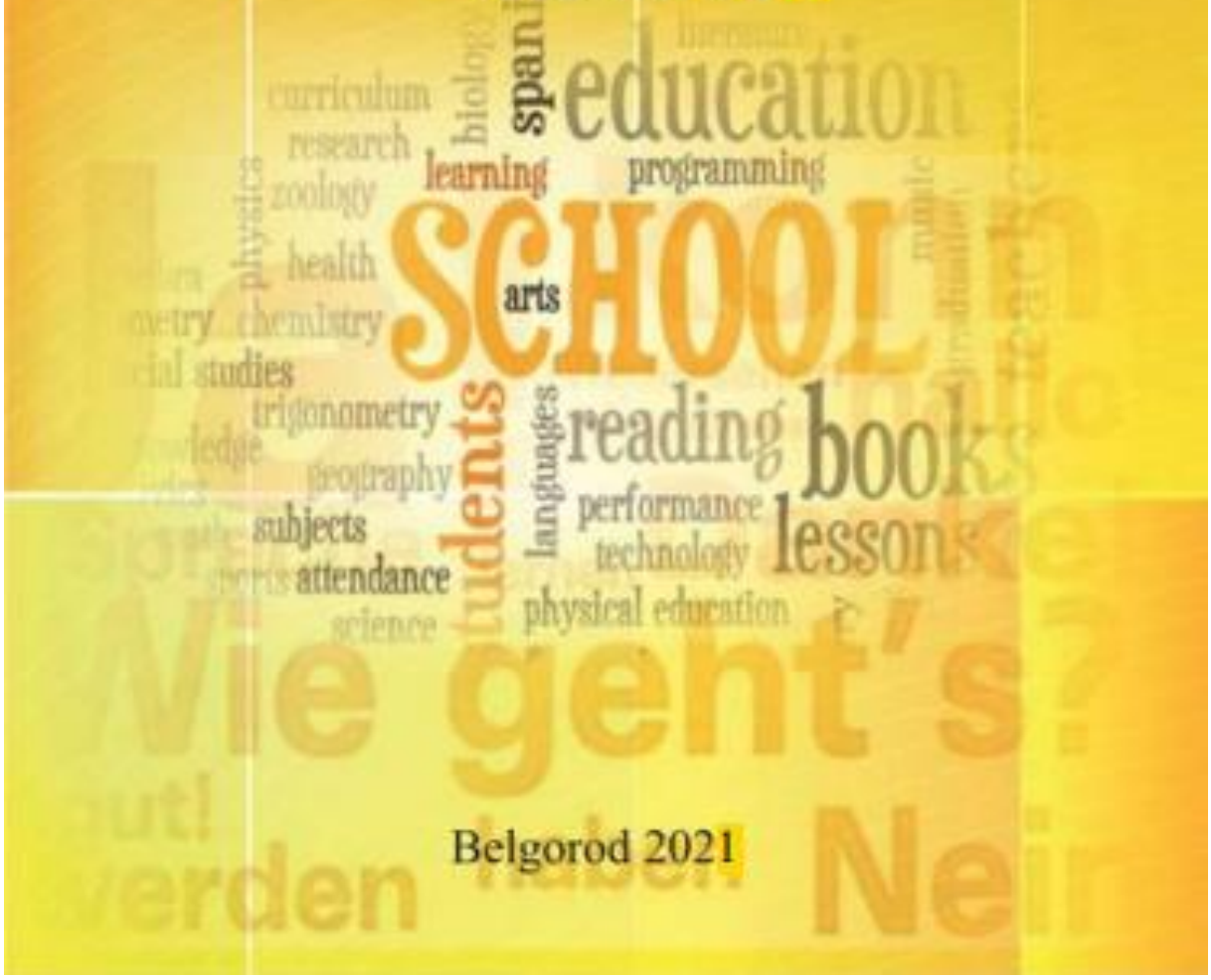
BELGOROD STATE NATIONAL RESEARCH UNIVERSITY
DEPARTMENT OF FOREIGN LANGUAGES AND PROFESSIONAL COMMUNICATION,
INSTITUTE OF CROSS-CULTURAL COMMUNICATIONS
AND INTERNATIONAL RELATIONS

WE MAKE THE FUTURE

Volume VIII



Belgorod 2021

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WE MAKE THE FUTURE

Volume VIII

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This book is a collection of students' articles written to present the most interesting andimportant universal scientific ideas and researches.

БЕЛГОРОДСКИЙ ГОСУДАРСТВЕННЫЙ НАЦИОНАЛЬНЫЙ
ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ
КАФЕДРА ИНОСТРАННЫХ ЯЗЫКОВ И ПРОФЕССИОНАЛЬНОЙ КОММУНИКАЦИИ
ИНСТИТУТ МЕЖКУЛЬТУРНОЙ КОММУНИКАЦИИ И МЕЖДУНАРОДНЫХ ОТНОШЕНИЙ

МЫ ДЕЛАЕМ БУДУЩЕЕ

Выпуск VIII

Сборник студенческих статей по итогам работы межинститутского круглого стола „WE MAKE THE FUTURE“
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W 37 **We make the future** (Мы делаем будущее): сборник студенческих статей по итогам работы межинститутского круглого стола „WE MAKE THE FUTURE“ (сентябрь – декабрь 2021 г.) / Под ред. Л.В. Цуриковой, Е.Н. Тарановой, Е.А. Карабутовой. – Вып. VIII. – Белгород, 2021. – 74 с.

Сборник студенческих статей охватывает широкий спектр актуальных проблем современной науки, отражает результаты теоретических и научно-практических исследований студентов неязыковых специальностей бакалавриата, специалитета и магистратуры очной и заочной форм обучения.

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SPECIALLY PROTECTED NATURAL AREAS IN THE FRAMEWORK OF THE IMPLEMENTATION OF THE CONCEPT "PROKHOROVSKY DISTRICT – NATURAL PARK AREA"

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Abstract. *The article analyzes the role of the existing network of protected areas in the formation of an ecological framework for overcoming the consequences of the fragmentation of natural ecosystems in the Prokhorovsky district of the Belgorod region. To increase the connectivity of the ecological framework, in addition to the existing PAs of regional and local importance, which are concentrated mainly in the western part of the district, the most significant areas for the preservation of zonal ecosystems have been identified, highlighting the specifics of Belogorye.*

Keywords: *fragmentation of the natural framework, ecological network, quasi-natural ecosystems, specially protected natural objects, the "core" of the ecological framework*

The purpose of the article is to identify the most significant areas in the conservation of zonal ecosystems for inclusion in the existing ecological network of the district.The agricultural territories of Prokhorovsky district are characterized by intensive use of almost all lands suitable for the production of agricultural products. Along with the intensification of agricultural production and the further development of the mining industry, which is relevant for the Belgorod region, the expansion of industrial and residential zones continues due to territories with preserved ecological potential (forests, hayfields and pastures). Natural and close to them ecosystems are represented by island watershed and beam forests, as well as meadow communities confined to the ravine-beam-valley network (hereinafter – RBVN). Fragmentation of natural ecosystems, in turn, leads to irreversible

consequences such as the decline in the number and disappearance of species, loss of biodiversity and the decrease in the stability of ecosystems on a regional scale.

The high degree of fragmentation of quasi-natural landscapes leads to the search for approaches to the formation of an ecological framework in the upper reaches of river systems as the most vulnerable in ecological terms [Gnilitsky, 2021: 205].

To overcome the problem of fragmentation, it is critically important to revise territorial planning and introduce a number of restrictions on the conduct of economic activity in the ravine-beam-valley network of the Prokhorovsky district. The target indicator is 55% of natural and close to them territories. The implementation of the concept "Prokhorovsky district – natural park area" can contribute to the achievement of this indicator [Goleusov, 2020: 18].

To form the ecological framework of the territory it is necessary, first of all, to determine the cores of the ecological framework. This is the usual way of choosing the protected areas at various levels [Bennett, 2004: 32; Elizarov, 2008; 303]. The network of protected areas of the Prokhorovsky district does not ensure the preservation of the invariant of forest-steppe landscapes: a combination of forest tracts with shrubby and grassy (meadow-steppe) ecosystems [Gnilitsky, 2021: 203].

The list of specially protected natural areas of regional significance on the territory of the Prokhorovsky district is presented in Table 1.

Table 1. **List of specially protected natural areas of regional significance on the territory of the Prokhorovsky district**

№ n/a	**Name of a specially protected natural area**	**Area, ha**	**Share of the corresponding area, %**
1	**2**	**3**	**4**
Green spaces		**1139,30**	**10,58**
1	Tract "Selidebnoe"	157,66	13,84
2	Tract "Popovo-Gaidukovo-Semakovo"	121,63	10,68
3	Tract "Plotavets"	113,17	9,93
4	Tract "Zalomnoe"	92,00	8,07
5	Tract "Mochaki-Prilepy"	86,43	7,59
6	Tract "Lomipolos"	76,46	6,71
7	Tract "Krugloe-Sakma"	74,97	6,58
8	Tract "Khokhlatskoe"	40,52	3,56
9	Tract "Khoroshee"	37,08	3,25
10	Tract"Tarataykinagrove"	35,71	3,13
11	Tract"BolshoeSornoe"	33,34	2,93
12	Tract "Ploskoe"	33,28	2,92
13	Tract "DalneeGorkoe"	33,27	2,92
14	Tract "Svinoe"	33,18	2,91
15	Tract "Yaruzhka"	23,99	2,11

№ n/a	Name of a specially protected natural area	Area, ha	Share of the corresponding area, %
1	**2**	**3**	**4**
16	Tract “Sloevoe”	22,97	2,02
17	Tract “Uyezdnoye”	22,92	2,01
18	Tract “Volovskoe”	21,92	1,92
19	Tract “Repnoe”	21,48	1,89
20	Tract “Dolgenkoe”	15,91	1,40
21	Tract “Belenikhino”	12,63	1,11
22	Tract“Yaruzhka-2”	10,51	0,92
23	Tract “Podsvinok”	7,87	0,69
24	Tract “Dedovka”	4,82	0,42
25	Tract “AnokhinLozhok”	3,45	0,30
26	Tract “Latka”	2,09	0,18
Slopes of beams		**10,50**	**0,10**
1	Beam south-east of the village of Luchki	4,49	42,77
2	Beam south-east of Kartashevka village	3,18	30,27
3	“Chalkmountain”	3,00	28,57
4	Slope of the beam from the tract “Stanovoe”	2,79	26,56
Zoological Hunting Reserve		**9610,01**	**89,28**
1	Complex hunting reserve “Teterevino”	9610,01	100,00
Springs and karstsprings		**4,69**	**0,04**
1	The Spring is the source of the Holy Great Martyr Panteleimon	0,78	16,67
2	Spring in the tract “Petrovskaya dacha”	0,78	16,67
3	Spring in the Grigoryevka farm	0,78	16,67
4	A spring in the village of Podolkhi	0,78	16,67
5	The spring at the “Barskoidachi”	0,78	16,67
6	Spring south-east of Chernovka farm	0,78	16,67
Total		**10764,50**	**100,00**

The total area of protected territories is 10764,50 ha (7,79 % of the space of the Prokhorovka district), and complex reserve “Grouse” accounts for about 90 %.

The main type of protected areas, eliminating complex reserve “Grouse”, including agricultural land – the “green spaces” (10,58 % of the space of all protected territories), i.e. forests.

The woodlands are mainly deciduous – alder, hazel, oak, birch, aspen, birch bark, linden (Alnus glutinosa L, Corylus avellana L, Quercus L, Betula L, Populus tremula L, Euonymus L, Tilia L, respectively). Coniferous tree species – pine (Pinus L) – also grow on sandy areas. The purpose of forests: landscaping and oxygen “cushion”.

The main feature of the network of protected areas of the district is the extreme unevenness of distribution and spatial separation. In addition, the steppe biome in the Prokhorovsky district is practically not protected. However,

representatives of the IG RAS believe [Sobolev, 2019: 65] that this territory, along with the Alekseevsky, Veidelevsky, Volokonovsky, Krasnensky and Rovensky districts, can be promising for the protection of steppe ecosystems.

In order to increase the connectivity of the ecological framework, in addition to the existing protected areas of regional and local significance, which are concentrated mainly in the western part of the study area, the area's most important for the conservation of zonal ecosystems, taking into account the specifics of the Belogorye, are allocated. The list of recommended sites of the cores of the ecological framework is presented in Table 2.

Table 2. **Recommended sites of the cores of the ecological framework**

River basin	Site name	Location	Area, ha
Psel	Site "Popovka"	Sources of the river Psel to the north of the village of Hillocks, the tract of Socrates and Popovka	97,6
	The site "Polezhaev"	The Polezhaev tract, the Polezhaevsky Mountains to the northwest of the village Prelestnoe	418,0
	Plot "Kostroma-Yudinka"	Section of the Psel River valley between the village of Vasilevka and Vesely	382,6
	Section "Youth Beam"	Youth Beam, northwest of Komsomolsky	194,4
Sazhnovsky Donets	Section "Sazhensky Log"	Section of the OBDS to the west of the village Pravorot	278,6
	Section "Dry Raft"	Section of the OBDS to the northwest of the village of Maloyablonovo	225,3
Ryndinka	Section "Ryndinka"	The section of the OBDS north of the mouth of the Ryndinka River to x. Lviv	1281,3
	Section "Novoselovka"	The eastern slope of the OBDS to the northeast of c. Novoselovka	128,7
Seversky Donets	Section"Vorobyova Balka"	The tract "Vorobyova Balka" to the west of the village. Podolkhi	38,6
	Section"Domanovka"	The section of the OBDS to the southwest of X. The first Mochaks to the north-eastern outskirts of the village of Podolkhi	905,7

River basin	Site name	Location	Area, ha
	Section”Bobrovsky Log”	The site of the OBDS to the south of the village of Sagaidachnoye and to the southeast of the village of Bobrovo, the tract “Bobrovsky Log”	553,6
Total			4504,56

Thus, 11 “core” territories were recommended, which preserve the invariant of forest-steppe ecosystems, and experience the least anthropogenic impact, with a total area of 4,5 thousand hectares, of which 4 are in the basin of the river Psel (1092,66 ha), 2 – in the basin of the Sazhnovsky Donets (503.89 ha), 2 – in the basin of the Ryndinka (1410,01 ha), 3 – in the basin of the Seversky Donets (1498,00 ha). The largest massifs appropriate for the protection of steppe landscapes are allocated in the basins of the Seversky Donets and Ryndinka (sites “Domanovka”, “Bobrovsky Log”, “Ryndinka”). It should be noted that in the past they were subjected to intensive grazing and haymaking, but currently there is an active restoration of associations characteristic of the forest-steppe. In particular, the association of the low-stemmed shrub of the Russian broom (Chamaecytisus ruthenicus L) in the combination with the hairy grasshopper (Stipa capillata L) can serve as indicators of the restoration of zonal communities.

The sites preserve the invariant of forest-steppe landscapes with good preservation of steppe vegetation. The protected areas are complex landscape reserves.

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REMOTE SENSING OF THE EARTH AND SOLVING ENVIRONMENTAL PROBLEMS IN THE FIELD OF ANIMAL HUSBANDRY ON THE TERRITORY OF BELGOROD REGION

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Abstract. *The procedure of monitoring farmland allows receiving up-to-date data regularly on the state of land and soil fertility. The information may differ*

from the data of the statistics service, which receives data from agricultural producers, and is not always reliable. The article analyzes the problems of integrated and specialized management of agricultural areas using remote sensing of the Earth. The importance of the data obtained with its help is difficult to overestimate, because, first of all, they allow monitoring the state of crops in very large areas. This article studies and applies the methods of remote sensing of the earth to solve environmental problems in the field of animal husbandry in the Belgorod region.

Keywords: *remote sensing, animal husbandry, GIS technologies, ecology, agricultural areas*

The Belgorod Region is one of the most economically developed constituent entities of the Russian Federation. The region has a powerful agro-industrial complex (AIC). In terms of production volumes in value terms, it is second only to the mining industry and ferrous metallurgy. The leading place among the spheres of the agro-industrial complex of the Belgorod region is occupied by agriculture and the food industry. Together with other regions of the Central Black Earth Region, the North Caucasian and Volga economic regions, the region is a major producer of agricultural products and food in Russia. Livestock breeding in the Belgorod region includes cattle breeding, poultry farming, pig breeding, sheep breeding, horse breeding, beekeeping and fish pond farming [Zhidkikh, 2015: 223]. The calculation of the volume of waste from livestock production for each production site within the basins of the studied rivers on the territory of the Belgorod region was taken as a basis for identifying the most polluted zones [Lupyan, 2009]. Figure 1 shows the location of pig farms in the administrative-territorial region.

