

# TECHNOSPHERE SAFETY ТЕХНОСФЕРНАЯ БЕЗОПАСНОСТЬ



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## Occupational Morbidity of Women Associated with Working Conditions in Agriculture

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### Abstract

**Introduction.** About a third of employees of medium and large agricultural enterprises work in hazardous and harmful conditions. It is worth clarifying that the situation in this area is constantly changing, information may become outdated. The presented scientific work is designed to solve this problem. New information should be considered and systematized to study current data. The work objective is to analyze recently published official statistics on the impact of working conditions on the health of agricultural sector workers and, in particular, women. In addition, the problems of the formation and development of occupational diseases of women employed in agriculture are considered.

**Materials and Methods.** The data of the Federal State Statistics Service, the Ministry of Health of the Russian Federation, as well as the works of foreign and Russian scientists who studied the peculiarities of work in agriculture were used as research materials. Official statistics data were summarized in the form of tables, visualized as diagrams. The illustrative material allowed us, in particular, to compare the indicators, to identify the most significant risks associated with the work of women in the agro-industrial complex.

**Results.** About 35 % (that is, more than a third) of the personnel of medium and large enterprises of the agro-industrial complex are women. Many of them work in harmful and dangerous conditions. From 2015 to 2021, the corresponding minimum recorded figure was 26.4 % of all women employed in agriculture, the maximum was 37 %. Generalized statistical data suggested that from 2015 to 2021 the situation was not significantly improving, a downward trend was not formed. If to speak about hard work, the proportion of women performing such functions increased from 13.8 % to 17.7 %, that is, by 2021 the situation noticeably worsened. We noted the progress with strenuous labor processes in agriculture. The proportion of women engaged in such jobs almost halved: from 3.5 % to 1.8 %. Physical overload, which functionally overstrain the organs and systems of the body, should be recognized as a particularly harmful factor for agricultural sector workers. The most problematic industry from the point of view of women's health was animal husbandry.

**Discussion and Conclusion.** The results of the work allow us to conclude about the unsatisfactory working conditions of women in agriculture. The situation can be improved by state control, mutual interest of employers and employees in the organization of workplaces and the compliance with labor protection requirements. A systematic approach should reduce the number of occupational diseases among women, improve the health indicators of agricultural workers

**Keywords:** women's health, occupational diseases, harmful and hazardous working conditions, physical overload

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## Профессиональная заболеваемость женщин, связанная с условиями труда в сельском хозяйстве

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### Аннотация

**Введение.** Около трети сотрудниц средних и крупных сельскохозяйственных предприятий работают в опасных и вредных условиях. Стоит уточнить, что ситуация в этой сфере постоянно меняется, информация может устаревать. Указанную проблему призвана решить представленная научная работа. Для изучения актуальных данных следует рассматривать и систематизировать новые сведения. Цель исследования — анализ недавно опубликованной официальной статистики о воздействии условий труда на здоровье работников агросектора и, в частности, женщин. Кроме того, рассматриваются проблемы формирования и развития профессиональных заболеваний женщин, занятых в сельском хозяйстве.

**Материалы и методы.** В качестве материалов исследования использовались сведения Федеральной службы государственной статистики, Министерства здравоохранения РФ, а также труды зарубежных и российских ученых, которые изучали особенности работы в сельском хозяйстве. Данные официальной статистики обобщались в виде таблиц, визуализировались как диаграммы. Иллюстративный материал позволил, в частности, сопоставить показатели, выявить наиболее существенные риски, связанные с работой женщин в агропромышленном комплексе.

**Результаты исследования.** Около 35 % (то есть более трети) персонала средних и крупных предприятий агропромышленного комплекса — это женщины. Многие из них трудятся во вредных и опасных условиях. С 2015 по 2021 гг. соответствующий минимальный зафиксированный показатель — 26,4 % из всех женщин, занятых в сельском хозяйстве, максимальный — 37 %. Обобщенные статистические данные позволяют утверждать, что с 2015 по 2021 гг. ситуация существенно не улучшается, понижающий тренд не формируется. Если же говорить о тяжелых работах, то доля женщин, выполняющих такие функции, увеличилась с 13,8 до 17,7 %, то есть к 2021 году ситуация заметно ухудшилась. Отметим прогресс с напряженными трудовыми процессами в сельском хозяйстве. Доля женщин, занятых такими работами, сократилась почти вдвое: с 3,5 % до 1,8 %. Особенно вредным для работниц агросектора производственным фактором следует признать физические перегрузки, которые функционально перенапрягают органы и системы организма. Наиболее проблемная с точки зрения женского здоровья отрасль — животноводство.

