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DEVELOPMENT OF INDUSTRIAL ANIMAL HUSBANDRY IN THE CONTEXT OF ENVIRONMENTAL PROTECTION

Abstract.
The article considers the ecological and economic consequences of the meat sub complex enterprises. It is determined that the development of animal husbandry, although it plays a strategic role for economic development, on the other hand, it is this sector of the economy that causes the greatest damage to the environment. It is noted that due to the lack of a well-established mechanism for the disposal of waste and animal products, water and soil are polluted, and this industry is one of the largest sources of greenhouse gas emissions into the atmosphere, which has a negative impact on the environment. The analysis of indicators of consumption of natural resources for development of branch is carried out, and also the ways of overcoming of negative influence of animal husbandry on a condition of environment are offered.

Keywords: *livestock, industrial livestock, environmental hazards, waste disposal, greenhouse gases, natural resources, the state of the environment.*

Presenting main material. Livestock is the second most important branch of agriculture after crop production. It provides the population with valuable food, milk, meat, eggs, and food, light, pharmaceutical and other industries with raw materials [1].

The development of animal husbandry, on the one hand, provides the population with the necessary food, the crop industry - organic fertilizers, which increases soil fertility, increases the content of nutrients in it, activates the development of microorganisms that are actively involved in humus formation, affect soil air composition. Cycles of conversion of nitrogen-containing compounds, one of the important links of which is the fixation of nitrogen by soil microorganisms. On the other hand, the intensive development of animal husbandry can have a negative impact on the environment and the health of the population. This is especially true of large industrial farms for keeping livestock and poultry.

The keeping and breeding of farm animals or poultry on a large scale, when their livestock on individual farms reaches thousands, hundreds of thousands or even a million heads is considered industrial livestock. Mainly due to industrial farms, the production of meat and meat and dairy products in the world has almost doubled in the last 30 years. In this regard, Ukraine is no exception. A large part of farm animals and poultry are kept on large industrial farms, which have a detrimental effect on the ecological environment due to the large number of animals kept in a limited area [3].

In the area of livestock complexes, the main problems of ecological importance are eutrophication of water bodies, possible accumulation of pathogenic microorganisms, air pollution by hydrogen sulfide, ammonia, molecular nitrogen and other compounds [2].

Large livestock complexes are a typical example of a local disturbance of the small cycle of organic matter and nutrients, when the global biogeochemical cycle is ultimately affected. As a rule, there is a local violation of the small cycle of substances in the ecosystems of spatially demarcated areas. Fig.1

