

PROBLEMS OF AGRICULTURAL HYGIENE

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Abstract

The President of the Republic of Uzbekistan's governmental plans on agricultural reform place emphasis on an integrated approach to developing this industry, accelerating and deepening the success of associated industries, and attaining the most effective end outcomes. The resolution of these difficulties is inextricably linked to the improvement of rural working and living circumstances. The rise of agricultural production to a new level in our country necessitates ongoing attention to rural employees, including improvements to their working conditions, rest, life, and health. It should be emphasized that unprecedented reforms are being implemented in the Republic of Uzbekistan's agriculture to enhance the working and living conditions of agricultural employees. Remote rural villages are growing socially as well as economically. Simultaneously, new, significant, and pressing concerns in agricultural hygienic science and sanitary practice have emerged. A current study of scientific advancements, automation, mechanization, and occupational health in agricultural production over the last decades is critical at this stage.

Keywords: occupational health, agricultural production, seasonality, temperature factor, dust, biological factors, pesticides, zoonanthroponoses.

INTRODUCTION

The agricultural employee spends the most of his life conducting societally beneficial labor in the field of production or agriculture. The negative impact of many toxic variables on the body of employees has diminished in recent decades, thanks to the introduction of new methods and sophisticated technologies in various areas of industry and agriculture.

This is aided, in particular, by the use of multi-stage mechanisms for heavy physical work, complicated automation of manufacturing processes, equipment sealing, the use of closed and return technological cycles in chemical and raw materials industries, and remote control and monitoring.

A set of widely utilized technological, sanitary, and treatment-and-prevention techniques reduces the frequency of occupational diseases and modifies the structure of businesses. Because of the removal of harmful and toxic substances (such as benzene and other organic solvents) from the manufacturing process, some occupational diseases are no longer found in practice. Occupational diseases are frequently benign, with just minor symptoms.

Simultaneously, numerous new hazardous variables are arising in modern manufacturing firms. Physically hazardous causes such as laser beams, plasma processes, infrared and ultrasonic, and ionizing beams are examples of these.

There are new chemicals being used. They are carcinogenic, mutagenic, allergic, and have other harmful consequences on the human body. Harmful psychophysiological aspects are becoming increasingly important as computer technology becomes more widely used. Because computer operators are frequently physically inert, they suffer from hypodynamics and its effects.

A major problem for the healthcare system, hygiene science, and sanitation is to create a healthy and safe working environment.

Agrotechnical and sanitary-hygienic foundations of agricultural production

Agricultural hygiene is a distinct subset of occupational health. This scientific department investigates the impact of agricultural production labor processes and factors on the human body, and proposes strategies to enhance working conditions on that basis.

Agricultural labor is distinguished by the following characteristics:

First Feature: seasonality, the intensity of extreme weather at specific periods of the year This attribute is more common in southern republics with a more continental climate.

Second feature: work is primarily done in the field (outdoors), and it begins in early spring and continues until late autumn, and even into winter. This situation is determined by the impact of complicated meteorological factors on agricultural laborers, the climatic conditions of the location where agricultural work is performed, the season, and other considerations.

Third feature: changes in labor types are common in agricultural production, which is mainly linked with manual labor.

Fourth feature: the employment is frequently placed a long distance away from the location of home. The sanitary implication is that the worker expends more energy on work. Due to the remoteness of the workplace 25-30 years ago, sheds were built in the fields, and workers rotated their housing seasonally. Field sheds, which are used as temporary resting places for workers and in some farms (Bukhara, Jizzakh, Samarkand, Andijan, Fergana regions) - as temporary medical centers to protect the health of field workers, particularly machine operators, are no longer required due to the advancement of transportation.

Fifth feature: agriculture is characterized by the fact that many chemicals (pesticides) are used in the processing of crops.

