесінің және шет елдерде жетегі лизингтік қатынастардың бүкіл кешенін Анықтамалар, және, демек, ішкі жағдайды енгізуді ұсынды, лизингтік операциялардың бөліктері.

Түйін сөздер: лизинг, ХҚЕС, бухгалтерлік есеп, операция, жалға алынған мүліктің амортизациясы, жалға алынған мүлікті сату

УДК 657.1

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СОВЕРШЕНСТВОВАНИЕ УЧЕТА ЛИЗИНГОВЫХ ОПЕРАЦИЙ В СООТВЕТСТВИИ С МСФО (IFRS) 16

Аннотация. Авторами статьи была исследована методика учета лизинговых операций, предписываемой отечественными нормативными документами и международными стандартами финансовой отчетности. Проведенное исследование показало существование серьезных различий в бухгалтерской трактовке, в частности, «Общие положения»; «Оценка лизингового имущества»; «Амортизация лизингового имущества»; «Учет лизинговых платежей»; «Учет затрат при ремонте лизингового имущества»; «Выбытие лизингового имущества»; «Раскрытие информации о лизинге в бухгалтерской отчетности». Определения всего комплекса лизинговых отношений, приводимой в отечественной системе учета и зарубежных странах, разняться в связи с отсутствием регламентирующих документов, в связи с чем предложено внедрить внутреннее Положение «Учет лизинговых операций», которое повысит прозрачность учета лизинга и позволит совершенствовать нормативно-законодательную базу в части лизинговых операций.

Ключевые слова: лизинг, МСФО, учет, операции, амортизация лизингового имущества, выбытие лизингового имущества.

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PECULIARITIES OF ENTERPRISE FORMATION IN THE NORTHERN REGION OF KAZAKHSTAN

Abstract. The issues of forming entrepreneurship in the Republic of Kazakhstan are among the most important and are considered at the highest state level. Entrepreneurship in the Republic of Kazakhstan has become a phenomenon of mass and relatively dynamic. In Western countries at present, entrepreneurship is characterized as a special, innovative, anti-bureaucratic style of management. The basis of this is a constant search for new opportunities, an orientation toward innovation, and the ability to attract and use resources to solve a given task on a wide variety of sources. In this regard, a scientific analysis of the economic problems of small business in Kazakhstan acquires special importance in the conditions of economic reform, characterized primarily by structural restructuring of the economy, the need to stabilize the reproduction processes and ensure in the long term sustainable economic development.

Keywords: business, economy, region, business, subjects.

Introduction. The XXI century, which is called the century of high technology, the information age, is characterized by globalization, integration of economies, activation of migration processes, cultural interpenetration. With all their positive consequences, these processes have a downside, related to the rationalization of spiritual life, the aggravation of the worldview and value crisis. In these conditions, as noted by the First President of RK NA. Nazarbayev in his message "Strategy" Kazakhstan-2050: a new political course of the state ", the most important strategic task is the formation of the New Kazakhstan Patriotism, which should unite the entire society and become the basis of its success:" Kazakhstan is our land. This is the land that for centuries belonged to our ancestors. The land that will belong to our descendants".

Methods of research. One of the priority directions of the economic reform, currently being carried out in Kazakhstan, is the formation and development of small business. The society is increasingly aware that small business is one of the key conditions for the formation of market mechanisms and is an integral part of the modern market system. The development of small business in unity with the diversification (breakdown) of the industrial sector is one of the foundations of the strategy "Kazakhstan - 2030". Small business in Kazakhstan is not only a necessary link in the creation of a market system of management, but also the most essential element in the social transformation of society.

Foreign experience of economic and social development confirms that entrepreneurship can become a real factor not only for stabilization, but also for the growth of the economy of Kazakhstan. Small business contributes to the maintenance at a proper level of competition, flexible restructuring of production, acceleration of innovation processes, the formation of the social orientation of market relations and the growth of employment.

The discussion of the results. Business is based on personal priorities of the entrepreneur, therefore, the business concept reflects the individual principles of the businessman, as well as the economic potential of the regions.

So, as of January 1, 2018 in the North Kazakhstan region, the survey of active SMEs in the regional context for the period under study showed that the positive dynamics persists in all regions of Kazakhstan. Summing up the review of the state of the SME sector in Kazakhstan, the following conclusions can be drawn:

1. Over the past few years, there has been a general growth in the absolute indicators of the SME sector (nominal number of registered, functioning SIDS, number of employed people, output).

2. Disproportions remain in the structure of SMEs by industry and organizational and legal forms: the share of entities providing trade and intermediary services is increasing, the number of individual entrepreneurs is growing at a faster pace than in enterprises and peasant farms.

3. By the end of 2014, the South-Kazakhstan and Almaty regions, as well as the city of Almaty, are traditionally the leaders in the number of active SME entities. According to the share of active SMEs in the total number of SMEs registered, as in the previous year, the first positions were taken by Aktyubinsk and West-Kazakhstan regions.

4. Traditionally, Almaty is the region with the largest number of SMEs registered in the form of a legal entity, due to the productivity of which the city has the largest output of SMEs and the number of people employed in it.

Table 1 - Number of operating small and medium-sized businesses as of January 1, 2018 units

	Total	в том числе				In% to the corresponding period of the previous year
		Small Business Company	The legal entity of medium-sized business	individual entrepreneurs	farming	
Total	27 587	4 704	125	19 595	3 163	99,8
Petropavlovsk	15 077	3 123	40	11 858	56	102,4
Ayrtausky	1 229	131	17	885	196	98,5
Akzharsky	689	87	1	359	242	106,8
M. Zhumabaeva	1 006	109	5	607	285	93,3
Esilsky	778	128	7	460	183	91,9
Zhambylsky	665	78	1	396	190	83,5
Kyzylzhar	1 449	209	4	947	289	100,7
Mamlutsky	790	98	4	510	178	92,1
Shal Akyna	867	128	2	539	198	93,2
Akkayinsky	649	82	4	346	217	97,4
Tayynshinsky	1 586	238	10	977	361	100,6
Timiryazevsky	677	58	5	301	313	90,3
Ualikhanovsky	611	68	1	345	197	103,2
G.Musrepov...	1 514	167	24	1 065	258	100,9

As of January 1, 2018, the number of operating subjects of small and medium-sized businesses, compared with the corresponding date of the previous year, decreased by 0.2%. In the total number of small and medium-sized businesses, the share of individual entrepreneurs was 71%, of small businesses - 17%, of peasant or private farms - 11.5%, of medium-sized businesses - 0.5%.

The volume of industrial production in January 2018. amounted to KZT 19081.9 million in current prices, which is 0.7% less than in January 2017. In the mining industry, production volumes decreased by 4.2%, in electricity, gas, steam and air conditioning - by 8.6%. In the manufacturing industry, output increased by 2.8%, in water supply, sewerage, control over collection and distribution of waste - by 1.6%.

The volume of gross output of agricultural products (services) in January 2018 amounted to 8497.7 million tenge, which is more than January 2017. by 5.3%.

The volume of freight turnover in January 2018. made up. The volume of industrial production in January 2018. amounted to KZT 19081.9 million in current prices, which is 0.7% less than in January 2017. In the mining industry, production volumes decreased by 4.2%, in electricity, gas, steam and air conditioning - by 8.6%. In the manufacturing industry, output increased by 2.8%, in water supply, sewerage, control over collection and distribution of waste - by 1.6%.

The volume of gross output of agricultural products (services) in January 2018 amounted to 8497.7 million tenge, which is more than January 2017. by 5.3%.

The volume of freight turnover in January 2018. amounted to 253.2 million tkm (including estimates of the volume of turnover of individual entrepreneurs engaged in commercial transport), or 102.5% by January 2017. The volume of passenger turnover was 294.7 million pkm, or 100% compared to the same period last year.

The volume of construction works (services) amounted to 923.2 million tenge, or 155.8% as of January 2017.

For housing construction 446.9 million tenge was sent (126.1% compared to January 2017), 3761 square meters were commissioned. meter of housing (125.2%).

Thus, at the moment in Kazakhstan, the most widely distributed partnerships with limited liability (LLP). It is in this form that most trade and intermediary enterprises are created.

In addition to the creation of shops and supermarkets, the intermediary business showed itself in exhibition activities. The company "Iteca" (England - Kazakhstan) accounts for not less than 80% of all exhibitions organized in Kazakhstan. The mediation business in the tourism industry has become especially widespread. Hundreds of firms offer today in Kazakhstan tourist trips abroad.

Among the measures of state support for entrepreneurship, the assistance and assistance of the state in securing small business for a particular market is of key importance. The implementation of this proposal can be ensured through the regular publication of the list of priority types of production, in the development of which the state is interested, and the list of regions that it would like to develop.

An effective measure of state support in one direction would be the granting of preferences when placing government contracts for the production of certain types of goods, works and services from a published list [4].

The objectives of the program to support entrepreneurship in the country are:

1. Identification of priority areas for business development in the sectorial and regional context.

First of all, we are talking about the creation of private and collective structures of a market economy in the sphere of production and processing of agricultural products, the production of consumer goods, the development of innovative activities;

2. Formation of all components of market infrastructure in Kazakhstan as a sovereign state (commodity, stock exchanges, holding, brokerage, brokerage, leasing, insurance, audit companies).

3. Creation and active activity of state and non-state bodies and organizations to support new economic structures. Formation of republican and local funds to support entrepreneurship.

All these measures to improve the state support of entrepreneurship will ultimately expand the scope of its activities and increase volumes, and will have a positive impact on each specific enterprise.

Taking into account the specific factors characteristic for modern Kazakhstan (huge territory, various soil and climatic conditions, a glaring gap in the levels of economic potential of regions, environmental problems) and for the purpose of analyzing the development of regional entrepreneurship in the RK, the authors of the study deemed it expedient to identify the following four influenza regions:

The first group consists of regions with unique reserves of mineral resources (mainly hydrocarbon reserves), a high level of development of the national productive potential, an inefficient sectorial economy, a social backwardness of the village, and a serious environmental situation (Atyrau, Aktobe, Mangistay, ZKO, and Kyzylorda region).

Priority directions of reforming the economy of these regions are intensive development of rich deposits of raw materials (chromite's, potassium salts, borates, nickel, cobalt, etc.), their complex processing; creation of highly developed industrial, social and market infrastructure meeting world standards of quality; creation of a favorable investment climate for domestic and foreign investors.

The second group is regions with a high production potential, with specialization in heavy industries, and self-sufficiency in financial resources. These regions include the East Kazakhstan region, Pavlodar, Karaganda, Kostanay regions and North Kazakhstan region [9].

Priority directions of reforming the economy of these regions should be further rapid reconstruction of the strong production potential; organization of the issue of a new high-volume product on the basis of the latest technologies, including the use of external sources of financing and advanced technologies for foreign; accelerated development of market infrastructure.

The third group is regions with specialization in the development of agro-industrial complexes, which are leading in the formation of the food fund of the Republic of Kazakhstan. These regions include the North Kazakhstan region, Akmola region, WKO, Almaty region.

Priority directions of reforming the economy of these regions are the further development of agriculture; introduction and use in the production process of the newest technologies and machinery ensuring high quality of agricultural production and export growth; organization of a wide network of small enterprises for processing agricultural raw materials; development of the consumer market [10].

Conclusions. Thus, it is important to conclude that the priority areas for reforming the economy of the regions are the prevention of the process of curbing the environmental crisis; radical reconstruction of the economic complex; creation of a network of small enterprises for the industrial processing of agricultural raw materials; providing the necessary conditions for those wishing to resettle the inhabitants of small and medium-sized cities, rural areas with environmentally hazardous environment surrounding the environment in other regions of the republic; Involving technical and humanitarian aid and its effective use.

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ҚАЗАҚСТАННЫҢ СОЛТҮСТІК ӨҢІРІНДЕ КӘСІПКЕРЛІКТІ ҚАЛЫПТАСТЫРУДЫҢ ЕРЕКШЕЛІКТЕРІ

Аннотация. Қазақстан Республикасында кәсіпкерліктің қалыптасуы маңызды және мемлекеттік деңгейде қарастырылады. Қазақстан Республикасында кәсіпкерлік жаппай және серпінді құбылыс болып табылады. Қазіргі уақытта батыс елдерінде кәсіпкерлік шарауашылықты жүргізудің ерекше, жаңашыл, антибюрократтық стилі ретінде сипатталады. Оның негізінде үнемі жаңа мүмкіндіктерді іздеу, инновацияғаларға бейімделу, алға қойылған мақсатқа жету үшін түрлі дереккөздерді пайдалану жатыр. Осыған байланысты Қазақстандағы шағын бизнестің экономикалық мәселелерін ғылыми тұрғыдан талдау, экономиканың қалыптасуында ерекше орын алады. Ең алдымен шаруашылықтың құрылымдық қайта құрылуы, ұдайы өндірістік процестердің қажетті түрде қалыптасуы мен экономикалық тұрақты дамуды қамтамасыз етумен сипатталады.

Түйін сөздер: кәсіпкерлік, экономика, аймақ, бизнес, субъекттер.

УДК 336.63

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ОСОБЕННОСТИ ФОРМИРОВАНИЯ ПРЕДПРИНИМАТЕЛЬСТВА В СЕВЕРНОМ РЕГИОНЕ КАЗАХСТАНА

Аннотация. Вопросы формирования предпринимательства в Республике Казахстан относятся к категории наиболее важных и рассматриваются на высшем государственном уровне. Предпринимательство в Республике Казахстан стало явлением массовым и относительно динамичным. В западных странах в настоящее время предпринимательство характеризуется как особый, новаторский, антибюрократический стиль хозяйствования. В основе, которого лежит постоянный поиск новых возможностей, ориентация на инновации, умение привлекать и использовать для решения поставленной задачи ресурсы на самых разнообразных источниках. В связи с этим научный анализ экономических проблем малого бизнеса в Казахстане приобретает особую значимость в условиях реформирования экономики, характеризующейся, в первую очередь структурной перестройкой хозяйства, необходимостью стабилизации воспроизводственных процессов и обеспечения в перспективе устойчивого экономического развития.

Ключевые слова: предпринимательство, экономика, регион, бизнес, субъекты.

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PROBLEMS AND WAYS TO SOLVE DIGITIZING OF SPATIAL DATA IN THE REPUBLIC OF KAZAKHSTAN

Abstract. This work has brought to light main problems faced in setting up and forming the National Spatial Data Infrastructure of the Republic of Kazakhstan (NSDI of the RK). The major ones are a proper formation of the executive structure; short list of standards in force for setting up of the NSDI of the RK; casual generation and inappropriate development of spatial data; low levels of technology; a necessity for an advanced training of specialists. During the organization of the NSDI of the RK, it has been suggested to turn attention to the executive structure of the Federal Geographic Data Committee which has been mentioned as an example in a schematic format. It has been suggested to formulate new standards for the NSDI of the RK or arrangement of statutes and regulations tested through practice of developed countries; to apply the recent advancements in spatial data generating and disseminating technology. The level of readiness and the development level for each of five spatial data groups of the NSDI of the RK such as fundamental, basic, industry, thematic and metadata group have been assessed. Lack of its own open coordinate system in the country that makes it impossible to set up the NSDI of the RK has been identified. It was noted that the structure of basic spatial data for the national spatial data infrastructure of the country has not been defined to this day. Casual generation and development of industry spatial data in the country by fewer than all government establishments and bodies have been acknowledged. In Kazakhstan, generating thematic spatial data was evolved very massively. However there is no civilized control and follow-up exchange mechanism in the thematic data generation. This resulted in a situation where thematic spatial data often becomes a property of geodata producers and is not included into the general storage and dissemination system. In the area of technology, the authors believe that it is necessary to use the technologies of spatial data infrastructure 2.0 in order to set up, build and develop the NSDI of the RK.

It is suggested to improve the Automated Information System of State Land Cadastre (AIS SLC) as one of the ways to generate and build the NSDI of the RK by adding SDI 2.0 thereto. The AIS SLC is quickly developed and has already had more than 12 sub-systems and cartographic framework for the whole territory of Kazakhstan. The AIS SLC can integrate with other information systems relatively easily and has vertical and horizontal structure and defined professional staff in each region of the country. To use fully the AIS SLC for setting up the NSDI of the RK, it is certainly necessary to solve in advance organizational, technical and technological problems identified by the authors.

Keywords: digitalization, spatial data, complex information technology platforms, national spatial data infrastructure, collective mind, creating content by users, problems, solutions.