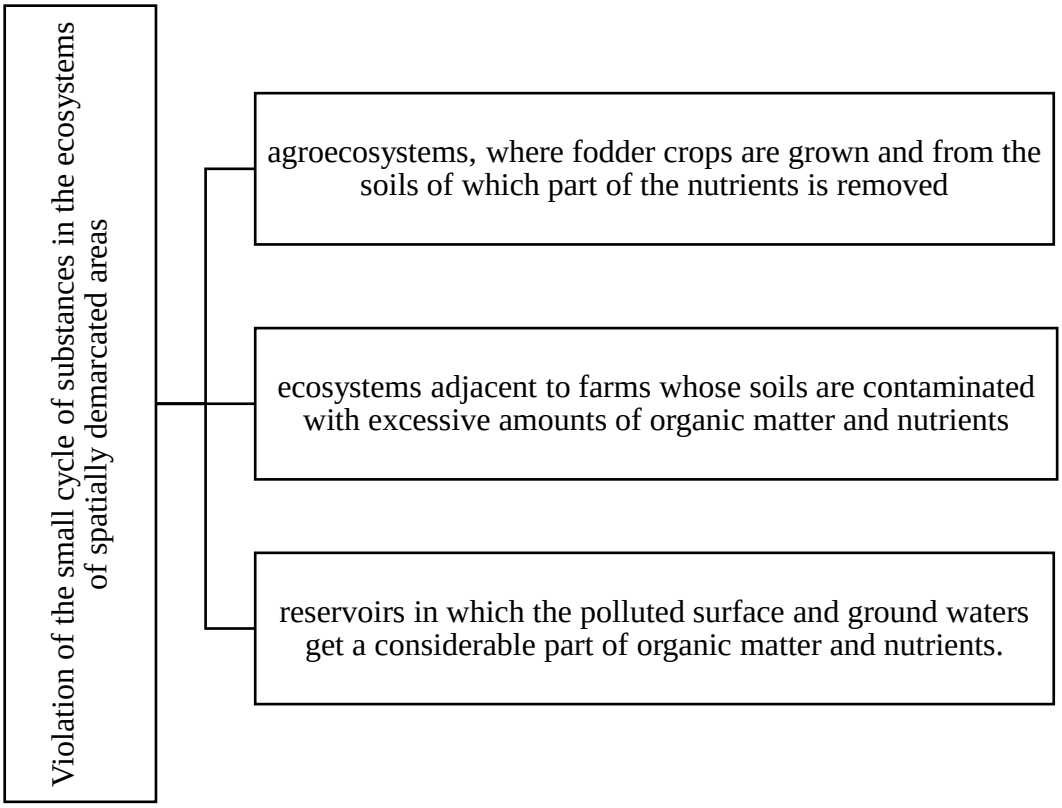

Fig.1 Violation of the small cycle of substances in ecosystems of spatially demarcated areas.
Source: formed by the author based on the source [2].

In Ukraine, industrial farms are considered to be objects of increased environmental danger due to the fact that a high concentration of livestock or poultry requires a large amount of fresh water, which has a significant negative impact on the water balance of the surrounding area. Globally, almost a quarter of all fresh water used by humans goes to livestock or related industries. Depending on the capacity, one industrial farm uses 300-500 m3 of water per day, which is equivalent to the water consumption of a small village. Such calculations include only the amount of water that is directly used to keep the animals, excluding associated costs. For example, 1 kg of chicken meat requires 4,300 liters of water, 1 kg of pork - 6,000, and 1 kg of beef - 15,500 liters [4, 15].

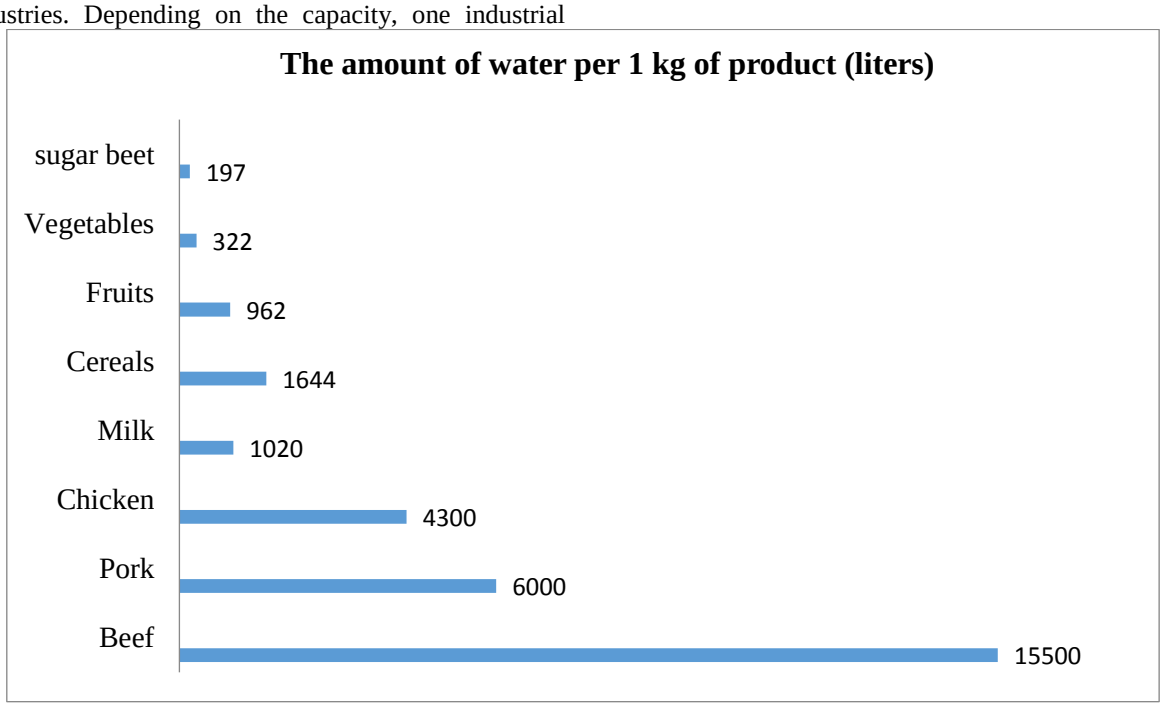

Fig.2 Volumes of water consumption for the manufacture of 1 kg of product
Source: [6]

Such volumes of water consumption negatively affect the water balance of the surrounding area [3].