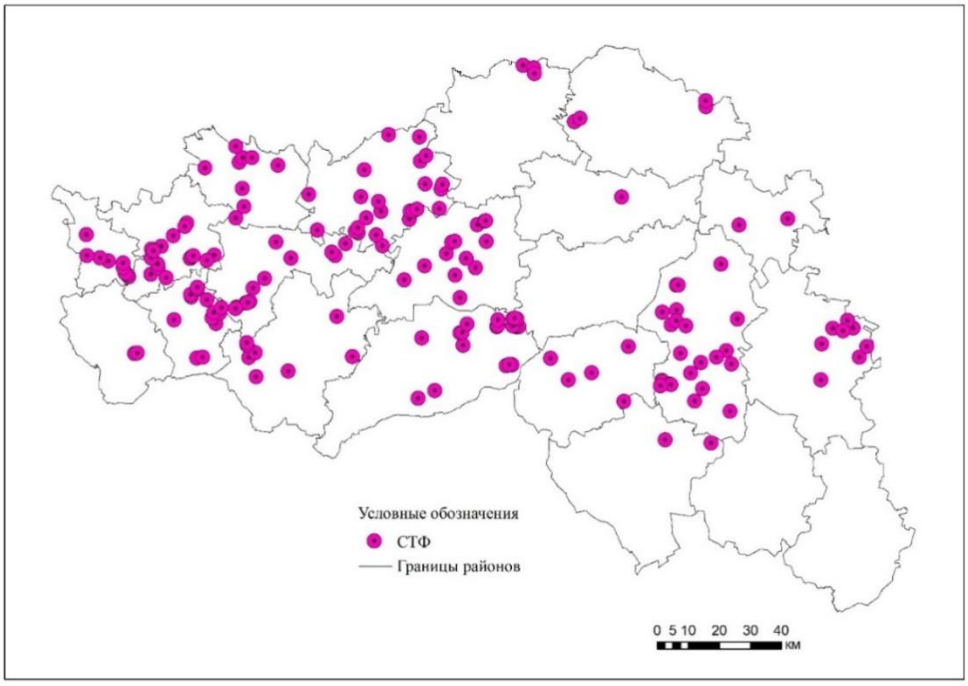


Figure 1. **Location of commercial pig farms in the Belgorod region**

As it is shown on the map, pig farms are located in almost every site of the Belgorod region, with the exception of the territories of Rovenky, Veydelevka and Novy Oskol. Using the data of the official statistics, the ratio between the area of pig-breeding grounds and the output of pig farms was calculated. As a result, with rare exceptions, there are from 25 to 30 thousand pigs per 1 conventional typical site of a pig-breeding complex in the Belgorod region. On average, for a typical pig-breeding complex in the Belgorod region, in terms of one animal unit, the manure yield is 4.8 kg per day (10% of the mass), of which solid waste is 0.48 kg (1% of the mass), volatile waste is 0.34 kg (less than 1%) [Kiselev, 2019: 101].

Then the formula for calculating waste will be the following one:

V waste = N livestock * V manure in kg from one animal unit per day.

Consider V waste (using the example of the Prokhorovsky district):

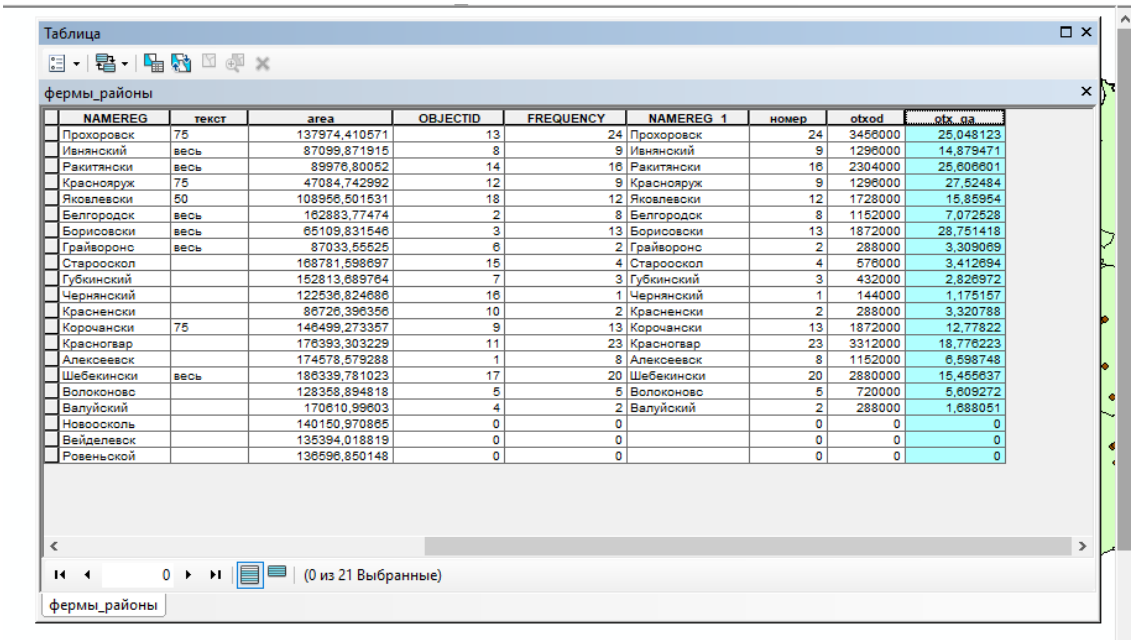
30,000 * 4.8 = 144,000 kg per day for 1 conventional typical site of a pig farm in the Belgorod region.

There are 24 farms in the Prokhorovsky region, which means 24 * 144,000 = 3456,000 - kg of waste per day for typical farms in the Prokhorovsky region.

District area = 137974 Hectares

Then the volume of waste will be = 3456000 (kg / day): 137974 Hectares = 25.048 (kg / day).

Using the ArcGIS program, it is possible to automatically calculate the amount of waste from a pig farm in any area (see Fig. 2).



NAMEREG	текст	area	OBJECTID	FREQUENCY	NAMEREG_1	номер	otxod	otx_ga
Прохоровск	75	137974,410571	13	24	Прохоровск	24	3456000	25,048123
Ивнянский	весь	87099,871915	8	9	Ивнянский	9	1296000	14,879471
Ракитянски	весь	89976,80052	14	16	Ракитянски	16	2304000	25,606601
Красноярук	75	47084,742992	12	9	Красноярук	9	1296000	27,52484
Яковлевски	50	108956,501531	18	12	Яковлевски	12	1728000	15,85954
Белгородск	весь	162883,77474	2	8	Белгородск	8	1152000	7,072528
Борисовски	весь	65109,831546	3	13	Борисовски	13	1872000	28,751418
Грайворонс	весь	87033,55525	6	2	Грайворонс	2	288000	3,309069
Старооскол		168781,598697	15	4	Старооскол	4	576000	3,412694
Губкинский		152813,689764	7	3	Губкинский	3	432000	2,826972
Чернянский		122536,824686	16	1	Чернянский	1	144000	1,175157
Красненски		86726,396356	10	2	Красненски	2	288000	3,320788
Корочански	75	146499,273357	9	13	Корочански	13	1872000	12,77822
Красногвар		176393,303229	11	23	Красногвар	23	3312000	18,776223
Алексеевск		174578,579288	1	8	Алексеевск	8	1152000	6,598748
Шебекински	весь	186339,781023	17	20	Шебекински	20	2880000	15,455637
Волоконовс		128358,894818	5	5	Волоконовс	5	720000	5,609272
Валуйский		170610,99603	4	2	Валуйский	2	288000	1,688051
Новооскольь		140150,970865	0	0		0	0	0
Вейделевск		135394,018819	0	0		0	0	0
Ровеньской		136596,850148	0	0		0	0	0

Figure 2. **Calculation of the amount of waste in an automated mode by regions**

Now it is necessary to present a map demonstrating the wastes storage of commercial pig farms (see Fig. 3).

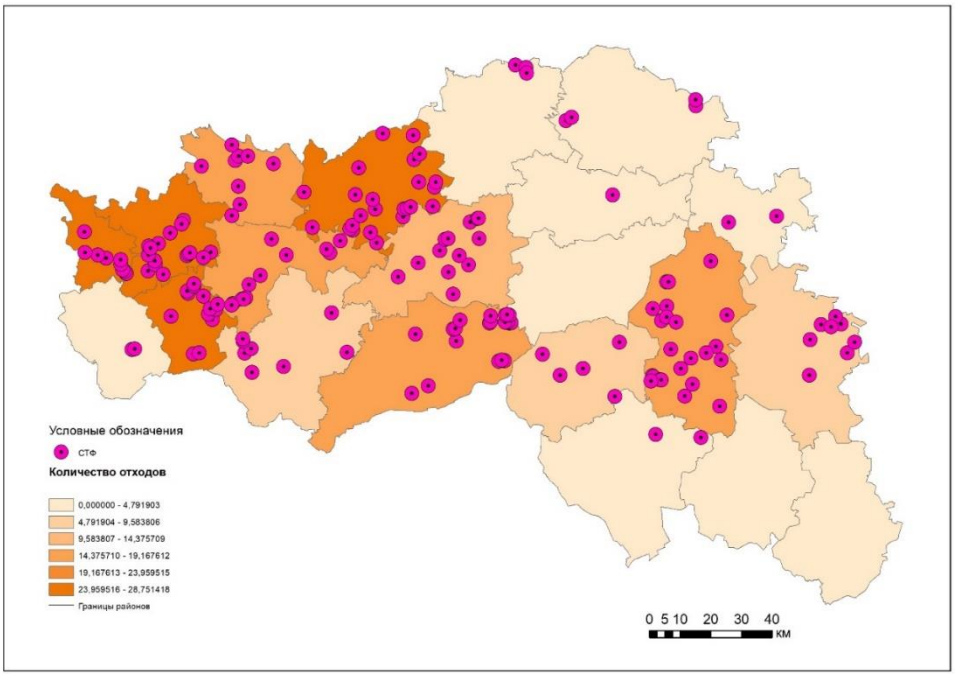


Figure 3. **A map of the wastes storage of commercial pig farms in the Belgorod region**

It can be noted that the Prokhorovsky, Borisovsky, Rakitnyansky and Krasnoyaruzhsky districts have the largest amount of wastes of commercial pig farms.

There are many advantages in the usage of remote sensing in agriculture. Remote sensing helps users better understand their field data and provides the appropriate tools to extract essential information from the data, from crop type identification to classification and yield estimation [Lagutin, 2009: 47]. The use of this technology is due to the need to increase agricultural production due to population growth and the limited area of the land, as well as a difficult environmental situation. Remote sensing of the Earth makes it possible to reduce the cost and time for field research, speed up the work, increase the reliability and completeness of information, and assess the state of agricultural land on large areas.

Fast work with ultra-high resolution data (several meters), spectral information with hundreds of channels, daily updated records, implementation of image processing algorithms in a cloud software environment, storage and archiving of very large amounts of facts – it is the future of remote sensing [Prasad, 2015: 116].

Thus, the future usage of remote sensing will lead to improvements in the spatial, spectral, radiometric and temporal characteristics of sensors. As the sensors become more powerful and compact, this will provide more accurate data. It should be emphasized that in recent years there has actually been a revolution in the development of remote sensing satellite systems. There is an increase in the number of high-quality Earth observation systems, an increase in the frequency and spatial resolution of satellite information available for the organization of continuous monitoring of agricultural land and crops. All this allows not only

conducting various scientific developments, but also creating and implementing various information systems on their basis for remote monitoring of agricultural lands and crops. At the same time, it should be noted that the expansion of the capabilities of modern ERS satellite systems has led to an almost explosive growth in the amount of information available for use.

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THE IMPACT OF PIG FARMS ON THE ENVIRONMENT OF THE CENTRAL CHERNOZEM REGION

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Abstract. *The purpose of the article is to consider the impact of pig farms on the environment (soil, air, water) and find ways to minimize the negative impact. The object of the research is the Central Chernozem Region that specializes in agriculture. Methods used in the article are: statistical, comparative geographical, review of literature and Internet sources. The article is on large swine-breeding complexes of the Central Chernozem Region. There is an assessment of the manufacturing impact on the environment in the article. A list of solutions to the problems caused by swine farms is offered.The Central Chernozem Region is one of leading pork producers in Russia. It is necessary to use modern resource-saving technologies in the region that ensure compliance with environmental standards and efficient production.*

Keywords: *pollutants, agriculture, animal breeding, pig breeding, Central Chernozem Region*

Today agriculture is one of the main spheres of the national economy. An expansion of agricultural companies is observed under the impact of import substitution. In particular, the number of livestock farms in the Central Chernozem Region is increasing. The Chernozem Region is one of the largest meat macro-regions in Russia. Close attention to the work of livestock companies is the challenge that the industry has to face in recent years. Environmental risks and potential environmental impacts associated with the activities of these companies often complicate the implementation of agricultural projects. In the Central Chernozem Region, the problem is relevant. Recently, companies had to refuse to construct farms due to population`s complaint.

The object of the research is the Central Chernozem Region that specializes in agriculture. One of the most developed areas is agriculture, manufacturing of livestock products. Pig breeding is a well-developing branch of animal livestock. Livestock farms, arable lands, feed mills, slaughterhouses and other production sites of the largest pork producers are located in the region: “Miratorg agro-industrial holding”, “Cherkizovo Group”, “Agroeco group”, “Eksima”, “Belgrankorm” and “Promagro”.

The methods used in the article, such as statistical, comparative geographical, review of literature and Internet sources, help to analyze the situation in this branch of industry. Several livestock farms have been created in the regions of the Central Chernozem Region. The leader in the production of basic animal products (pork) is Belgorod region, where 896.6 thousand tons were produced in 2019. The next on the list are Tambov region (564.1 thousand tons in 2019),

Lipetsk region (376.0 thousand tons in 2019), Kursk region (329.2 thousand tons in 2019), Voronezh region (296.5 thousand tons in 2019).

Pig-breeding complexes have an impact on the environment because of their activities. Firstly, the level of water pollution is high. It causes degradation of reservoirs. There is an insufficient amount of agricultural land for the full use of manure as an organic fertilizer in some farms. It leads to use of increased doses of application, and then to ingress of some fertilizers into water. For example, in Belgorod region, it is noted that a large amount of organic waste creates a potentially high module of human pressure on the river basins [Kisilev, 2019: 2].

Secondly, emissions of pollutants into the air are increasing. The main source of pollution around pig farms are storage ponds, primary sedimentation tanks of liquid fraction, manure collectors [bel.ru/news, 2021: 1]. There is a release of carbon dioxide (CO_2), hydrogen sulfide (H_2S), methane (CH_4) and ammonia (NH_3) during the production process.

The intensity of stinking odors increases. They can spread to 5 km. There are different aeration methods or enzymes reducing emissions. Planting in sanitary protection zones decreases the impact of farms on the atmosphere [bel.ru/news, 2021: 1].

The third effect of activities of pig breeding complexes is improper disposal of wastes and, as a result, reduction of biological diversity. Some pig farms do not have enough land for disposal of manure. There are complexes that do not have an area for disposal at all [bel.ru/news, 2021: 2]. For instance, Miratorg Belgorod is accused of destroying and damaging forests. On the territory of Prokhorovsky forestry, oaks, ash trees, maples and forest floor were destroyed because of contamination with biological waste. The damage amounted to more than 800 thousand roubles. According to the management of Belgorod region forests, Miratorg-Belgorod LLC dumped liquid manure drains on the lands of the forest fund [bel.ru/news, 2021: 2].

The construction of livestock complexes may threaten protected areas. In Kursk, they tried to create a pig complex in the buffer zone of Central Black Earth Nature Reserve. If it had been built, existence of the reserve would have been under threat. There were requests received from the veterinary services for the total slaughtering of wild boars, considering a vector of ASFV (African swine fever virus). After discussions, it was decided to refuse to build an enterprise near the biosphere reserve, which is a part of the UNESCO reserves network.

Households are also affected by farms. The management of Voronezh firm Agroeco promised to build pig farms in the Verkhnemamonskiy district away from populated areas. The projects were redone. Local residents feared that environmental situation could worsen. Agroeco Group changed placement plans of pig farms.

The following ways to solve problems caused by pig farms can be found:

- control over the application of fertilizers (manure);
- calculation of animals per unit area of land;
- separation of manure into liquid and solid fractions in pigsties [Shalavina, 2017: 5];

- recycling of pig wastes into organomineral fertilizers.

In conclusion, animal breeding in the Central Chernozem Region is actively developing. The region is one of the largest meat macro-regions of Russia – it accounts for 50% of pork production in Russia. Pig breeding complexes have a negative impact on the environment. It should be noted that the construction of livestock complexes might threaten protected areas. The negative impact can be minimized by adopting legislative acts. During construction of new complexes and modernization of existing ones,it is necessary to use modern resource-saving technologies that ensure compliance environmental standards with profitability.

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DIE VERGLEICHSANALYSE VOM GEGENWÄRTIGEN ZUSTAND DER BIOENERGETIK IN RUSSLAND UND DEUTSCHLAND

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Annotation. *Dieser Artikel widmet sich dem Thema „Biokraftstoffe", die heute als eine der wichtigsten alternativen Energiequellen der Welt gelten. Im Artikel wird die vergleichende Analyse des Zustandes der Bioenergetik am Beispiel von Russland und Deutschland durchgeführt. Daneben werden die zukünftigen*

Perspektiven der Entwicklung dieser Branche in beiden Ländern behandelt und die positiven und negativen Seiten der Steigerung der Energieproduktion aus Biomasse beschrieben. Im Laufe der Analyse wurde festgestellt, dass trotz der Fortschritte bei der Nutzung von Biokraftstoffen lässt sich die Entwicklung von Bioenergieprojekten in Russlandim Vergleich zu Deutschland immer noch übrig zu wünschen.

Schlüsselwörter: *die Biokraftstoffe, alternative Energiequelle, die Biomasse, die Bioressourcen, die Organisation der Bioenergieproduktion*

Der stetige Anstieg der Preise für fossile Energieressourcen und die Bemühungen vieler Länder, die ökologische Sicherheit der Entsorgung von organischen Abfällen, die Verringerung der Umweltverschmutzung und die Verringerung der Treibhausgasemissionen anzugehen, haben zu einem stetigen Anstieg der Produktion und des Verbrauchs von Energie auf der Grundlage der Biomasseverarbeitung seit 2003 geführt. Nach der Meinung der Wissenschaftler hat sich biologischer Brennstoff als die am weitesten verbreitete und beherrschte alternative Energiequellepositiv etabliert [Osipov, Kozyreva, 2018].