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ПРОБЛЕМЫ И ПУТИ РЕШЕНИЯ ЦИФРОВИЗАЦИИ ПРОСТРАНСТВЕННЫХ ДАННЫХ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация: В работы выявлены основные проблемы создания и формирования Национальной инфраструктуры пространственных данных Республики Казахстан (НИПД РК). Главными из них являются:

правильное формирование исполнительной структуры; неполный состав действующих стандартов для создания НИПД РК; бессистемное создание и неадекватное формирование пространственных данных; низкий уровень технологии; необходимость совершенствования подготовки специалистов. При организации НИПД РК предложено обратить внимание на исполнительную структуру Федерального комитета по геоданным США, которая приведена в качестве примера в схематической форме. Предложена выработка новых стандартов для НИПД РК или переложения нормативно-правовых документов, проверенных на практике развитых стран; применение последних достижений в области технологии создания и распространения пространственных данных. Оценены степень готовности и уровень развития каждой из пяти групп пространственных данных НИПД РК: фундаментальной, базовой, отраслевых, тематических и метаданных. Указано на отсутствие в республике собственной открытой системы координат, без которой невозможно создать НИПД РК. Отмечено, что до настоящего времени не определен состав базовых пространственных данных национальной инфраструктуры пространственных данных страны. Обращено внимание, что в республике отраслевые пространственные данные создаются и формируются бессистемно и не всеми государственными ведомствами органами. В Казахстане, наиболее массовое развитие получило создание тематических пространственных данных. Однако, в области создания тематических данных отсутствует механизм цивилизованного контроля и последующего обмена. Это привело к тому, что тематические пространственные данные часто превращаются в собственность производителей геоданных и не поступают в общую систему их хранения и распространения. В области технологии авторы считают, что для создания, формирования и развитие НИПД РК необходимо использовать технологии инфраструктуры пространственных данных 2.0.

В качестве одного из путей создания и формирования НИПД РК предлагается совершенствование Автоматизированной информационной системы государственного земельного кадастра (АИС ГЗК), дополнив её технологиями ИПД 2.0. АИС ГЗК динамично развивается и уже имеет более 12 подсистем и картографическую основу на всю территорию Казахстана. АИС ГЗК способна относительно легко интегрироваться с другими информационными системами, имеет вертикальную и горизонтальную структуру и сформированный штат квалифицированных сотрудников в каждом районе республики. Естественно, для полноценного использования АИС ГЗК для создание НИПД РК необходимо предварительно решить выявленные авторами организационные, технические, технологические проблемы.

Ключевые слова: цифровизация, пространственные данные, комплексные информационно-технологические платформы, национальная инфраструктура пространственных данных, коллективный разум, создание содержание пользователями, проблемы, пути решения.

В мире цифровые пространственные данные (синонимы – геоданные и георесурсы) составляют более 80% общей цифровой информации [1]. Поэтому, развитые страны к своим геоданным относятся крайне бережно, понимая, что, в целом, именно эти 4/5 цифровой информации играют решающую роль в росте и развитии экономики государства, эффективности деятельности субъектов бизнеса и социальной удовлетворенности граждан, в частности. Вследствие этого, для успешного достижения основных целей цифровизации, развитыми странами в качестве мероприятии первостепенной важности были созданы «Национальные инфраструктуры пространственных данных» (НИПД).

Казахстан так же полностью признал необходимость вступления в «цифровую эпоху» и активного внедрения для осуществления этой цели «комплексных информационно-технологических платформ» [2], одной из которых является «НИПД Республики Казахстан» (НИПД РК). Благодаря в основном нашим усилиям [3], после активных дискуссий НИПД РК, вошел в План мероприятий по реализации Государственной программы «Цифровой Казахстан» [4,5].

НИПД развитых стран построены так, что через коллективный разум их участников поддерживаются инновационные технологические тренды, направленные на создание, формирование и развитие пространственных данных и условия для максимального развития предпринимательства на уровнях: Government to Government (G2G), Government to Business (G2B) и Government to Citizen (G2C), включая Business to Business (B2B). Кроме того, примеры отдельных стран показывают, что правильное создание и формирование организационной структуры и программно-технологической платформы НИПД окупается очень быстро. К тому же, происходит лавинообразный рост цифровизации, что приводит, в итоге, к цифровой трансформации экономики страны.

В тоже время, по разным причинам, некоторые НИПД, не всегда создаются, формируются и развиваются согласно требованиям, предъявляемым к современным ИПД [6].

Целью данной работы является показать наиболее эффективные пути создания, формирования и развития пространственных данных на всех трех уровнях деятельности государства: G2G, G2B и G2C на примере Национальной инфраструктуры пространственных данных. Задачи работы - выявление наиболее острых проблем создания НИПД РК и путей их решения.

Компоненты НИПД. В целом НИПД состоит из пяти главных компонентов: организационной, нормативно-правовой, технологической, пространственных данных и людей (специалистов), которые создают, формируют и развивают геоданные [3].

Организацию пространственных данных на уровне государства можно продемонстрировать на примере структуры Федерального комитета по геоданным США (Federal Geographic Data Committee -FGDC) [7] (рисунок 1).

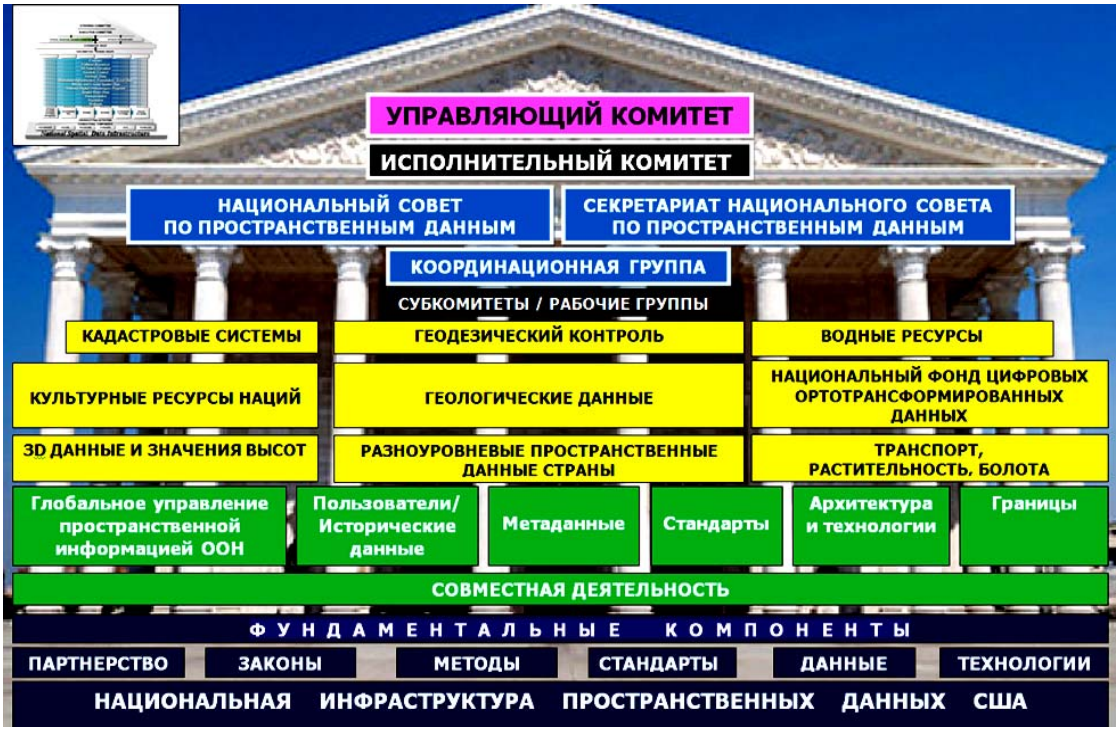

Рисунок 1 – Схема организационная структура Федерального комитета по геоданным США [7]

Она состоит из четырех крупных блоков: управляющей; пространственных данных; системы, обеспечивающей совместную деятельность; фундаментальной компоненты, направленной на создание, формирование и развитие НИПД.

К сожалению, в Казахстане еще не создана организационная структура, ответственная за ведения НИПД РК. По предварительным данным, ответственность за создание, формирования и развитие НИПД РК будет возложена на Комитет по управлению земельными ресурсами Министерства сельского хозяйства РК (КУЗР МСХ РК). КУЗР является государственным органом, ответственным за: создание и контроля пространственных данных (картографо-геодезическая служба); хранение пространственных данных (национальный картографо-геодезический фонд); учет, оценку, мониторинг и зонирование земельного фонда республики (ГосНПЦзем). Следовательно, выбор КУЗР МСХ РК, как ответственного госоргана для создания НИПД РК, вполне обоснованно с точки зрения вышеуказанных функций: создание, контроль, хранение, учет, оценка, мониторинг и зонирование пространственных данных всех категорий.

В тоже время, при создании НИПД крайне важным организационным моментом является наделение её полномочиями или достаточно твердыми условиями существования, которые не должны подвергаться размыванию ответственности при изменении организационной структуры исполнительной и политической власти в стране. Как правило, надежность существования НИПД обеспечивается возложением ответственности за её существование непосредственно главе

государства или главе правительства. Такие НИПД имеют возможность сохраниться и развиваться даже при самых острых кризисных ситуациях (пример – США, страны ЕС, Южная Корея и др.).

Стандартизация и нормативно-правовая база для НИПД РК недостаточно проработана. Понятия «пространственные данные» и «инфраструктура пространственных данных», благодаря усилиям ученых, впервые были введены в «Закон Республики Казахстан о космической деятельности» [8]. Но, еще нет «Закона о пространственных данных РК» и, соответствующих, подзаконных актов, стандартов, регламентов и инструкций, адекватно обеспечивающих реализацию норм такого юридического документа. Принципиально, этими компонентами НИПД РК можно обеспечить без особого напряжения, поскольку стандарты НИПД прошли длительные проверки в более чем 100 государствах. Эти стандарты, в основном, следует переложить для условий Казахстана. Тогда откроются колоссальные возможности для законного обмена пространственными данными, со всеми вытекающими отсюда последствиями.

Пространственные данные. Непременным достоинством НИПД является создание, формирование и развитие пространственных данных на системно-аналитической основе [3]. Они включают в свой состав пять видов пространственных данных.

1. Фундаментальные пространственные данные – это геометрия страны. Казахстан еще не имеет открытую государственную геодезическую систему координат. До решения данной проблемы невозможно приступать к созданию НИПД РК.

2. Базовые пространственные данные - это слабо изменяемые, как правило, среднего масштаба геоданные (границы республики, областей, районов; крупные водоемы и реки; дороги республиканского значения и др.),

которые всегда находятся в открытом доступе. К данному времени, состав базовых пространственных данных НИПД РК еще не определен.

3. Отраслевые пространственные данные – это обычно крупномасш-табные геоданные. Они составляются и систематически обновляются в целях решения производственных задач отраслей. Пока единственной, сданной в промышленную эксплуатацию информационной системой в области исполь-зования пространственных данных является – Автоматизированная информационная система государственного земельного кадастра [9]. Остальные информационные системы находятся в разных уровнях разработки [10].

4. Тематические пространственные данные – это разномасштабные, составленные на территорию интереса геоинформационные системы разной сложности и направленности всеми заинтересованными субъектами. Они в стране в основном создаются за счет бюджетных средств. Но, несмотря на это, систематизация и хранение тематических данных еще не налажено на должном уровне.

5. Метаданные – это данные о данных, указывающие формат, место нахождения и др. сведения о пространственных данных. Республика еще не располагает систематизированными в едином ключе метаданными к пространственным данным.

Окном НИПД в мир пользователей и производителей ЦПД является её геопортал (рисунок 2).

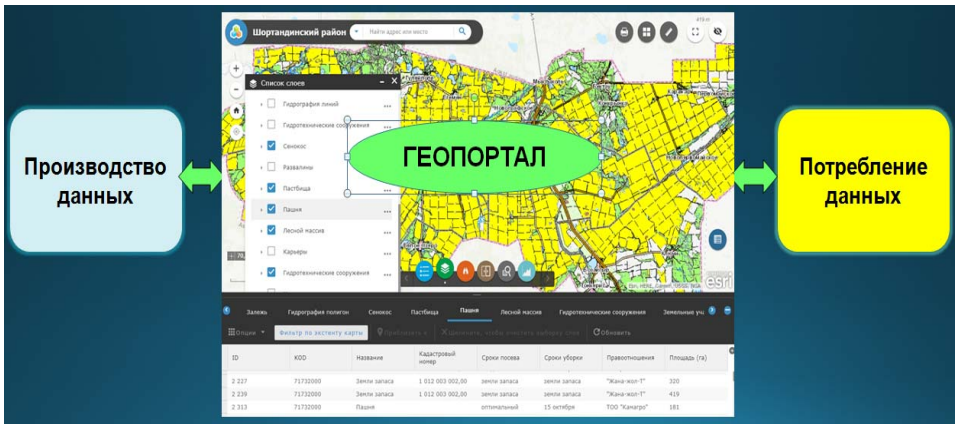

Рисунок 2 – Общая схема работы ИПД через геопортал

Геопортал служит для визуализации систематизированной базы геоданных и поддержания всей системы. Следующая функция геопортала - выполнение элементарного пространственного анализа, которая будет способствовать распространению данных, обмену данными между участниками и элементарному анализу визуализированных пространственных данных. Например, на геопортале, расширенные анализы пространственных данных с использованием атрибутивных данных не всегда доступны. Следовательно, роль геопортала ИПД нельзя переоценивать, как и недооценивать.

Технология создания и формирования НИПД за последние 10 лет перетерпело очень серьезные изменения. Например, первые НИПД (НИПД 1.0) создавались полностью за счет средств государства сверху вниз, т.е. по вертикали. Сейчас НИПД 2.0 разрабатываются и развиваются, главным образом, с использованием коллективного разума всего сообщества геоиндустрии страны, регионов и даже мира [11]. Соответствующее использование технологии НИПД 2.0 дают широкие возможности для цифровизации государства.

Люди или специалисты. Число и квалификация специалистов в области создания пространственных данных в республике растет достаточно высокими темпами. Практически, создание геоинформационных систем в республике вступило в пользовательскую фазу. Так, в данное время, программные обеспечения (ПО) для создания геоинформационных систем стали доступны, практически, каждому мотивированному лицу. Некоторые ПО, для создания многофункциональных геосервисов, находятся в открытом доступе [12]. Это способствует резкому увеличению потенциала для цифровизации страны, через исключение финансовых затрат на приобретение ПО.

Пути решения проблем. На наш взгляд, создание и формирование НИПД РК можно осуществить через совершенствование АИС ГЗК дополнив её технологиями ИПД 2.0. АИС ГЗК динамично развивается и уже имеет более 12 информационных подсистем и картографическую основу на всю территорию Казахстана. Она способна относительно легко интегрироваться с другими информационными и геоинформационными системами. При этом, АИС ГЗК имеет вертикальную и горизонтальную структуру и уже сформированный штат сотрудников в каждом районе республики, работающих в предметной области – земельно-кадастровой службе. Естественно, для полноценного использования АИС ГЗК необходимо сначала решить вышеприведенные организационные, технические, технологические проблемы.

Таким образом, нами показаны некоторые проблемы и пути решения при организации Национальной инфраструктуры пространственных данных Республики Казахстан. На уровне G2G – это собственная организационная структура НИПД РК, а так же правильная постановка проблемы ведения системы государственных ведомственных кадастров на базе АИС ГЗК. На уровне G2B – это предоставление бизнес структурам всех пространственных данных открытого содержания, выполненных за счет бюджетных средств государств. На уровне G2C – это массовое вовлечение граждан и специалистов для создания, формирования и развитие НИПД РК. Выявлены главные проблемы создания, формирования НИПД РК и пути их решения.

Исследования выполнены, согласно договора №242 на грантовое финансирование от 27 марта 2018 года по проекту «Разработка инфраструктуры пространственных данных 2.0 на примере агропромышленной агломерации».

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДА КІҢІСТІКТІК ДЕРЕКТЕРДІ САНДАНДЫРУ ПРОБЛЕМАРЫ МЕН ШЕШУ ЖОЛДАРЫ

Аннотация. Еңбекте Қазақстан Республикасының ұлттық кеңістіктік деректер инфрақұрылымын (ҚР ҰКДИ) дайындау және қалыптастыру проблемалары анықталған. Басты проблемалар қатарына мыналар жатады: атқарушы құрылымды дұрыс ұйымдастыру; ҰКДИ-ға қатысты мемлекеттік стандарттардың толық еместігі; кеңістіктік деректердің жүйесіз дайындалып нақтылы қалыптастырылмауы; технологиялар дәрежесінің төмендігі; мамандар дайындауды жетілдіру. ҚР ҰКДИ-ін ұйымдастырғанда АҚШ ҰКДИ-інің атқарушы құрылымына мән бере отырып дайындау ұсынылып ол мысал схема ретінде көрсетілген. ҚР ҰКДИ-іне байланысты жаңа стандарттар дайындалуы екерек. Немесе, дамыған мемелекеттердің тәжрибелерін еске ала отырып, олардағы жасалған нормативтік-құқықтық құжаттарды ауысымдау да жөн. ҚР ҰКДИ-інің кеңістіктік деректерін дайындауда экономкалық тұрғыдан пайдалы технологиялардың соңғы жетістіктерімен жұмыс істеу дұрыс. ҚР ҰКДИ-ің бес топтағы кеңістіктік деректерінің дайындығына және даму деңгейіне баға берілген. Олар: фундаменталдық, базалық, салалық, тақырыптық және метадеректер. Республикада ҰКДИ құру үшін ашық координаттық жүйенің жоқтығы нақтыланған. Онсыз ҚР ҰКДИ-ін құруға болмайтыны басып көрсетілген. Бүгінге дейін ҚР ҰКДИ-іне қажет базалық кеңістіктік деректер құрамы анықталмаған. Республикада салалық кеңістіктік деректерінің дайындлуы жүйесіз жүргізіліп кейбір мемлекеттік органдар белсенділік таныта алмай келеді.Қазақстанда тақырыптық кеңістіктік деректер дайындау жақсы дамыған. Бірақ тақырыптық кеңістіктік деректерді дайындауда өркениетті бақылау және кеңістіктік деректер алмасу жүйесінің механизмдері жеткілікті реттелмеген. Бұл құбылыс тақырыптық кеңістіктік деректердің жалпы мемлекеттік сақтау және алмасу жүйесіне ілікпей оларды дайндаушылардың меншігіне айналуына әкеліп соғуда.