Livestock complexes pollute surface water, groundwater, as sanitary and hygienic conditions on farms are also mainly maintained by water: for washing animals, cleaning the premises and their disinfection, feed preparation, washing dishes and equipment, manure washing, etc. as a result, a large number of nutrients enters the reservoirs. In natural reservoirs, manure causes mass poisoning of aquatic organisms. The amount of ammonia in the water increases sharply and the oxygen content decreases.

The amount of effluents of livestock complexes is from 250 to 3000 tons per day (from 90 thousand to 1 million tons per year). At the same time, with the growth of water consumption for the needs of animal husbandry, the discharge of wastewater into reservoirs increases, as a result of which they become polluted and lose their useful properties. Even the discharge of small doses of untreated manure-containing wastewater from livestock farms and complexes contains the most dangerous nitrates, nitrogen and phosphorus, which reduces the oxygen content of the water, causes massive fish deaths and causes significant economic damage and water blooms. Due to the excessive content of these substances, 415 areas of the world suffer from algal blooms [6].

Therefore, the intensive and diverse impact of agriculture on the environment is explained not only by the growing consumption of natural resources necessary for the continuous growth of agricultural production, but also by the formation of significant waste and wastewater from livestock farms, complexes, poultry farms and other agricultural facilities.

Sources of wastewater production at poultry farms are the main production facilities (poultry houses, shops for sorting and packing eggs, slaughter of birds and feed preparation, incubators), auxiliary (mechanical workshops, garages, canteens, laboratories, etc.), and residential settlements of poultry. enterprises. The main sources of pollution are technological systems for removal, preparation and disposal of feces and wastewater. Feces, water vapor and gases are released by birds in the course of their life. Wastewater from poultry enterprises is divided into four types:

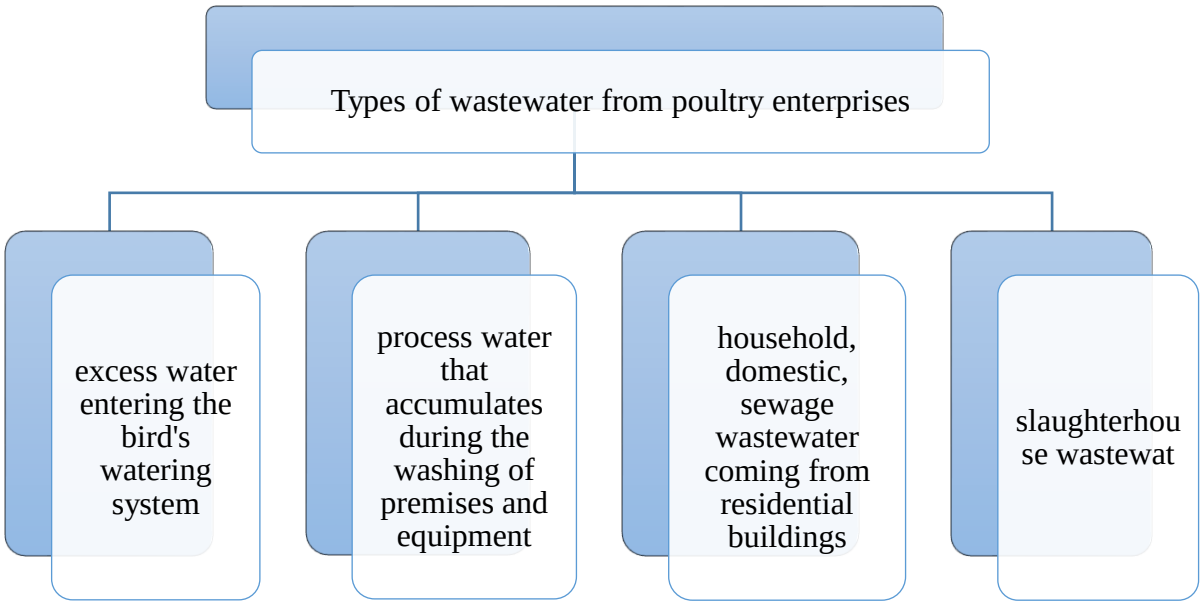

Fig.3 Wastewater from poultry enterprises by species.

Source: formed by the author based on the source [2].

Feces, feed residues, gravel, feathers, eggshells, broken eggs, technical fat, etc. enter the wastewater. On average, 125 tons of feces and more than 1,500 m3 of wastewater accumulate from one poultry farm per 500,000 laying hens or 6 million broilers per day. Sewage of the poultry farm of the egg direction carries intensive organic and bacterial pollution:

BOD5 - 232.7 mg / l,

• suspended solids - 418 mg / l,

• ammonia nitrogen-15.6 mg / l,

• microbial count - 2.1 • 106,

• circle-titer -104.