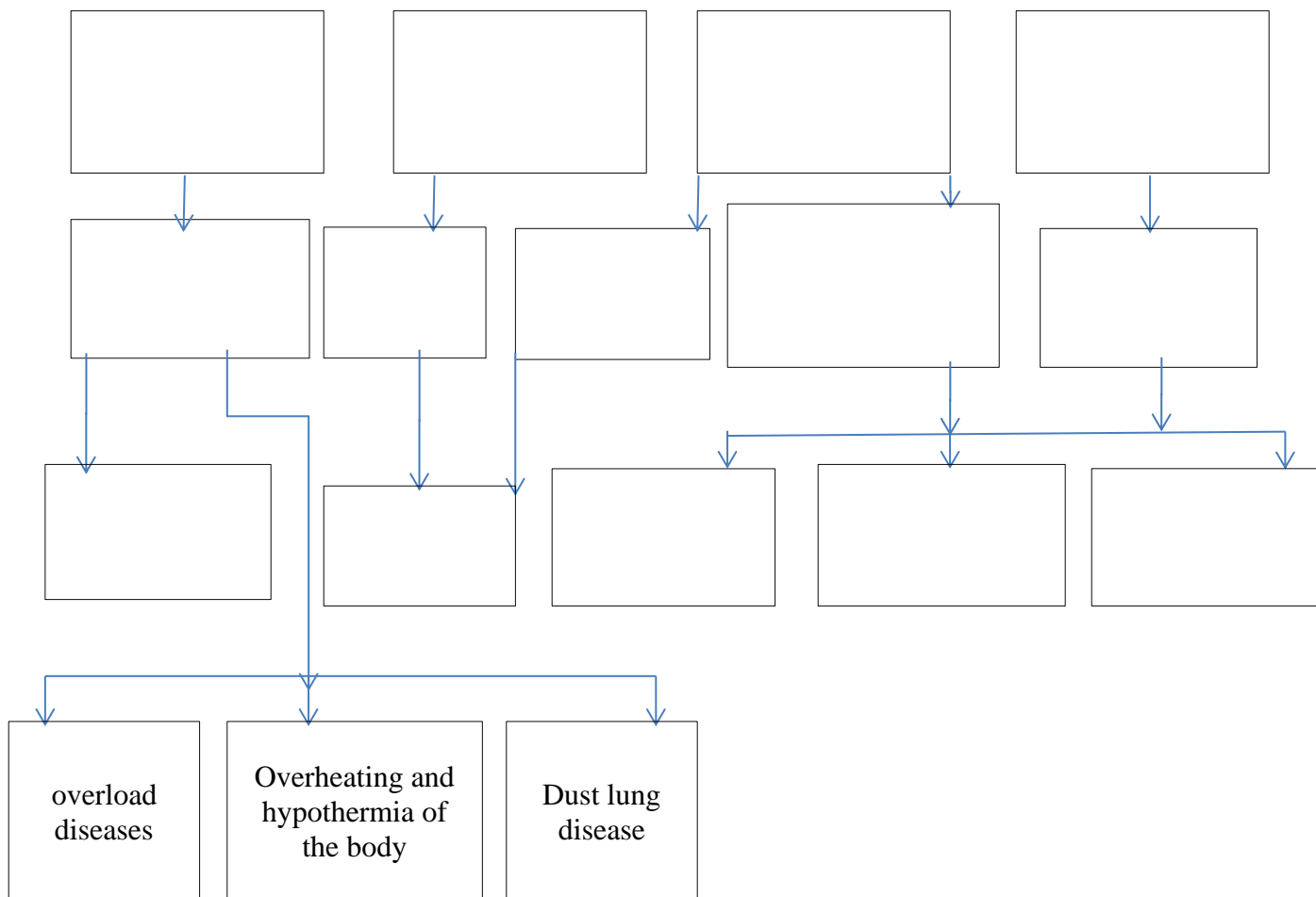
As a result, they damage not only workplaces but the entire biosphere [4, 5, 6, 13, 23]. Many biologically active compounds, biofertilizers, plant growth stimulants, minerals, and other substances are now employed in agriculture. [1, 10, 15, 35].