Технология саласында, авторлар, ҚР ҰКДИ-ін жасау, қалыптастыру және дамыту кеңістіктік деректер инфрақұрылымын 2.0 технологиялары бойынша жүргізілуін қолдайды.

ҚР ҰКДИ-ін жасау, қалыптастыру және дамыту үшін мемлекеттік жер кадастрының автоматтандырылған ақпаратық жүйесін (МЖК ААЖ) негізге алып, оны КДИ 2.0 технологияларымен толықтыруды жетекшілікке алу керегін мақұлдайды.МЖК ААЖ жақсы дамыған 12-ден аса қосымшалары және бүкіл республиканы қамтитын картографиялық негізі бар жүйе. МЖК ААЖ республиканың барлық аудандарын қамтиды, басқа ақпараттық жүйелермен оңай интеграцияланады, вертикалді және горизонтальды құрылымымен жоғары дәрежелі мамандары бар. Әрине, МЖК ААЖ-ды ҚР ҰКДИ-ін жасау үшін пайдаланардың алдында, алдын ала жоғарыда көрсетілген кемшіліктерді реттеп алу керек.

Түйін сөздер: сандандыру, кеңістіктік деректер, кешендік ақпараттық-технологиялық платформа, ұлттық кеңістіктік деректер инфрақұрылымы, ұжымдық ақыл ой, кеңістіктік деректерді пайдаланушылардың өздері құруы.

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SCIENTIFIC METHOD OF CREATION CAPILLARY-POROUS COOLING SYSTEMS FOR ELEMENTS OF ENERGY BUILDING OF POWER STATIONS

Abstract. To create a scientific methodology, studies of the ultimate heat fluxes in metallic and poorly heat-conducting porous structures operating under the combined action of gravitational and capillary forces and cooling various devices of thermal power plants have been carried out. On the basis of the problem of thermoelasticity and experimental data, the mechanism of destruction of metal vaporising surfaces and poorly heat-conducting coatings of low porosity made of natural mineral media (granite) is described. On the basis of the analogy of the phenomena, the dependences of the heat fluxes on the time of their action and the depth of penetration of temperature perturbations are revealed. Capillary - porous systems have high intensity, high heat transfer ability, reliability, compactness.

Keywords: heat transfer crisis; capillary-porous structure; heat and power installations.

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НАУЧНАЯ МЕТОДИКА СОЗДАНИЯ КАПИЛЛЯРНО-ПОРИСТЫХ СИСТЕМ ОХЛАЖДЕНИЯ ДЛЯ ЭЛЕМЕНТОВ ЭНЕРГООБОРУДОВАНИЯ ЭЛЕКТРОСТАНЦИЙ.

Аннотация. Для создания научной методики проведены исследования предельных тепловых потоков в металлических и плохотеплопроводных пористых структурах, работающих при совместном действии гравитационных и капиллярных сил, и охлаждающих различные устройства теплоэнергоустановок . На основе задачи термоупругости и опытных данных описан механизм разрушения металлических парогенерирующих поверхностей и плохотеплопроводных покрытий малой пористости, выполненных из естественных минеральных сред (гранита). На основе аналогии явлений выявлены зависимости тепловых потоков от времени их действия и глубины проникновения температурных возмущений. Капиллярно – пористые системы обладают высокой интенсивностью, большой теплопередающей способностью, надежностью, компактностью.

Ключевые слова: кризис теплопередачи; капиллярно-пористая структура; тепловые энергоустановки.

Введение. Успехи в применении капиллярно-пористых материалов в технике привлекали многих исследователей и изобретателей создавать на их основе различные устройства. Повышалась интенсивность теплоотводящих систем и форсировка протекающих в них процессов [1-3]. Использование пористых материалов помимо систем охлаждения позволяло создавать агрегаты, в которых решались проблемы взрывобезопасности, охраны труда и долговечности [4,6]. Этому способствовала возможность управлять процессами парообразования за счет избытка жидкости в порых и капиллярных структурах, создаваемого совместными действиями капиллярных и массовых сил [7-9].

В тепловых энергетических установках (ТЭУ) капиллярно-пористые материалы используются для охлаждения высокофорсированных детонационных горелочных устройств [3], создания

пароохладителей в паровых котлах [9], маслоохладителей, исключающие попадания масло в охлаждающую воду и воды в систему подшипников [10], лабиринтных уплотнений [11], и в других устройствах [10].

Основные области практического применения капиллярно-пористых систем представлены в [3,5,8-11].

Капиллярно-пористые системы позволяют достигнуть экономии топлива, сырья, воздуха, воды, тепла, повысить надежность охлаждения и взрывопожаробезопастность работы оборудования, способствовать высокоэффективному разрушению горных пород, бетонов, металлов, уменьшить низкотемпературную коррозию поверхностей, сократить загрязнению биосферы ядовитыми газами, пылью, теплом, ускорить решение проблем продовольственной программы, получить большой экономический и социальный эффекты в области экологии и охраны труда.

Основными преимуществами капиллряно-пористых систем являются высокая интенсивность, большая теплопередающая способность, надежность, компактность, простота в изготовлении и эксплуатации, они улутшают режимные и технологические показатели и имеют невысокие капитальные и эксплуатационные расходы.

Авторы [12] проводят сравнительный анализ методов расчета теплоотдачи по кипению воды с недогревом в вертикальных каналах, причем считают очаговую коррозию оболочек твэлов ядерных реакторов аналогом капиллярно-пористой структуры [13,14]. Однако исследования теплообмена по регулярной структурированной поверхности не проводилось.

По мнению авторов [15,16] поверхностное кипение на пористых поверхностях может влиять на развитие коррозии из-за эрозионного воздействия на поверхность теплообмена при схлопывании пузырей пара в недогретой жидкости. Поэтому требуется исследовать парообразование жидкости в капиллярно-пористых структурах в поле капиллярных и массовых сил с учетом скорости и недогрева, которые создаются избытком жидкости.

Оценка интенсивности теплообмена для кипения жидкости в большом объёме и тонких пленках на гладкой поверхности показала на их равные возможности [12-14] при высоких тепловых потоках, и на более высокие показатели теплопередачи, чем у систем с капиллярно-пористым покрытием [15-16]. Требуется провести исследования теплопередающих возможностей капиллярно-пористых покрытий, работающих в поле капиллярных и массовых сил, и установить величины придельных (критических) нагрузок, приводящих к разрушению поверхностей нагрева.

На рисунке 1 представленна методика исследования капиллярно-пористых систем применительно к различным элементам энергоустановок. Системы отличаются тем, что имеют преимущественно гравитационный подвод жидкости и по интенсивности теплопередачи занимают промежуточное положение между тонкопленочными испарителями и пористыми испарителями с преимущественно капиллярным подводом жидкости (тепловыми трубами). Поэтому такие системы следует выделить в отдельный класс теплоотводящих систем.

Проведенные исследования позволяют дать рекомендации по выбору теплохолодоносителя, учесть вид его циркуляции, определить геометрию и материал аппаратов и интенсификаторов теплообмена, с учетом условий и ориентаций работы системы под давлением или разрежением, подводом и видом энергии, ориентации системы. Обобщение экспериментальных результатов и методика расчета тепло- и массообменна в капиллярно-пористых системах в соответствии с рисунком 1 представлены в [17-21].

Исследование различных факторов, влияющих на теплообмен в структурах, показывают, что особый интерес вызывают предельные (критические) состояния поверхности нагрева, когда система способна переносить максимальные потоки энергии и вещества. Однако в этом случае требуется знать величины тепловых потоков и термических напряжений с целью обеспечить надежную долговечную работу установки. Так можно получить максимальный перенос энергии и вещества для следующих условий: используется чистая жидкость, циркулирующая по принудительной схеме в закрытых эллиптических теплообменниках под давлением в перфорированных и профилированных поверхностях нагрева, выполненных из нержавеющей стали. Система работает с избытком жидкости, а наличие массовых сил обеспечивает вынужденное течение теплохолодоносителя с недогревом. Энергия подводится к вертикально расположенной поверхности по периметру сверхзвуковым высокотемпературным пульсирующим вращающимся факелом [1,3,11,19].

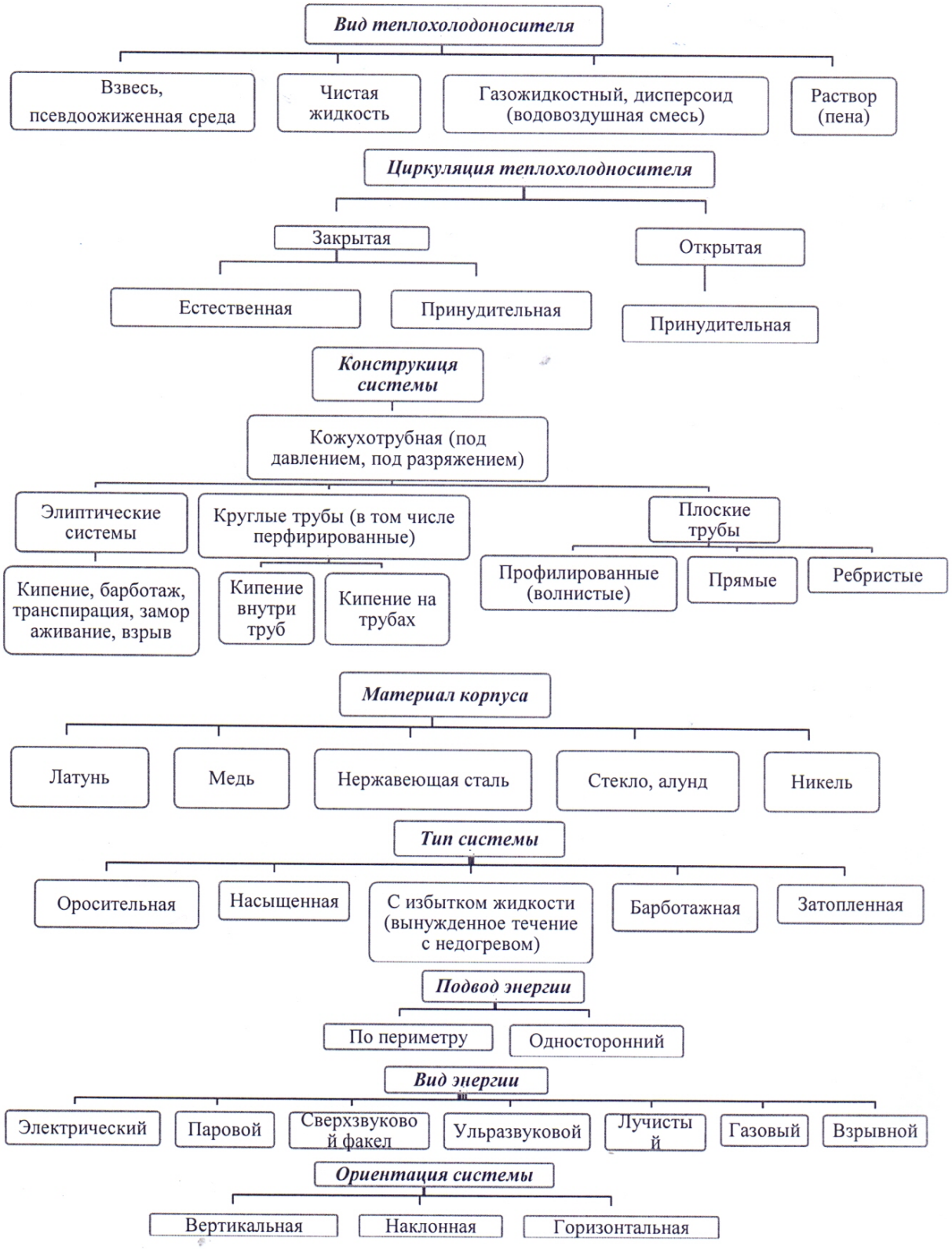

Рисунок 1 - Методика исследования различных факторов влияния на тепломассообмена в капиллярно-пористых систем ТЭУ

Экспериментальный метод. Исследования проводятся в капиллярно-пористой системе охлаждения, которая может работать по принципу замкнутой испарительно- конденсационной

схеме, либо быть разомкнутой. Изучаются различные условия теплообмена: способ подвода охладителя; степень прижатия капиллярно-пористой структуры; способность подпитки структуры из микро- артерий по высоте теплообменной поверхности; ориентация поверхности относительно гравитационных сил; геометрия: плоские, трубчатые и искривленные поверхности охлаждения; влияние давления вплоть до кризисных явлений с пережогом стенки (см. Рис 1).

Для исследования механизма теплообмена привлекаются методы голографии, обобщение подобных и аналогичных явлений [1,3,11,20,21]. Управление теплообменом проводится за счет эллиптических систем, путем комбинированного действия капиллярных и массовых сил [1,3].

Изучение теплообмена носит практический характер, предназначено для создания различных тепловых энергоустановок: пароохладителей паровых котлов, пористых покрытий из плохотеплопроводного материала, уплотнений в паровых турбинах и ряда других энергоустановок [1, 3, 7, 10, 19].

На рисунке 2 изображен поперечный разрез плоской экспериментальной установки с перфорированной прижимной пластиной 3 (Рис.3), трубчатыми артериями 4 и капиллярно-пористой структурой 2.

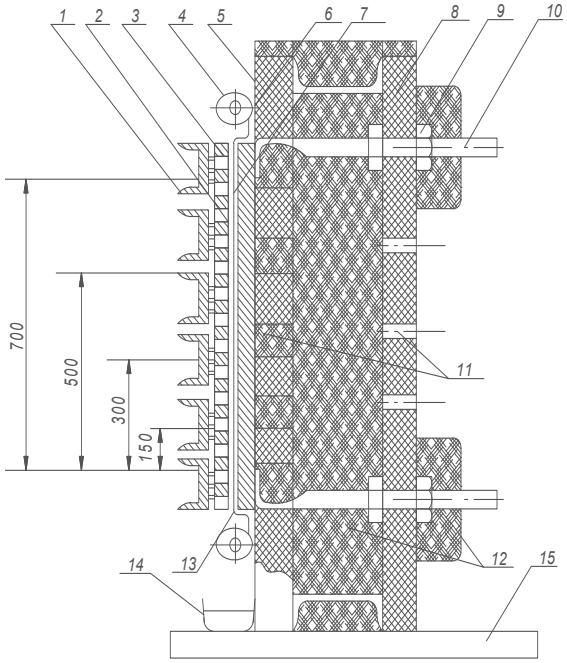

Рисунок 2 - Поперечный разрез плоской экспериментальной установки: 1 – прижимная планка, 2 – капиллярно-пористая структура, 3 – перфорированная прижимная пластина, 4 – трубчатая артерия, 5 – асбоцементная плита, 6 – нагреватель, 7 – изоляция, 8 – плита, 9 - прижимная гайка, 10 – электрод, 11 – окна, 12 – теплоизоляция, 13 – охлаждаемая стенка, 14 – сборник, 15 – подставка

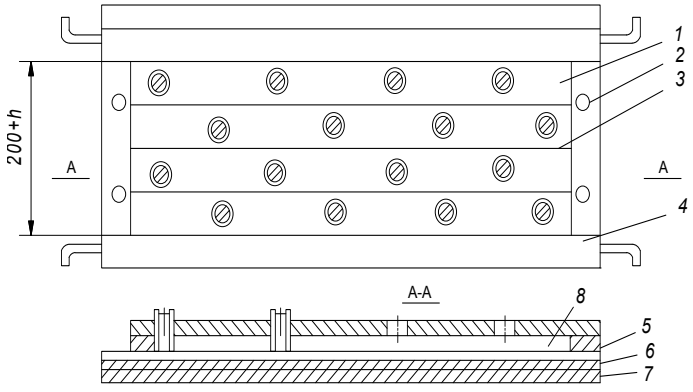

Рисунок 3 - Схема прижатия капиллярно-пористой структуры: 1 – пластины, 2 – прижимные винты, 3 – щели для выхода пара, 4 – подвод жидкости, 5 – прижимная перфорированная пластина, 6 – капиллярно-пористая структура, 7 – обогреваемая стенка, 8 – микро артерия

Наибольшая возможная погрешность:

А) при измерении тока - ±0,6%, падение напряжения - ±1%, мощность - ±1,6%,

Б) при определении расхода жидкости ротаметрами - ±3%.

Невязка баланса по подведенному током теплу и теплу, отведенному циркуляционной и избыточной воды с учетом потерь тепла через изоляцию, не превышали ±12%, а по циркуляционной воде - ±11%. Расхождение материального баланса между расходом охлаждающей жидкости, расхода слива и конденсата составляет не больше ±10%.