Biokraftstoffe sind ein Produkt der Verarbeitung von Biomasse, die 100% organischen (tierischen oder pflanzlichenUrsprungs sind.Das sinddie Lebensmittel, die Haushaltsabfälle, die Produkte von Tieren, dabei auch Stroh und nicht verarbeitete Materialien der Holzindustrie, Hausmüll. Die Produkte, die sich aus der Verarbeitung von Biomasse ergeben, können zur Erzeugung von thermischer und elektrischer Energie, flüssigen und gasförmigen Brennstoffen verwendet werden [Linnik, 2019].

Es ist bekannt, dass die unkontrollierte Emission von Methan, das sich in der Erdatmosphäre ansammelt, zu einem ausgeprägten Treibhauseffekt führt und damit den allmählichen Klimawandel des Planeten hervorruft. Derzeit ist eine der effektivsten Methode zur Verwendung von Methanemissionen die Gewinnung von Energie und Biodünger. Die Einsatzgebiete von Biogas sind unterschiedlich – von der direkten Verbrennung in thermischen Anlagen unterschiedlicher Leistung bis zur gemeinsamen Erzeugung von Wärme und elektrischer Energie oder der Nachspeisung von Biogasnetzen von Erdgas. Dabei kann Biogas sowohl aus Abfällen der Agro- und Lebensmittelindustrie als auch in kommunalen Abfallreinigungsanlagen oder Deponien aus festem Hausmüll gewonnen werden. Im Ausland insbesondere in der Europäischen Union ist die Praxis der Gewinnung von Bioenergie aus speziell angebauten pflanzlichen Rohstoffen weit verbreitet [Sergienko, Kashchenko, Jelistratova, 2014].

In diesem Zusammenhang ist das Ziel des Artikels eine vergleichende Analyse des Zustandes der Bioenergiebranche in Russland und Deutschland im heutigen Moment durchzuführen. Die Ziele der durchgeführten Studie waren einerseits die Untersuchung des Entwicklungsstandes der Nutzung von Bioenergie in Russland und Deutschland, andererseits die Bestimmung des Fortschritts bei der Nutzung von Biokraftstoffen.

Das Problem der Entsorgung von Abfällen ist heute in Russland sehr aktuell. Die Müllentsorgung wird durch die vollständige Verarbeitung von Abfällen der

Hauptproduktion in Produkten, die eine unabhängige Bedeutung und eine potenzielle Nische auf dem Markt haben,nicht nur die ökologische Situation im Bereich der Unterbringung der Betriebe verbessern, sondern auch die Rentabilität der Produktion erheblich besser zu machen.

Russland ist ein der weltführerden Länder in Bezug auf Bioressourcen. Nach verschiedenen Einschätzungen beträgt das Gesamtenergiepotenzial von Biomasse in Russland derzeit 15-20 Tausend MW. Laut statistischen Daten vom Rosstatzählt man die potenzielle Produktion von Biogas aus Biomasse in Russland bis zu 74 Milliarden m^3 pro Jahr [Linnik, 2019].

In Russland gibt es alles Notwendige für die erfolgreiche Entwicklung der heimischen Bioenergiebranche. Die Angaben des Ministeriums für Landwirtschaft der Russischen Föderation sagen, dass in der Industrie mehr als 390 Millionen Tonnen Abfall pro Jahr (trocken) gebildet werden, im Bereich der Holz-und Holzverarbeitung ca. 700 Millionen Tonnen hergestellt werden und in der Wohnungs- und Kommunalwirtschaft (feste Haushaltsabfälle) etwa 70 Millionen Tonnen (von ihnen 10 Millionen Tonnen entfallen auf kommunale Abflüsse) produziert werden.

Laut FGNU „Rosinformagrotech“ wird das Potenzial des landwirtschaftlichen Komplexes des Landes auf 773 Millionen Tonnen Abfall geschätzt, von denen 66 Milliarden m^3 Biogas und 112 Millionen Tonnen Dünger produziert werden können. Darüber hinaus kann die effiziente Nutzung und Verarbeitung von Pflanzen- und Holzabfällen in Biokraftstoffen die Abhängigkeit der Agroindustrie von der zentralisierten Energieversorgung verringern werden. 3 Millionen Tonnen Ölsamen (von ihnen Sonnenblumen – 89%, Soja – 9%, Senf – 0,4%, Raps – 1,6%) werden jährlich verarbeitet, wobei die Ausbeute an Öl nur etwa 40% beträgt [Garipov, 2016; Kravchenko, 2013].

So ist die Organisation der Bioenergieproduktion in Russland derzeit auf industrieller Ebene in der Formationsphase. Eine Reihe von Wirtschaftssubjekten beginnen gerade erst die Technologie der Produktion von biologischen Brennstoffen als Energieressourcen für den internen Gebrauch zu verwenden. Lokale Produktion für Biokraftstoffe erscheint in Nischni Nowgorod, Wladimir, Kaluga, sowie in der Republik Tatarstan, Mari-El, in der Region Krasnodar. In diesen und in einigen anderen Subjekten der Russischen Föderation wird Biogas aus Abfällen der Tierhaltung, der Geflügelzucht und der Pflanzenzucht gewonnen. Die Nutzung von Bioenergie ist bisher nur auf die thermische und elektrische Erzeugung beschränkt.

Die Wissenschaftler, die Vertreter des Agrargeschäfts und Landwirte haben einen bedeutenden Beitrag zur Entwicklung fortschrittlicher Energietechnologien geleistet. Im Zuge der fortschreitenden Entwicklung des Innovationsprozesses wurde 1998 der Bundesverband BioEnergie gegründet, der die Interessen der Biomasse-Energieerzeuger koordinieren und lobbyieren soll. In Deutschland werden laut Experten insgesamt rund zwei Drittel der erneuerbaren Energien aus Biomasse produziert.

In der Bundesrepublik wird dabei ein Viertel der elektrischen Energie (25,4%, davon 7,9% durch Bioenergie) sowie 9% der Wärme und 5,3% des

Kraftstoffs für Fahrzeuge aus erneuerbaren Energien erzeugt. Aus diesen Energiequellen wurden im Jahr 2014 etwa 160,3 Milliarden kWh Strom erzeugt, was 26,1% der gesamten Stromerzeugung des Landes ausmachte. Biomasse entfielen 43 Milliarden kWh oder 27% der gesamten Energie, die auserneuerbaren Energien produziert wurde. Für die Mobilität biologischer Energieträger in der Wirtschaft des Landes gibt es keine Alternative.

Anfang des Jahres 2015 produzierten und lieferten mehr als 8000 Biogasanlagen im Land Strom mit einer Gesamtleistung von rund 4000 MW. Durch die Anzahl solcher Anlagen ist Deutschland einer der Marktführer in der Welt. Ein wesentlicher Vorteil von Biogasanlagen ist ihre Fähigkeit, Schwingungen des elektrischen Stroms im Netzwerk auszugleichen. Biogas kann unabhängig von Wetter und Tageszeit hergestellt werden, und daher ist seine Anwendung bei der Umsetzung der neuen EU-Politik zur Änderung der Energiestruktur wichtig.

Im Jahre 2013 wurden in Biogasanlagen 27 Milliarden kWh Strom produziert, 2,2 Millionen Tonnen Biodiesel, 1,2 Millionen Tonnen Bioethanol sowie 1200 Tonnen Pflanzenöl verbraucht.

Auf dem Markt für erneuerbare Wärme ist in heutiger Zeit Biomasse die wichtigste Energiequelle. Ihr Anteil am gesamten Energieverbrauch beträgt 9%, wobei 80% durch Biomasseverarbeitung erzeugt werden. Als Rohstoff für die Produktion von Bioenergie verwendet man die landwirtschaftlichen Kulturen (Mais, Getreide, Zuckerrüben, Raps, Ginger, etc.), die Pflanzenarten (Weide, Pappel, Miscanthus etc.), die Abfälle der Tierhaltung (Gülle etc.). Andere landwirtschaftliche, forstliche und kommunale Abfälle (Stroh, Holzreste, forstliche Abfälle, organische Abfälle) tragen ebenfalls wesentlich zur Erzeugung von klimaschonender Wärme bei. Besonders effektiv ist die Kombination „Kraft – Wärme“, bei der aus biogenen Quellen gleichzeitig Strom und Wärme gewonnen werden.

Es sei darauf hingewiesen, dass seit 2007 in Deutschland Stimmen gegen die Entwicklung der Bioenergie waren. Die Hauptargumente der Gegner gegen die Bioenergieproduktion waren die folgenden:

– die Menschen verhungern in der Welt hungern und aus der Nahrung wird Treibstoff hergestellt (Vergleich „Treibstoff – Teller“);

– das Interesse der Landwirte an der Produktion von Energiepflanzen führt zu einem Mangel an Land für die Produktion von Lebensmitteln;

– unzureichende Nahrungsmittelproduktion führt zu höheren Preisen;

– aufgrund der Vorherrschaft in den Fruchtfolgen von Raps und Mais in der Landwirtschaft beginnt sich eine Monokultur zu entwickeln, die zu einer Verringerung der Bodenfruchtbarkeit, einer verstärkten Chemie und einer Verletzung der ökologischen Situation führt;

– Biokraftstoffproduktion führt zu negativen Auswirkungen auf das Klima;

– die Bioenergieproduktion verursacht steigende Energiekosten, da der Staat gezwungen ist, alternative Energieproduzenten, einschließlich Landwirten, zusätzlich zu bezahlen.

Als Folge des schlechten Images in der Gesellschaft gegenüber der Bioenergie wurde von der Regierung der Grundsatz bei der Entwicklung erneuerbarer Energien in der EU auf Sonne- und Windenergie gesetzt.

Fazit

In Russland gibt es heute alles Notwendige für die Entwicklung der Bioenergie. Das Land verfügt über die größten Ackerflächen mit Waldressourcen, die derzeit zu einem Drittel nicht genutzt werden. Es gibt auch fortschrittliche Technologien, die bereits heute die Verarbeitung von Biomasse der ersten und zweiten Generation ermöglichen.

Biogas ist in Russland ein universeller Brennstoff, dessen Produktion überall im Land eingestellt werden kann. Aber trotz der Aussichten lässt sich die Entwicklung der Bioenergie in Russland übrig zu wünschen.

Die Hemmung der Entwicklung der Bioenergie in Russischer Föderation erfolgt aufgrund der großen Reserven von traditionellen Energiequellen (Kohle, Öl, Gas), sowie aufgrund der hohen Verbrauchssteuersätze, der Nichtbereitschaft des Transportsektor für den Verbrauchsolcher Energiequelle und spezifischen Merkmalen von Biokraftstoffen.

In Deutschland steht der Einsatz von Biokraftstoffen derzeit in Frage. Auf dem Markt für erneuerbare Wärme ist die Biomasse die wichtigste Energiequelle. Doch seit 2007 gibt es in Deutschland die Stimmen gegen die Entwicklung der Bioenergie.

Heute beginnt die Förderung der Bioenergieproduktion in den deutschen Bundesbehörden Unterstützung zu finden. Die Produktion von Bioenergie aus Biomasse braucht man laut K. Schmidt, Bundesminister für Ernährung und Landwirtschaft die wirtschaftliche Entwicklung in ländlichen Regionen und fördert die Entsorgung von Biomasse in der Land- und Forstwirtschaft.

Wegen des Bundesgesetzes für erneuerbare Energien (EEG) stand die Bioenergie 2014 nach Ansicht des Ministers vor einer schweren Prüfung. Aus Sicht der Industrie ist der Minister mit den Grundvoraussetzungen des geltenden Gesetzes nicht zufrieden. Er glaubt, dass es notwendig ist, die staatliche Unterstützung für den Betrieb der bestehenden Produktionskapazitäten zu gewährleisten, sowie das Vertrauen in die Bioenergie in den Köpfen der Öffentlichkeit zu bilden.

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SECTION 2. SOCIAL SCIENCES, ECONOMICS

ARTIFICIAL INTELLIGENCE IN THE ACCOUNTING PROFESSION

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Abstract. *The article reveals the accounting, classified as an information system, has in our world today aligned with information technologies to broaden its performance capability. Technological changes occur over time and they have made accounting activities and tasks easier. Besides, it is underlined that accounting profession has changed by the evolution of accounting software, information technologies and the recent developments in artificial intelligence.*

Keywords*: artificial intelligence, accounting profession, technology, globalization, business, development*

The basic approach to artificial intelligence is to progressively and strategically discover ways of performing complex human activities and show how computer technologies can operate in the manner of humans. The capabilities of technologies and system facilities lies in their intelligence, versatility and complexity rather than in their source of power [Lombardo, 2015].

Practitioners in accounting have employed technology to improve capacity and make effective and strategic decisions for many years and counting. ICAEW identified three wide issues that technology can help accountants to solve. They include:

• Providing cheap and affordable data to support decision-making.

• Generating new insights from data analysis.

• Focusing on valuable tasks such as problem solving, planning and strategy development, decision-making, relationship building and leadership.

Techniques of the artificial intelligence provides important improvements across all areas of accounting, are capable to provide accountants with powerful abilities, to automate various tasks and decisions. In addition, the capabilities change and the nature of the artificial intelligence systems enable continual improvement.

Information and communication technologies (ICT) are not only used by enterprises. The factors including globalization, swift development of ICT with increasing effect and reducing costs, increasing information sharing extended electronic tax management applications all around the globe and in our country [Turner & Apelt, 2004]. The global development of technology for performing activities in their diversities is a way of enhancing operating mechanisms. The internet has become the major source for information communication and transmission area [Seyal, Noah & Rahim, 2002].

Artificial intelligence (AI) is an advent in technology that automatically handles activities as inputted efficiently, effectively, amenably. It is a revolutionary technology to boost the performance capability of any profession. Four dimensions given by Carol & O'Leary describe the artificial intelligence. These dimensions include intelligence, business, research and programming. The intelligent dimension pertains the use of machines and facilities in ways that human participation would act in performing operations from the business and research dimensions. The programming dimension includes significant programming study, problem solving and search for various applicable techniques, as researchers of artificial intelligence believe the imitation of human thinking to be an important part of the artificial intelligence.

The AI has been introduced to the accounting business to perform accounting activities and information more effectively, amenably and adequately with the electronic service through computerized administrations and internet facilities. It will enable all parties (government authority, entrepreneurs, stakeholders, suppliers, income earners and the public) to transact activities, perform operations and share the information. This system can be established in corporate bodies and as an accounting education. The use of technology in accounting area has become widespread due to technological development and its

use to produce administrative purpose information based on the integrated accounting systems.

Accounting has a primary objective of providing information to respective users in the most appropriate and tailored manner to help them make economic internal or external decisions. All applicable areas in the world today are adopted and adapted to using information and communication technologies. The accounting profession is a broad sector that includes auditing, taxation, management, forensics, corporate reporting and all these fields are included in this evolutional transformation. Accounting technology became important in the educational sector because it encourages learners to gain knowledge and literacy in various applications and information.

Artificial intelligence is a revolutionary development that can move the accounting profession to delivering with efficiency and driving strategic decisions. Accounting practice has a history of artificial intelligence (AI) applications way back from 25 years. Machine learning models, an improvement in AI, when applied to data or other developments of AI can complement human thinking, be used to mitigate fraud, human error and enhance accurate performance of accounting functions. It is of great significance to the accounting profession.

Emerging technologies produce improved enterprises by enabling them to accelerate into new markets, make global substantial contributions, gain understanding, and build relationship with existing and potential clients. The operations of the AI will be of pivotal change to accounting practice. Administrates under accounting will be relieved of intensive and monotonous labour in domestic accounting practice; the system will help solve problems overlooked or not identified by human input. Automation, digitalization, processing and sorting of all kinds of data with artificial intelligence will reduce costs of performing these tasks manually and yield high productivity. It creates the ability to use available resources and information to perform efficiently. The gap between the areas of accounting and computer science in the areas of artificial intelligence can be closed by accounting practitioners and researchers, as they bring both fields in conjunction to improve business productivity.

Every area of technology in alliance with artificial intelligence will significantly influence the business as the world evolves to development on all angles, like quantum computing or block chain. This continuous development and expansion of technology is not to take over human participation, but to combine human expertise and machine learning models that can complement the human thinking to produce remarkable results. Making processes of operations of high accuracy, efficient and effective productivity with all forms of error cleared out are the purpose for setting up new technologies. Artificial intelligence will build a glamorous future for the accounting profession.

Thus, the AI is an opportunity for growth and establishment of the business world in our present day. For this cause, accounting practitioners and students should be educated and trained properly in accounting fields to gain expertise, reliable skills to apply accounting and technological knowledge combined and become of substantial value to self and in the business world. Furthermore, the

technologies developed can show their full capabilities when they are studied and appropriately exploited. Therefore, we need to understand their specific characteristics, and how they can be used in solving real problems.

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MICROSTRUCTURE OF A LOW ALLOYED CU-CR-ZR ALLOY AFTER ECAP-CONFORM

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Abstract. *The article deals with the microstructure of a Cu-0.1%Cr-0.1%Zr alloy after annealing or aging and equal channel angular pressing with conform (ECAP-C) process was investigated. ECAP-C led to formation of strain induced low-angle boundaries (LAB) which transformed in high-angle boundaries (HAB). Deformation microbands developed after 1 ECAP-C pass, leading to new ultrafine grains formation in the microbands upon further processing. Average grain size gradually decreased with strain while dislocation density increased. After 8 ECAP-C passes average grain size achieved 1μm. Maximum of LAB density occurred after 4 ECAP passes and then LAB density decreased with strain.*

Relationships between dislocation density, grain size, and density of crystallite boundaries were discussed.

Keywords: *alloy, microstructure, ECAP-C, HAB, LAB*

1. Introduction

Cu-Cr-Zr alloys are perspective candidates for electrical application due to combination of high electrical conductivity and strength after appropriate treatment [Wang, 2019]. The most investigated and prevalent treatment of Cu-Cr-Zr alloys is severe plastic deformation (SPD) with annealing [Murashkin, 2016; Morozova, 2018]. Ultrafine grained structure with fine particles providing high strength and conductivity can be formed by different deformation methods and heat temperatures. The main disadvantage of SPD technique is production of small samples with volume less 10^{-4} m^{-2}. New SPD technique combining equal channel angular pressing and conform process can help to solve this problem.