Bacteriological studies of wastewater have established their contamination with Proteus, Pseudomonas aeruginosa, staphylococci, Escherichia coli, Shigella, Salmonella and viruses [2, 12].

Large livestock complexes and poultry farms in modern conditions remain the most harmful pollutants. At the fattening site, where, for example, 10 thousand heads cattle, up to 200 tons of manure accumulates daily. For example, only a pig complex for 100 thousand heads, or a complex of cattle for 35 thousand heads can pollute the environment at the level of a large industrial center with a population of 400-500 thousand people. The ongoing transformations, changes in forms of ownership and management in the agro-industrial complex have not been accompanied in recent years by the expansion of the use of environmental and resource-saving technologies. As a result, the main indicators of the industry's impact on the environment have not improved significantly in recent years, the environmental

situation in some regions remains unfavorable, and environmental pollution is high. Wastewater from livestock complexes and other agricultural facilities is discharged almost without treatment. Most treatment facilities (78.5%) do not meet regulatory requirements. Inefficient operation of treatment facilities is due to outdated wastewater treatment technologies and equipment wear [5].

Thus, there is a need to develop ways of utilization and rational use of livestock waste.

In addition to significant water abstraction, industrial livestock has a negative impact on the environment due to emissions of ammonia, methane and other gases into the air. The unpleasant odor spreads for kilometers. In addition, emissions from industrial farms are harmful to humans and the environment. The World Food and Agriculture Organization estimates that livestock accounts for 18% of all human greenhouse gas emissions. This is more than the entire transport sector of the planet. Fig.3.

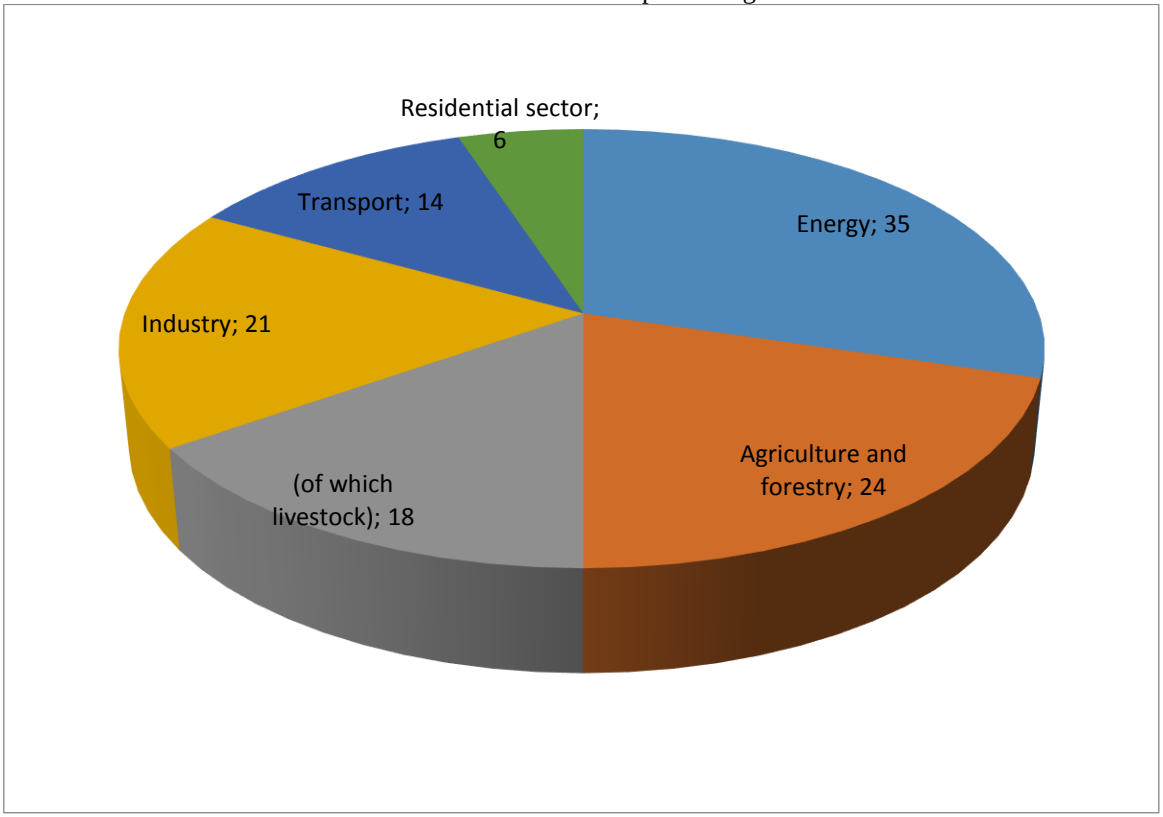

Fig.4 Emissions of greenhouse gases,%.