Методика измерений и обработка опытных данных опубликована в работах [2,4]. Для исследования кризиса кипения нами так же собирались установки, выполненные в виде огнеструйной горелки ракетного типа. Схема экспериментальной установки и условия проведения опытов представлены в [3]. Камеры сгорания и сверхзвуковые сопла охлаждались капиллярно-пористой и водяной системой (Рис 4). Термореактивная горелка так же использовалась для исследования предельного состояния капиллярно-пористых покрытий, выполненных из естественных минеральных сред (гранитные, кварцевые и тешенитные покрытия). Тепловое воздействие осуществлялось сверхзвуковым (до 2000 м/с) высокотемпературным (до 2500°С) пульсирующим факелом (см. рис. 1, вид энергии). Результаты разрушенных камер сгорания показаны на рис 4.

Результаты кризиса теплопередачи в капиллярно-пористой системе охлаждения и их обсуждения.

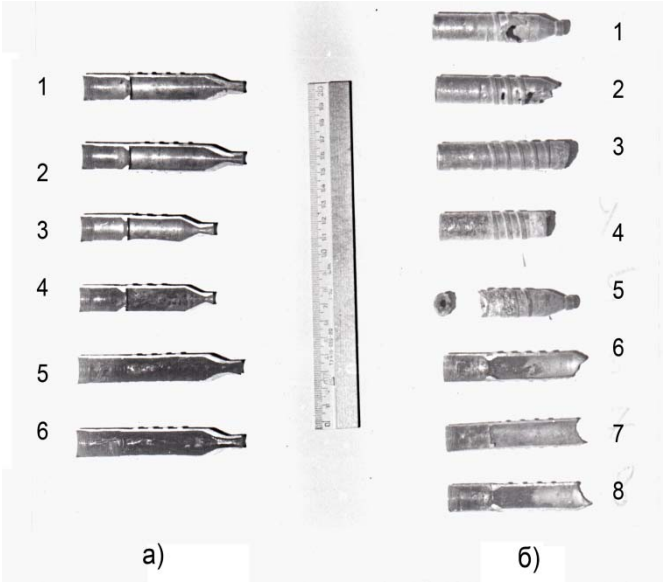

Рисунок 4 - Разрушенные камеры сгорания и сверхзвуковые сопла горелки:
а) сопла выполнены без утолщения стенки: 1, 2, 3, 4 – до эксплуатации; 5, 6 – после 40 часов эксплуатации (разрушены дефлекторные кольца и увеличены сечения сопел); 1, 2, 5, 6 – α = 0,8; 3, 4 – α = 0,6;
4 – камеры сгорания с укороченным соплом (обеспечивала проведение детонационного режима горения). Система охлаждения – водяная ($q_{кр.сеч.}$= 1x10^6 Вт/м^2; $\overline{W} = 10$м/с)
б) сопла выполнены с утолщением стенки: 1-8 – α = 0,6…0,65; разрушение произошло в результате прорыва газов в водяную систему охлаждения при разгерметизации уплотнений; 5 – камера
сгорания с оплавленным завихрителем. Система охлаждения – капиллярно-пористая ($q_{кр.сеч.}$= 1x10^6 Вт/м^2)

Модель капиллярно-пористого покрытия. Для определения предельных тепловых потоков и напряжений решается задача термоупругости [3,9,10] при граничных условиях второго рода для одномерного уравнения нестационарной теплопроводности.

Рассмотрим пластину толщиной 2h. К поверхности z=+h, начиная с момента времени τ=0, подводиться постоянный удельный тепловой поток q. Нижняя поверхность z=-h и боковые края пластины теплоизолированны.

Уравнения теплопроводности с граничными и начальными условиями запишется в виде:

$$\alpha_{\text{ст}} \frac{\partial^2 T}{\partial z^2} = \frac{\partial \text{T}}{\partial \tau}, \ \text{T} = 0, \ \tau < 0 \tag{1}$$

$$\lambda_{\text{ст}} \frac{\partial T}{\partial z} = q, \qquad z = +h$$

$$\lambda_{\text{ст}} \frac{\partial T}{\partial z} = 0, z = -h$$

Распределение температуры по толщине зависит от теплофизических свойств материала, величины теплового потока и времени его подача:

$$T\left(\frac{z}{h};\tau\right) = q\left\{\frac{M}{2(c\lambda g)_{\text{ст}}}\tau + \frac{\frac{3z^2}{h^2}+\frac{6^z}{h-1}}{12M} - \frac{4}{\pi^2 M}\ \sum_{n=1}^{\infty}\frac{(-1)^n}{n^2} exp\left[-n^2\frac{\pi^2 M^2}{4(c\lambda g)_{\text{ст}}}\tau\right] cos\frac{n\pi}{2}\left(\frac{z}{h}+1\right)\right\}, \tag{2}$$

где $M=\frac{\lambda_{\text{ст}}}{h}$; n – целые положительные числа.

Зная распределение температуры в пластине, находим термические напряжения растяжения и сжатия, возникающие в некоторый момент времени τ на различной глубине от поверхности $\delta_i = (h=z_i)$ при данном значении теплового потока q, поскольку пластина с переменной по толщине температурой находиться в плоско напряженном состоянии.

$$\sigma_{\text{XX}} = \sigma_{yy} \ = -\frac{\alpha \text{E}}{(1-\nu)}\text{T}\left(\frac{z}{h};\tau\right) + \frac{1}{(1-\nu)2h}\int_{-h}^{+h} 2'ET\left(\frac{z}{h};\tau\right)dz, \tag{3}$$

где первый член - составляющая напряжения сжатия, а второй – растяжения.

Решение уравнения (1).

Задаваясь предельными значениями напряжения сжатия и растяжения для горной породы (пористые покрытия из естественной минеральной среды) и металла, получаем зависимость теплового потока, требуемого для разрушения, от времени подачи и глубины проникновения. Кроме того, приравнивая температуры на поверхности пластины к температуре плавления породы и металла, находим значения удельных тепловых потоков, необходимых для расплавления поверхностного слоя за различный промежуток времени их действия:

плавление поверхности

$$q_1 = \frac{\text{T}_{\text{пл.}}}{\left\{\frac{M}{2(cg\lambda)_{\text{ст}}}\tau + \frac{2}{3M} - \frac{4}{\pi^2 M}\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2} exp\left[-n^2\frac{\pi^2 M^2}{4(cg\lambda)_{\text{ст}}}\tau\right] cosn\pi\right\}}; \tag{4}$$

создание предельных напряжений сжатия

$$q_2 = \frac{\frac{(1-\nu)\sigma_{\text{пр.сж.}}}{\alpha \text{E}}}{\frac{M}{2c\lambda g_{\text{ст}}}\tau + \frac{\frac{3z^2}{h^2}+\frac{6^z}{h-1}}{12M} - \frac{4}{\pi^2 M}\ \sum_{n=1}^{\infty}\frac{(-1)^n}{n^2} exp\left[-n^2\frac{\pi^2 M^2}{4c\lambda g_{\text{ст}}}\tau\right] cos\frac{n\pi}{2}\left(\frac{z}{h}+1\right)} \tag{5}$$

создания предельных напряжений растяжения

$$q_3 = \frac{\frac{(1-\nu)\sigma_{\text{пр.раст.}}}{\alpha \text{E}}}{\frac{M}{2(c\lambda g)_{\text{ст}}}\tau} \tag{6}$$

где $M=\lambda_{\text{ст}}/h$ – параметр, n – целые положительные числа.

Зависимости величины q_1, q_2, q_3 от времени τ при фиксированных значениях размера частицы δ для покрытия, либо глубины проникновения температурных возмущений для металла, рассчитывались на ПК применительно к пластине, выполненным из кварца, гранита и металла (медь и нержавеющая сталь).

Заключение

На основе проведенных исследований в случае облучения факелом керосино-кислородной горелки пористого покрытия на рабочем участке имеем до $4x10^7$ Вт/м^2 , что соответствует q покрытий $0{,}4x10^7$ Вт/м^2. Механизм разрушения металлов принципиально отличается от механизма разрушения покрытий из горных пород.

Разработана научная методика исследования и создания капиллярно-пористых систем охлаждения и покрытий для различных условий тепломассообмена в элементах энергооборудования.

Обозначения

m – расход, кг/с;
q – тепловая нагрузка, Вт/м^2;
h – высота, толщина пленки, м;
$\overline{W}$ – средняя скорость, м/с;
α – коэффициент избытка воздуха;
T – температура, К;
в – ширина ячейки сетки на просвет (гидравлический размер пор), м;
G – удельный расход, кг/м^{2}с;
d – размер (диаметр) зерен структуры, м;
x – координата (направление движения жидкости), м;
y – координата (направление движения жидкости), м;
z – координата, м;
τ – время, с;
a – коэффициент теплопроводности, м^2/с;
λ – коэффициенты теплопроводности, Вт/мК;
C – теплоемкость, Дж/кгК;
ρ – плотность кг/м^3;
δ – толщина структуры (глубина распространения волны, размер частиц), м;
σ –напряжение;
α – коэффициент линейного расширения, К$^{-1}$;
ν – коэффициент Пуассона (поперечного сжатия);
E – модуль Юнга (упругости), Па;
Q – удельная энергия разрушения, Дж/м^3

Индексы

ж, п – жидкость, пар; кр. сеч. – критическое сечение; г – горячий; ст. – стенка; г – гидравлический; н – насыщение; пл. – плавление (пленка); пр. сж. – предельное сжатие; пр. раст. – предельное растяжение.

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ЗЕРТТЕУ НӘТИЖЕСІ ҚУАТТЫЛЫҚ-БІР ЖАБДЫҚ ЖҮЙЕСІ ЭНЕРГИЯ ҚҰРЫЛЫСЫНЫҢ ЭНЕРГЕТИКАЛЫҚ ҚҰРЫЛЫСЫНЫҢ ЭЛЕМЕНТІ

Аннотация. Ғылыми-зерттеу әдістерін жасау үшін гравитациялық және капиллярлық силдермен жұмыс істейтін металл және платформациялық поршенді құрылымдардағы жылу құятын жылу көздерін зерттеу және жылу қондырғыларының түрлі салқындатқыш құрылғыларын зерттеу жұмыстары жүргізілді. Негізінен минералдық ортадан (гранит) шығарылған металды парогенерирующих сырықтардан шығарылатын механизмдер мен оптикалық деректерді табу механизмі қажет. Осындай ұқсастықтар негізінде жылу алмастырулардың өздігінен өтетін температуралық және жылжымалы жылу алмастырулардың шығу тәсілдерін анықтайды. Бұл жүйе жоғары қарқындылықпен, үлкен жылумен, сенімділікпен ерекшеленеді.

Түйін сөздер: жылу тасымалдау дағдарысы; капиллярлық-кеуекті құрылым.

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THE ANALYSIS OF INFLUENCE OF MINING-GEOLOGICAL FACTORS ON EDGES STABILITY ON THE EXAMPLE OF THE SARBAI PIT

Abstract: Conditions complication of mining operations production because of increase in depth of development and involvement in field exploitation with the composite mining-and-geological conditions is characteristic of the modern pits. In these conditions, the great significance is gathered by questions of geomechanical ensuring stability of pit edges and boards. In practice of conducting open mining operations educe several groups of the factors influencing stability, depending on vision of authors, these factors can be consolidated in two and more groups [1-5].

Research work results of rock mass jointing, influence of queries systems on stability of boards and edges are given in the article, carried out by the Institute of Mining named after D.A.Kunaev. As an example was chosenSarybaiiron-ore pit which development is characterized with significant depth increase and transition to development of deep lying ores. The certain sites of pit boards requiring special attention when conducting mining operations are defined.

Keywords: open pit mining, pit, board, edge, deformations, stability, jointing, rock mass.

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АНАЛИЗ ВЛИЯНИЯ ГОРНО-ГЕОЛОГИЧЕСКИХ ФАКТОРОВ НА УСТОЙЧИВОСТЬ БОРТОВ НА ПРИМЕРЕ САРБАЙСКОГО КАРЬЕРА

Аннотация:Для современных карьеров характерно усложнение условий производства горных работ из-за увеличения глубины разработки и вовлечения в эксплуатацию месторождений со сложными горно-геологическими условиями. В этих условиях большое значение приобретают вопросы геомеханического обеспечения устойчивости уступов и бортов карьера. В практике ведения открытых горных работ выявляютнесколько групп факторов, влияющих на устойчивость, в зависимости от видения авторов эти факторы могут быть объединены в две и более группы [1-5].

В статье приведены результаты научно-исследовательской работы по изучениютрещиноватости массива горных пород, влияния систем трещин на устойчивость бортов и уступов, выполненные Институтом горного дела им. Д.А. Кунаева. В качестве примера выбран Сарбайский железорудный карьер, для развития которого характерно значительное увеличение глубины и переход к разработке глубоко залегающих руд. Определены отдельныеучастки бортов карьера, требующие повышенного внимания при проведении горных работ.

Ключевые слова: открытые горные работы, карьер, борт, уступ, деформации, устойчивость, трещиноватость, массив.

Потребности в минеральном сырье из года в год возрастают, что введет за собой необходимость повышения производственных мощностей горных производств. Месторождения имеющие простые горно-геологические условия и высокое содержание полезного компонента в рудах уже отработаны или близки к завершению работ. Поэтому современное развитие горнодобывающей отрасли характеризуется усложнением условий производства горных работ из-за увеличения глубины разработки и вовлечения в эксплуатациюместорождений со сложными горно-геологическими условиями. При увеличении глубины действующих карьеров вопросы устойчивостибортов превращаются в проблемы большой экономической значимости для горных предприятий.

Прогнозирование деформационных процессов возможно на основании комплексного подхода, включающего изучение структурно-тектонического строения и прочностных свойств массива, инструментальные наблюдения за деформированием различных участков прибортового массива, оценку уровня и направления действия тектонических сил, а также проведение геомеханических расчетов устойчивости [1, 6, 7].

Производство горных работ в карьере в соответствии с проектной документацией не всегда гарантирует отсутствие деформаций бортов, локальных участков бортов и уступов,особенно при формировании предельного контура карьера. Причины возникающихнарушений устойчивости прибортовых массивов различны в зависимости отгеологических, инженерно-геологических, гидрогеологических условий и параметровборта на конкретном участке карьерного поля[1, 8].

В практике ведения открытых горных работ все факторы, влияющие на устойчивость бортов карьеров, можно разделить на четыре группы: инженерно-геологические, гидрогеологические, физико-географические, горнотехнические [2].

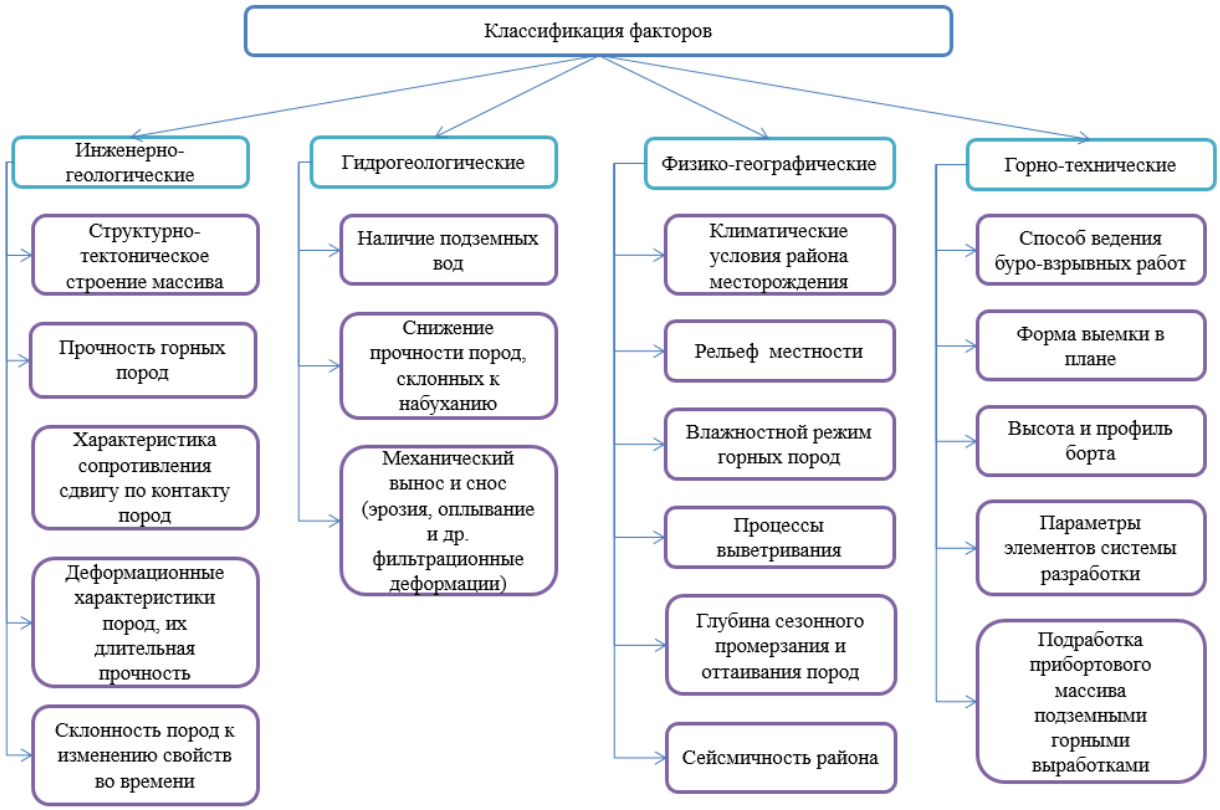

Рисунок 1 – Классификация факторов, влияющих на устойчивость уступов и бортов карьеров

К наиболее существенным инженерно-геологическим факторам относят структурно-тектоническое строение массива горных пород, прочность и деформационные характеристики пород, склонность пород в откосах к изменению свойств с течением времени (набухание, разуплотнение, выветривание, выщелачивание) (рисунок 1) [2, 9, 10].