The aim of the article is to study the microstructure evolution of a Cu-Cr-Zr alloy during ECAP-Conform. ECAP-C can produce long rods and wires with unique properties, such as electrodes for point welding, automobile wire, contact wire for high speed trains, etc. However, there is a deficiency of experimental data about microstructure evolution of Cu-Cr-Zr alloys during ECAP-Conform and effect of microstructure on mechanical properties and electrical conductivity.

2. Experiment

A Cu-0.1%Cr-0.1%Zr alloy was chosen as the starting material. The billets were annealed at 920 °C during 1 h and water quenched (ST). Then, a part of the samples was aged at temperature of 550 °C during 4 h (AT). Both types of samples were subjected to ECAP-C at room temperature via route B_C to 1, 2, 4, 8 passes. The intersection angle of matrix channels was 120°. The microstructures were investigated using a Nova NanoSEM 450 scanning electron microscope with an electron backscattered diffraction (EBSD) analyzer. The average grain and subgrain sizes were estimated as average values between transversal and longitudinal boundary and subboundary intercept. The dislocation density was determinated as function of the Kernel Average Misorientation.

The fraction of ultrafine grains (with a size below 2 micron), the density of crystallite boundaries, average misorientation angle, Kernel average misorientation (for scan step of 200 nm) were estimated using the OIM Software. The specimens for microstructure investigations were polished by 25% HNO_3 and 75% CH_3OH electrolyte at temperature of -20 °C and voltage of 10 V by a Tenupol 5 machine.

3. Results and discussion

a. Microstructure in initial state

After solution treatment at 920 °C, the Cu-Cr-Zr alloy contained low fraction of coarse particles that crystallized during cooling of ingot. The average grain size was about 140 μm, and the dislocation density was about 10^{13} m^{-2}. Aging at 450 °C led to precipitation of fine ellipsoid bcc Cr-rich particles. The size of particles in the longitudinal direction and transverse direction was 10-15 nm and 5-7 nm, respectively. Numerical annealing twins were observed. HAB fractions were above 0.98 and the average misorientation angles comprised 45-48° in

both initial states. Kernel Average misorientations over a distance of 3 μm were about 0.5°.

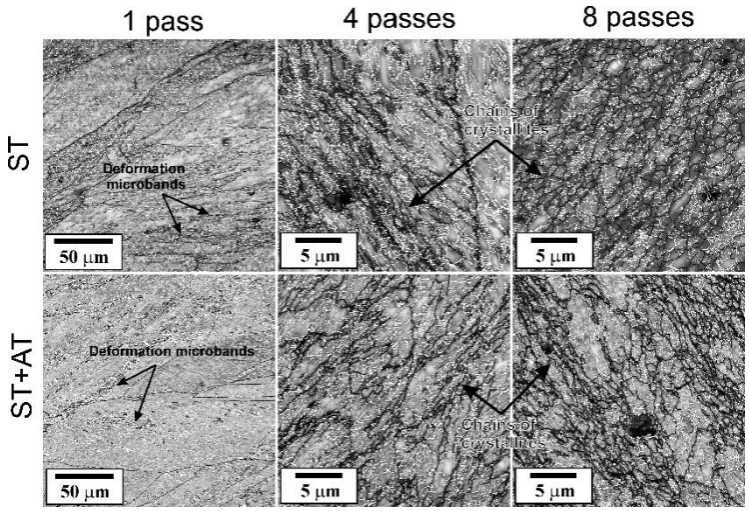

Figure 1. **Microstructure evolution during ECAP-C in the Cu-Cr-Zr alloy. Black and white lines represent HAB and LAB, respectively**

b. Microstructure after ECAP-C

ECAP-C was accompanied by the formation of strain-induced LAB and elongation of initial grains (Figure 1) which were spitted by the deformation microbands consisting of long parallel HABs. Chains of crystallites with irregular LAB-HAB were observed in AT samples after 1 ECAP-C pass. Further deformation led to increase in misorientations of LABs with subsequent transformation of LABs into HABs. New ultrafine grains formed predominantly in deformation microbands. Fraction of ultrafine grains increased significantly after 4 ECAP-C passes.8 ECAP-C passes led to formation of equiaxed crystallites with a size about 0.5 μm and high fraction of HAB.

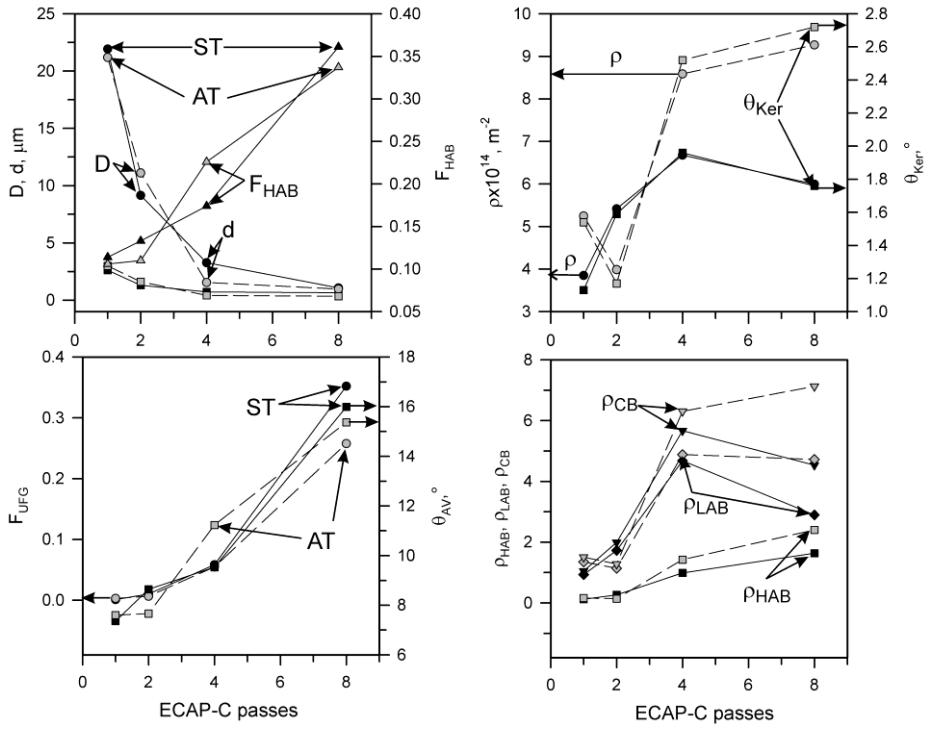

Figure 2. **Effect of ECAP-C on grain (D) and subgrain size (d), fraction o HAB (F_{HAB}), dislocation density (ρ), Kernel average misorientation ($θ_{Ker}$ fraction of ultrafine grains (F_{UFG}), average misorientation angle of grai boundaries ($θ_{av}$), density of HAB ($ρ_{HAB}$), LAB ($ρ_{LAB}$) and all crystallite($ρ_{CB}$)**

ECAP-C at room temperature led to significant grain refinement along with an increase in dislocation density and microstrain (Figure 2). Gradual transformation of strain-induced LAB into HAB during deformation decreased the mean grain size from 120-140 μm to 1 μm. HAB fraction slowly changed after 1-2 ECAP-C passes followed by significant increase after 4-8 passes. Deformation was accompanied by an increase in HAB fraction to 0.36 and 0.34 in ST and AT condition after 8 ECAP-C passes, respectively. Dislocation densities in ST and AT conditions approached an apparent saturation at $6.5*10^{14}$ m^{-2} and $9*10^{14}$ m^{-2} after 4 ECAP passes, respectively. Tendencies of change in average boundary misorientation angle and UFG fraction were the same, i.e., a kind of incubation period during 1-4 passes and a drastic increase after 8 ECAP-C passes. ECAP-C promoted an increase in the boundary density. The density of LAB achieved maximum about 4.7-4.8 $μm^{-1}$ after 4 ECAP-C passes and then decreased to 2.9 $μm^{-1}$ and 4.7 $μm^{-1}$ for ST and AT condition, respectively. The density of HAB in AT samples was higher than in ST condition and gradually increased with deformation that testify to the development of LAB to HAB transformation. Initial heat treatment slowly effected on grain refinement kinetic during ECAP-C, but fine precipitation promoted accommodation higher dislocation density.

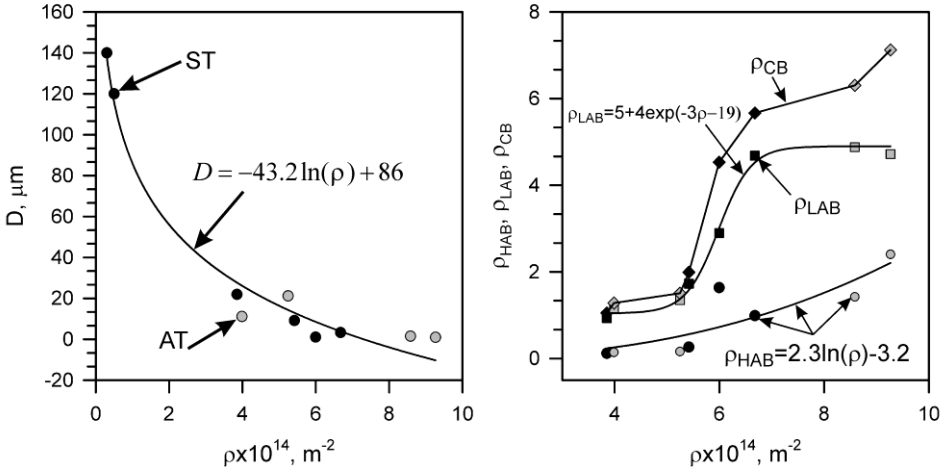

Figure 3. **Relationship between grain size (D) and dislocation density (ρ); th density of HAB (ρ_{HAB}), LAB (ρ_{LAB}), and crystallites boundaries (ρ_{CB}) vs th dislocation density**

The relationship between the grain size D and the dislocation density ρ can be expressed by logarithmic law (Figure 3):

$$D = -43.2\ln(\rho) + 86 \qquad (1)$$

An increase in the dislocation density during ECAP-C led to the formation smaller grains. The dislocation density affected the development of strain-induced boundaries. The change in LAB density ρ_{LAB} can be described by sigmoidal law:

$$\rho_{LAB} = 5 + 4\exp(-3\rho - 19) \qquad (2)$$

In contrast, the HAB density (ρ_{HAB}) increased with dislocation density according to logarithmic law:

$$\rho_{HAB} = 2.3\ln(\rho) - 3.2 \qquad (3)$$

Thus, equitations (1-3) described well the experimental correlation of grain size and grain boundaries density with dislocation density. An increase in dislocation density promoted their rearrangement in strain-induced boundaries, which quickly increased their misorientation, transformed in HAB, leading to new ultrafine grains.

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LONGREAD: SPECIFIC FEATURES AND TECHNOLOGY OF CREATION

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Abstract. *The present article is devoted to the study of a special format and genre in journalism – multimedia longread. The author's opinion is based on various definitions of longread and the analysis of its specific characteristics. The history of this format in journalism and its previous analogues are considered. The article deals with the technology of creating a longread and the method of presenting information on the examples of foreign and domestic media. It is concluded that multimedia longread is one of the most popular formats of journalism at the moment and its further study can affect the development of Internet media.*

Keywords: *longread, journalism, multimedia, information technology, format, audience*

The development of information technology has greatly influenced journalism and the information sphere in general. On the one hand, new opportunities for development have appeared, including new journalistic formats and genres, and the costs of printing information products have decreased due to the Internet platform for media publications. On the other hand, technological progress has led to the emergence of a continuous flow of information that the audience can not cope with. Actually, people become more selective in the choice of information sources – it is much more difficult to attract their attention nowadays.

In order to survive today, various media "fight" for the audience not only with each other, but also with representatives of citizen journalism – bloggers and other Internet users. In the face of intense competition, professional journalists are forced to look for new ways to attract an audience. In this regard, two opposite patterns can be observed. Some experts rely on the short message format and argue

that the audience no longer reads long texts and gets information from headlines and illustrations. Others, on the contrary, consider the format of long texts, equipped with the means of a multimedia language – longread, to be advantageous.

A multimedia longread is a journalistic work based on a long text and rich audiovisual series. The format presupposes a deep immersion of the reader in the topic, as well as a serious study by the journalist of a large number of sources on the subject of the research [Galustyan, Kulchitskaya, 2016: 8].

The first publication of this format entitled "Snow Fall" by The New York Times in 2012 revolutionized the world of multimedia journalism. As a result, other media began to create such projects, now publications of this type are sometimes called “Snow Fall”, and in the editorial office of The New York Times, according to the editor's statement, this word entered circulation as a verb: “People are now saying: “Can we Snow Fall?” [Bozrikova, 2021].

Longread has many names: transmedia storytelling, multimedia storytelling, interactive article and many others.

The relevance of this study is due to the fact that longread today is a phenomenon that at the moment is not even given a specific and clear definition. It needs to be studied and developed because it influences the person reading it. It’s important to understand how to shape the interest of the audience in modern realities. It should also be noted that “for 5 years longread has been one of the most popular forms of presentation and optimization of information, but at the same time it has not yet been studied by what means the new format attracts the audience, gets an emotional impact on it, and what its components are” [Baranova, 2014: 21].

The novelty of the research lies in the fact that at this stage longread has not been fully studied from a scientific point of view.

The object of the research is the longread format.

The subject of research is the specifics of the longread format.

The aim of the study is to define a longread and understand the technology of its creation and presentation of material on the example of longreads from foreign and domestic media that publish materials in this format on a regular basis.

Longread was originally a format that only a few large editions could afford. It demanded significant financial and resource investments, which were only within the power of a limited circle of the media. Snow Fall was created by a team of 17 people, and it took a lot of time: nine months on the scale of a newspaper editorial office is a colossally extended work cycle. Considering these facts, it is difficult to imagine that in a few years the fashion for such projects will capture the media market not only in the USA, but also in other countries.

Gradually, the mass media have developed an algorithm; following which a person can speed up the process of creating such a multimedia product, make it less labor intensive. The analysis of the process of creating longreads in our country and abroad shows that the number of people working on this format is decreasing. The deadlines for a single project are getting tighter.

There are special web platforms that help to collect longreads like constructors. For example, "Tilda Publishing" or "Scroll Kit" gives the opportunity

to design a multimedia work for any beginner who does not have programming skills. Therefore, now a team of three or four people is quite capable of creating a longread if the participants have good journalistic skills and creative thinking [Belousova, Shirobokov, 2012: 31].

A high-quality longread is a detailed analysis of a popular, trending or important topic for the public, because it does not contain useless information, but of specific facts, statistics and much information.

It's important to focus on the following components:

1. Thinking about the readers, working through the meaning;
2. Thinking about evaluators by working out structure and headings;
3. Thinking about cross-readers (people who read the text in fragments and search only for what they are interested in) while working on the layout [Bulayeva, 2015: 121].

In case the author understands the three points well, it's possible to attract the readers' attention. Longread will make them stay on the page for a long time, and for this format, audience time is the most coveted and valuable reward.

The materials usually touch on acute social problems, which need to go deeply, which helps authors to find a large amount of information and allow readers choosing the part of the text that interests them most [Bozrikova, 2021].

Currently, the longread format is the most optimal form of information presentation, in which multimedia tools help readers to "immerse" in the material and facilitate in-depth reading of long and sometimes difficult to comprehend texts [Bregeadze, Korzhov, 2021].

During the analysis of the empirical base, some patterns were identified. Most often, in the longread format, texts are presented in the essay genre, which is the borderline between emotional and rational journalism. In general, the genres of these two groups use the format with the same frequency. However, in addition to the essay, genres can be of the following forms: portrait, commentary, analytical article, expert and personal interview.

It is also important to note that the use of certain multimedia tools largely depends not only on the genre, but also on the authors of the projects, their ideas and the material on the publication page.

In conclusion, it's important to mention that longread publications with a harmonious ratio of audiovisual and textual components are indeed an effective tool to optimize long and complex texts and make them easier to read and comprehend. Therefore, this multimedia format has prospects for its use in the field of education.

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BASIC MANAGEMENT PRACTICES OF CUSTOMS AUTHORITIES

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Abstract. *The article provides an overview of management methods and highlights the features of management principles used in the work of customs authorities. A comparison was made and differences between economic and administrative management methods were revealed by the author. Special attention is given to indirect and direct managerial influence.*

Keywords: *customs authorities, management methods, direct and indirect managerial influence, management, customs policy*

Currently, the issues of the management system in the customs authorities are of scientific interest. This is explained by the fact that the generalization of the accumulated experience, the use of scientifically grounded, constructive proposals

and recommendations for improving the management system will help to increase the efficiency of the customs authorities. The management process in this body is the functional activity of personnel united in a system of management subjects (managers and subordinates), aimed not only at the qualitative formation of the customs service, but also at achieving the goals of the customs team by implementing the selected functions. The implementation of this is possible through the use of optimal methods and principles of management.

One of the features of the principles of management in the customs authorities is one-man management, the essence of which is to grant power, decision rights, responsibility and the ability to control the processes and relations in the customs service to a certain official [Makrusev, 2014:51]. Taking into account the revealed features, the methods of management in the customs authorities should be considered (Figure 1).