Source: [6].

Methane emissions from cattle are about 90 million tons per year, or almost 16% of annual global emissions of this greenhouse gas. Violation of manure and manure storage technology leads to emissions of 7% of nitrous oxide from the total volume, which is one of the most dangerous greenhouse gases, because the greenhouse effect caused by one ton of nitrous oxide is equal to the greenhouse effect caused by 296 tons of carbon dioxide [3].

Industrial livestock is a source of three greenhouse gases: methane, nitrogen dioxide and carbon dioxide. Livestock produces 9% of carbon dioxide CO2; 37% enters the atmosphere of methane, which is 23 times more efficiently ignites the planet than carbon dioxide. Methane is formed during digestion in animals and due to the large amount of manure that accumulates on farms; 64% ammonium, which forms acid rain; 65% of nitric oxide, which is 296 times higher than the global warming potential of CO2 [14].

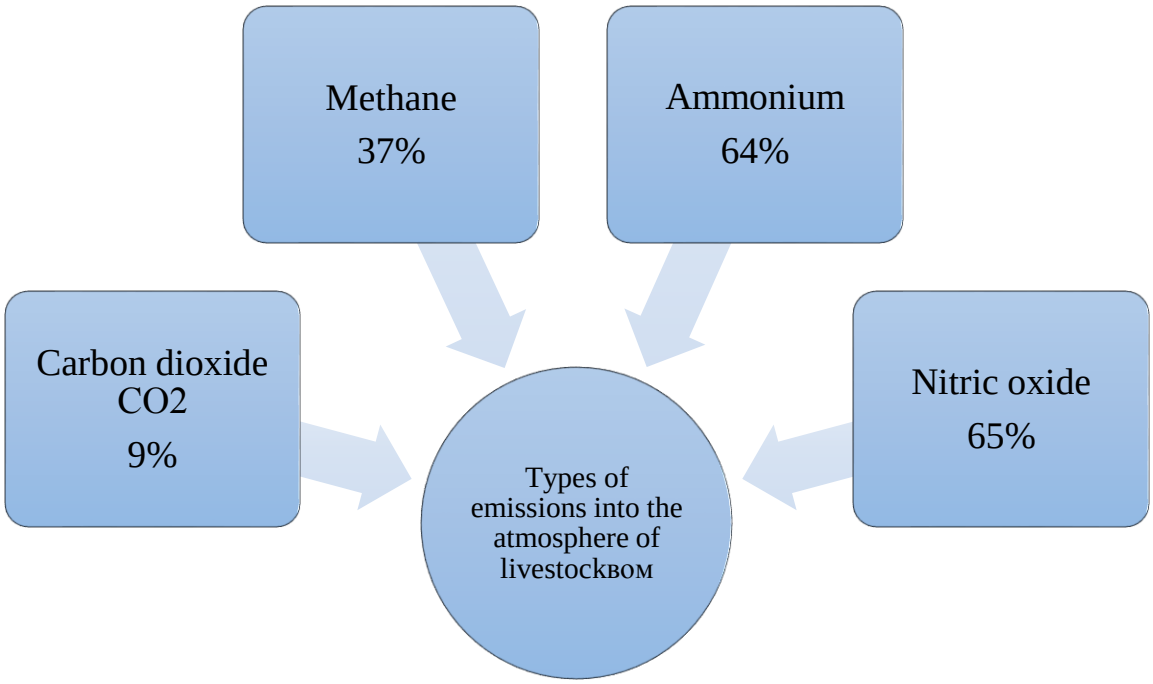

Fig.5 Types of emissions into the atmosphere by livestock

Source: Formed by ators based

Atmospheric air is significantly affected by improper storage and use of litter-free manure. If stored in the open state, ammonia, molecular nitrogen and other compounds evaporate into the atmosphere. In livestock complexes, gases, mainly CO2 and CH4, are formed during animal respiration and manure foaming. Ammonia, hydrogen sulfide, mercaptans, indole and skatole can be released from manure. In addition to gaseous pollutants and microorganisms, the air contains dust from feed, drying waste, wool and animal skins. Its content reaches 4 mg / m3. One pig farm for 40 thousand animals in 1 hour emits up to 9 kg of dust, up to 50 kg of ammonia, 5 kg of hydrogen sulfide, more than 80 billion microorganisms [2].