**Обсуждение и заключение.** Результаты работы позволяют сделать вывод о неудовлетворительных условиях труда женщин в сельском хозяйстве. Ситуацию могут улучшить государственный контроль, взаимная заинтересованность работодателей и работников в организации рабочих мест и соблюдении требований охраны труда. Системный подход должен сократить число профессиональных заболеваний среди женщин, улучшить показатели по здоровью работниц агросферы.

**Ключевые слова:** здоровье женщин, профессиональные заболевания, вредные и опасные условия труда, физические перегрузки

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**Introduction.** Women's health is an important medical and social problem. Many areas depend on its solution, including the socio-demographic situation [1]. Health is determined by a number of heterogeneous factors, including:

- economy;
- ecology;
- social security (income, availability of medical services);

- nutrition;
- attitude to bad habits..

A person can spend up to 1/4 of his or her life in the workplace, so health largely depends on the production environment. The problems of occupational safety and women's health are not only actively discussed in society, but also require close attention of the authorities. It is necessary to take into account that the situation in the field is constantly changing, and the information is outdated. Using data that does not correspond to the current state of the problem will prevent its solution. The presented scientific work is designed to eliminate this drawback. The relevance involves consideration and systematization of new information. Thus, in December 2023, Russia approved the National Strategy of Action in the Interests of Women for 2023–2030. One of its priorities is to preserve women's health<sup>1</sup>. The Labor Code contains provisions on occupational safety and women's health<sup>2</sup>. Decree of the President of Russia of 04.03.1993 No. 337 "On the priorities of state policy in relation to women" declares the need for priority provision of women's rights to occupational safety, protection of their life and health, taking into account the function of motherhood<sup>3</sup>. It should be recognized that in some cases, the working conditions of women remain unsafe and harmful, and the state of health is unsatisfactory.

The study objective is to analyze recently published official statistics on the impact of working conditions on women's health. In addition, the problems of the formation and development of occupational diseases of workers employed in the agricultural sector are considered.

**Materials and Methods.** The paper considers Russian and foreign literature devoted to the problem. These materials are compared with the data of the Federal State Statistics Service and the Ministry of Health of the Russian Federation. This approach made it possible to systematize and show in dynamics the information about the number of women working in hazardous and harmful working conditions, and about the potential threat to their health. A comparative analysis was carried out, which established similar and different risks for men and women employed in the agro-industrial complex. The information was summarized, presented in the form of tables and diagrams. Processing of a significant digital array gave grounds to speak about the representativeness of the material and the validity of the proposed conclusions.

**Results.** A significant part of the working population of the country is involved in agriculture. Therefore, by the end of 2021, almost 900 thousand people worked in the agro-industrial complex of Russia. Here and further we will provide the analytics without taking into account small and microenterprises, since Rosstat has not published the relevant data. Of these 900 thousand, 313 thousand people (about 35 %, that is, more than a third) were women<sup>4, 5</sup>.

A significant proportion of those employed in jobs with working conditions that did not meet the requirements of legislation remained in the country as a whole (Fig. 1) and in the agricultural sector (Fig. 2) [2].

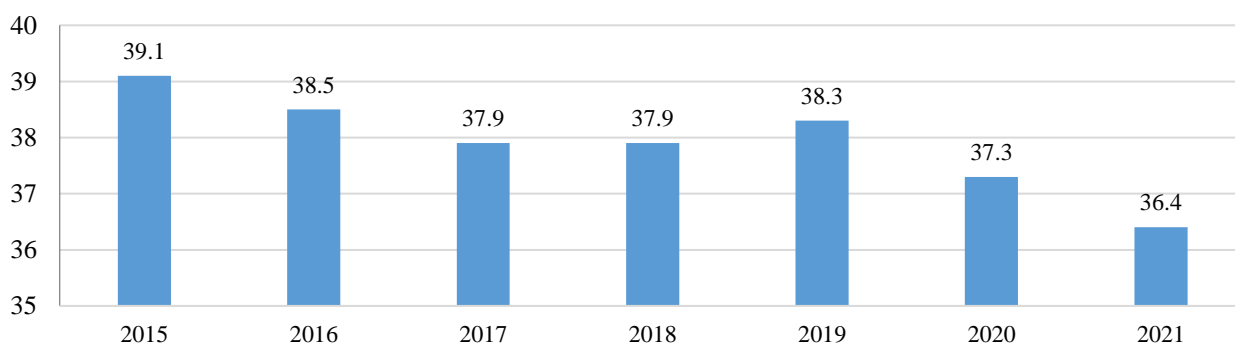


Fig. 1. The share of employees engaged in work with harmful and (or) hazardous working conditions, %