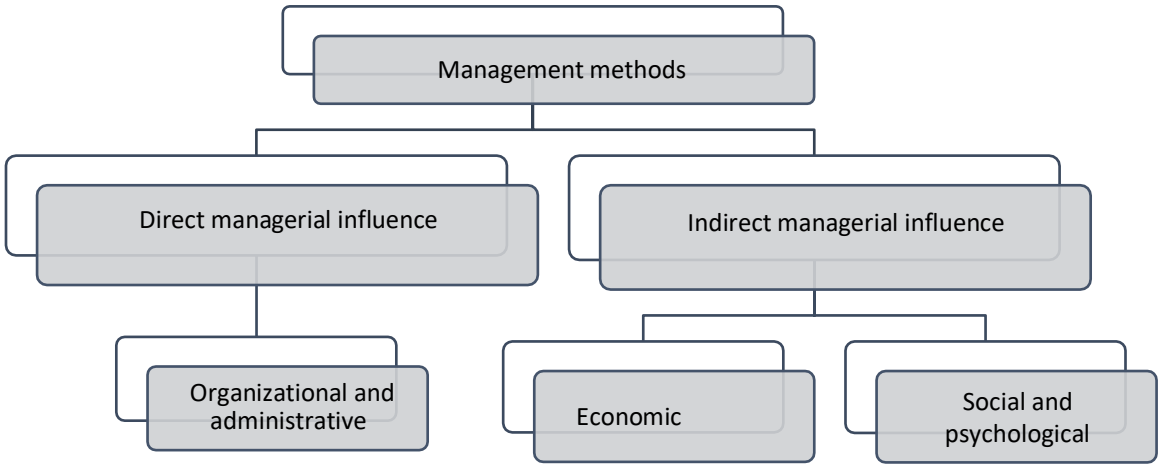

Figure 1. **Management methods in the customs authorities**

The analysis of the above methods should be conducted in more detail. A *control method* is a set of techniques and ways of influencing an object to achieve the goals set by the organization. *Economic methods* of management include a certain system of options of purposeful impact on the object, using economic incentives that induce customs officials to perform assigned tasks without clearly formulated orders from the authority, as well as to assume full responsibility for their actions.

An important feature of economic management methods is the implementation of activities aimed at ensuring the unity of interests of customs officers. This process takes place it two aspects: 1) management through directive planning in terms of the formation of the revenue side of the budget of the Russian Federation, 2) management based on the creation and use of a fund for the development of the customs system. The method of economic incentives is based on the second aspect and includes such instruments as: financial incentives, collective material interest and economic responsibility [Ondar, 2019].

Besides, the features of economic and administrative management methods must be compared and highlighted. These options are based on general rules of conduct that allow customs authorities to manage resources and use them for their own purposes. However, it should be noted that administrative management methods cannot be used without the presence of specific tasks aimed at achieving the set goals of the customs system by creating a clear structure of the system, as well as good conditions for the preparation, adoption and implementation of decisions.

Economic management methods have an indirect impact through a system of relations that takes into account the interests of the controlled object. Administrative management methods, in turn, cannot be guided by the economic interests of the object by nature and method of implementation.

It is worth noting that economic management methods imply independence of the system at all levels, which means that responsibility for decisions and their consequences lies with the individual employee, manager or body, while administrative methods place most of the responsibility for actions on higher-level bodies, which make the most important decisions [Ofitsialnyy sayt federalnoy tamozhennoy sluzhby, 2020].

In addition, economic methods have such an impact on decision makers that motivates them to develop alternatives for action in the process of their activity. Besides, they choose from the specific alternatives that are most appropriate to their interests, while administrative orders require mandatory, precise implementation. In this way, it can be argued that solving a particular problem, the methods serve the purposes of practical management, providing it with a system of rules, techniques, approaches that reduce the time and other resources spent on setting and realizing goals.

In conclusion, it is the quality of management that determines the effectiveness of management systems. Changes in the overall customs environment are not only related to strict adherence to internal customs rules itself, but also to the ability to prepare, develop and make competent and timely decisions in the implementation of activities at any stage and level of the customs system.

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SECTION 3. CHEMICAL AND BIOLOGICAL SCIENCES

ZUR FRAGE DER PFLANZLICHEN ALTERNATIVEN ZU KUHMILCH

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Annotation. *Dieser Artikel widmet sich dem Thema „Milchersatz“. Es behandelt sich im Artikel über verschiedene pflanzliche Alternativen zu Kuhmilch, die heute sehr verbreitet sind. Im Artikel werden diese Alternativen und ihre Vor- und Nachteile analysiert und beschrieben. Der Autor des Artikels klärt im Artikel den Begriff „Milch“.*

Schlüsselwörter: *die Kuhmilch, die Hafermilch, die Mandelmilch, die Sojamilch, die Hanfmilch,die Reismilch, die Lupinenmilch,die Erbsenmilch,die Kokosmilch, pflanzliche Alternativen zu Kuhmilch, der Milchersatz*

Pflanzliche Milch ist ein einzigartiges Produkt, das Vitamine und Spurenelemente enthält. Es ernährt den Körper und füllt ihn mit Energie. Mit der zunehmenden Mode für einen gesunden Lebensstil, Vegetarismus und Veganismus, mit der Entstehung neuer medizinischen Forschungen erhöht sich der Konsum von pflanzlicher Milch [Alekseeva, 2018].

Der Milch-Markt verändert sich, geänderte Verbrauchergewohnheiten sorgen für ein Wachstum bei pflanzlichen Milchalternativen. Das Angebot und die Vielfalt an Soja-, Reis-, Dinkel-, Hafer-, Mangeldrinks ist am Lebensmarkt in der ganzen Welt stetig am Wachsen. Die Wahl dieser Produkte ist durch gesundheitliche und ethische Gründe bestimmt. Das Ziel dieses Artikels ist die pflanzlichen Alternativen zu Kuhmilch zu erforschen, zu analysieren und kurz zu fassen.

Vor allem klären wir am Anfang den Begriff „Milch“. Die Getränke auf Basis von Getreide, Hülsenfrüchten und Samen werden unter Umständen als „Milch“ bezeichnet, doch dieser Begriff ist klar definiert. Für Getränke, welche aus Sojabohnen, Hafer, Dinkel, Mandeln, Haselnüssen, Macadamianüssen, Cashewnüssen usw. hergestellt werden, verwendet man die Bezeichnung „Getränk“ oder „Drink“ und nicht die Bezeichnung „Milch“. Die Bezeichnung

„Milch“ ist ausschließlich dem durch ein- oder mehrmaliges Melken gewonnenen Erzeugnis der normalen Eutersekretionen ohne jeglichen Zusatz oder Entzug vorbehalten. So ist „Milch“ das Gemelk einer oder mehrerer Kühe [Pflanzliche Milch-Alternativen. Unter der Lupe, 2019].

Heutzutage gibt es eine Menge von besten pflanzlichen Alternativen zu Milch. Vor allem sind das: Hafermilch, Mandelmilch, Sojamilch, Getreidemilch; Hanfmilch, Reismilch, Lupinenmilch, Erbsenmilch. Für die Herstellung dieser pflanzlichen Milch-Alternativen werden Getreide, Pseudocerealien, Hülsenfrüchte, Ölsamen und Nüsse in bestimmten Herstellungsverfahren zu Getränken verarbeitet. Die Getränke können optisch an Milch erinnern. Für ihre Produktion werden moderne Technologien und Ausrüstungen verwendet, um einen optimalen Nährwert und Haltbarkeit zu gewährleisten [Pflanzliche Milch-Alternativen. UnterderLupe, 2019]. Nach der Meinung von L. Denisenko ist diepflanzliche Milch eine sehr gute Alternativeder Kuhmilch [Denisenko, 2019].

Weiter werden im Artikel die Vor- und Nachteile der pflanzlichen Alternativen zu Milch beschrieben und analysiert.

Die Hafermilch gilt im Moment als bester Milchersatz. Es ist bewiesen, dass sie keine Laktose, kein Milcheiweiß, keine Sojabestandteile enthält. Aber sie enthält Gluten und ist kalorienhaltig (weniger als Kuhmilch). Dabei ist Hafermilch ziemlich arm an Nährstoffen und Proteinen. Für Hafermilch spricht die gute Ökobilanz. Der Anbau kommt ohne Herbizide aus. Es gibt viel Hafer aus Bio-Anbau. Das zählt man zu den Vorteilen. Das beste in der Hafermilch ist es, dass sie keine Zusatzstoffe enthält. Die Hafermilch ist eigentlich der Hafer, das Wasser und ein wenig Meersalz.

Die Mandelmilch ist in den USA längst ein Trend geworden. In Deutschland ist sie als Milchersatz fast so populär wie Sojamilch. Sie enthält im Vergleich zu Kuh- und Getreidemilch nur sehr wenig Eiweiß und kaum Calcium. Sie bietet reichlich Spurenelemente, Vitamine und relativ wenig Fett. Besonders nachhaltig ist die Mandelmilch nicht. Es ist bekannt, dass Mandeln viel Wasser brauchen und die Anbaugebiete von Mandeln in den trockenen Regionen liegen. Die Transportwege von Mandeln sind meist lang und die Herkunft der Mandeln (Kalifornien oder Italien) ist bei verarbeiteten Produkten nicht mehr zu erkennen. Man betrachtet Mandel als Lebensmittel und nicht als Getränk.

Die Sojamilch ist die bekannteste Milch-Alternative, dabei auch eine sehr umstrittene. Sojadrinks enthalten gesunde Stoffe wie Folsäure und pflanzliche Proteine und kein Cholesterin. Der Gehalt an Calcium ist geringer als bei Kuhmilch. Strittig sind die „Isoflavone“ (pflanzliche Hormone), die dem weiblichen Sexualhormon Östrogen ähneln. In Asien hat man die Meinung, dass Sojadrinks vor Krebs schützen können und gegen Beschwerden in den Wechseljahren helfen. Aber die Studien des Bundesinstituts für Risikoforschungen zeigen die „unklare Wirkung“ von Sojamilch und rät sie Säuglingen und Kleinkindern nicht zu geben. Es lohnt sich nicht darüber vergessen, dass alle Sojaprodukte das Niveau von Thyreotropin (ein Hormon, das die Schilddrüse stimuliert) erhöhen. Wenn man Probleme mit der Schilddrüse hat, muss man die Sojaprodukte einschränken (oder überhaupt vermeiden).

Pflanzliche Milch aus Getreide oder Getreidemilch und Getreidedrinks wird aus klassischen Getreidesorten wie Dinkel, Hafer, Roggen zubereitet und eignet sich für Milchallergiker/innen. Es gibt dort die Nährstoffe, aber kaum Proteine. Ökologisch hat sie den Vorteil, weil sie regional produzieren kann.

Die Hanfmilch wird aus Hanfsamen hergestellt, aber nicht aus den Blüten oder Blättern der Hanfpflanzen. In Großbritannien ist sie weitverbreitet, in Deutschland aber nicht sonderlich bekannt. Die Hanfmilch enthält kaum ungesundes Fett, dafür wertvolle Omega3-Fettsäuren und pflanzliches Protein. Im Vergleich zur Kuhmilch enthält die Hanfmilch weniger Kalorien, Protein und Kohlenhydrate, aber hat ungefähr die gleiche Menge an Fett.

Die Reismilch ist eine Getreidemilch, die an Kalorien reich und an Nährstoffen arm ist. Diese Tatsache macht sie nicht gerade zum empfehlenswerten Ersatz für Milch. Sie ist laktosefrei, milcheiweißfrei und glutenfrei und eignet sich in erster Linie als Milchalternative für Allergiker/innen.

Die Lupinenmilch gilt als Milchersatz der Zukunft. Süßlupinen sind eher einer der Hoffnungsträger der pflanzlichen Ernährung. Sie können regional angebaut werden. Diese Milch enthält viel mehr Protein als Sojabohnen und weder Gluten, noch Laktose, Milcheiweiß oder Sojaproteine. Die Produkte aus Lupine sind die regionale Soja-Alternative. Zugleich kann die Lupinenmilch solche Mineralstoffe wie Kalium, Magnesium, Calcium und Eisen enthalten.

Die Erbsenmilch ist der vegane Milchersatz aus gelben und nicht grünen Erbsen. Diese Milch ist laktose-, glute-, soja, - nuss und gentechnikfrei und enthält kein Milcheiweiß. Auf dem deutschen Markt ist sie seit April 2019. Sie ist in verschiedenen Sorten zu haben: gesüßt, ungesüßt, aromatisiert (z.B. Kakao, Vanille, Kaffee).Die Erbsenmilch ist ein neuer Spieler auf dem Milchersatzmarkt. Die Hauptvorteile der Erbsenmilch sind ein niedriger Fettgehalt, eine geringe Anzahl von Kalorien und eine große Anzahl von Proteinen. Dieses Getränk ähnelt sich am nächsten die Kuhmilch in Bezug auf den Proteingehalt. Sicher hat die Erbsenmilch mehr Zucker als die Kuhmilch. Die Erbsenmilch eignet sich daher nicht für Menschen, die sich an die Keto-Diät halten. Die Erbsenmilch wird aus Proteinpulver hergestellt, das aus gelben Erbsen gewonnen wird. Es wird oft Öl und Zucker hinzugefügt.

Die Kokosmilch.Die Kokosmilch ist in der Küche sehr bekannt. Diese Milch ist in der orientalischen Küche populär. Die Kokosmilch eignet sich hervorragend für süße Smoothies oder Backwaren und ist praktisch frei von Kohlenhydraten und Proteinen. Dieses Getränk wird aus geriebenem Kokosnussfleisch, Wasser und einigen Verdickungsmitteln hergestellt. Die Kokosmilch ist ein Rekordhalter unter den Milchersatzstoffen in Bezug auf den Gehalt an „guten“ gesättigten Fetten. Ihr Hauptnachteil ist der Mangel an Protein. Dafür schätztman hoch die Kuhmilch. So ist die Kokosmilch nicht für Menschen geeignet, die nach einer Proteinquelle suchen. Aber wenn man genug pflanzliches oder tierisches Eiweiß in der täglichen Ernährung hat, dann ist die Kokosmilch die perfekte Wahl.

Die Kokosmilch eignet sich für Allergiker, die Milchprodukte, Soja, Nüsse oder Gluten nicht vertragen. Es ist wichtig zu erwähnen, dass der Kokosnuss als Frucht betrachtet wird, und nicht als Nuss). Die Kokosmilch enthält auch

Caprylsäure. Sie hat eine entzündungshemmende Wirkung, fördert die Wiederherstellung der Darmschleimhaut, hilft mit Virusinfektionen effektiver umzugehen. Diese Milch ist die superfoods pflanzliche Milch aller dieser Getränke und ist aufgrund ihrer cremigen Konsistenz ideal als veganer Milch-Ersatz geeignet.

Fazit

Pflanzliche Milchalternativen werden heute immer beliebter. Das ist wegen des Klimaschutzes, Tierwohls oder der Unverträglichkeit. Das liegt unter anderem daran, dass sich der Lebensstil der Menschen wandelt. Neben der zunehmenden Zahl an Vegetariern und Veganern, spielt der bewusste Konsum von Lebensmitteln eine große Rolle. Viele Menschen konsumieren den Milchersatz, weil sie die Umwelt weniger belasten möchten.

Die Auswahl eines Milchersatzes ist eine schwierige Aufgabe. Man muss ein Produkt wählen, das den geschmacklichen Anforderungen entspricht und alle notwendigen Spurenelemente enthält. Heute ist es viel einfacher, diese Wahl zu treffen. Aber es gibt keine Gründe von der Kuhmilch zu verzichten, wenn man die Laktose gut verträgt.

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ORGANOLEPTIC ANALYSIS OF COLD-PRESS OIL OF SEA BUCKTHORN

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Abstract. *The article deals with the properties of sea buckthorn which has been used as a source of vitamin C for a long time. Various methods of production give different product yields. The author analyzes some physico-chemical properties of cold pressed oil. The conclusion is made that the cold pressing method is the most preferable due to the yield of active substances.*

Keywords: *cold-press oil, sea buckthorn, physico-chemical analysis, organoleptic analysis, methods of oil production*

Currently, an urgent problem is the development of physical and psychological disorders in the population due to poor nutrition, insufficient physical activity and nervous and emotional overstrain. It is established that the main reasons for the appearance of these pathological conditions are vitamin C deficiency in 70% of the world's population, provitamin A (carotenoids) – in 40% and every third person is deficient in vitamin R. In connection with the latter, the search for sources of biologically active substances for the preparation of drugs and products with high biological activity used in the treatment and prevention of diseases is very relevant [Balahovskiy, 1989; Belinskiy, 2008].

Among fruit and berry crops, a special place is occupied by sea buckthorn, which is a valuable source of a number of important biologically active compounds. Its fruits contain water-and fat-soluble vitamins, lipids, polyphenols, carbohydrates, amino acids, and minerals [Goremykina, Vereshchagin, 2014; Petrova, 2012: 115]. However, it is of the greatest interest due to the presence of unique oil, which has a high physiological activity and is used in the treatment of a number of diseases.

The quantitative and qualitative composition of the oil from the sea buckthorn pulp is variable and depends on the physiological and genetic characteristics of the sea buckthorn variety, the agroclimatic conditions of its cultivation, the anatomical localization in the fruit, as well as the technology of oil production [Sklyarevskiy, 2002; Trineeva, Safonova, Slivkin, 2013].

Previously, it was found that the cold-pressed technology of buckthorn in terms of the content of fatty oil, carotenoids and vitamin E is the most economically profitable, as well as more active in terms of the pharmacological effects [Yunusova, Shihragimova, 2016: 47]. When producing oils by cold pressing, there is no heating of the raw materials, so this method is gentler in relation to the useful substances of the oils. Almost all vitamins and minerals are preserved without the use of harmful impurities. According to the organoleptic properties, this oil has a softer and more delicate aroma and tasteand also has an orange-red color due to the increased content of carotenoids.