Chemical and biological pollution of the air is also greatly facilitated by underdeveloped technologies in industrial and livestock complexes and poultry farms. Sources of air pollution are livestock facilities, feeding grounds, manure storages, biological ponds, sewage storage ponds, filtration fields, irrigation fields. In the area of livestock complexes and poultry farms atmospheric air is polluted with microorganisms, dust, ammonia and other products of animal life, spread unpleasant odors (more than 45 different substances). These odors can spread over a considerable distance (up to 10 km), especially from pig farms [5, 14].

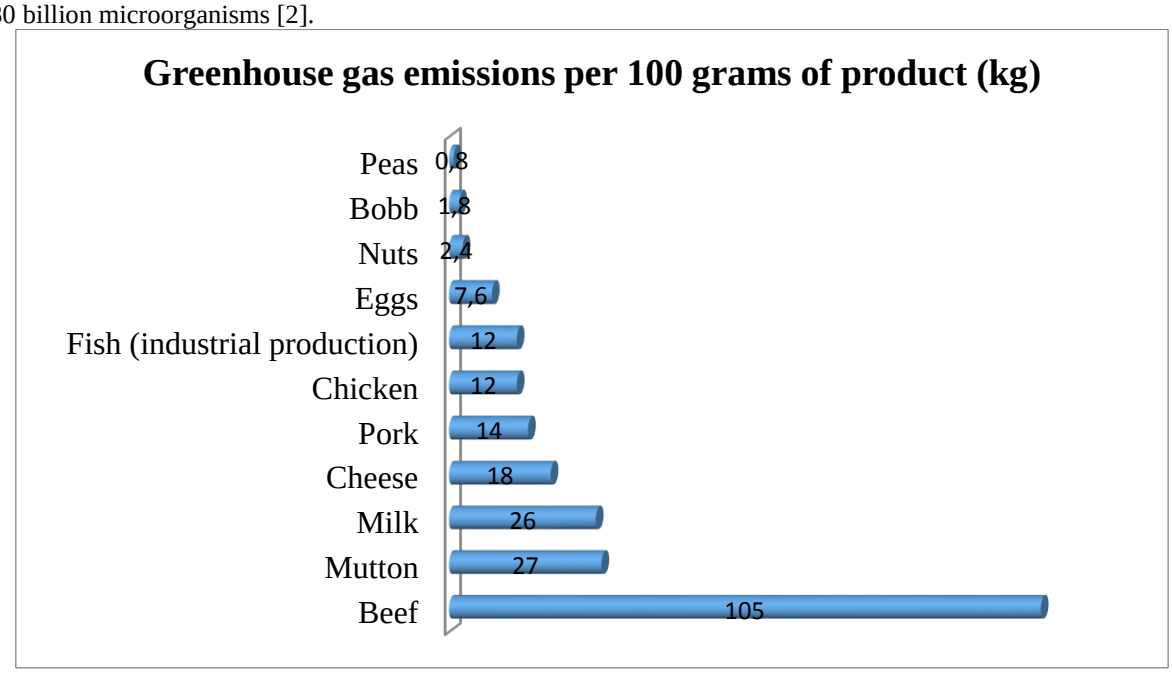

Fig. 6 Greenhouse gas emissions from production

Source: [6]

Having studied the main sources of greenhouse gas emissions in the manufacture of products, it becomes clear that the scale of greenhouse gas emissions is extremely large in the field of animal husbandry. The world's twenty largest meat and dairy companies generate more greenhouse gases than the rest of Germany. Livestock industrial facilities cause enormous damage to the environment. Their emissions lead to the formation of atmospheric aerosol and acid rain, increasing the concentration of greenhouse gases [6, 13].

This sector is the cause of rising carbon emissions, as new pastures are destroying the rainforests of Brazil and Southeast Asia. Forests are also being cut down for animal feed fields.

However, there is a tendency in the world to increase the consumption and, consequently, the production of meat and meat products as the welfare of the population increases. According to forecasts, the volume of meat production in the world in the near future more than double from 229 million tons in 1999/2001 to 465 million tons in 2050, and milk production is likely to increase from 580 to 1043 million tons [7, 16].

If meat consumption increases, efforts to reduce CO2 emissions will be offset and an increase in global temperature by 2 degrees is inevitable. Meat consumption is one of the key causes of climate change on the planet. If people's consumer sentiment does not change, the global trend of increasing consumption of livestock products will only increase the negative impact of the sector on the climate [6, 17].