Science and technology advancements have altered the biological infectious risk in agriculture. At this point, the risk of disease transmission from animals (livestock, poultry farms) to humans occurs (livestock, poultry, etc.) [8, 11, 15, 21].

It is also worth noting that the advancement of animal husbandry and poultry farming increases the production of a wide range of biological and chemical preparations (antibiotics, fungicides, yeast, amino acids, vitamins, etc.). This, in turn, increases agricultural workers' direct interaction with these compounds [18, 19, 21, 22, 28].

Figure 1 depicts information regarding the characteristics of agricultural workers and the factors that influence them.

Problems and their causes of modern agriculture:



The majority of agricultural activity is done outside. The biggest factor impacting the body of workers working outside in Uzbekistan is the weather. Agricultural activity is done in hot weather throughout the summer (non-calendar) months of the year (May-September). Overheating of the body (hyperthermia) is caused by high ambient temperature and sunlight [4, 5, 7, 9, 13, 16].

Many scientists' research (T.I. Iskandarov, 2001; G.T. Iskandarov, 2003) show that when performing agricultural work in the summer, workers are exposed to air temperatures of + 45 + 50 oC.

Aside from high summer temperatures, the air eventually becomes exceedingly dry, with high temperatures, a lot of dust, and other unfavorable natural conditions.

Such weather conditions are extremely harmful to the bodies of agricultural laborers. Machine operators are personally subjected to unusual temperature impacts. The tightness of the cabs of several agricultural tractors protects them from harsh weather conditions to some extent. The absorption of high temperatures by the roof and metal walls of the cabins, on the other hand, causes the temperature within the cabin to rise above the outside temperature. Agricultural activity is done in the spring-autumn season (March-November) at temperatures ranging from +15 to +25 degrees Celsius. The speed of air movement in such conditions is 5-10 m/s, and the relative humidity is 40-80%. (our observations). It is worth noting that the morning temperature in the spring and fall months lowers to + 5 + 8 o, and the wind speed is 12 m/s.

Based on the foregoing, it should be noted that during the summer months, agricultural laborers' bodies are subjected to high temperatures, causing them to overheat. Under the impact of low temperatures, the opposite process - cooling - is found in early spring and late autumn. This, in turn, has a negative impact on the body heat transmission mechanism [12, 27].

Another technique to keep the tractor driver cool is to carefully manage his or her work and relaxation schedule. Work must continue from 5:30 to 11:00 and 16:00 to 20:00 in our hot climate. At the same time, it is critical to give cotton fiber work clothing to agricultural employees. This fabric wicks away moisture, breathes well, and dries swiftly. To keep workers cool in the heat, proper drinking arrangements are essential. To accomplish this, it is preferable to organize green tea, various tinctures, and beverages enhanced with vitamins (A, B, PP, C) for outdoor workers [40, 41].

It is recommended that agricultural machinery operators create facilities for outdoor activities, meals, and showers on farms. It is also critical to construct heated (30-32C) restrooms during the autumn-winter and spring seasons. [39, 41].

The majority of agrotechnical activities take place in the spring (preparation of land for crops, seeding crops, etc.), autumn (harvesting, cleaning the field of plant leftovers), and winter (plowing, leveling, washing saline soils). Workers' bodies cool down during this time of year due to the influence of low temperatures (typically 5-10 oC) [20, 24, 27].

It should be emphasized that cooling the body instinctively causes blood vessels in any organ or area of the body to contract, resulting in pathological alterations in that organ. [12, 15, 20, 26].

Cold and humidity, according to I.P. Pavlova, have a short-term stimulating effect on the human body. Long-term effects include a decrease in the activity of certain organs such as the lungs and kidneys. As a result, infectious agents existing in the body produce diseases such as bronchitis, nephritis, pneumonia, and others. The formation and progression of a cold is based on the reflex process of vascular movement caused by the difference in temperature between the chilled area of the body and the outside temperature. Based on the preceding, the year-round adoption of measures to protect agricultural workers from meteorological environmental elements is the foundation for preventing heat stroke (overheating) and bodily freezing.