Деформации бортов в скальных массивах могут происходить как в виде внезапных обрушений, так и в виде вялотекущего деформационного процесса с периодическими сменами этапов тектонического и гравитационного деформирования [1].

Главными причинами деформаций прибортовых массивов, присущие всем карьерам, являются:

- несоответствие параметров уступов и бортов реальным инженерно-геологическим условиям участка деформации;
- слабая изученность массива на периферийных участках месторождения, в массивах которых отстраиваются предельные борта карьера;
- изменение инженерно-геологических, гидрогеологических условий и физико-механических свойств пород и их контактов при развитии внутрикарьерного пространства;
- воздействие на массив тектонических сил, сопровождающееся изменениемструктурного строения и подвижности прибортовых массивов;
- действие более высоких, по сравнению с приповерхностными, напряжений, измененными деформационно-прочностными свойствами массивов горных пород и техногенными нарушениями.

Рассмотрим на примере Сарбайского месторождения магнетитовых руд влияние различных факторов на изменение параметров бортов карьера при увеличении глубины отработки. Месторождение разрабатывается открытым способом Сарбайским карьером с 1960 года. Карьер вскрыт двумя траншеями: юго-восточной до отметки 125 м (глубина 70 м), связывающей карьер с фабрикой и отвалом, и северной траншеей на глубину 15 м, по которой транспортируется только порода в отвал.

Параметры карьера на конец 2017 года и проектируемые параметры на конец отработки с учетом отработки запасов руды на глубоких горизонтах представлены в таблице 1.

Таблица 1 – Параметры Сарбайского карьера

Параметры	Существующие параметры	Проектные параметры с учетом углубки
Отметка дна карьера, м	Минус 390 м	Минус 500 м
Ширина, м	2400 м	2400 м
Длина, м	3450 м	3450м
Высота уступа: Рыхлые породы Скальные породы	 10-13 м 40м	 10-13 40 м
Угол наклона уступа: Рыхлые породы Скальные породы	 25-50° 55°-65°	 25-50 55-70°

Главной особенностью месторождения является его двухъярусное строение. Палеозойские (главным образом, каменноугольные) отложения образуют складчатый фундамент, а перекрывающие их с резким угловым несогласием горизонтально залегающие рыхлые мезозойско-кайнозойские отложения - платформенный чехол мощностью 150 ÷ 230 м.

Месторождение сложено мощной толщей рыхлых песчано-глинистых отложений мезо-кайнозойского возраста, залегающих на скальных породах, представленных разнообразными эффузивно-осадочными, интрузивными, метасоматическими породами и рудными телами Сарбайское железорудное месторождение относится к слоистым месторождениям с четко выраженными и закономерно расположенными поверхностями ослабления большой протя-женности в виде напластования, контактов слоев или сланцеватости.

Породы покровной толщи в условиях предварительного осушения обладают вполне достаточной устойчивостью в откосах карьера. Однако, происходит оплывание и обрушение откосов, сложенных меловыми песками, неогеновыми глинами и четвертичными суглинками в следствии их влагонасыщения.

В целом инженерно-геологические условия отработки Сарбайского карьера сложные, что обусловлено прочностными свойствами пород, структурой массива (большая мощность рыхлых пород до 140 м, наличие поверхностей ослабления: слоистость в рыхлых породах, трещиноватость, сланцеватость в скальных породах), склонностью пород к выветриванию, гидрологическими факторами - обводненностью скальных и рыхлых пород.

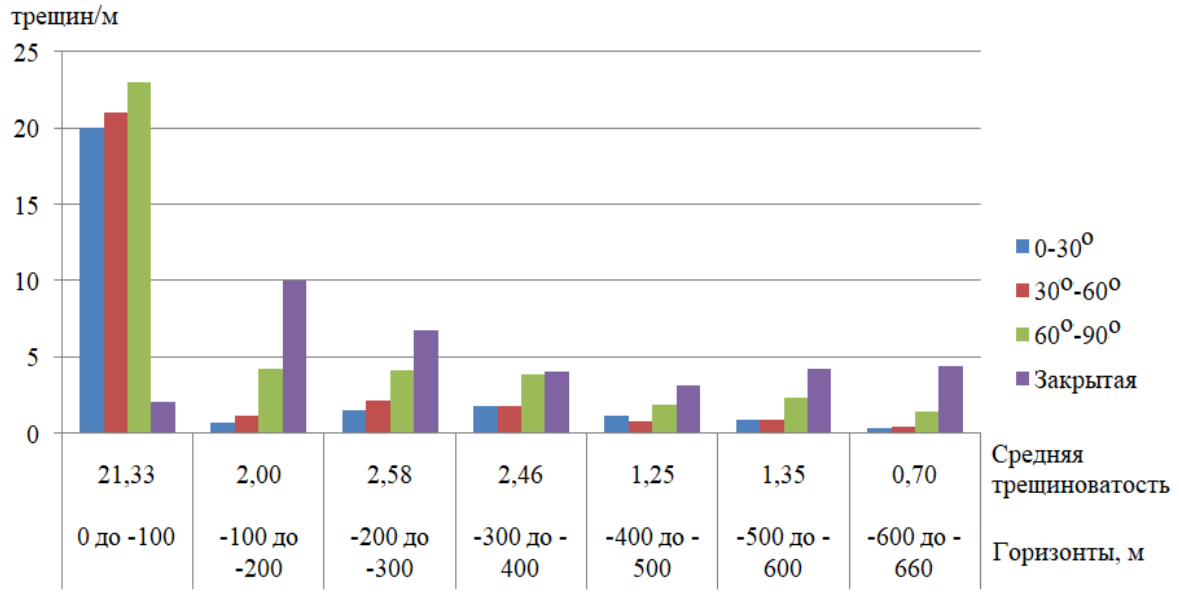

Рисунок 2 – Результата определения трещиноватости массива горных пород по геотехническому бурению

На устойчивость бортов и уступов Сарбайского карьера оказывают влияние следующие факторы - наличие поверхностей ослабления (трещиноватость, слоистость в рыхлых породах, сланцеватость в скальных породах), обводненность, низкие прочностные свойства горных пород.Основным фактором является интенсивная трещиноватость отдельных участков. Изучение трещиноватости производилось методами обработки результатов геотехнического бурения скважин (рисунок 2) и обработки данных полевых исследований. В ходе бурения вертикальных скважин длиной до 7 метров для определения действующих напряжений в массиве также произведена телеинспекция скважин [11].

По результатам геотехнического бурения отмечена тенденция увеличения блочности массива с глубиной, на глубоких горизонтах с отметки минус 400 м (600 м от поверхности) выявлены зоны пород с малой трещиноватостью, приближающиеся к монолитным породам. В целом трещиноватость пород Сарбайского карьера развита неравномерно от слаботрещиноватых (1-3 трещин/метр - в пределах зоны неизмененных пород) до интенсивно трещиноватых (до 20 трещин/метр – в пределах зон тектонических нарушений).

Основное количество открытых трещин (более 60%) ориентировано в субвертикальном направлении с углами падения 60° до 90°, без заполнителя, раскрытые вследствие выветривания. Доминирующая часть трещин закрытого типа -крутопадающие субширотного простирания [12-16]. Отмечается возрастание углов падения трещиноватости пород с глубиной. Полости закрытых трещин обычно заполнены неустойчивым кальцито-хлоритным материалом, реже гематитом, магнетитом, пиритом.

Для построения точной модели структурных нарушений и неоднородностей с учетом основных закономерностей распределения и взаимоотношений трещиноватости разных систем в полевых условиях проводилась предварительная фотосъемка уступов карьера и многопарамет-рическая документация элементов трещиноватости и структурных неоднородностей. Для определения трещиноватости скальных пород были выбраны наиболее информативные снимкифотодокументации, что позволило охарактеризовать литологические и петрологические типы горных пород в пределах восточного и южного бортов Сарбайского карьера, в сторону которых направлено дальнейшее ведение горных работ (таблица 2).

Таблица 2 - Характеристика основных параметров систем трещин южного и восточного бортов Сарбайского карьера

	1 система	2 система	3 система	4 система	5 система	6 система
Генезис	Тектонические трещины скола					
Число трещин	223	280	91	85	26	42
Азимут падения	277,28-301,53 289,41	321,4-334,73 328,02	38,73-64,43 52,99	358,8-359,5 357,24	175,36-180,1 177,24	186,15-210,0 198,09
Азимут простирания	7,28-31,53 19,41	51,41-64,73 58,06	128,73-155,4 142,99	88,8-89,47 89,2	85,36-90,15 87,24	96,15-120,02 108,09
Угол падения	41,04-60,68 52,68	28,83-64,05 36,8	60,35-88,23 77,95	18,0-54,3 19,42	1,00-5,00 2,53	52,42-90,0 78,33
Длина, м	0,14-15,45 1,07	0,14-3,90 0,83	0,20-4,25 1,18	0,11-4,12 0,88	0,15-1,68 0,64	0,10-3,14 0,53
Ширина	0,50-5,00 2,50	1,00-10,00 3,00	1,00-7,00 2,00	2,00-12,00 2,50	0,50-10,00 2,00	1,00-25,00 2,00
Расстояние между трещинами, м	0,09-1,40 0,61	0,16-1,25 0,56	0,25-1,96 0,78	0,23-1,60 0,70	2,50-5,21 3,43	0,11-1,46 0,58
Форма	Плоская	Ступенчатая	Волнистая	Ступенчатая	Волнистая	Ступенчатая
Поверхность стенок	Шероховатая					

Трещиноватость существенно определяет прочностные и деформационные свойства массива и связанное с этим развитие опасных геологических и инженерно- геологических явлений [17-20].На Сарбайском карьере в период с 30.03.2009 г. по 27.04.2016 г. произошло 4 обрушения, 3 из них на северо-западе, при постановке борта в конечное положение, и последнее в пределах горизонтов минус 110 ÷ минус 140 м на восточном борту.

Во всех случаях характерным является наличие туффитов, слагающих уступы бортов карьера. Для них свойственна хорошо выраженная слоистая текстура с мощностью слойков от нескольких миллиметров до десятков сантиметров и первых метров (Рисунок 3). В пределах скарново-рудной зоны месторождения туффиты интенсивно изменены, вплоть до перехода в метасоматиты и скарны.

Рисунок 3 - Слоистая текстура туффитов Южного борта карьера, горизонт 0 м

Поскольку поверхности наслоения изначально ослаблены, то в дальнейшем по ним образуют трещины отрыва и скола. Хорошо показывает зависимость трещиноватости от слоистости пород 1 система трещин, совпадающая с полосчатостью и слоистостью руд и пород (таблица 3).

Таблица 3 - Трещиноватость различных литотипов горных пород восточного и южного бортов Сарбайского карьера

№	Породы	Среднее расстояние между трещинами, м	Модуль трещиноватости, тр/м
1	Туфы	0.98	1.02
2	Известняки	0.81	1.23
3	Туффиты	0.30	3.33

Телеинспекция стенок производилась по пробуренным горизонтальным скважинам на трех экспериментальных участках. Первый экспериментальный участок располагается в западной части карьера (гор. -240 м), второй и третий участки располагаются в северо-восточной части карьера (гор. -240 м и гор. -320 м). Каждый экспериментальный участок включает три замерные станции по три скважины. Предварительный анализ показал, что массив в бортах карьера характеризуется высокой трещиноватостью вмещающих пород. Основное количество открытых трещин ориентировано в субвертикальном направлении. Расстояние между трещинами варьируется в диапазоне от 5-10 до 300-400 мм. Кроме субвертикальной в бортах карьера присутствует и субгоризонтальнаятрещиноватость. В среднем на погонный метр скважины приходится 3-4 трещины.

Учет влияния трещиноватости на свойства массива производится с помощью коэффициента структурного ослабления **λ**, который позволяет переходить от значений сцепления горных пород в образце к сцеплению пород в массиве [3]. По результатам натурных замеров параметров трещиноватости получена логарифмическая зависимость коэффициента структурного ослабления от величины сцепления в образце (рисунок 5).

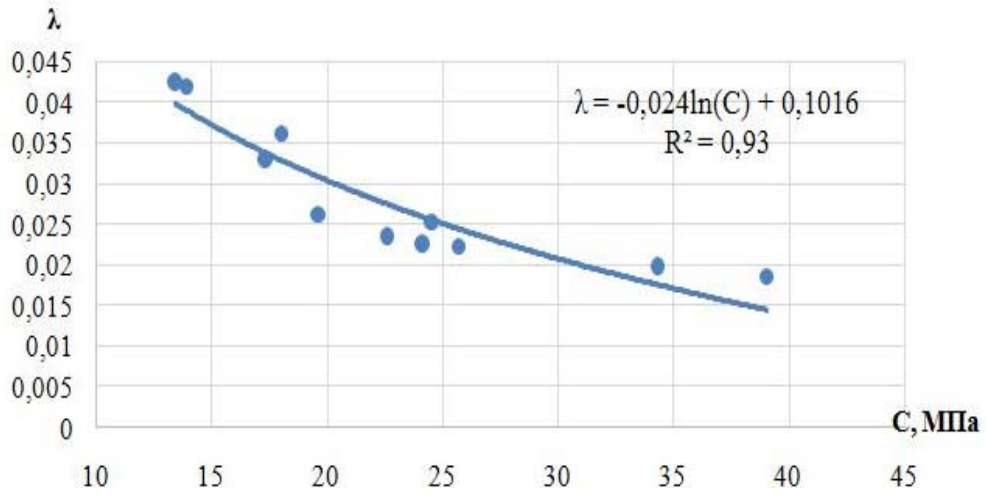

Рисунок 5 - Зависимость коэффициента структурного ослабления (λ) от величины сцепления в образце (*C*)

Исходные физико-механические данные для расчета устойчивости бортов карьера с учетом трещиноватости представлены в таблице 4[21].

На Сарбайском месторождении при углубке карьера до отметки минус 500 м к природным (естественным) поверхностям ослабления можно отнести I систему трещин, интенсивно проявленную в околорудных туффитах. Наиболее неблагоприятные инженерно-геологические условия будут наблюдаться в восточной части карьера, так как углы падения пород, слагаюших восточный борт и проявленной в них 1 системы трещин близки к углам наклона уступов (таблица 5), что может привести к возникновению локальных деформаций, не вызывающие потери общей устойчивости борта.

Таблица 4 – Расчетные прочностные характеристики пород
по данным испытаний кернового материала

Основной комплекс пород	Размер блока l, м	Коэффициент структурного ослабления, λ	Показатели в образце		Расчетные показатели в массиве, n=1,3			Плотность, γ,т/м^3
			Удельное сцепление Со, МПа	Угол внутрен трения	Сцепление См Мпа	Сцепление См т/м2	Угол вн. трения	
Туфы	0,61	0,0219	30,08	37,06	0,65	66,04	37,06	2,77
Диориты	0,82	0,02	43,50	35,00	0,88	89,60	35,00	2,84
Туффиты	0,26	0,03	18,53	36,10	0,54	54,83	36,10	2,84
Руда	0,66	0,02	20,57	38,00	0,47	47,90	38,00	3,61
Известняки	0,63	0,0361	18,00	35,00	0,65	66,30	35,00	2,81
Метасоматиты	0,28	0,04	15,60	35,00	0,58	58,95	35,00	2,86

Таблица 5 – Данные по трещиноватости Восточного борта

№ скважины	Открытая трещиноватость						Общее количество открытых трещин	Закрытая трещинова-тость
	0-30^o		30-60^o		60-90^o			
	Кол-во трещин	%	Кол-во трещин	%	Кол-во трещин	%		
3	193	14,5	279	21	858	**64,5**	1330	797
4	125	18,7	110	16,4	432	**64,7**	667	1095
5	355	14	629	25	1535	**61**	2519	1926

Для обеспечения устойчивости проектных параметров уступов Восточного борта необходимо:

- заоткоску производить по согласным трещинам с помощью отрезных щелей, взрыванием наклонных скважин под углом падения трещин (60^o);

- применение противодеформационной (сейсмооберегающей) технологии заоткоски уступов на предельном контуре в скальных породах;

- своевременно создавать отрезную щель при подходе горных работ к приоткосной зоне. Параметры отрезной щели должны в достаточной мере снижать динамическое действие взрыва.