<sup>1</sup> *Ob utverzhdenii Nacional'noj strategii dejstvij v interesah zhenshhin na 2023–2030 gody.* Decree of the Government of the Russian Federation No. 4356-r of 29.12.2022. Consultant Plus. URL: [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_436691/0ab1d11f34aa37bd186ca7948792439bf4b2d4c1/](http://www.consultant.ru/document/cons_doc_LAW_436691/0ab1d11f34aa37bd186ca7948792439bf4b2d4c1/) (accessed: 31.05.2023).

<sup>2</sup> *Labor Code of the Russian Federation.* No. 197-FZ of 30.12.2001. Consultant Plus. URL: [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_34683/](http://www.consultant.ru/document/cons_doc_LAW_34683/) (accessed: 31.05.2023).

<sup>3</sup> *O pervoocherednyh zadachah gosudarstvennoj politiki v otnoshenii zhenshhin.* Decree of the President of the Russian Federation No. 337 of 04.03.1993. Consultant Plus. URL: [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_1591/](http://www.consultant.ru/document/cons_doc_LAW_1591/) (accessed: 31.05.2023).

<sup>4</sup> *Usloviya truda. Proizvodstvennyj travmatizm.* Federal State Statistics Service. URL: [https://rosstat.gov.ru/working\\_conditions](https://rosstat.gov.ru/working_conditions) (accessed: 31.05.2023).

<sup>5</sup> *Sostojanie uslovij truda rabotnikov organizacij Rossijskoj Federacii po otдел'nym vidam jekonomicheskoy dejatel'nosti.* Federal State Statistics Service. URL: <https://rosstat.gov.ru/folder/11110/document/13264> (accessed: 31.05.2023).

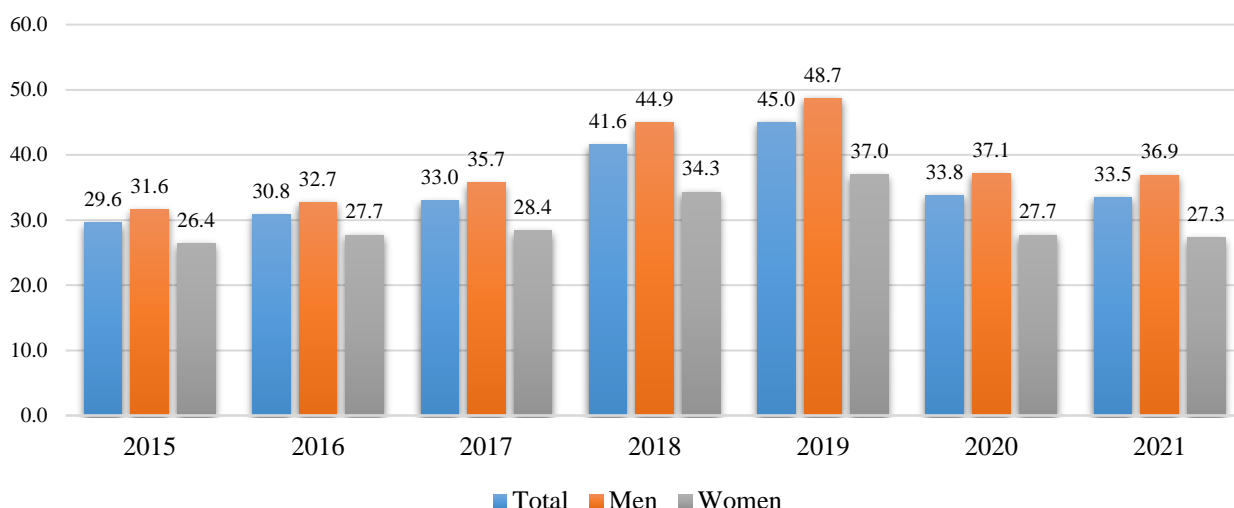


Fig. 2. The share of employees engaged in work with harmful and (or) hazardous working conditions in agriculture, %

This and the following similar figures require explanation. Each column of the chart shows the proportion of agricultural sector employees working in various unfavorable conditions. Everything counts from 100 %. In this case, for example, in 2015, out of the total number of employees (100 %), 29.6 % worked in harmful and (or) hazardous conditions. Out of 100 % of men, it was 31.6 %; out of 100 % of women it was 26.4 %.