Dust is one of the production variables that occurs throughout the farming process in the fields (plowing, planting, growing seedlings, harvesting, livestock farms, vegetable growing, etc.). Through the respiratory system, dust can induce laryngitis, pharyngitis, chronic bronchitis, and pneumoconiosis in agricultural laborers [2, 13, 15, 26, 30, 33].

The major constituent elements of agricultural dust are a mixture of plant and animal parts (mixed dust), and this dust has severe allergens for the human body. [36,37]. Fungi and bacteria thrive in the organic components of the dust, which contains mineral and metal contaminants. For them, growth and reproduction under moderate temperature and humidity conditions can be an extra hazard to the body of agricultural workers [16, 26, 31].

According to V.M. Perelegin (1992) and V.P. Small (1993), 59-98.9% of agricultural dust is fine dispersion of up to 4 microns in size that penetrates deep into the upper and lower respiratory system. As a result, at high concentrations in the air, they endanger human health, and the permitted level of such powders based on silicon oxide II should not exceed 2 mg/m³ (cotton fiber, animal dust).

Soil dust is produced in agriculture during plowing, row spacing, harvesting, animal and bird storage, and field clearing. Al₂O₃, Fe₂O₃, K₂O, Na₂O₂, MgO, and CaO are all found in soil dust. Furthermore, pesticides from chemical soil treatment are present in soil dust. Soil dust contains a variety of bacteria, helminth eggs, and molds, as well as vegetable and mineral salts. Fungi can be found on the soil's surface [28, 32, 36, 38].

Plant dust affects agricultural workers' bodies in agricultural operations. Vegetable dust is produced as a byproduct of plant vitality and industrial plant operations. Our republic's raw cotton cultivation and processing is expanding year after year. This, in turn, increases worker exposure to plant dust. Plant dust containing cotton fiber, according to (T.I. Iskandarov-1998), N.I. Smetanina (1997), and V.M. Perelegin et al. (1992), causes diffuse sclerotic and nodular alterations in the lungs. According to V.M. Perelegina's (1998) scientific study, fibrous plant dust generated in organic and cotton processing plants has no allergenic effects.

The majority of germs and molds are retained by plant dust from cotton manufacturing factories. The World Health Organization's experts (1999) established that continuous exposure to plant dust induces the pathology of byssinosis.

Byssinosis illness is primarily caused by the creation of histamine (with extremely poor connective tissue growth) as the body's primary reaction during its manufacture (pathogenesis) in response to the irritating effect of fibrous plant dust [1, 11, 14, 26].

S.A. Prosvernitsyna et al. (1996) discovered that people who have been exposed to dust for an extended period of time acquire a high amount of cholesterol in their blood and manufacture a large amount of glycoproteins in their blood serum, as well as vitamins B1 and B2.

Based on the aforementioned, it is critical to develop and execute methods to protect employees' health against dust generated during agricultural production.

The industrialization of livestock and poultry farms, as well as the increase in livestock and poultry numbers, resulted in the emergence of biological elements in agricultural output.

The development of biological nutrients (mixtures) for cattle and poultry is underway. The area dedicated to food and industrial crops is likewise growing. Simultaneously, biological agents (rather than insecticides) are routinely utilized to protect crops against pests.

Thus, in animal husbandry, poultry farming and vegetable growing, the interaction of workers with biological factors is enhanced [29, 31, 34].

Biological factors can be conditionally divided into:

1. Organic components (plant fiber, wool, fluff, leather, extracted ether, oil, and so on) derived from plant and animal parts.
2. Aromatic plant components found in essential oils.
3. Saprophytic conditionally harmful microorganisms, pathogenic microflora, viruses, and fungi found in the air, on the surface of objects, and in food products, among other things.

Microorganisms that cause zoonoses.

5. Biologically active chemicals derived from various organic constituents, as well as biological protective agents, and so on.

Allergens, pathogens of infectious and fungal illnesses, and toxic chemicals are biologically damaging agents encountered in agricultural productivity. Microorganisms that induce zoonotic (occupational) diseases in agricultural workers are examples of biological variables.