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САРБАЙ КАРЬЕРІ МЫСАЛЫНДА КЕН ОРЫНДАРЫНЫҢ ТҰРАҚТЫЛЫҒЫН КЕН-ГЕОЛОГИЯЛЫҚ ФАКТОРЛАРДЫҢ ӘСЕРІН ТАЛДАУ

Аннотация: Заманауи карьерлер үшін күрделі тау-геологиялық шарттармен кен орындарды жүзеге асыруға өндеу және тартудағы кен қазбаларын өндірудің күрделілігімен сипатталады. Мұндай жағдайда ойық шеттерінің және тараптардың тұрақтылығына геомеханикалық қолдаудың маңыздылығына ие болады. Ашық тау-кен өндіру тәжірибесінде авторлардың пікірлеріне байланысты тұрақтылыққа әсер ететін факторлардың бірнеше тобы анықталған, бұл факторлар екі немесе одан да көп топтарға біріктірілуі мүмкін [1-5].

Мақалада Д.А.Қонаев атындағы Тау-кен істері институтымен жүргізілген тау жыныстарының массивін сынықтылығы, сыну жүйелерінің ойық пен борттардың тұрақтылығына әсері ғылыми-зерттеу жұмыстарының нәтижелері көрсетілген. Мысал ретінде Сарбай темір карьері алынған, оның дамуы үшін тереңдіктің артуымен және терең кендерді игеруге көшуімен сипатталады. Тау-кен жұмыстарын жүргізу кезінде назар аударуды қажет ететін карьер тараптарының нақты учаскелері анықталды.

Түйін сөздер: ашық тау-кен жұмыстары, карьер, борт, ойық, түрдің өзгеруі, тұрақтылық, сыну, массив.

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NONSPECIFIC PROTECTION OF THE ORGANISM OF COWS-MOTHERS AND CALVES IN REALIZATION OF REPRODUCTIVE AND PRODUCTIVE QUALITIES

Abstract. Improvement of reproductive qualities of the white-and-black cattle and realization of the productive potential of calves during the remote periods of growing and fattening by activation of nonspecific resistance of an organism by biological products is an urgent problem of the modern zootechnical science and practice. For the first time, on the basis of complex researches, the expediency of application of the Prevention-N-A developed biological product on the basis of the Saccharomyces cerevisiae polysaccharide complex of yeast cells and germicide of Aminoglycosides group in technology of receiving and growing of calves in comparison to earlier approved PS-2 medicine is evidence-based and experimentally proved It was established that the immunocorrection of the organism of down-calving cows and newborn calves under pressure of environmental and technological stress factors with new generation biopreparations prevents cows from gynecological diseases in the birth and postnatal periods, improving reproductive qualities, and in calves - promotes the prevention of diseases of the respiratory and digestive organs, activates growth and development, ensuring a more complete realization of the productive potential of the young stock in the periods of growing and fattening, with more expression effect of Prevention-N-A. The purity of meat carcasses by organoleptic, biochemical and spectrometric indicators and, consequently, the safety of the tested preparations were proved.

Keywords. Cows, calves, biological products, nonspecific resistance, gynecologic state, reproductive and productive qualities.

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НЕСПЕЦИФИЧЕСКАЯ ЗАЩИТА ОРГАНИЗМА КОРОВ - МАТЕРЕЙ И ТЕЛЯТ В РЕАЛИЗАЦИИ ВОСПРОИЗВОДИТЕЛЬНЫХ И ПРОДУКТИВНЫХ КАЧЕСТВ

Аннотация. Улучшение воспроизводительных качеств черно-пестрого скота и реализация продуктивного потенциала телят в отдаленные периоды доращивания и откорма активизацией неспецифической резистентности организма биопрепаратами является актуальной проблемой современной зоотехнической науки и практики. Впервые на основе комплексных исследований научно обоснована и экспериментально доказана целесообразность применения разработанного биопрепарата Prevention-N-A на основе полисахаридного комплекса дрожжевых клеток Saccharomyces cerevisiae и бактерицидного препарата группы аминогликозидов в технологии получения и выращивания телят в сопоставлении с ранее апробированным препаратом PS-2. Установлено, что иммунокоррекция организма глубокостельных коров и новорожденных телят в условиях прессинга эколого-технологических стресс-факторов биопрепаратами нового поколения предупреждает у коров гинекологические заболевания в родовой и послеродовой периоды, улучшая воспроизводительные качества, а у телят – способствует профилактике заболеваний органов дыхания и пищеварения, активизирует рост и развитие, обеспечивая более полную реализацию продуктивного потенциала молодняка в периоды доращивания и откорма, при более выраженном эффекте Prevention-N-A. Доказана доброкачественность мясных туш по органолептическим, биохимическим и спектрометрическим показателям и, следовательно, безопасность испытуемых препаратов.

Ключевые слова. Коровы, телята, биопрепараты, неспецифическая резистентность, гинекологическое состояние, воспроизводительные и продуктивные качества.

Введение. Молочное скотоводство Российской Федерации – одна из самых доходных отраслей животноводства, и необходимость его дальнейшего развития диктуется удовлетворением потребностей населения в продуктах питания собственного производства, что играет важную роль в продовольственной безопасности страны.

Одним из важнейших факторов, определяющих достижение генетического потенциала продуктивности, воспроизводительных способностей, резистентности к заболеваниям, продуктивного долголетия животных современных высокопродуктивных пород, повышения их кормоконверсивной способности, а, следовательно, успешного развития скотоводства, является соблюдение зоогигиенических требований, предъявляемых цепочке «корма → условия содержания → охрана ферм от заноса возбудителей болезней → получение и сохранность телят → качество и переработка продукции → охрана окружающей среды → здоровье человека». Однако современные технологии зачастую нарушают сложившиеся в процессе филогенеза взаимоотношения организма животных с окружающей средой и традиционными условиями содержания, кормления и обслуживания, отрывая их от природной среды обитания и приближая к биологической машине, задачей которой является производство целевой продукции. Животным не удается избежать действия стресс-факторов, что приводит к снижению неспецифической устойчивости организма, различным функциональным нарушениям и, как следствие, к заболеваниям. Особенно чувствителен организм к воздействиям неблагоприятных факторов среды обитания в первый и последний месяцы внутриутробного развития, и первые месяцы новорожденности. Физиологический статус материнского организма отражается на внутриутробном развитии плода и постнатальном онтогенезе новорожденного [1, 3, 7, 8, 9].

В контексте вышеизложенного на современном этапе развития скотоводства особое значение приобретает проблема предупреждения неблагоприятного воздействия на организм технологических и экологических факторов, вызывающих снижение репродуктивных и продуктивных качеств животных [2, 12, 16, 17, 18]. Одним из способов профилактики негативного влияния стресс-факторов, улучшения воспроизводительных и продуктивных качеств черно-пестрого скота является иммунопрофилактика организма биопрепаратами [4, 5, 6, 10, 11, 13, 14, 15, 19, 20, 21], наряду с совершенствованием технологии ведения племенной работы и выращивания молодняка крупного рогатого скота [22 - 26].

Исследования проведены в рамках международного сотрудничества ученых Российской Федерации (руководитель доктор биологических наук, профессор Владимир Григорьевич Семенов) и Республики Казахстан (руководитель член – корреспондент Национальной академии наук Республики Казахстан, доктор сельскохозяйственных наук Дастанбек Асылбекович Баймуканов) в период 2015 -2017г.г. по приоритетным отраслям продуктивного животноводства.

Цель настоящей работы – улучшение воспроизводительных качеств черно-пестрого скота и реализация продуктивного потенциала телят в отдаленные периоды доращивания и откорма активизацией неспецифической резистентности организма биопрепаратами PS-2 и Prevention-N-A.

Для достижения намеченной цели были поставлены следующие ***задачи:***

1. Изучить гигиенические условия содержания и кормления сухостойных (стельных) и дойных коров, телят с рождения до 180 суток (в том числе профилакторный период до 25 суток), молодняка в периоды доращивания до 360 суток и откорма до 540 суток.

2. Провести исследования гинекологического состояния и воспроизводительных качеств черно-пестрого скота на фоне иммунокоррекции организма биопрепаратами PS-2, апробированного ранее, и Prevention-N-A, разработанного и испытуемого впервые.

3. Выявить влияние биопрепаратов на рост и развитие, заболеваемость и сохранность телят.

4. Дать оценку мясной продуктивности молодняка и качеству говядины.

5. Охарактеризовать физиологическое состояние, морфологический и биохимический профили крови, неспецифическую резистентность организма в биологической цепи «корова – теленок – молодняк».

6. Определить экономическую целесообразность применения биопрепаратов PS-2 и Prevention-N-A в технологии получения и выращивания телят.

Материал и методы исследований.

Экспериментальные исследования проведены в условиях молочно-товарной фермы СХПК имени Ульянова Аликовского района Чувашской Республики в соответствии с планом научных исследований ФГБОУ ВО «Чувашская государственная сельскохозяйственная академия», а обработка материалов осуществлялась в БУ ЧР «Чувашская республиканская ветеринарная лаборатория» Госветслужбы ЧР, лаборатории био- и нанотехнологий и в лаборатории кафедры морфологии, акушерства и терапии ФГБОУ ВО Чувашская ГСХА в период с 2012 по 2016 годы.

Объектами исследований были стельные (за 45 суток до отела) и новотельные (3-5 суток после отела) коровы черно-пестрой породы, телята с рождения и молодняк до 540-суточного возраста. В научно-хозяйственном опыте были подобраны три группы сухостойных коров по принципу пар-аналогов с учетом клинико-физиологического состояния, возраста и живой массы по 10 животных в каждой. По аналогичному же принципу подбирали группы новорожденных телят.

С целью улучшения воспроизводительных качеств черно-пестрого скота и реализации продуктивного потенциала телят в отдаленные периоды доращивания и откорма молодняка использовали биопрепараты, разработанные учеными ФГБОУ ВО Чувашская ГСХА: PS-2 и Prevention-N-A (В.Г. Семенов и др.). Коровам 1-й опытной группы внутримышечно инъецировали PS-2 в дозе 10 мл трехкратно за 45-40, 25-20 и 15-10 суток до отела, 2-й опытной группы – Prevention-N-A в указанной дозе и сроки, контрольной группы – биопрепараты не вводили. Телятам 1-й и 2-й опытных групп внутримышечно инъецировали соответственно PS-2 и Prevention-N-A двукратно на 2...3-е и 7...9-е сутки жизни в дозе 3 мл.

PS-2 – препарат для повышения неспецифической резистентности и иммуногенеза животных, представляет собой водную суспензию, содержащую полисахаридный комплекс дрожжевых клеток, иммобилизированных в агаровом геле с добавлением производного бензимидазола (2,3,5,6-тетрагидро-6-фенилимидазо-(2,1,- β)-тиазола гидрохлорида). На биопрепарат PS-2 получен патент РФ на изобретение № 2332214, зарегистрировано в Государственном реестре изобретений РФ 27.08.2008 г., опубликовано в официальном бюллетене «Изобретения. Полезные модели» 27.08.2008 г., № 24.

Prevention-N-A – комплексный препарат для активизации неспецифической резистентности организма крупного рогатого скота, представляет собой 2,5%-ую водную суспензию дрожжевых клеток saccharomyces cerevisiae, иммобилизированных в агаровом геле с добавлением производного бензимидазола и бактерицидного препарата группы аминогликозидов – (S)-0-3-Амино-3-дезокси-альфа-D-глюкопиранозил-(1-6)-0-[6-амино-6-дезокси-альфа-D-глюкопиранозил-(1-4)-N1-(4-амино-2-гидрокси-1-оксобутил)-2-дезокси-D-стрептамин. На биопрепарат Prevention-N-A получен патент РФ на изобретение № 2602687, зарегистрировано в Государственном реестре изобретений РФ 26.10.2016 г.

Результаты исследований. Научно-исследовательская работа проведена в соответствии с зоогигиеническими нормами по основным показателям микроклимата в коровниках и родильном отделении, помещениях для выращивания телят, доращивания и откорма молодняка (табл. 1).

Так, параметры воздушного бассейна в осенне-зимний период в родильном отделении и зимний период в профилактории имели соответственно следующие величины: температура – 15,0 и 15,6 ^{o}C, относительная влажность – 67,3 и 73,4 %, скорость движения воздуха – 0,28 и 0,19 м/с, бактериальная обсемененность – 30,3 и 23,1 тыс/м^3, содержание аммиака – 8,7 и 6,0 мг/м^3, сероводорода – 4,8 и 3,2 мг/м^3, углекислого газа – 0,14 и 0,16 %, угарного газа – не обнаружено, пыли – 2,7 и 1,3 мг/м^3. Световой коэффициент составил 1:13 при коэффициенте естественной освещенности 0,68 и 0,75 %.

Таблица 1 – Микроклимат в помещениях для животных

Показатель	Помещение					
	коровник	родильное отделение	профилак-торий	телятник	доращи-вания	откорма
T, ^{o}C	10,1±0,25	15,0±0,39	15,6±0,18	13,9±0,10	12,7±0,14	10,9±0,15
R, %	70,3±1,14	67,3±0,76	73,4±0,89	76,1±0,4	75,6±0,51	74,6±0,50
v, м/с	0,31±0,02	0,28±0,02	0,19±0,01	0,21±0,01	0,22±0,01	0,24±0,01
СК	1:14	1:13	1:13	1:13	1:13	1:15
КЕО, %	0,63±0,04	0,68±0,02	0,75±0,02	0,80±0,02	0,81±0,04	0,73±0,04
NH_3, мг/м^3	13,5±0,60	8,7±0,52	6,0±0,19	8,8±0,21	8,6±0,37	9,4±0,30
H_2S, мг/м^3	7,2±0,26	4,8±0,29	3,2±0,16	5,6±0,18	4,7±0,23	5,0±0,17
CO_2, %	0,20±0,01	0,14±0,01	0,16±0,00	0,22±0,00	0,16±0,01	0,18±0,01
БО, тыс/м^3	43,7±1,56	30,3±1,02	23,1±0,72	34,0±0,79	28,6±0,63	30,9±0,55
Пыль, мг/м^3	4,2±0,31	2,7±0,25	1,3±0,09	2,9±0,12	2,3±0,12	2,5±0,15

Кормили животных по рационам, принятым в хозяйстве, сбалансированность их по энергии и питательным веществам, минеральным элементам и витаминам согласовывали с детализированными нормами кормления.

Суточный рацион для стельных сухостойных коров включал 6,0 кг сена люцерно-кострецового, 7,5 кг сенажа тимофеечно-клеверного, 12,5 кг силоса кукурузного, 5,0 кг свеклы кормовой, 3,0 кг смеси концентратов, 0,3 кг патоки, 0,7 кг БВМК для крупного рогатого скота (сухостойные) К+. Рацион для дойных коров с живой массой 500 кг и удоем 20 кг в зимний период включал 3,5 кг сена люцерно-кострецового, 9 кг сенажа тимофеечно-клеверного, 21 кг силоса кукурузного, 10 кг свеклы кормовой, 5,0 кг смеси концентратов, 0,9 кг патоки кормовой, 0,8 кг БВМК для крупного рогатого скота (дойное стадо).

Схема кормления телят рассчитана на достижение живой массы в 90-суточном возрасте 90 кг при расходе 175 кг цельного молока и 120 кг стартерного комбикорма. Гранулированный стартерный комбикорм-концентрат для телят К+ включает зерновую часть (70%), концентрат масличных культур (15%), кормовые дрожжи (5%), монокальцийфосфат (1%), витаминно-минеральный премикс (1%), мел (1,5%), заменитель обезжиренного молока (6%) и поваренную соль (0,5%), а также каротиноиды. В составе рациона для телят также предусмотрено сено и сенаж.

При выращивании телят с 90- до 180-суточного возраста, доращивании и откорме молодняка использовали комбикорм, состоящий из 80 % размолотого зерна и 20 % БВМК. В БВМК содержится 87,4 % сухого вещества, 274,2 г сырого протеина, 10,2 МДж/кг обменной энергии, 80,8 г сырой клетчатки, 31 г кальция, 20,4 г фосфора, 250 мг/кг каротина, 19,5 г лизина, 13,7 г метионина. Витаминно-минеральный состав следующий: 80 тыс. МЕ витамина А, 8 тыс. МЕ – $Д_3$, 8 мг – Е, 1,2 мг – B_1, 40 мг – B_2, 80 мг – B_3, 80 мг – B_5, 0,08 мг витамина B_{12}, 60 мг Fe, 40 мг Mn, 20 мг Cu, 80 мг Zn, 2,0 мг Co, 2,4 мг J, 80 мг Mg, 0,4 мг селенита натрия, 20 мг оксинила, 2000 мг БИО-МОС.

Обеспеченность рационов в энергии и протеине представлена в табл. 2.