From 2015 to 2021, 29.6–45 % of the staff had harmful or hazardous working conditions in agriculture, and the declining trend line was not fixed (see Figure 2). During these years, about a third of agricultural workers (26.4–37 %) worked in dangerous and hazardous conditions.

Hazardous and harmful working conditions in agriculture are associated with factors of the production environment (Fig. 3, Table 1), the severity (Fig. 4) and the intensity of the labor process (Fig. 5).

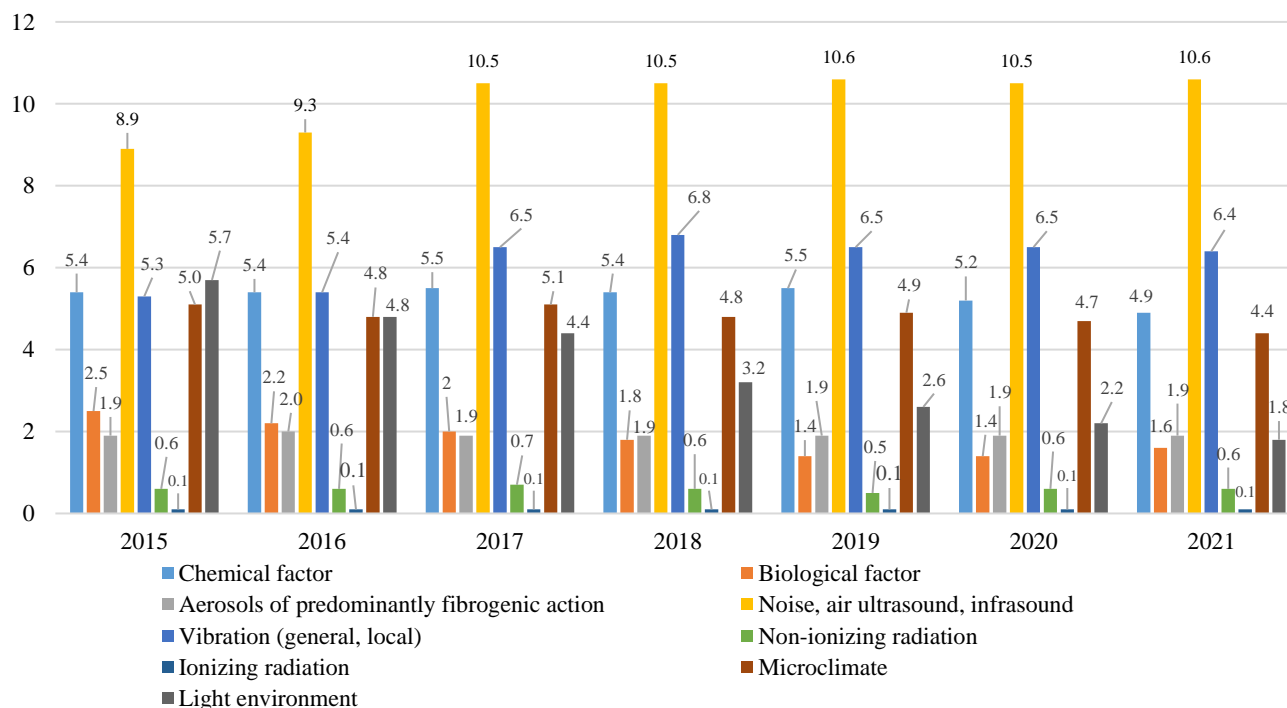


Fig. 3. The share of agricultural workers exposed to various harmful factors of the production environment, %

As you can see, acoustic factors, vibration, chemicals and microclimate influenced most often people.