Manufacturers have mastered various methods of obtaining oils, so the urgent issue is to check the quality and safety of these products. The main physical and chemical indicators of the quality of the produced cold-pressed oil are: humidity, refractive index, saponification number, acid, peroxide and iodine number according to the accepted GOST standards.

The determination of humidity is carried out by heating in a dried porcelain cup. Take 20 g of the analyzed oil and boil at a temperature of (103±2)°C until the bubble release is completely stopped [GOST ISO 662-2019].

Calculate the content of moisture and volatile substances, (% by weight), according to the formula:

$$w = \frac{m_1 - m_2}{m_1 - m_0} \cdot 100 \quad (1)$$

where m_1 is the mass of the cup, thermometer, and sample for analysis before heating, g;

m_2 - weight of the cup, the thermometer and the residue after heating, g;

m_0 - cup weight, g.

The result of the determination is the arithmetic mean of the two experiments performed.

Studies of oil refraction are carried out on a refractometer with a scale discreteness of not less than 0.0002, with a refractive index from 1.3000 to 1.7000, providing a measurement error of ±2·10 of the type IRF-22, IRF-23, IRF-454 or RJ. According to the instructions attached to the device, the refractive index of the test oil is determined at 20°C, at this temperature the sample remains liquid [GOST 5482-90].

The refractive index is determined with respect to air at the wavelength of the yellow sodium line (589.6 nm). The arithmetic mean of the three definitions is taken as the result of the definition. Calculations are performed up to the fourth decimal place. The difference between two parallel definitions should not be more than 0.0002.

The saponification number is the number of milligrams of potassium hydroxide required to saponify 1 g of the analyzed oil [GOST 5478-90]. To determine this indicator, take an exact weight of 2-2.5 g of oil and weigh it in a flask. Pour from the burette 25 cm^3 of an alcoholic solution of potassium hydroxide concentration C (KOH) = 0.5 mol / dm^3. The flask is connected to the reverse refrigerator, lowered into a boiling water bath and left for 1 hour, periodically shaking its contents.

To the resulting colorless hot soap solution, pour 0.5 cm^3 of the phenolphthalein indicator solution and immediately titrate with a solution of hydrochloric acid concentration C (HCI) = 0.5 mol / dm^3 until pink coloring appears. Under the same conditions, a control determination is carried out without the test sample.

Saponification number X, mg KOH/g is calculated by the formula:

$$X = \frac{28{,}055F \cdot (V - V_1)}{m} \quad (2)$$

where 28.055 – mass of potassium hydroxide equivalent to 1 cm^3 of a hydrochloric acid solution with a concentration of c (HCI) = 0.5 mol / dm^3, mg;

F is the ratio of the actual concentration of the hydrochloric acid solution of concentration c (HCI) = 0.5 mol/dm^3 to the nominal concentration;

V – volume of hydrochloric acid solution with concentration C (HCI)=0.5 mol/dm3, used for neutralization of the control sample, cm^3;

V_1– volume of hydrochloric acid solution with concentration C (HCI)=0.5 mol/dm3, used for neutralization of the analyzed sample, cm^3;

m – mass of the analyzed sample, g.

The acid number is determined by preparing an alcohol-ether mixture by volume of two parts of ethyl alcohol and one part of ethyl ether with the addition of five drops of a solution of the phenolphthalein indicator per 50 ml. The alcohol-ether mixture is neutralized with a solution of potassium hydroxide or sodium hydroxide of molar concentration (KOH or NaOH) = 0.1 mol/dm3 to a slightly pink color. Clear unsealed sea buckthorn oil for analysis is well mixed. In a conical flask with a volume of 250 ml, 1-2 g is weighed with an accuracy of 0.001 g. Then 50 ml of an alcohol-ether neutralized mixture is added to the weight. The resulting oil solution is rapidly titrated with a solution of potassium hydroxide under constant stirring until a weak pink color is obtained, which is stable for 30 seconds [GOST 5476-80].

$$К_ч = \frac{V_{KOH} \cdot 5,61}{m_n} \quad (3)$$

V_{KOH} is the volume of potassium hydroxide used for titration of the solution in milliliters;

5.61 – the number of milligrams of KOH corresponding to 1 ml of KOH solution;

M_n – weight of the cold-pressed oil in grams.

The method for determining the peroxide number is based on the reaction of the oxidation products of sea buckthorn oil with potassium iodide in a solution of acetic acid and chloroform and the subsequent quantitative determination of the released iodine with a solution of sodium thiosulfate by titrimetric method [GOST 26593-85].

Add 10 cm^3 of chloroform, quickly dissolve the test sample, pour 15 cm^3 of acetic acid and 1 cm^3 of potassium iodide solution, immediately close the flask, mix the contents for 1 min and leave for 5 minutes in a dark place at a temperature of 15-25°C. Then add 75 cm^3 of water, mix thoroughly and add a starch solution until a weak blue-purple color appears and the released iodine is titrated with a solution of sodium thiosulfate to a milky white color with a solution of molar concentration (Na2S2O3·5H2O) = 0.002 mol/dm^3, if the estimated value of the peroxide number is less than 6.0 mmol/kg. If it is greater than 6.0 mmol / kg, after adding water and stirring, the released iodine is titrated with a solution of molar concentration (Na2S2O3·5H2O) = 0.01 mol / dm^3 until the color intensity is clearly reduced. Carefully add the starch until a weak uniform blue-purple color appears. The remaining iodine is titrated with a solution of sodium thiosulfate to a milky white color at the end of titration.

The peroxide number X in mmol/kg 1/2 O is calculated by the formula:

$$X = \frac{(V_1 - V_0) \cdot c \cdot 1000}{m} \quad (4)$$

V_0 is the volume of the sodium thiosulfate solution used in the control measurement, cm^3;

V_1– the volume of the sodium thiosulfate solution used in the measurement, cm3;

C – actual concentration of the sodium thiosulfate solution used, calculated by adjusting for the nominal concentration, mol / dm^3;

m – mass of the test sample, g;

The iodine number is a value that characterizes the content of unsaturated compounds in 100 g of vegetable oil, expressed in grams of iodine [GOST 5475-69].

The suspension is dissolved in 10 cm3 of chloroform, then 20 cm3 of Kaufman's solution is poured from the burette. The flask with the mixture is closed with a cork, the contents are carefully mixed and put in a dark place at a temperature of about 20°C. The infusion time is set depending on the expected value of the iodine number:

for oil with an iodine number less than 100 – 1 h,

for oil with an iodine number of more than 100 – 1.5 hours.

After infusing for a time, 10-15 cm^3 of potassium iodide solution and 50-60 cm^3 of distilled water are pipetted into the flask. The released iodine is titrated with a solution concentration (Na2S2O3) = 0.1 mol/dm^3 (0.1 n.) until a yellowish color is obtained. After that, add 1-2 cm3 of the starch solution and continue titration until the blue color completely disappears.

A key indicator of the quality of cold-pressed sea buckthorn oil is the content of carotenoids. These biologically active substances are natural organic pigments synthesized by fungi, bacteria, algae, higher plants and coral polyps, colored in yellow, orange or red. Carotenoids have an antioxidant, anti-carcinogenic effect and increase the content of high-density lipoproteins.

It should be noted that many scientists consider the spectrometric method to be the most effective one for determining carotenoids [GOST 54058-2010]. To begin with, prepare a standard solution of potassium dichromate. To do this, take an exact weight of 0.36 g of K2Cr2O7 and dissolve in 1 liter of water, mixing the powder thoroughly. An exact weight of 0.05 g of sea buckthorn oil is placed in a flask and dissolved in 50 ml of hexane, mixing thoroughly. Using a spectrophotometer, the optical density in the resulting sample is measured in a cuvette having a layer thickness of 0.01 cm, a wavelength of 450 nm. The reference solution is hexane.

The total content of carotenoids in mg% (X) is calculated by the formula:

$$x = \frac{D \cdot 0{,}00208 \cdot 100 \cdot 50}{a \cdot D_{(std.)}} \quad (5)$$

D – optical density of the test sample solution;

100 - dilution in milliliters;

50 – dilution in milliliters;

0.00208 – the content of β-carotene in 1 ml of solution in water in milligrams;

a – weight of oil in grams;

D (std.) is the optical density of the potassium dichromate solution.

Summing up, it is worth noting that since ancient times people have used sea buckthorn as a medicine, and even now, official medicine has allowed the use of sea buckthorn oil as an antiulcer drug. Consequently, the production of this oil by the cold pressing method is the most preferable from the point of view of the yield of active substances. Besides, the subsequent analysis of physicochemical and pharmacological properties makes it possible to dose the composition of new medicinal products based on plant raw materials more accurately.

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SECTION 4. PSYCHOLOGICAL SCIENCES

BURNOUT SYNDROME OF TEACHERS WORKING WITH MENTALLY DISABLED CHILDREN

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Abstract. *The article deals with one of the negative consequences of professional teaching activity – the formation of a mental burnout syndrome. It was found out that this syndrome reduces the effectiveness of teaching activity and affects the* individuals' *health. The author analyses the risk factors for the development of this syndrome and proposes the ways to prevent this state.*

Keywords: *teachers, professional teaching activity, disabled children, the syndrome of emotional burnout, mental health, health disorders*

The profession of a teacher belongs to the group of high risk professions for the frequency of health disorders. The study of emotional burnout of teachers who

work with disabled children is relevant because nowadays the number of children with mental disabilities is very high and it has a tendency to increase.

It can be highlighted that the relevance of the study of the burnout syndrome of teachers working with disabled children is significant.

The object of the study is the emotional burnout of the individual.

The subject of the study is features of emotional burnout of teachers working with disabled children.

The purpose of this work is to understand the features of the manifestation of the burnout syndrome of teachers working with disabled children.

The present research involves setting up the following tasks:

1. To conduct a theoretical analysis of the problem of the burnout syndrome of teachers working with disabled children in the domestic and foreign literature.

2. To identify ways and methods to reduce the emotional burden of teachers working with disabled children.

3. To study the features of emotional burnout of teachers working with disabled students and teachers working with other children.

In psychology, the burnout syndrome is understood as one of the protective mechanisms, expressed in a certain emotional attitude of the teacher to the professional activity [Vodopyanova, Starchenkova, 2008]. Currently researchers have identified about 100 symptoms that are somehow associated with emotional burnout.

It should be mentioned that the genesis of the burnout syndrome is of an individual nature and is determined by differences in the emotional and motivational sphere, as well as the conditions in which the professional activity of the teacher takes place.

Under the burnout syndrome, there are different states and internal processes that need to be distinguished and differentiated in each specific case, since they have different causes and require different approaches in their solution:

1) Emotional burnout syndrome as a manifestation of protective mechanisms aimed to weaken unfavorable professional factors.

2) The syndrome of emotional burnout as a result of changes in the motivational sphere of the specialist.

3) The syndrome of emotional burnout as evidence of some features of the interaction between the teacher and the student.

Deformation is a consequence of emotional burnout, when the protective mechanisms weaken so much that the employee cannot resist the destructive factors and the process of destruction of the personality begins.

Thus, these factors are most specific for the activities of teachers working with physically and mentally disabled children (HIA).

Parents of children with disabilities are a special category. The discovery of a developmental defect of a child often causes parents' severe stress, which can be characterized in different ways: confusion, a sense of inferiority, helplessness, and fear. Evidently, this category of parents does not understand that a lot of their child's problems are secondary and are not related to the disease itself, but to their parental and pedagogical inconsistency. Some parents of disabled children believe

that the child's disease has affected the failure of their own professional career and this position often negatively affects the self-esteem of such children.

This cannot but affect the personality and professional activities of the teachers of children with disabilities as well. Of course, teachers experience increased tension when interacting with the parents of their students: on the one hand, situational and personal manifestations of parents, on the other hand, the lack of training and knowledge of teachers. It can lead to emotional problems for educators of groups for children with disabilities, and in the future, to the syndrome of emotional burnout.

The problem of emotional burnout is related to the reason for a person's choice of a profession, since the choice of "social" and "helping" professions may be the desire to realize the motive of power, which undermines the nervous system and the human psyche.

Young and inexperienced employees are more likely to suffer from emotional burnout, since they tend to have unrealistic expectations of their professional activities.

Risk factors for the development of burnout syndrome are considered:

- a weak type of nervous system, which is characterized by a psychosomatic reaction to stress;
- low self-esteem, as emotional burnout weakens a person's self-esteem;
- perfectionism as the desire to do everything perfectly, never make mistakes.

Vodopyanova N.E. and Starchenkova E.S. note, that emotional burnout is typical for overly conscientious employees of social professions, in which an altruistic orientation is required due to excessive social return [Vodopyanova, Starchenkova, 2008].

Any teacher, doing professional activity, experiences a large amount of stress, as he is in constant communication with people of different ages and social status. The need to resolve conflict situations positively and in time, to adapt to a large number of interlocutors in a short time, the necessity to control oneself, to maintain calm, to provide support, to be someone who always knows what to do, lead to a high level of responsibility stress. Stress gradually accumulates and teachers eventually get the syndrome of emotional burnout [Ilyin, 2002].

As it was found out, prevention of emotional burnout of teachers working with disabled children includes the following stages:

- Stage 1 – information and diagnostic. Informing about stress levels, causes, symptoms, assessment of the level of stress resistance by approved methods.
- Stage 2 – awareness. It considers awareness of teachers to cope with stress, awareness of the relationship between psychological well-being and psychosomatics, creating motivation to changes.
- Stage 3 – development. It includes replenishment and accumulation of resources to create changes in the usual response and thinking, developing self-regulation skills, creating a supportive, positive atmosphere in the team [Boyko, 2006].

At the first stage of development of emotional burnout a person needs to rest, relax, get enough sleep, and keep to a proper diet. Further, communication with loved ones or just nice people helps to get support and recharge the energy.

At the second stage of emotional burnout, people, firstly, should have a full sleep, nutrition, rest, relaxation, and pleasurable experience. Secondly, a psychologist should "link" separate experiences in the perception of the past, present, and future. Depressive manifestations are reduced by cutting off the negative emotional experiences.

For teachers who have reached the third stage of emotional burnout, a psychological correction can also be used: to reveal the inner strength and form the ability to use it, to develop cognitive needs, to leave negative experiences of the past, to create a resource state in the present and to gain professional confidence [Schatz, 2013].

In conclusion it is important to note, that in modern conditions, the activity of a teacher working with disabled children is caused by emotional burnout, chronic stress, emotional exhaustion, and a high level of requirements for its competencies in the context of inclusive education. Over time, there is an increase in anxiety experiences, the accumulation of fatigue, a decrease in mood, behavioral breakdowns and vegetative-vascular disorders, leading to the development of emotional burnout.

Thus, the means, preventing emotional burnout of teachers working with disabled children, are carried out by providing sufficient knowledge about personal and professional deformities, are arranged in the system of measures that restore the mental health of the teacher, the positive relationships with students and colleagues, and can be helpful for the formation of stress resistance, the development of self-actualization, assistance in personal and professional growth of teachers, mastering the skills of self-regulation.

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SECTION 5. MEDICAL SCIENCES

THE REASONS OF VISION DECLINE AMONG CHILDREN OF SCHOOL AGE

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Abstract. *The article is devoted to visual impairments among schoolchildren. The aim of this paper is to describe some eye disorders which appear and increase because of environmental factors such as light exposure, low physical activity, and the length of the educational process. In conclusion, it is evident that this study underlines the importance of following special rules to preserve good vision throughout the life.*

Keywords: *visual impairment, refractive errors, myopia, hyperopia, astigmatism, blurred vision, strabismus, cylindrical glasses, light rays, retina, sclera*

Social and hygienic learning conditions in educational institutions make a significant contribution to the formation of students' health. The emergence of new technical teaching aids, the work of children with computer devices of electronic computers contribute to the growth of diseases of the pupils' organs of vision. For the normal growth and development of children, factors such as insufficient lighting in classrooms, poor microclimate of school premises, and overloading with classes are also important. Among schoolchildren, the percentage of people with visual impairments is increasing every year, so the relevance of this work is great.

Many people have vision problems since childhood. In this regard, a very important role is assigned to the implementation of preventive measures and the timely adoption of measures aimed at preventing unwanted consequences.

Good eyesight is necessary for a person for any activity: study and work, rest and everyday life in general. Loss of vision, especially in childhood, is a tragedy for a person and his family. Since the child's body is sufficiently susceptible to various kinds of influences, it is in childhood that special attention must be paid to vision.

The degree of participation of the visual analyzer in the process of school activities is very high. And at school, for the first time in their lives, children begin to perform daily, rather long and increasing work over the years, directly related to eye strain. Therefore, it is at school age that the hygiene of vision in children is of particular importance, the task of which is to provide all the conditions for the optimal state of the functions of the eye. However, unfortunately, it is at school age that children develop visual disorders and, first of all, myopia [Flaxman, 2017].

Visual impairment entails noticeable and very diverse changes in behavior, physical condition, quite often with blindness and visual impairment, neuropsychiatric disorders are observed. The psychology of children with various disabilities differs in many respects from the state of a healthy child.

Children with visual impairments often have a low level of physical development. Due to insufficient development of coordination of movement, schoolchildren are slow, clumsy and not confident enough. Before giving an answer to any question, children with visual impairments carefully consider their every word and movement, while they require constant approval and confirmation of the correctness of their actions from adults.

Thus, the correct construction of the process of teaching and upbringing both at school and in the family, the use of rationally selected methods and techniques, the inclusion of the child in full communication, joint activities and mutual assistance of teachers and parents in this direction will avoid such deviations and significantly increase the level of students' assimilation of school knowledge. The influence of profound visual impairments on the development process is associated with the appearance of deviations in all types of cognitive activity and affects the formation of the child's personal and emotional-volitional spheres. The most pronounced visual impairment manifests itself in a decrease in the total amount of information received from the outside, in a change in its quality [Beard, 2016].