Таблица 2 – Обеспеченность рационов в энергии и протеине

Показатель	Фактически ср./сут	Норма ср./сут	Обеспеченность, %
сухостойный период коров			
ЭКЕ	14,6	13,2	110,3
Сырой протеин, г	1931,3	1845,0	104,7
Переваримый протеин, г	1289,5	1265,0	101,9
период раздоя коров			
ЭКЕ	18,97	17,0	111,6
Сырой протеин, г	2312,9	2320,0	99,7
Переваримый протеин, г	1551,1	1560,0	99,4
период выращивания телят с 1 по 90 сутки			
ЭКЕ	3,01	2,65	113,4
Сырой протеин, г	472,9	470,5	100,5
Переваримый протеин, г	407,5	390,0	104,5
период выращивания телят с 90 по 180 сутки			
ЭКЕ	4,07	3,9	104,3
Сырой протеин, г	525,2	581,0	90,4
Переваримый протеин, г	341,4	392,0	87,1
период доращивания молодняка с 180 по 360 сутки			
ЭКЕ	6,04	5,9	103,2
Сырой протеин, г	841,2	796,0	105,7
Переваримый протеин, г	507,1	515,0	98,5
период откорма молодняка с 360 по 540 сутки			
ЭКЕ	8,15	8,0	101,9
Сырой протеин, г	1117,5	979,0	114,1
Переваримый протеин, г	676,1	691,0	97,8

Таким образом, условия содержания и кормления в периоды сухостоя и раздоя коров, выращивания телят, доращивания и откорма молодняка соответствовали зоогигиеническим нормам и детализированным нормам кормления.

Результаты исследований гинекологического состояния коров приведены в табл. 3.

Под влиянием биопрепаратов PS-2 и Prevention-N-A у коров сокращались сроки отделения плодных оболочек на 6,0 и 6,4 ч, исключалось задержание последа, предупреждались послеродовые осложнения и заболевания молочной железы. Риск возникновения субинволюции матки и эндометрита при внутримышечном введении коровам PS-2 уменьшался в 3,0 и 2,0 раза соответственно, а при применении Prevention-N-A исключался ($P<0,05$). На фоне иммунопрофилактики организма у коров сокращались сроки наступления половой охоты на 11,6 и 14,2 сут, уменьшался индекс осеменения в 1,6 и 1,8 раза, укорачивался сервис-период на 22,4 и 28,4 сут и повышалась оплодотворяемость в 1 охоту в 2,5 и 3,0 раза ($P<0,05$-$0,01$).

Таблица 3 – Показатели гинекологического состояния коров

Показатель	Группа животных		
	контрольная	1 опытная	2 опытная
Количество животных	10	10	10
Сроки отделения последа, ч	13,2±1,02	7,2±0,58*	6,8±0,66*
Задержание последа	4	-	-
Субинволюция матки	3	1	-
Эндометриты	2	1	-
Мастит	2	-	-
Сроки наступления 1 охоты, сут	43,2±1,36	31,6±0,93*	29,0±0,71*
Индекс осеменения	2,6±0,43	1,6±0,24*	1,4±0,19**
Сервис-период, сут	87,0±3,05	64,6±1,94**	58,6±1,50**
Оплодотворилось коров:			
в первую охоту	2	5	6
во вторую охоту	3	4	4
в третью охоту	5	1	-

* $P\leq0,05$; ** $P\leq0,01$.

Таким образом, внутримышечная инъекция коровам биопрепаратов предупреждала гинекологические заболевания и повышала воспроизводительную функцию, при более выраженном эффекте Prevention-N-A.

Установлено, что температура тела, частота пульса и дыхательных движений у коров подопытных групп были в пределах физиологических норм.

Увеличение количества эритроцитов и концентрации гемоглобина в крови животных опытных групп на фоне внутримышечного введения биопрепаратов PS-2 и Prevention-N-A на 3-5 сутки после отела на 0,56 и 0,62x10^{12}/л и на 4,4 и 6,4 г/л (P<0,05-0,01) свидетельствует об улучшении у них гемопоэза, а повышение числа лейкоцитов на 0,26 и 0,42x10^{9}/л (P>0,05) соответственно – об активизации клеточных защитных факторов организма. При этом ЦП и СГЭ у коров опытных групп существенно не изменялись.

Уменьшение количества эозинофилов в крови коров за 10-5 суток до отела и на 3-5 сутки после отела свидетельствует о том, что они испытывали стресс, а увеличение указанных гранулоцитов в крови животных под воздействием биопрепаратов PS-2 и Prevention-N-A за 10-5 суток до отела на 0,8 и 0,6 % и через 3-5 суток после отела на 0,6 и 0,8 % вызвано активизацией неспецифической устойчивости организма.

Если количество палочкоядерных форм нейтрофилов в крови коров 1-й и 2-й опытных групп было ниже, чем в контроле, за 35-30 суток до отела – на 1,2 и 1,6 %, 15-10 суток – на 2,2 и 2,4 %, 10-5 суток до отела – на 1,4 и 1,6 % и на 3-5-е сутки после отела – на 1,8 (P<0,05) и 1,8 % (P<0,05), то сегментоядерных нейтрофилов оказалось, наоборот, выше за 30-25 суток до отела на 0,6 и 1,0 %, 15-10 суток – на 0,6 и 0,4 %, 10-5 суток до отела – на 0,4 и 0,2 %, но через 3-5 суток после отела было ниже на 0,2 и 0,6 % (P>0,05) соответственно. Учитывая, что нейтрофилы обладают выраженным фагоцитозом, установленные качественные изменения в стадиях развития этих гранулоцитов и сдвиг нейтрофильного ядра вправо свидетельствуют об активизации неспецифической устойчивости организма. Биопрепараты стимулировали продукцию лимфоцитов кроветворными органами, т.е. клеточные факторы неспецифической резистентности. Количество указанного вида агранулоцитов в крови животных опытных групп было выше на 0,2-1,0 и 0,6-1,4 % (P<0,05), чем в контроле.

Установлено, что PS-2 и Prevention-N-A повышали обмен белка, продукцию альбуминов (пластического материала) и γ-глобулинов (гуморального фактора неспецифической резистентности). Эти биохимические показатели у животных 1-й и 2-й опытных групп на 3-5 сутки после отела оказались выше контрольных величин на 3,2 и 2,8 г/л, 1,4 и 1,3 г/л, 2,7 и 2,1 г/л соответственно (P<0,05-0,01). Понижение γ-глобулиновой фракции белка в сыворотке крови подопытных коров после отела, можно предположить, связано с выработкой лактоглобулинов молозива, что направлено на формирование колострального иммунитета у новорожденных телят. А достоверное повышение γ-глобулинов в сыворотке крови коров опытных групп в периоды сухостоя и раздоя свидетельствует об активизации гуморального звена неспецифической резистентности организма под воздействием биопрепаратов.

Внутримышечная инъекция глубокостельным коровам биопрепаратов PS-2 и Prevention-N-A повышала щелочной резерв крови на 3,8 и 5,2 об % CO_2 (P<0,05-0,01) вследствие активизации буферных систем, уровень глюкозы на 0,36 и 0,30 ммоль/л (P<0,05-0,01), общего кальция на 0,18 и 0,20 ммоль/л (P<0,05) и неорганического фосфора на 0,27 и 0,19 ммоль/л (P<0,05) соответственно. Следует отметить, что PS-2 оказывал более выраженный стимулирующий эффект на белковый и углеводный обмен, а Prevention-N-A – нормализовал кислотно-щелочное состояние организма и минеральный обмен. Выявлено, что препараты не повлияли на обмен провитамина А.

Динамика основных гематологических показателей неспецифической устойчивости организма коров наглядно приведена на рис. 1-4.

Установлено, что фагоцитарная активность лейкоцитов крови коров контрольной группы варьировала в заключительный период стельности с 48,0±2,35 % до 49,2±1,50 %. А в 1-й и 2-й опытных группах она последовательно возрастала с 48,2±2,31 до 52,8±1,93 % и с 51,2±0,86 до 53,2±1,46 %. После отела активность фагоцитов снизилась в контрольной группе до 44,6±1,69 %, в 1-й и 2-й опытных группах – до 50,8±2,22 % и 51,6±1,69 % соответственно. Уровень исследуемого

показателя неспецифической резистентности был выше у коров 1-й и 2-й опытных групп на 6,2 и 7,0 % по сравнению с контролем (P<0,05) соответственно.

Если фагоцитарный индекс крови коров контрольной группы понижался до отела с 8,8±0,37 до 7,8±0,37, то в 1-й опытной группе, наоборот, неуклонно повышался с 9,0±0,32 до 10,0±0,32. У животных 2-й опытной группы указанный показатель клеточного звена неспецифической резистентности организма также повышался с 9,2±0,37 до 10,2±0,49 при наблюдении в период за 35-30 – 15-10 суток до отела, однако за 10-5 суток до отела установлено его понижение до 9,8±0,80. Следует отметить, что фагоцитарный индекс оказался выше у коров 1-й и 2-й опытных групп на 1,4 (т.е. на 16,6 %) и 1,5 (или на 21,4 %) за 15-10 суток до отела и на 2,2 (т.е. на 28,2 %) и 2,0 (или на 25,6 %) за 10-5 суток до отела соответственно по сравнению с контролем (P<0,05-0,01). После отела фагоцитарный индекс был выше у животных опытных групп по сравнению с контролем на 1,8 (т.е. на 23,7 %) и 2,0 (или на 26,3 %) соответственно (P<0,05).

Активность лизоцима в плазме крови глубокостельных коров контрольной группы снижалась, а у животных 1-й и 2-й опытных групп повышалась и за 10-5 суток до отела равнялась 16,4±0,27 %, 20,1±0,24 и 20,0±0,54 % соответственно.

Указанная активность у животных опытных групп оказалась достоверно выше на 3,7 и 3,6 % по сравнению с контролем (P<0,001). После отела коров лизоцимная активность плазмы крови снизилась как в контрольной, так и в 1-й и 2-й опытных группах животных и составила соответственно 15,2±0,37 %, 19,0±0,21 и 19,0±0,66 %, то есть она оказалось выше в обеих опытных группах на 3,8 % (P<0,001).

Бактерицидная активность сыворотки крови глубокостельных коров повышалась как в контроле, так и в принятых вариантах опытов и за 10-5 суток до отела составила 50,9±0,90 %, 54,2±1,30 и 54,4±1,11 % соответственно. При этом она была выше у животных 1-й и 2-й опытных групп на 3,3 (P>0,05) и 3,5 % (P<0,05). После отела бактерицидная активность сыворотки крови животных снижалась и на 3-5 сутки составила: в контроле – 48,0±0,85 %, в 1-й опытной – 53,2±1,07 % и во 2-й опытной группе – 53,4±1,43 %. То есть у коров опытных групп она была достоверно выше на 5,2 и 5,4 % (P<0,05).

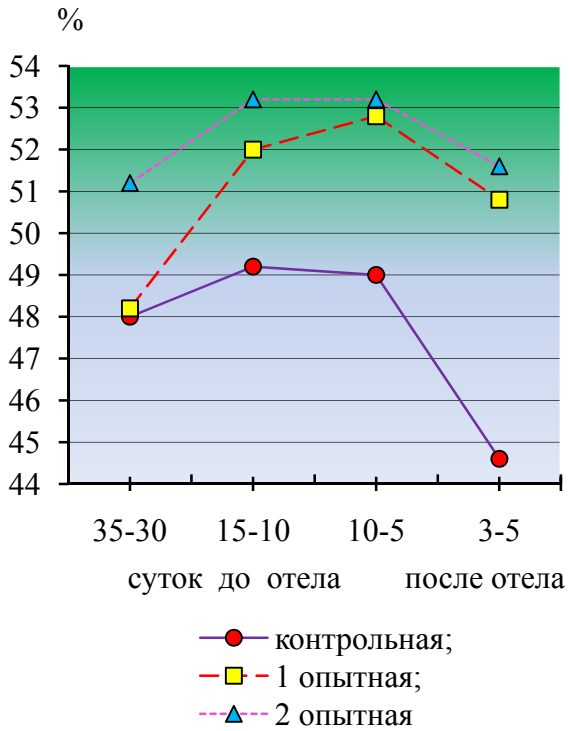

Рисунок 1 – Динамика фагоцитарной активности

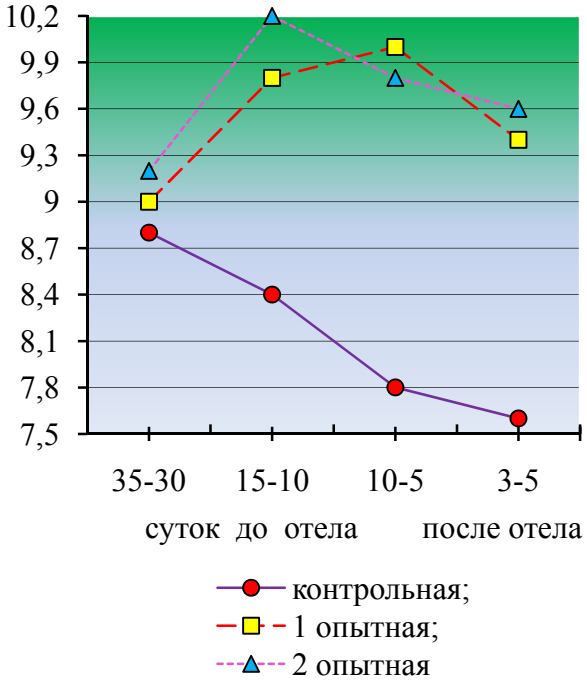

Рисунок 2 – Динамика фагоцитарного индекса

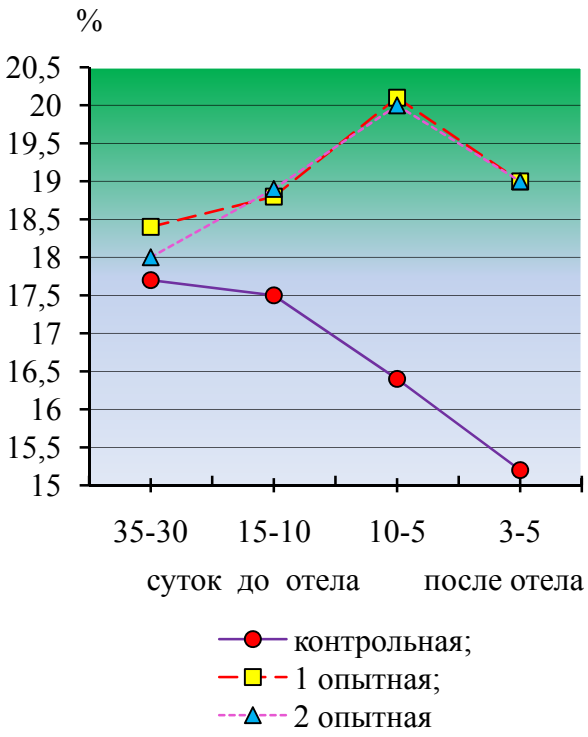

Рисунок 3 – Динамика лизоцимной активности

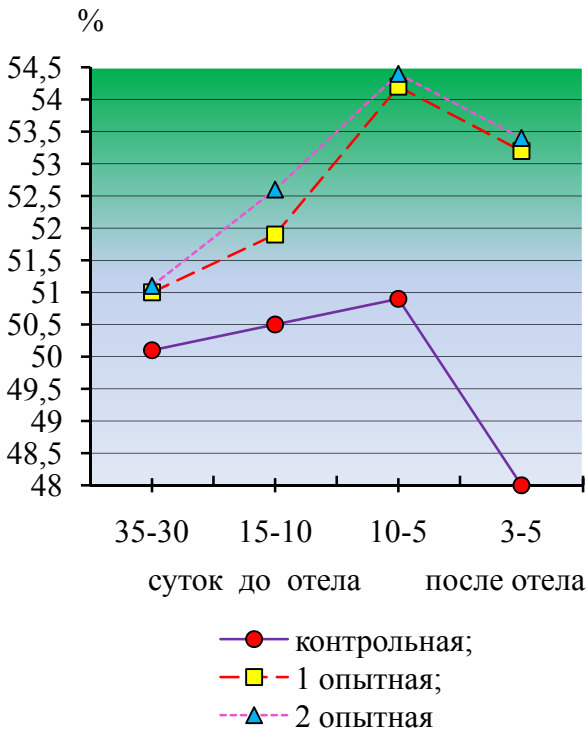

Рисунок 4 – Динамика бактерицидной активности

На основании проведенных исследований можно обобщить, что внутримышечная инъекция коровам препаратов PS-2, испытанного еще ранее, и Prevention-N-A, разработанного и апробируемого впервые, в дозе 10 мл за 45-40, 25-20 и 15-10 суток до отела способствовала повышению неспецифической устойчивости организма.

В результате внутримышечного введения телятам биопрепаратов PS-2 и Prevention-N-A установлено повышение их роста и развития.

К завершению периода выращивания животные 1-й и 2-й опытных групп превосходили по живой массе контрольных сверстников на 4,6 и 7,0 кг, доращивания – 13,8 и 17,0 кг и откорма – на 19,4 и 24,2 кг соответственно ($P<0,05$-$0,01$). Среднесуточный прирост животных опытных групп оказался выше, чем в контроле, в период выращивания на 22,3 и 34,5 г, доращивания – на 52,0 и 55,0 г и откорма на 31,0 и 40,0 г соответственно ($P<0,05$-$0,001$). Следует отметить, что наиболее выраженный ростостимулирующий эффект оказывал разработанный и апробированный нами Prevention-N-A, нежели ранее испытанный PS-2.