Table 1

The number of agricultural sector workers exposed to adverse factors of the production environment

Year	Number of people	Are under the influence of these factors, people, %*									
		Total	1	2	3	4	5	6	7	8	9
2015	375773	99011/26.4	53411/ 4.6	12313/ 3.3	5690/ 1.5	20236/ 5.4	1901/ 0.5	2431/ 0.7	278/ 0.1	21817/ 5.8	25787/ 6.9
2016	389677	107798/27.7	17115/ 4.4	12211/ 3.1	6631/ 1.7	20397/ 5.2	1930/ 0.5	2017/ 0.5	235/ 0.1	21552/ 5.5	22320/ 5.7
2017	359596	102176/28.4	15852/ 4.4	10730/ 3.0	5129/ 1.4	21192/ 5.9	1790/ 0.5	1446/ 0.4	131/ 0.0	21319/ 5.9	18142/ 5.1
2018	342316	97298/28.4	15250/ 4.5	8577/ 2.5	5128/ 1.5	20507/ 6.0	1958/ 0.6	656/ 0.2	98/ 0.0	20308/ 5.9	11994/ 3.5
2019	342532	96567/28.2	15321/ 4.5	7138/ 2.1	5273/ 1.5	21335/ 6.2	2021/ 0.6	545/ 0.2	153/ 0.0	22669/ 6.6	9905/ 2.9
2020	325955	90312/27.7	13726/ 4.2	7123/ 2.2	5144/ 1.6	19554/ 6.0	1903/ 0.6	486/ 0.1	165/ 0.1	21129/ 6.5	7826/ 2.4
2021	312653	85227/27.3	12314/ 3.9	7014/ 2.2	4456/ 1.4	18523/ 5.9	1578/ 0.5	280/ 0.1	94/ 0.0	19132/ 6.1	5945/ 1.9

\* 1 — chemical; 2 — biological; 3 — aerosols, mainly of fibrogenic action; 4 — noise, ultrasound, air, infrasound; 5 — vibration (general and local); 6 — non-ionizing radiation; 7 — ionizing radiation; 8 — microclimate; 9 — light environment.

Therefore, the workplaces of 26.4–28.4 % of employees did not meet the standards. Unfavorable conditions were primarily noise, air ultrasound, infrasound, chemistry and microclimate. Of the factors described above, women were the least likely to experience vibration.