Significant reduction or complete absence of visual sensations, perceptions, representations in the field of sensory cognition limits the possibilities of forming images of imagination, memory, as well as psychological systems, their structures, connections, functions and relationships within these systems. There are qualitative changes in the system of analyzer relationships, specific features arise in the formation of images, concepts, speech, in the ratio of the figurative and conceptual in mental activity, in orientation and mobility in space.

Consequently, the child forms his own, very peculiar psychological system, qualitatively and structurally not similar to any system of a normally developing child, since it includes processes that are at different levels of development due to the influence of the primary defect on them, as well as its correction based on the creation of new compensatory pathways of development. This shows that interfunctional connections in children with visual impairments are also carried out differently, in a peculiar way.

Therefore, the formation and development of the psychological system of children with visual impairments is directly related to the correctional work carried out with them, and with the formation of compensatory processes starting from early childhood.

Refractive errors include: myopia, hyperopia and astigmatism.

Myopia (or near-sightedness): light is focused in front of the retina due to the long eyeball or the high focusing power of the lens or cornea; vision can be improved with a concave or divergent lens minus power.

Hyperopia (or farsightedness): light is focused behind the retina due to a short eyeball or poor focusing ability of the lens or cornea; vision can be improved with a convex or convergent lens with increased power.

Astigmatism: as the eye is curved more in one direction than in the other, light is focused at different points in front of and behind the retina, distorting vision; a cylindrical lens is used to improve vision.

With myopia, the image does not fall on a specific area of the retina, but is located in a plane in front of it. Therefore, it is perceived by us as fuzzy. This is due to the discrepancy between the strength of the optical system of the eye and its length. Usually, with myopia, the size of the eyeball is enlarged (axial myopia), although it can also occur as a result of excessive refractive power (refractive myopia). The greater the discrepancy, the greater the myopia [White, 2015].

Astigmatism occurs when the cornea or lens is curved more in one direction than in the other. The shape of the eye looks more like a football than a baseball. The prevalence of astigmatism is highest in infancy and childhood. The beams are focused at several points (in front and / or behind the retina) instead of one, which distorts far and near vision.

Hyperopia s occurs when light beams are focused behind the retina (because the eye is either too short or has too little focusing power), making near and far objects appear blurry. The signs and symptoms of hyperopia are the more severe the closer you are to the eye.

Some hyperopia is normal during childhood and correction is usually not required. This is because children can compensate for this on their own using their natural focusing mechanism (accommodation). A greater degree of hyperopia may require correction with convergent glasses or glasses with increased (+) magnification, especially when it is associated with strabismus (accommodative esotropia).

Good vision can be maintained for years to come if a person follows a few simple rules [Leissner, 2014].

1. Hygiene of vision while working at the computer.

Today computers are used very widely. Many people spend most of their time in front of the monitor for days, or even nights, forgetting that this can negatively affect the quality of vision.

While working at a computer, the eye muscles get tired (up to accommodation disorders), is exposed to increased stress retina, as a result there is a risk of reduced vision.

To minimize negative effects, you need to arrange the space for exercise properly. The optimal distance from the eyes to the screen is about 60-70 cm – at arm's length. It is necessary to choose a comfortable chair, to achieve the correct illumination of the workplace (the screen should not glare). The center of the screen should be 10 degrees below eye level.

Time spent in front of the computer: children 6-7 years old – 10 minutes, 1st grade students – 15 minutes, 2nd - 9th grade up to 30 minutes, senior pupils and students – 30-50 minutes each with breaks for a total of up to 3 hours; in addition, it is necessary to take carotenoids (lutein and zeaxanthin), the main function of which is to shield from the damaging effects of intense light. A person receives these substances only from food, they are not restored by the body itself.

2. Adequate Nutrition.

Nutrition should provide a sufficient supply of vitamins necessary for the proper functioning of the organs of vision.These include:

• vitamin E enhances the activity of antioxidants, improves blood circulation in the eye area (nuts, spinach, vegetable oil);

• vitamin A (retinol), which increases the body's resistance to infections, affecting visual acuity, which regulates processes in the mucous membranes (eggs, milk, liver of marine fish);

• vitamin C (ascorbic acid), which strengthens blood vessels and has a general strengthening effect on the whole body (kiwi, red currant, white cabbage, oranges, lemons, spinach, green peas).

• B vitamins ensure optimal functioning of the nervous and immune systems (yeast, cottage cheese, cheese, legumes);

In addition, people need various trace elements, the most important of which are zinc, selenium, copper.

Excessive use of substances that negatively affect visual functions should be avoided – coffee, strong tea, refined sugar, tobacco and alcohol.

3. Eye rinsing and stimulation.

The organs of vision are well stimulated by cold water. Experts recommend immersing your face in cold water several times for three to four seconds. A good result is obtained by alternately applying pieces of cloth to the eyes, one of which is moistened with hot water and the other with very cold water.

In case of forced stay in dusty conditions, it is suggested to wash the eyes with a weak tea leaves.

4. Gymnastics for the eyes.

A modern person has to work a lot with information and its various sources.

And most often – to spend endless hours in front of a computer monitor or viewing printed text. Eyes not only get tired of the constant monotonous work.

The vision itself can also deteriorate from improper lighting, posture and lack of blood supply to the eye. To avoid vision problems and the need to start wearing glasses it’s necessary to do eye exercises every day that will improve the focus of vision. There are special eye exercises. Eye gymnastics has been around for millennia and has proven to be effective.

Summing up the results, it can be concluded that reduced visual acuity in a large number of people, including children and adolescents, has become a serious problem nowadays. Irreversible changes in the lens appear as a result of prolonged tension and focusing of the gaze on objects that are too close to the eyes. Each person should understand how important it is to protect and preserve sight. At present, the prevention of visual impairment in schoolchildren is very important.

More than a third of children graduate from school wearing glasses. And while studying in the classroom, there are not enough first desks to seat all the myopic. Vision problems directly affect school performance. In addition, from visual stress, a child with poor eyesight begins to have a headache, which reduces the craving for knowledge.

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PERIPROSTHETIC JOINT INFECTIONS

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Abstract. *Consideration of periprosthetic infections (PPIs) arising as a result of surgical intervention takes an important place in the work. Particular attention is paid to the classification of periprosthetic infections. The main causes of infections, the frequency of their occurrence, the variety of complications arising from infections, possible risk factors that increase the likelihood of PPI, signs, their diagnosis and*

clinical recommendations are described. The article is intended for senior medical school students.

Keywords: *periprosthetic joint infections, joint arthropathy, infections, microorganisms, MRSA, treatment*

In recent decades, the most effective way to treat the terminal stages of the development of degenerative-dystrophic diseases is endoprosthesis, that is, an operation aimed at replacing the destroyed joint components with a biologically compatible implant that repeats the anatomical shape of the musculoskeletal system. Around the world, the number of endoprosthesis surgeries is increasing, however, despite the constant improvement of methods of prevention and surgical intervention, periprosthetic infections remain a problem, with the increase in the number of surgeries, the number of infections also increases.

Periprosthetic infections (PPIs) are infectious process that occurs as a result of surgical intervention, which occurs after arthroplasty, pathogenetically associated with the presence of an implant. The infectious process and the degree of damage inflicted on the body develop depending on the ability of microorganisms to colonize biogenic and abiogenic surfaces.

The main causes are pathogenic bacteria, which are interrelated with the type of pathogen and the very type of prosthesis used, their tendency to adhere to various foreign materials. For example, Staphylococcus aureus in most cases causes infection in the metal parts of the implant, and the epidermal - in the polymer. Inflammation can be provoked by various microorganisms, such as the previously mentioned staphylococci, streptococci, enterococci, Escherichia coli, gram-negative bacteria and others that have the properties of forming a biological film, which is understood as a structured community of bacterial cells, enclosed in a polymer matrix and attached to inert or living surfaces [Morray, 2003]. The most problematic for treatment are infections caused by methicillin-resistant strains of Staphylococcus aureus and Staphylococcus epidermidis.

According to researchers, the incidence of PPI in the recent years has been increasing dramatically. If earlier the probability of infection was approximately from 0.7 to 2.5%, at the moment the figures are approaching 5-6% [Tsukayama, 1996]. However, it should also be noted that the incidence of relapses in the case of existing PPI increases to 23.2 - 31.5% [Teeny, 1990].

Complications after endoprosthesis surgery can lead to disability of the patient due to chronic osteomyelitis, also in the case of generalization of the infection and the development of a systemic inflammatory reaction syndrome or sepsis, infectious blood poisoning, it will not be possible to avoid a lethal outcome. However, the development of early postoperative suppuration in patients with PPI should not be called a complication after surgery, since this can be considered the result of ineffective treatment due to carelessly implemented treatment tactics or due to the patient's unscrupulous attitude to his own health.

There are also risk factors that increase the likelihood of a periprosthetic infection, the presence of previous hip surgery, rheumatoid arthritis, obesity, diabetes mellitus, bleeding disorders, anaemia, and immunosuppression. It should be noted

that complications can also arise as a result of the patient's old age, prolonged use of various antibiotics before surgery, violation of the doctor's recommended and rehabilitation measures.

Local signs of PPI are fever, the appearance of oedema and painful sensations, local hyperaemia and hypertension, as well as dysfunction of the limb with symptoms of intoxication, but sometimes the infection proceeds with no clinical symptoms. Periprosthetic infections are diagnosed by taking into the account a detailed history, laboratory tests, X-ray imaging, MRI and ultrasound. The main diagnostic standard is considered to be bacteriological examination of samples of periprosthetic tissues and synovial fluid, which makes it possible to check the presence of the causative agent of the disease on the biomaterial.

Currently, PPI is usually classified according to D. T. Tsukayama, who proposed four clinical types of deep infections of the surgical site, highlighting acute postoperative, late chronic, acute hematogenous, or delayed, periprosthetic infection and positive intraoperative culture [Teeny, 1990]. This approach to the study of PPI made it possible to obtain about 71% of positive treatment results and is considered one of the most common in medical practice.

The first type of infection – acute postoperative infection occurs within the first month after surgery, which is associated with interoperative contamination with microorganisms from the environment or the operating field.

The second type of infection develops in the period from one month to a year after the operation and is characterized by increased pain in the joint.

The third type of infection is associated with an episode of bacteraemia and occurs a year or more after surgery in a satisfactory functioning joint. Morrey B. at this stage also proposed to divide this type of infection by identifying the source of the pathogen: the source is known – an acute hematogenous complication, the source is unknown – acute delayed [Tsukayama, 1996].

The fourth type of infection involves asymptomatic bacterial colonization of the endoprosthesis surface, detected during revision surgery, which is confirmed by microbiological analysis of tissue samples.

Patients who have been officially diagnosed with PPI should only undergo surgical debridement while retaining the endoprosthesis if it is well fixed, does not contain lead, and no more than a month or three weeks have elapsed since the surgery.

If the patient does not meet the criteria indicated above, but any other surgical procedures carry a huge risk or are unacceptable, then surgical debridement can be performed openly or arthroscopically, which will allow for a more complete surgical debridement, as well as replacement of the polyethylene liner [Tsukayama, 1996]. If the patient is clinically well to undergo several stages of surgical intervention, then it is recommended to use a two-stage revision arthroplasty [Lie, 204].

If it is impossible to perform the operation in several stages, the likelihood of removing the endoprosthesis itself without its subsequent installation and a long course of antimicrobial suppressive therapy can be considered. In the most extreme case, it is worth applying limb amputation.

When treating PPI, it is worth starting antibiotic therapy after a detailed analysis of samples of clinical material and removal of structures for bacteriological examination.

Thus, it's important to mention that nowadays there are no specific clinical recommendations for the treatment of PPI, which is due to the lack of evidence base for one or another treatment method. The development and nature of possible complications depends on many factors: the nature of the pathogen, the duration of the infectious process, the volume of sanitizing intervention, the patient's condition, the severity of his concomitant pathology, including his nutritional status. The correct diagnosis and treatment of infection depends on the qualitative interaction between orthopaedics, microbiologists and clinical pharmacologists in the pre-analytical, analytical and post-analytical periods.

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SECTION 6. LEGAL SCIENCES

THE PROBLEM OF LEGAL REGULATION OF THE INSTITUTION OF SELF-EMPLOYED CITIZENS

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Abstract. *The issue of self-employment in Russia is currently very relevant due to the changes that have taken place in the structure of tax and civil legislation. The author examines the legal basis of this institution and also proposes to single it out in a separate block at the legislative level, differentiating between the categories of workers and individual entrepreneurs. To address the future role of self-employment of citizens in the Russian Federation, it is proposed to legislate them in the register of small and medium-sized businesses.*

Keywords: *self-employed citizens, self-employment, individual entrepreneurs, workers, civil law*

The changes in the field of tax and civilian [Federal'nyy zakon RF, 2017] legislation in 2016-2017 led to the reform of the legal framework of self-employed citizens. Due to the support of the State Duma much work was done in the direction of improving this institute in the Russian Federation.The main problem was to differentiate the status of self-employed people, employers and individual entrepreneurs.

It should be noted that the search for the content of the term turned out to be very problematic, since this concept does not exist in Russian legislation. Turning to the International Labor Safety Standard, which has been operating since 2017, it is possible to sum up the information provided there and to formulate a definition. So, self-employed persons are citizens who receive remuneration for the provision of services, in contrast to employers, and in their legal status refer to the field of entrepreneurial activity [GOST 12.0.0004, 2015].

Now self-employment is the activities of individuals on the provision of personal services and the help of housekeeping. Therefore, it can be assumed that these relationships contain the norms of labor law. Accordingly, the following controversial question arises: a self-employed person has no employment relationship and is neither an employee nor the employer. Consequently, they are outside the legal field of the sphere of labor legislation. Some researchers note that this category contains features of both the employee and the entrepreneur [Lysenko, 2017: 6-7]. When comparing the status of self-employed citizens with individual entrepreneurs, a common feature is that they both should register for the tax inspection. However, there is a distinctive feature – it lies in the fact that self-employed citizens do not provide reporting to the tax service.

Self-employed citizens do not have the right to hire employees, since there are no intermediaries or third parties in their activities. In turn, individual entrepreneurs are endowed with this right, as work can be beyond their capabilities. It turned out to be rather difficult to determine the legal environment of self-employed workers, regardless of whether they belong to the business class. The fact is that the need for self-employed citizens as individual entrepreneurs is not provided.

When determining tax and pension legislation on the legal basis of self-employed citizens, it is necessary to make a comparative analysis of the employee and the self-employed. A distinctive feature of the legal institution of self-employed citizens is that theydo not enter into an employment contract and do not draw up a work record [Tsukanova, Pridatko, 2016: 202]. Since they have no employer, which is a mandatory party to the contract, therefore, this category of people has no labor relations, and they do not affect rights and duties. On the contrary, employees have a specific workplace that is indicated in the contract while self-employed people independently determine the place of work or are invited to the client to provide certain services.

It is worth noting that the insurance pension of self-employed persons is regulated by the Resolutions of the Government of the Russian Federation No. 1015 dated 02.10.2014 “On approval of the rules for calculating and confirming insurance experience for establishing insurance pensions”. The self-employed must pay contributions to mandatory pension insurance, and as a result, the payment period will be included as such contributions. The possibility to pay voluntarily mandatory insurance premiums to pension insurance appeared due to the decree № 500 of the Head of the State of November 27, 2018 “On State Social Insurance” [Ukaz Prezidenta RF “O gosudarstvennom sotsial'nom strakhovanii” ot 27.11.2018 № 500]. It should be taken into consideration that the amount of income cannot be less than the amount of wages. The introduction of this standard will allow citizens to get the required work experience with the payment of mandatory insurance premiums to get labor pension.

According to the comparative analysis, it is obvious that the category of self-employed persons features the functions of both the employee and the employer (also on the payment of insurance premiums). In practice, people very often do not make proper labor relations and, therefore, fall out from under the control of labor legislation. According to Article 303 of the Labor Code of the Russian Federation, the employee does not pay insurance premiums at the conclusion of an employment contract. Consequently, this institution requires further legislative development in the field of labor law.

In foreign countries, the solution to the problem of unemployment is that citizens are provided with a loan which can be invested in business development. For example, in the Netherlands, the maximum amount of a business loan is 32,774 euros. In this country, there is an opportunity to teach citizens new courses, as well as provide them with additional expenses. In 2008, there was an economic crisis in the Netherlands, and with the help of this promising trend and

the support of the state 12 thousand dismissed persons were employed [Nikiforova, 2019: 127-128].

Also, the United States of America is a bright example of improving the self-employment of citizens, which occurred in 1980-1990. The direction of internal and foreign policy has seriously changed, a huge number of unemployed people have emerged that have not been in demand in the labor market. To solve the problem, the US Department of Labor has conducted an economic experiment within 10 years. The essence of this step lies in the fact that the unemployed is attracted to the sphere of individual entrepreneurship, taking into account financial resources through insurance. During this period, some changes were made to the methodology for the introduction of the British and French models of development of autonomous work among the unemployed. This contributed to an increase in their economic efficiency, expressed in the number of people who passed new practices and successfully opened their own, stable, individual enterprises [Malykhin, 2019]. Therefore, the institution of self-employment in foreign countries is based on legislative regulation, which allows not only to get rid of the status of unemployed, but also to realize themselves as highly qualified specialists.

Thus, the conducted research leads to the conclusion that for a favorable economic situation in the domestic market, it is necessary to introduce innovations. In addition, it is necessary to legislate a separate category of so-called "self-employed citizens" and appropriate measures to support them.The development of this area was amended on May 27, 2020 in the Federal Law “On the Development of Small and Medium Entrepreneurship in the Russian Federation” [Federal'nyy Zakon RF ot 24.05.2007 №209-FZ]. At the same time, the law requires further development so that self-employed persons receive legislative consolidation and are included in the register of small and medium-sized businesses.