Экстерьерные промеры молодняка в динамике представлены в табл. 4.

Характеристика экстерьерно-конституциональных особенностей подопытных животных позволяет заключить, что под воздействием биопрепаратов повышались зоотехнические промеры. Аналогичная закономерность выявлена в характере изменений коэффициента роста животных сопоставляемых групп.

У телят опытных групп снижались болезни органов дыхания и пищеварения в 2,3 и 7,0 раза, сроки выздоровления – на 1,3 и 4,3 сут и коэффициент Мелленберга – в 2,8 и 15,4 раза соответственно по сравнению с контролем ($P<0,05$), что свидетельствует о выраженной профилактической эффективности испытанных препаратов при указанных заболеваниях.

Установлено, что прирост массы тела животных 1-й и 2-й опытных групп за период с 1- до 540-суточного возраста оказался выше в среднем на 18,8 и 23,4 кг, а затраты кормов на 1 кг прироста живой массы, наоборот, ниже на 0,36 и 0,45 ЭКЕ соответственно, нежели в контроле.

Таблица 4 – Динамика экстерьерных промеров молодняка

Группа животных	Возраст, сут	Промер, см			
		косая длина туловища	высота в холке	обхват груди за лопатками	обхват пясти
Контрольная	1	69±0,93	68±0,71	72±0,73	10,0±0,09
	30	80±0,92	77±0,93	85±0,86	10,3±0,08
	60	92±0,92	85±1,12	91±0,40	12,4±0,10
	90	102±1,03	86±1,07	100±0,24	13,0±0,10
	120	111±0,37	88±0,86	106±0,24	13,5±0,07
	150	115±0,51	92±0,86	111±0,45	14,1±0,09
	180	122±0,68	97±1,08	117±0,51	14,9±0,04
	360	146±0,84	113±0,93	147±0,60	15,2±0,07
	540	168±1,16	125±0,86	170±0,80	15,9±0,07
1 опытная	1	71±0,89	69±0,66	73±0,58	10,1±0,13
	30	82±0,68	80±0,86	87±0,93	10,6±0,10
	60	94±0,75	86±0,93	92±0,55	12,6±0,10
	90	103±0,81	87±0,97	101±0,60	13,2±0,10
	120	111±0,63	90±0,68	106±0,58	13,6±0,10
	150	117±0,93	94±0,68	112±0,51	14,1±0,07
	180	123±0,51	99±0,58	118±0,51	15,1±0,09
	360	147±1,16	116±1,30	150±0,51**	15,4±0,08
	540	172±0,66*	128±1,14	172±0,20*	16,0±0,05
2 опытная	1	71±0,97	69±0,71	73±0,68	10,1±0,14
	30	83±1,03	80±0,71	87±0,98	10,6±0,11
	60	95±0,66*	87±1,02	92±0,49	12,7±0,13
	90	105±0,51*	88±0,86	101±0,49	13,2±0,11
	120	112±1,21	90±0,66	107±0,55*	13,7±0,06
	150	117±1,41	94±0,71	113±0,75	14,3±0,08
	180	123±0,97	99±0,87	120±1,03	15,2±0,09*
	360	150±0,75*	117±0,86**	151±0,75**	15,4±0,07
	540	172±1,29	130±0,71*	173±0,51*	16,1±0,14

*** P≤0,05; ** P≤0,01.**

Убойные качества молодняка представлены в табл. 5.

На фоне применения биопрепаратов повышалась предубойная масса молодняка на 20,3 и 24,4 кг, масса парной туши – на 12,9 и 16,8 кг, убойная масса – на 13,8 и 17,5 кг и масса внутреннего жира на 0,9 и 0,7 кг. Таким образом, под влиянием биопрепаратов установлено улучшение откормочных и убойных качеств молодняка (P<0,05-0,001).

Показатели мясности полутуш молодняка представлена в табл. 6.

Масса полутуш молодняка 1-й и 2-й опытных групп оказалась выше по сравнению с контролем на 6,8 и 9,2 кг, масса мякоти – на 5,33 и 7,25 кг и костей – на 1,0 и 1,38 кг соответственно (P<0,01-0,001). Однако выход костей от полутуш молодняка опытных групп был ниже соответственно на 0,4 и 0,5 %. Результаты этих исследований свидетельствуют о том, что с увеличением массы полутуш подопытных животных повышался удельный вес мякоти, а костей, наоборот, уменьшался.

По органолептическим, биохимическим и спектрометрическим показателям говядина соответствовала требованиям требованиям Технического регламента Таможенного союза «О безопасности пищевой продукции» ТР ТС 021/2011 и Технического регламента Таможенного союза «О безопасности мяса и мясной продукции» ТР ТС 034/2013, что свидетельствует о доброкачественности мясных туш [27].

Таблица 5 – Убойные качества молодняка

Показатель	Группа животных		
	контрольная	1 опытная	2 опытная
Живая масса при снятии с откорма, кг	426,6±2,50	446,0±3,17**	450,8±2,28***
Предубойная живая масса, кг	416,8±2,17	437,1±2,61***	441,2±2,05***
Масса туши, кг	211,3±1,95	224,2±2,11**	228,1±1,83***
Выход туши, %	50,7	51,3	51,7
Масса внутреннего жира, кг	7,4±0,25	8,3±0,19*	8,1±0,15*
Выход внутреннего жира, %	3,50	3,70	3,55
Масса шкуры, кг	29,4±0,31	30,1±0,27	30,2±0,25
Выход шкуры, %	7,05	6,90	6,85
Убойная масса, кг	218,7±2,21	232,5±2,47**	236,2±2,17***
Убойный выход, %	52,5	53,2	53,5

* P≤0,05, ** P≤0,01, *** P≤0,001.

Установлено, что температура тела, частота пульса и дыхательных движений у телят в период выращивания и у молодняка в процессе доращивания и откорма находились в пределах физиологических норм.

Биопрепараты активизировали эритропоэз и повышали концентрацию гемоглобина в крови (P<0,05-0,01), но не оказали влияние на ЦП, СГЭ и лейкопоэз. Гемопоэз был более выраженным под воздействием Prevention-N-A.

Выявленный факт относительной эозинофилии в крови животных опытных групп позволяет заключить, что испытуемые препараты вызывали антистрессовое действие на организм, особенно в период выращивания телят, при более высоком эффекте Prevention-N-A.

В крови подопытных новорожденных телят преобладали палочкоядерные формы нейтрофилов, а в последующие сроки исследований – сегментоядерные. Причем количество сегментоядерных нейтрофилов было выше в крови животных опытных групп, нежели в контроле (P>0,05). Установленные качественные изменения в стадиях развития нейтрофилов свидетельствуют о сдвиге нейтрофильного ядра вправо, т.е. об активизации клеточных факторов неспецифической защиты организма животных под воздействием препаратов.

Таблица 6 – Мясность полутуш молодняка

Показатель	Группа животных		
	контрольная	1 опытная	2 опытная
Масса полутуш, кг	103,6±1,27	110,4±1,05**	112,8±1,07***
Мякоть, кг	77,80±0,95	83,13±0,76**	85,05±0,89***
Выход мякоти, %	75,09	75,29	75,39
Кости, кг	21,85±0,63	22,85±0,21*	23,23±0,27**
Выход костей, %	21,09	20,69	20,59

* P≤0,05, ** P≤0,01, *** P≤0,001.

На фоне внутримышечной инъекции телятам биопрепаратов установлено повышение выработки красным костным мозгом главных клеточных элементов иммунной системы – лимфоцитов, что свидетельствует о стимуляции клеточного (контактное взаимодействие с клетками-жертвами) и гуморального (выработка антител) иммунитета.

Содержание общего белка, альбуминов и γ-глобулинов в сыворотке крови молодняка 1-й и 2-й опытных групп оказалось достоверно выше, чем в контроле, например, к завершению периода выращивания – на 3,8 и 5,0 г/л, 3,3 и 4,5 г/л, 3,5 и 3,7 г/л соответственно (P<0,05-0,01). Указанные изменения в сыворотке крови животных были вызваны активизацией механизма неспецифической защиты организма под влиянием биопрепаратов.

После внутримышечного введения телятам биопрепаратов PS-2 и Prevention-N-A в организме активизировались буферные системы, обмен глюкозы, общего кальция, неорганического фосфора и провитамина А.

Состояние гуморальной резистентности организма молодняка наиболее полно характеризуют лизоцимная активность плазмы и бактерицидная активность сыворотки крови (рис. 5, 6).

Лизоцимная активность плазмы крови животных контрольной, 1-й и 2-й опытных групп возрастала в опытный период с 6,1±0,36 до 24,2±0,41 %, с 6,4±0,40 до 25,4±0,45 и с 7,0±0,44 до 26,0±0,23 % соответственно. Указанная активность гуморального звена неспецифической защиты организма животных 1-й и 2-й опытных групп оказалась выше, нежели в контроле: в период выращивания – на 1,5 – 3,1 и 2,0 – 4,1 % (P<0,05-0,001), доращивания – на 1,8 (P<0,05) и 2,8 % (P<0,001), откорма – на 1,2 (P>0,05) и 1,8 % (P<0,001).

Бактерицидная активность сыворотки крови контрольных и опытных животных на 1-е сутки после постановки опытов существенно не отличалась и составляла 32,0±1,10 %, 32,1±1,24 и 32,8±1,02 % соответственно. В последующем величины этого показателя последовательно возрастали и к концу срока наблюдения составили 58,0±0,40 %, 59,0±0,48 и 60,1±0,23 %, т.е. увеличились в 1,81, 1,84 и 1,83 раза. Следует отметить, что бактерицидная активность сыворотки крови животных 1-й опытной группы была достоверно выше, чем в контроле: в возрасте 15 суток на 4,6 %, 30 суток – на 2,8 %, 60 суток – на 5,0 %, 90 суток – на 3,7 %, 120 суток – на 3,3 % и 180 суток – на 3,4 % (P<0,05-0,01). В то же время разница между данными животных 2-й опытной и контрольной групп оказалась достоверной через 15, 30, 60, 90, 120, 180 и 540 суток после внутримышечной инъекции биопрепарата Prevention-N-A. У молодняка 2-й опытной группы соответствующие величины превосходили контрольные на 5,4 %, 4,8, 6,8, 6,0, 5,1, 5,6, 2,8 и 2,1 % соответственно (P<0,01-0,001).

Кроме того, использованные в опытах препараты стимулировали продукцию иммуноглобулинов.

Установлено, что у молодняка, выращенного с применением PS-2 и Prevention-N-A, фагоцитарная активность лейкоцитов оказалась выше по сравнению с контролем к завершению периода выращивания на 4,0 % и на 4,6 %, доращивания – на 4,0 и 6,4 %, откорма – на 2,8 и 3,4 % (P<0,05-0,01). Подобная закономерность прослеживалась и в динамике фагоцитарного индекса.

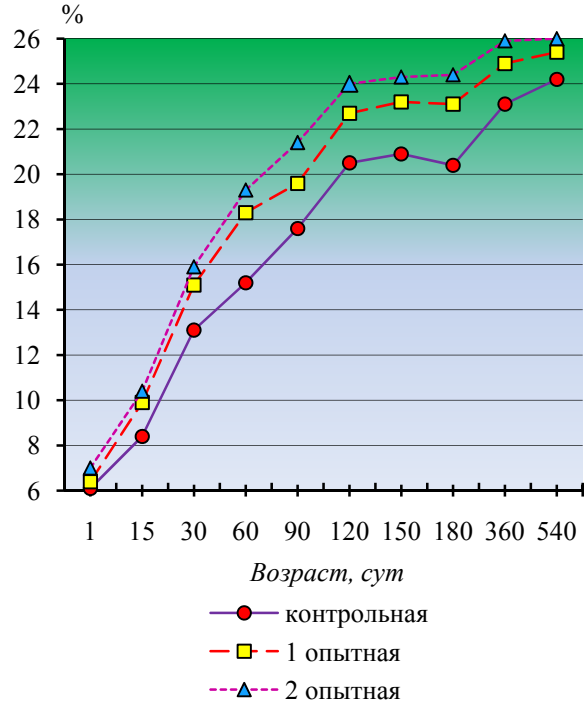

Рисунок 5 – Динамика лизоцимной активности

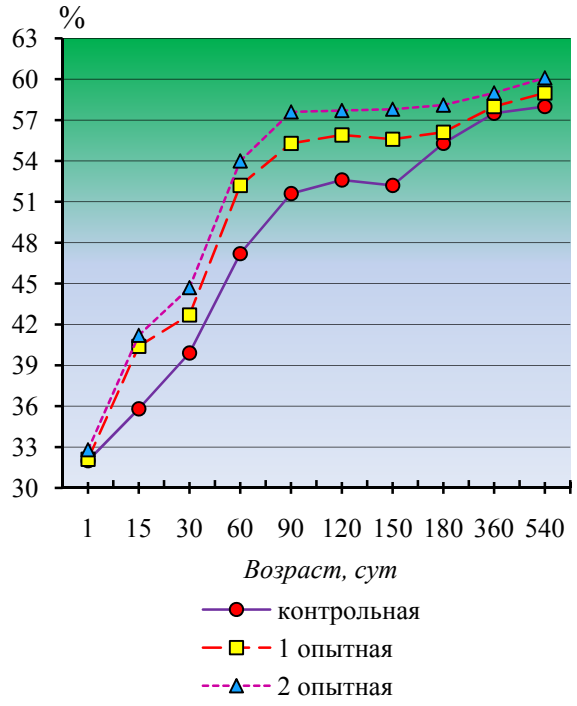

Рисунок 6 – Динамика бактерицидной активности

Следовательно, биопрепараты активизируют как гуморальное, так и клеточное звенья неспецифической устойчивости организма.

Экономическая эффективность применения биопрепаратов PS-2 и Prevention-N-A в технологии получения и выращивания телят с целью улучшения воспроизводительных качеств черно-пестрого скота и откормочных качеств молодняка составила из расчета на 1 руб. дополнительных затрат 6,0 и 7,48 руб. соответственно.

Вывод. Таким образом, биопрепараты PS-2 и Prevention-N-A, активизируя неспецифическую устойчивость организма коров-матерей и новорожденных телят к воздействию эколого-технологических факторов среды обитания, предупреждают послеродовые осложнения и гинекологические заболевания коров и улучшают их воспроизводительные качества, а у телят способствуют профилактике заболеваний органов дыхания и пищеварения, активизируют рост и развитие, улучшают откормочные и убойные качества молодняка.

Предложения производству. С целью улучшения воспроизводительных качеств черно-пестрого скота и реализации продуктивного потенциала телят в отдаленные периоды доращивания и откорма рекомендуем:

1) внутримышечно инъецировать биопрепарат Prevention-N-A стельным сухостойным коровам трехкратно за 45-40, 25-20 и 15-10 суток до отела в дозе по 10 мл;

2) вводить внутримышечно биопрепарат Prevention-N-A телятам двукратно на 2...3-е и 7...9-е сутки жизни в дозе по 3 мл.

Следует учесть, что биопрепараты PS-2 и Prevention-N-A улучшают воспроизводительные качества коров, откормочные и убойные качества молодняка за счет активизации неспецифической устойчивости организма, предупреждают заболеваемость коров и телят, при более выраженном соответствующем эффекте Prevention-N-A.

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ӨНІМДІЛІК САПАСЫ ЖӘНЕ ҰДАЙЫ ӨСІРУДІ ЖҮЗЕГЕ АСЫРҒАНДА АНАЛЫҚ СИЫР МЕН БҰЗАУ ОРГАНИЗІМІНДЕ ӨЗГЕШЕ ҚОРҒАНЫС

Аннотация. Мүйізді ірі қара (қара – ала сиыр) малдың репродуктивтік қасиеттерін жақсарту және биологиялық препараттармен организмге тән емес қарсылықты белсендіру арқылы бұзауды бордақылау қазіргі заманғы зоотехникалық ғылым мен практиканың өзекті мәселесі болып табылады. Бұрын бекітілген

PS -2 препаратымен салыстырғанда, Saccharomyces cerevisiae ашытқы жасушалары және Prevention-N-A бактерицидтік полисахаридтер кешенінің негізінде дайындалған препараттарды қолданудың тиімділігі ғылыми негізделіп, алғашқы рет тәжірибие негізінде дәлелденді. Жаңа биопрепараттармен (Prevention-N-A) көп төлдеген сиырлардың және туылған төлдердің ағзасын иммунокоррекциялау эколого – технологиялық стресс- факторлар жағдайында сиырларда төлдеу және төлдеуден кейінгі уақыттарда гинекологиялық сырқаттарды алдын алуға, ал бұзауларда тыныс алу және асқорту ағзаларының сырқаттарын болдырмауға, өсіп – жетілуді ынталандырады, өсіру және бордақылау кезінде өнімділік потенциалының толық ашылуына мүмкіндік береді. Сыналып отырған препараттардың қауіпсіздігі еттің органолептикалық, биохимиялық және спектрометриялық көрсеткіштерінің оң нәтижелері бойынша дәлелденді

Түйін сөздер. Сиырлар, бұзау, биопрепараттар, тән емес қарсылық, гинекологиялық күй, репродуктивтік және өнімділік қасиеттері.

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