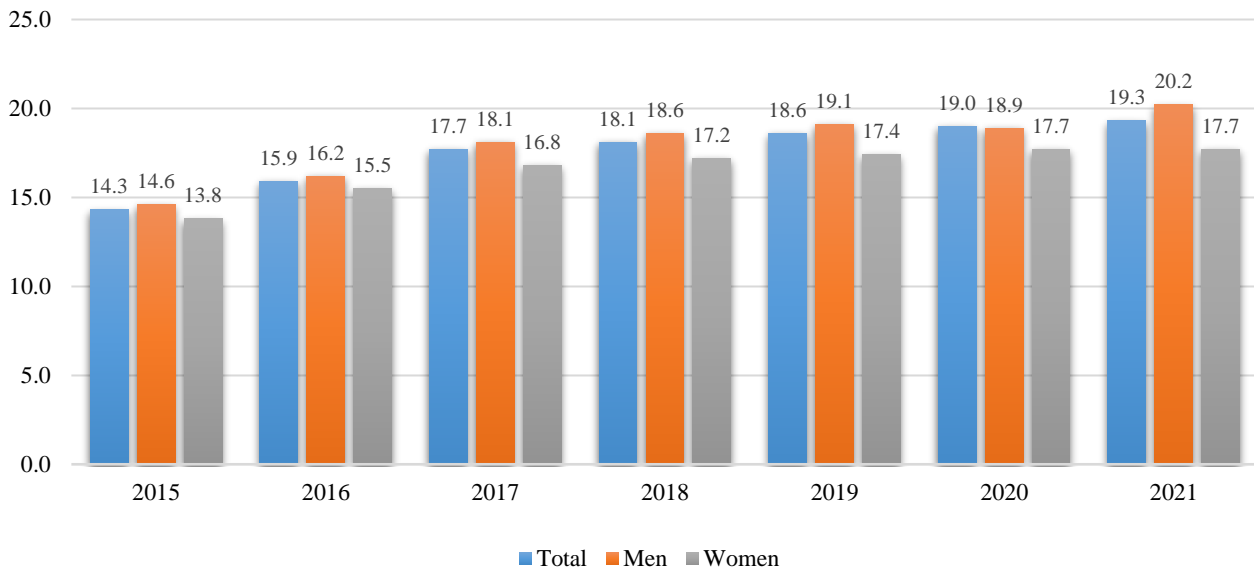


Fig. 4. The share of people employed in heavy work in agriculture, %

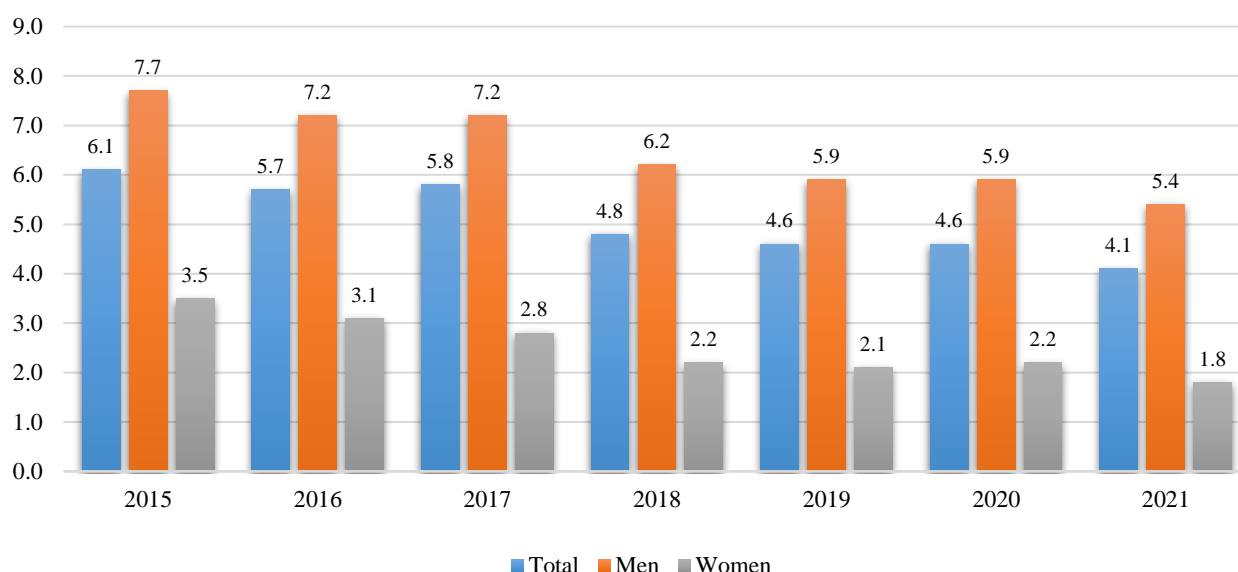


Fig. 5. The share of people employed in stressful labor processes in agriculture, %

First of all, we should note the increase in the share of those engaged in hard work. In general, this indicator increased from 14.3 % to 19.3 %. The corresponding figures for women — from 13.8 % to 17.7 %. In addition, Figures 4 and 5 show that the share of people in stressful labor processes decreased from 6.1 % to 4.1 % in general and from 3.5 % to 1.8 %, if we talk about women.

The negative phenomena described above create risks for the development of occupational and professionally caused diseases. Among the branches of the Russian economy, agriculture ranks fourth in terms of such ailments, as well as related disability<sup>6</sup>. Diseases caused by physical overloads, functional overstrain of organs and body systems were recorded especially a lot (about 51 %). In second place was the impact of physical factors (about 22.5 %). The third was the harmful effect of aerosols, mainly fibrogenic ones (about 13 %), and chemicals (about 8.5 %) [2].

Of the primary identified occupational pathologies of agricultural workers, diseases of the musculoskeletal system and connective tissue (radiculopathy, musculotonic syndromes, myalgia, myofibrosis of the forearms, epicondyle of humerus, etc.) were most common (64.8 %). 10.3 % were respiratory diseases (occupational bronchitis, bronchial asthma, etc.). Injuries, poisoning and other consequences of external influences, as well as diseases of the skin, nervous system, ear and mastoid process were recorded in 11.6 % [2].

Studies of domestic and foreign scientists confirm the impact of factors that form harmful and hazardous working conditions on the health of women in agriculture. In particular, hard work was considered, in which employees lifted weights of more than 10 kg every day. 2/3 of such women suffered from pain in the spine (mainly in the lower back), cervical and thoracic sections. This reduced the quality of life and provoked such health risks as overwork and premature menopause [3]. Heavy female labor was a common cause of musculoskeletal diseases of the lower back, shoulders, knees and especially wrists [4]. Severe conditions and exposure to chemicals turn into reproductive health problems [5, 6]. Lipid metabolism disorders were widespread among postmenopausal women in the agricultural sector, which indicates the risks of cardiovascular diseases [7].