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THE LEGAL STATUS OF WOMEN IN LABOR RELATIONS IN THE RUSSIAN FEDERATION

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Abstract*. The article deals with the consideration of the legal status of women in labor relation. The relevance of the topic lies in the fact that nowadays women make up the largest part of the working class but the position of women in the workplace is worse in comparison with men. The author considers the concept of legal status, condition of employment, as well as legal acts regulating the legal status of women in labor relation.*

Keywords*: legal status of women, discrimination, labor relations, working women, working conditions*

The problem of the legal status of women is one of the most urgent topics in labor relations. Article 7 of the Constitution of the Russian Federation enshrines the protection of labor and health of people, the provision of state support for the family, motherhood, fatherhood and childhood [Konstitutsiya Rossiyskoy Federatsii, 1993]. This suggests that the main purpose of the welfare state is to achieve social equality, regardless of gender, race, nationality [Trudovoy kodeks Rossiyskoy Federatsii, 2001].

Evidently, women are being discriminated. Employers often make notes about preference in men when drawing up an advertisement. According to statistics, women are more likely to be fired when the number of employees is laid off. Because of the prevailing stereotypes of employers, it is more difficult for a woman to get a job again.

One more problem which needs to be solved is employment and working conditions of women having small children and mothers of many children. Thesecategories primarily need part-time job, but the fact is that many employers do not take it into account and women have to agree to any working environment [Bolshakov, 2014]. In general, the legislator must consider the issue in relation to mothers of young children and the violation of their rights must be controlled by supervising bodies.

In 2020, 5,800 special thematic inspections were carried out against women workers by the Federal Labor Inspectorate, which showed more than 3,000 various violations of compliance with labor legislation and labor protection for women [Pushkareva, 2002: 45]. The above-mentioned violations can be of various types. For example, under the provisions of the Labor Code of the Russian Federation, the use of women's labor in jobs with harmful and dangerous working conditions is limited. It is also prohibited for women to do underground work, with the exception of non-physical tasks or sanitation and hygiene services.

According to Article 209 of the Labor Code "harmful and dangerous working conditions are a combination of factors of labor activity and industrial situation, which can lead to illness or injury". For instance, there are rules establishing the weight of a load that a woman can move in one day while being in a factory [Petrov, 2015: 83]. Besides, in most cases, women living in villages and towns take on men's work. Agricultural industry is characterized by the use of the highest level of manual labor, so this issue is very urgent. Basically, women living in villages have to do this work due to the fact that villages are focused on agricultural production and there are no other jobs.

The next issue which needs to be considered is health. According to the specialists of the Institute of Medicine of the Russian Academy of Medical Sciences, the prevention of reproductive disorders of working men and women is one of the most important problems of modern society. Working conditions affect human health and reproductive functions of the body, which is why the government should provide guarantees for improving them, especially in the women’s workplace. Besides, the state must ensure the rehabilitation of persons who have suffered at work [Pushkareva, 2002: 45]. On this basis, the ratification of

the provision "On benefits in cases of injuries" of the Convention of the International Labor Organization can be regarded as a step to the improvement of social protection of working women [Shatrova, 2003: 18].

As a rule, women face labor rights violations more often than men. It can be proved with the help of the analysis of the number of requests for legal advice on labor rights to hot telephone lines. The majority of these calls held in St. Petersburg, Kaliningrad, Novosibirsk and Vladivostok are from women [Pushkareva, 2002: 27].

Nowadays it isquite problematic to find a job, especially for those with small children and mothers of many children. They have to agree to any working conditions and employers often take advantage of this which needs to be controlled by supervising bodies.

Summing up, it is possible to say that the Russian legislation, which contains norms-prohibitions in relation to discrimination, is insufficient. It is necessary to create normative legal acts both at the federal level and at the level of bylaws that regulate specifically established prohibitions on non-discrimination on the basis of gender in labor relations, as well as ensure guarantees for their implementation. In turn, in order to get good results in the adoption and implementation of laws, women themselves should stand up for their rights.

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SECTION 7. ENGINEERING TECHNOLOGIES

DESIGNING ELECTRONIC LEARNING SYSTEM FOR FUNCTIONAL PROGRAMMING

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Abstract. *The article deals with the current conditions of the pandemic, the requirements for digitalization have increased dramatically. In this regard, it is more important than ever to develop interactive learning systems that support the possibility of online learning. This system describes the initial stages of designing such a system in the framework of the subject "Functional programming".*

Keywords: *e-learning, functional programming, languages, declarative programming, electronic learning system*

The field of informatization has been developing for a long time, but the education sector in this area has begun its development quite recently. The first advances in this area were made by the Massachusetts Technical University in 2001. They provided the courses to users on the Internet resource. Taking a leaf out of book, many universities around the world created their electronic resources. This event can be considered the beginning of the digitalization of the educational environment [Ras, Zbigniew, 2010: 9]

Nowadays there are several types of e-learning. We'll try to characterize the types for choosing the most suitable variant within the framework of the topic "Functional programming".

Type 1. Complete e-learning.

This type can be characterized by the following scheme.

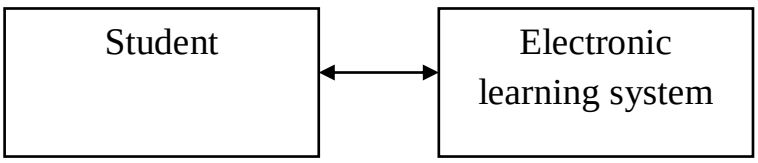

Figure 1. **Scheme of complete e-learning**

In full e-learning, the system is the instructor.

System functions:

– providing of lecture and practical materials;

– issuing assignments, checking the student's knowledge of the studied material;

– processing the results of completed tasks;

– providing the results to the students.

System advantages:

– does not require the intervention of other people;

– allows the students working at their own pace.

Disadvantages of the system:

– the complexity of the system development, when developing it is necessary to take the student's behavior into account [Field, Harrison, 2013: 120].

Type 2. Supporting students in learning with e-textbooks

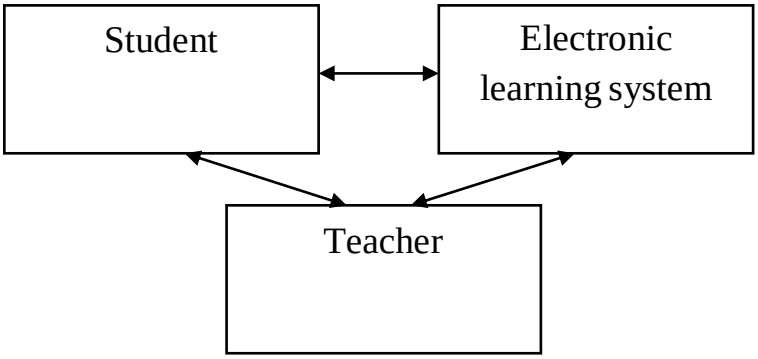

Figure 2. **Scheme of support for learning using electronic textbooks**

In this type of e-learning the system there is an auxiliary source of knowledge for the student [Michaelson, 2011: 35].

System functions:

– providing lecture and practical materials.

System advantages:

– individual approach to the student.

Disadvantages of the system:

– need for personal contact;

– lack of constant access to the teacher, does not allow the student to independently complete assignments and receive results.

Type 3. Distance learning

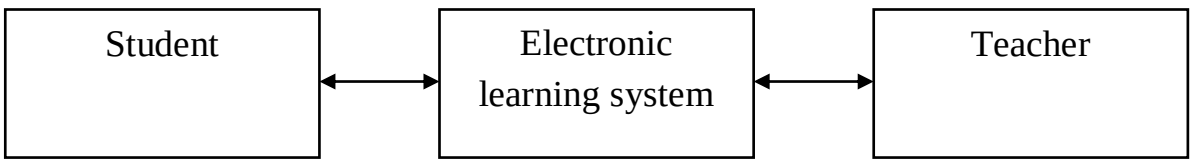

Figure 3. **Scheme of distance learning**

In distance learning the electronic system is an intermediary between the teacher and the student.

System functions:

– providing lecture and practical materials;
– providing student's answers to the teacher;
– providing the student with the results.

System advantages:

– individual approach to the student;
– no need for personal contact.

Disadvantages of the system:

– lack of constant access to the teacher, does not allow the student to independently complete assignments and receive the results [Harper, 2012: 32].

In addition to the main goal – the provision of e-learning, this system also performs an auxiliary function – the popularization of the declarative programming paradigm, functional programming.

Functional programming is a section of discrete mathematics and a programming paradigm, in which the computation process is interpreted as the calculation of the values of functions in the mathematical understanding of the latter (as opposed to functions as subroutines in procedural programming). Function calls are the only type of actions performed in a functional program. This kind of programming allows solving a number of problems, the solution of which with the help of an imperative method is irrational.

Based on the above facts, it would be advisable to use the first type of e-learning model, namely full e-learning. This system can provide an electronic educational and methodological complex, consisting of the following elements:

– text module;
– test module;
– check module;
– game module.

The check module is an online compiler for the language, using the verification of the entered program. The module tests the program with reference data and gives the user the verification result.

The text module is a set of lectures and assignments for lecture material in a form of the text.

The test module provides a set of test questions for the lecture material.

The game module contains elements designed to diversify the learning process.

Figure 4 shows a UML diagram of a collaboration.

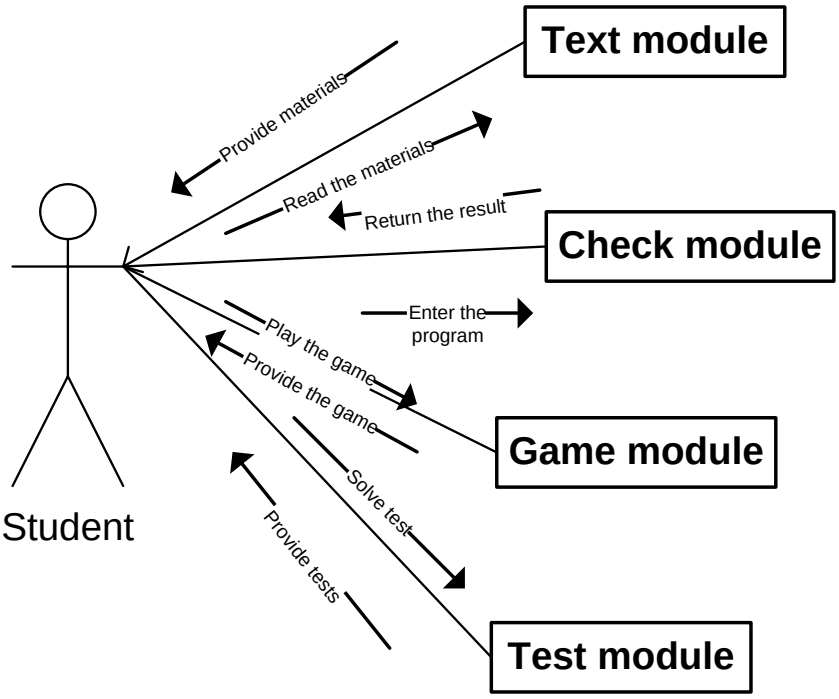

Figure 4. **Diagram of a collaboration**

During the design of the system, the test module and the game module will be combined into an evaluation tool module due to a similar structure.

Highlighting the fact that the article has mostly practical usage and written as part of extensive project it can be useful in others technical area. Besides the article raises an urgent problem in modern society and suggest suitable solution by using graphic tools and unified modeling language (UML). In addition, area covered in the article, functional programming, is gaining popularity from year to year both abroad and in Russia.

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SCIENTIFIC AND TECHNOLOGICAL PROGRESS IN MODERN LIFE: INNOVATIVE TRENDS OF 2021

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Abstract. *The article deals with the scientific and technological progress which is considered to be one of the most important factors of development of the industrial sector and other spheres of life in most countries. Life modernization and technological processes contribute to solving the problem of limited resources, and influencing the development of the countries. The article focuses on the main technologies and innovative trends of 2021.*

Keywords: *scientific and technological progress, innovation, technologies, economic growth, trend, distance learning*

The role of scientific and technological progress (STP) in modern life is very high. It is an internal part of the development of any country. Modernization process in the technical sphere implies new jobs, new variations of equipment and technologies, and infrastructure improvement. It has a positive impact on the people's lives. The scientific and technical potential allows making national economy effective.

Scientific and technological progress is a long and evolutionary process which every new stage brings new qualitative changes and innovations to the development of the society. The transition of the economy to a new qualitative level allows creating innovations and developing high-tech industries. The modern stage of the scientific and technical process is characterized by the transformation of science into a direct productive force of the country. Germany, Japan, USA are the largest manufacturers of electrical engineering, cars and many other modern achievements of science and technology. These countries have become the leaders of the world economy. But they would not have succeeded so much in the scientific sphere without investments in the latest technologies development. Currently, STP is also characterized by computerization of a high degree. The production and control process has become automated, and a person is mainly responsible for the programming and controlling functions.

Any state today conducts a unified state scientific and technical policy to ensure the effective functioning of the economy of its country. Such policy includes the development of a system of measures aimed at ensuring the integrated development of science and technology, as well as the implementation of their results in the economy and other spheres of public life. One of the main tasks of science and technology policy is to choose priorities in the development of science, technology and industries in which it is primarily necessary to implement technological and scientific achievements. The main trends set the general vector of scientific and technological development of the country. First of all, this is due to the limited resources of the state for conducting complex research and

implementing them in practice. Therefore, the importance of correctly identifying the main directions of STP and their implementation is very high. The main trends of scientific and technological progress are understood as the directions of development of science and technology, the implementation of which in practice will provide the greatest social and economic efficiency in the shortest possible time. Each state itself determines the main directions of scientific and technological progress, which are constantly changing at each stage of development. However, some trends are becoming the same in their development for most countries of the world. Various factors influence the change in scientific and technical trends.

Evidently, the 2020 pandemic has affected people's way of life greatly and made its own adjustments, in particular, in the economic sphere. In this regard, the main trends in the development of scientific and technological progress, specific for 2021, can be considered below. During the Coronavirus pandemic, businesses collapsed and a lot of people lost their works. That is why more people started working remotely. This trend is specific for 2021, because many people do not want to return to their usual offices. At the same time, many online professions have become profitable. The Zoom program has given the favorable conditions for online job. And many other new programs have appeared too. Various startups offered solutions for online activities. Bluescape, Eloops, Figma, Slab and Tandem programs have offered tools for creating and sharing content, tracking the status and results of projects, training new employees, creating virtual offices that stimulate the employee’s communication and allow coordinating their actions [Maksimenkov, 2018].

Another new trend is contactless goods delivery. Its popularity has increased because people want to minimize physical contact and are not going to abandon this trend in 2021. In the USA, for instance, the popularity of contactless delivery service has increased by 20%. Such service is provided by DoorDash, Postmates, and Instacart. Meituan is the first company in China that has offered contactless delivery in Wuhan. Nowadays they use drones to deliver products to their customers. In Russia Delivery Club is a popular company that provides contactless delivery. In March the company reported that in Moscow and St. Petersburg the number of customers’ orders increased by 22%. Since January the Avito online platform delivery has increased by 35%. Interestingly, in Russia, this service has already been mastered by Yandex, Ozon, Wildberries and other online platforms.

In the healthcare sector COVID-19 pandemic causes high popularity and development of the telemedicine. That is why many public and private clinics began to offer telemedicine services. A doctor and a patient do not need to communicate in the clinics, but in a video chat. Artificial intellect machines diagnose diseases according to patients’ photos, special sensors can analyze important indicators of human health, and medicines can be delivered in a contactless way. This area of medicine, developing in many countries of the world, has both its advantages and disadvantages. The most important disadvantage is the doctors’ inability to assess the patients’ conditions through a webcam. So, the people’s attitude to it is ambiguous.

Online education development is the result of Coronavirus pandemic. Since the starting point of the Coronavirus pandemic, schools, universities and other educational institutions of about 190 countries have arranged the classes in the form of video conferences. The Chinese 17zuoye, Yuanfudao, iTutorGroup and Hujiang, the American Udacity, Coursera, Age of Learning and Outschool can be mentioned as the best platforms for online education [Coccia, 2021].

In 2021 the artificial intellect and industrial automation technologies have significantly increased. Due to the implementation of artificial intellect machines and robotics the automation of production has become the main alternative for production management. Today UBTech Robotics (China), Cloud Minds (USA), Bright Machines (USA), Roobo (China), Vicarious (USA), Preferred Networks (Japan), Fetch Robotics (USA), Covariant (USA), Locus Robotics (USA), Built Robotics (USA), Kindred Systems (Canada) and XYZ Robotics (China) have become the leading companies providing automation of production processes.

Virtual reality technologies (VR and AR) are of great demand. They have become an integral part of everyday life in various spheres. As mentioned above, a large number of people changed their job in offices to online job, and AR and VR helped them to communicate while working. Immersive technologies can give people incredible opportunities in all spheres of life. AR avatars, indoor AR navigation, remote assistants, integration of artificial intellect machines into augmented and virtual reality, mobile AR, AR in the cloud, virtual sports events, eye tracking and facial recognition technology are more popular in 2021, and the growing development of 5G Internet has accelerated the spread of technologies.

The unmanned transport innovations are considered one more trend, in particular, the progress of autonomous driving technologies. Honda has recently announced that it will produce autopilot cars. And the Tesla autopilot system is good not only for traffic control, but also for road signs, as well as traffic lights recognition [Belakhov, 2016].

Thus, scientific and technological progress can be considered the most important factor in the socio-economic development of countries. The speed of implementation of technical inventions is constantly growing, opening up new horizons in various spheres. The technological development can change many industries. It’s possible to realize real drivers of technological and business innovations.

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