In agriculture, mainly herbivores are bred, so a plant fodder base (meadows, pastures, etc.) is created for them. Modern livestock, especially high-yielding breeds, are very picky about the quality of feed, so the pastures are selective eating of individual plants, which changes the species composition of plant diversity and without correction can make the pasture unsuitable for further use. In addition to eating the green part of the plant, the soil is compacted, which changes the living conditions of soil organisms [5].

Meat and milk, which provide only 18% of a person's calories and 37% of protein, require 83% of all agricultural land. Abandonment of industrial livestock can free up areas equal to the area of the United States, China, the EU and Australia [6].

Also, a significant negative impact on soils is the introduction of litter-free manure and livestock effluents from cattle and pigs into the soil leads to bacterial contamination. Pathogenic bacteria are stored in the soil under irrigation for 4-6 months. Crops grown on such soils are infected with pathogenic bacteria. In the case of introducing effluents into the soil by sprinkling at a distance of up to 400 m, helminth eggs are spread [2].

When high doses of manure are applied to the soil, soils are phosphated and contaminated with heavy metals. The result of this "Fertilization" of crops is a decrease in soil fertility. In some Asian countries, a quarter of the total area of agricultural land suffers from an excess of nutrients, half of the excess phosphorus in the soil - at the expense of industrial livestock. Industrial livestock is also one of the potential contaminants of soils with pathogenic microorganisms. In order to prevent disease, about half of all antibiotics used by humans in the world are in the livestock industry. Excessive use of antibiotics on farms leads to the emergence and spread of viruses and bacteria resistant to antibiotics. Once in the environment, they cause disease in animals and humans. For example, industrial farm waste may contain a deadly bacterium, antibiotic-resistant methicillin-resistant staphylococcus. Industrial farms can also be major foci of swine or bird flu. In 1918, the H1N1 virus, similar to the current swine flu virus, caused a pandemic that killed about 50 million people worldwide (about 5% of the population). In the following decades, the virus mutated and now has different strains (CIWF. The Role of Factory Farming in the Cause and Spread of Swine Influenza. 2009). In 2009, the World Health Organization officially announced the outbreak of an epidemic caused by one of the H1N1 strains (IRD: A / California / 04/2009 (H1N1) - swine flu. It is a new virus that has emerged in the pig population and can infect humans. It is well known that farms in general, and especially industrial, as well as poultry complexes are built outside cities, mainly in rural areas, which creates environmental and domestic problems. Locals living near such farms often complain of unpleasant odors, ill health, low water levels in wells and contamination with toxic substances, as well as contamination of the surrounding area with livestock waste. During the construction and operation of farms, large trucks drive on rural roads, which in the vast majority do not have a hard surface and break them. The local population suffers from negative consequences, while receiving insignificant economic benefits, as modern methods of industrial enterprises require a minimum number of jobs. In addition, in order to prevent the spread of disease and in accordance with the requirements of sanitary safety, workers must be deprived of contact with livestock and poultry, and the vast majority of farmers have their own small farms. . For local communities, the construction of a biogas plant on industrial farms would help to partially solve environmental problems, such as reducing odor and the risk of manure seeping into groundwater and surface water, and reducing greenhouse gas emissions. However, the biogas plant, as well as the introduction of other modern technologies, will only partially reduce the impact of livestock complexes on the environment. It will not be able to solve the problem of using a significant amount of water, the development and spread of viruses, and so on. Therefore, instead of large industrial farms it is necessary to develop small farms and small complexes. In contrast to Ukraine, the world community has long raised the issue of violating ethical standards of animal treatment on large industrial farms, where harsh conditions are created for their maintenance [3].

In Ukraine, industrial farms for pigs, livestock, fur animals, poultry, meat processing plants and waste disposal enterprises are objects of increased environmental danger. Following Ukraine's accession to the Paris Convention and the signing of the Association Agreement, the government included pollution from agricultural activities in draft laws and strategic documents.

First, in the draft amendments to the law "On the basic principles of state environmental policy of Ukraine for the period up to 2020" Ministry of Ecology proposes to include the agro-industrial complex in the list of sectors that have the greatest impact on climate change.

Second, the 2050 Low-Carbon Development Strategy commits the government to implementing measures that will improve waste management processes.

Third, this issue is part of the National Waste Management Strategy. Ukraine has committed itself to implementing Directive 2010/75 / EU on industrial emissions, to create economic incentives for the collection, use and recycling of waste, and to encourage the use of biomass for energy production.

Fourth, Ukraine has a law on strategic environmental assessment, which requires economic activity to be assessed for environmental impact.