Zoonoses are infectious and parasitic diseases that affect both animals and humans. Zoonoses are a group of about 100 illnesses with varied etiologies.

The source of zoonoses diseases for humans is first and foremost those animals with which a person frequently comes into contact in the course of economic activity and daily life: agricultural and domestic animals, rodents, as well as wild animals used for hunting. Because of the advancement of globalization processes and the deterioration of the ecological situation, close encounters between people and diverse animal species have become considerably more common than previously.

The control of plant pests, illnesses, and animal ectoparasites plays an essential role in agricultural agrotechnology. Pesticides are used in agriculture to carry out this vital agrotechnical procedure.

Pesticides are well-known plant protection products derived from two Latin words: "pestis" (infection) and "caedo" (kill). Pesticides are used in agriculture for 4.5-5 billion dollars worldwide each year. Pesticide use in agriculture, on the other hand, not only kills pests but can also harm the environment and human health.

Pesticides are used in agricultural technologies to protect plants from pests and illnesses. It should be mentioned that in our country, the use of chemicals in agriculture is prohibited until they have passed a rigorous toxicological and sanitary-hygienic assessment. [4, 12, 18]. Furthermore, low-toxic, ecologically friendly pesticides are now employed in agricultural practice [5, 21, 25].

Pesticide use in agriculture in the republic, particularly the Bukhara region, has been decreasing year after year (in 2018, 14 drugs were used in the country, and 6 in the region). Despite the decline in pesticide use in agriculture, these biologically active compounds continue to be a factor that significantly affects the health of field workers.

Many pesticide formulations are very toxic, resistant to natural degradation, poorly soluble in water, have bioaccumulative qualities in adipose tissue, mobility in food chains, and a strong capacity to accumulate in living creatures. All of these characteristics make pesticides dangerous compounds that endanger the health of not just humans, but also many other organisms. Many insecticides are quite persistent and extend far from the point of application. DDT, for example, was discovered in the livers of penguins in Antarctica in the mid-1960s, far from where the chemical was employed. [3, 4, 7, 18].

Pesticides contain a variety of harmful compounds, including nonferrous metals, that usually wind up in diverse water sources. When polluted reservoir water is utilized for irrigation, nonferrous metals are carried to the fields and concentrated in the uppermost fertile humus-containing soil layer. Metal concentrations in this layer reduce soil nitrogen-fixing capacity and crop yields, as well as metal accumulation exceeding permitted quantities in feed and other products. [17].

Another issue emerged in the second half of the twentieth century: a drop in the content of vitamins and microelements in crop production, as well as a buildup of dangerous compounds (nitrates, pesticides, hormones, antibiotics, and so on) in both crop and livestock products. As a result, pesticides and other dangerous compounds accumulating in various foods have a profound impact on the immune system, particularly the immune system of youngsters, resulting in a higher occurrence of various diseases. Thus, frequently unwell children are a problem with a medical as well as a socioeconomic component that necessitates an integrated approach to its resolution through the implementation of therapeutic, rehabilitative, and preventive measures. [42].

The decline in vitamin and microelement content in agricultural output is due to soil degradation and intensification of production, particularly in animal husbandry. Precision agricultural technologies, for example, are farming practices and technology that mitigate or entirely remove negative influences.

In Uzbekistan, agricultural output employs 44 percent of the labor force and accounts for 17.6 percent of the country's GDP. In this sense, hygienic science is always focused on the issues that people engaged in agricultural production may face. And the primary purpose of agricultural hygiene is to remove the negative elements impacting agricultural workers' health.

The most recent scientific discoveries and the experience of modern agricultural firms are targeted at facilitating agricultural employees' labor and achieving high agricultural productivity. Achievements in biology, chemistry, and other fundamental sciences allow us to effectively care for and cultivate various crops, develop animal husbandry, devise new farming methods, develop new chemical and biological pest control methods, and so on. The quick adoption of such innovations and technology in agriculture will lower the likelihood of inadequate agricultural production parameters affecting worker and environmental health.

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