<sup>6</sup> *Glavnyy vneshtatnyy specialist profpatolog. Planiruemye rezul'taty dejatel'nosti. Otchet glavnogo vneshtatnogo specialista profpatologa Minzdrava Rossii za 2019 god.* Ministry of Health of the Russian Federation. URL: <https://minzdrav.gov.ru/vneshtatnye-spetsialisty/glavnyy-vneshtatnyy-spetsialist-38/plan-38> (accessed: 18.07.2023).

The working environment in agriculture provoked allergic respiratory diseases. The reasons were organic substances, solid particles of biological origin (organic dust) with mold and microorganisms. Such a suspension can cause allergic reactions, rhinitis, asthma, exogenous allergic alveolitis, pneumonitis [8], [9]. Vibroacoustic factors of the production environment in agriculture can contribute to hearing impairment [10].

Judging by the list of possible diseases, the situation in animal husbandry was particularly difficult. Here, women were at risk of diseases of the neuromuscular apparatus, peripheral nervous system, heart and blood vessels, digestive organs, movement, and the female genital sphere. Conditions of pig breeding enterprises can provoke chronic tonsillitis, myocardiopathy associated with focal infection. Those employed in poultry farming were diagnosed with diseases of the upper respiratory tract and skin infections. In crop production, female workers suffer from vegetative-vascular disorders, hypertension, diseases of the peripheral nervous system. Under the influence of pesticides, chronic coronary insufficiency, diseases of the heart muscle, gastrointestinal tract, liver and biliary tract developed. Severe dustiness caused nonspecific lung diseases [11].

As a result of investigations of cases of occupational pathology, the main causes of acute occupational and chronic occupational diseases were established (Fig. 6).



Fig. 6. Causes of occupational diseases, %: *a* — acute; *b* — chronic

Let us clarify that the diagrams in Fig. 6 reflect only the most significant, according to experts, causes of ailments. Part (*a*) does not take into account shortcomings in the use of personal and collective protective equipment, emergencies, lack of timely first aid. Part (*b*) does not take into account violations of industrial sanitation and occupational hygiene, insufficiently good working conditions, weak mechanization and automation.

Studies of working conditions and occupational diseases in agriculture indicate non-compliance with sanitary and other standards established to protect the health of workers. Let us name some violations:

- there was no regular monitoring of working environment factors, labor processes, industrial and sanitary facilities;
- the rules of workplace organization, requirements for equipment, facilities, transport were not observed;
- preliminary and periodic medical examinations of employees engaged in harmful and hazardous production conditions were not carried out [12].



The following measures will contribute to the normalization of working conditions and the prevention of occupational diseases of agricultural workers:

- compliance with legislation in the field of occupational safety and women's health;
- sufficient financing of occupational safety measures;
- regular inspections and scheduled preventive repairs, modernization of equipment — a source of harmful and hazardous factors;
- control of technical processes and technological equipment of workplaces;
- mechanization and automation of production;
- organization of work, adequate to the nature and scope of work performed, technological process;
- compliance with the work and rest regime, depending on the severity and intensity of work;
- step-by-step production control of working conditions, sanitary and epidemiological condition and ergonomics of workplaces;
- taking into account standard norms and special assessment of working conditions to provide employees with collective protection, individual protection, special clothing and footwear, as well as monitoring their use;
- special assessment of working conditions to reduce the impact of the identified negative factors of the production environment and the labor process;
- introduction of modern digital tools for training, instruction on occupational safety, first aid;
- timely medical examinations and compliance with doctors' prescriptions;
- maintenance of equipped medical offices, psychological relief departments, sports and recreational facilities in working condition;
- immunization and seasonal prevention of respiratory diseases;
- promotion of a healthy lifestyle.

**Discussion and Conclusion.** Many women employed in agriculture work in unsatisfactory conditions. About a third of employees are affected by negative factors. The severity and intensity of production processes contribute to the development of occupational diseases. To improve the situation, state control over the state of working conditions and occupational diseases is necessary. It is necessary to develop and implement measures for the protection of women's labor and health, including in agriculture.

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