Conclusions: Thus, the development of meat products subcomplex plays an important role in the economy of any country, as it is one of the priority sectors of the economy, as well as ensuring food security. But after examining the impact of the industry on the environment, it is clear that further development of the industry in the same vein, without measures to reduce the negative effects on the environment, can lead to irreparable environmental consequences that not only affect the environment but also health. me and the life of the population. To reduce the negative impact of animal husbandry on the environment on all livestock complexes and large specialized farms, it is now mandatory to have perfect sewerage networks and treatment facilities that would reliably protect the environment, including water bodies, from pollution. Currently, the following methods of wastewater treatment of agricultural production are widely used:

- complete biological treatment according to a special scheme and use for soil fertilization of sewage sludge; - separation of waste into solid and liquid fractions with the subsequent use of water for irrigation, and solid sludge in the form of fertilizer;

- composting of effluents with peat crumbs and organic agricultural waste in special storage facilities, the compost obtained in this way is used as organic fertilizers.

One of the promising areas for solving environmental problems and obtaining additional energy resources and at the same time integrated use of industrial livestock waste can be considered the production of biogas from them. The latter is a product of processing organic livestock waste using so-called methane microorganisms. This gas can be used to heat water and prepare feed. When biogas is obtained without air access, the processed manure completely retains nitrogen in the organic fertilizer (whereas during composting almost half of the nitrogen is lost). In addition, under such conditions, weed seeds contained in livestock waste lose their germination, and pathogenic microbes, helminth eggs, etc. are neutralized [3]. Another method of reducing the negative impact of the livestock industry on the environment is to reduce meat consumption. If you eat beans, vegetables and fruits instead of meat, it is possible to reduce greenhouse gas emissions by a quarter.

One of the ways to green livestock is to improve the technology of utilization of by-products and livestock waste in the direction of full use of physical mass and nutrients of manure and manure, which reduces pollution of water sources and the release of ammonia and greenhouse gases. To overcome the negative environmental consequences during the processing of manure and manure, it is advisable to organize their industrial processing to obtain organic fertilizers, as well as to use bioenergy plants. The adoption of each of these decisions has the following advantages, first, for industrial processing: preservation of nitrogen, phosphorus, potassium and other elements contained in the primary fresh raw materials; fermentation takes place under appropriate supervision, so you can make the necessary amendments to the process in a timely manner; destruction of emissions of unpleasant odors during storage and use; obtaining environmentally friendly organic fertilizers in concentrated form. Secondly, the consumer's interests in the purchase of organic fertilizers are preserved, which makes it possible to abandon the use (or reduce the use) of mineral fertilizers. As a result - obtaining environmentally friendly products, increasing crop yields, improving the biological and physicochemical properties of soils. Promising is the production of eco-safe organo-mineral fertilizers based on chicken manure, wastewater, which not only increase crop yields, but also the ecological condition of the soil. Given the current realities, the introduction of biogas technologies is considered as one of the possible ways to achieve energy independence of Ukraine. In the future, biogas plants will be able to produce in Ukraine from 2.6 to 18 billion m3 of natural gas per year [17].

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FORMATION OF THE MECHANISM OF ANTI-CRISIS MANAGEMENT IN AGRICULTURAL ENTERPRISES

Abstract.
The article substantiates the theoretical and practical aspects of the formation of crisis management and the development of crisis programs of agricultural enterprises in modern economic conditions. The components of the crisis management mechanism in agricultural enterprises have been clarified. The stages of crisis management at agricultural enterprises are described. The requirements for the development of the anti-crisis program of agricultural enterprises are considered. The parameters for carrying out anti-crisis measures at agricultural enterprises have been clarified. The algorithm of actions for stabilization of agricultural enterprises is substantiated.

Keywords*: anti-crisis management, anti-crisis management mechanism, preventive anti-crisis management, reactive anti-crisis management, situational anti-crisis management, anti-crisis program.*

Formulation of the problem. Modern economic conditions for the operation of enterprises often lead to the development of a crisis. Domestic agricultural enterprises operate in conditions of financial difficulties due to the instability of the economic situation, inefficient use of funds, unbalanced financial flows, inflation, etc.

Overcoming the crisis of agricultural enterprises requires in each case adequate, unique and comprehensive application of crisis management, which would aim to minimize the risk of losing control over the situation and its development in a natural, destructive scenario.

Analysis of recent research and publications. Problems of crisis management are revealed in the research of economists: K. Golovach [1], V. Koyuda [3], L. Ligonenko [5; 6], I. Makarenko [7], V. Makhovka [8], S. Ramazanov [10], P. Stetsyuk [11], O. Tereshchenko [12], O. Khandiy [13] and others. These studies are devoted mainly to the theory and methodology of