ENVIRONMENTALLY FRIENDLY METHODS TO REDUCE AIR POLLUTION

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Annotation. The purpose of this article is to examine the problems associated with atmospheric changes caused by rapidly developing countries. Statistical research and comparative analysis were used to study the processes associated with air pollution and the technological solutions used to address these issues. The pros, cons, and disadvantages of global development for human health were also examined using analytical methods. These methods revealed that clean transportation is a unique tool for reducing air pollution. Furthermore, it was established that reducing sources of air pollution is essential. Sustainable development is also essential for a healthy lifestyle.

Keywords: Industry, ecotransport, sprayer, biotechnology, atmosphere, problem, dust, microparticles, ecosystem, biosystem, aerosol, pressure, control systems, sustainable development.

Аннотация. Цель представленной статьи — изучение проблем, связанных с атмосферными изменениями, вызванными быстро развивающимися странами. Для изучения процессов, связанных с загрязнением воздуха, и технологических средств, используемых для решения этих проблем, применялись методы статистического исследования и сравнительного анализа. Также на основе аналитического метода были изучены плюсы, минусы и недостатки глобального развития для здоровья человека. С помощью этих методов было выявлено, что экологически чистый транспорт является уникальным инструментом снижения загрязнения воздуха. При этом было установлено, что необходимо сокращать источники загрязнения воздуха. Также было выявлено, что для здорового образа жизни необходимо регулировать устойчивое развитие.

Ключевые слова: Промышленность, экотранспорт, распылитель, биотехнология, атмосфера, проблема, пыль, микрочастицы, экосистема, биосистема, аэрозоль, давление, системы управления, устойчивое развитие.

Annotatsiya. Taqdim etilayotgan maqolaning maqsadi, jadal bilan rivojlanayotgan mamalakatlar sabab, atmosferaning o‘zgarishi bilan bog’liq muammolarni o’rganish. Xavo ifloslanishi bilan bog’liq jarayonlarni va muammolarni xal qilish uchun qo’llaniladigan texnologik vositalarni o’rganish uchun, statistik tadqiqot va qiyosiy tahlil usullari qg‘llanildi. Hamda, inson salomatligi uchun global rivojlanishning plyus-minus tomonlari va kamchiliklari taxlillash usul asosida

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o’rganildi. Ushbu usullar yordamida, ekologik toza transportlar, havo ifloslanishishini kamaytirish uchun qo’llaniladigan noyob vosita ekanligi aniqlandi. Shu bilan birga, havo ifloslanishiga sabab bo’lo’vchi manbalarni kamaytirish kerakligi aniqlandi. Hamda, sog‘lom turmush tarzi uchun, barqaror rivojlanishni tartibga solish kerakligi ma’lum bo’ldi.

Kalit sg‘zlar: Sanoat, ekotransport, purkagich, biotexnologiya, atmosfera, muammo, chang, mikrozarracha, ekotizim, biotizim, aerozol, bosim, boshqaruv tizimlari, barqaror.

INTRODUCTION.

Air pollution is a serious environmental problem due to its significant impact on the dynamics and health of ecosystems. This article examines the impact of air pollution on ecosystems, its causes, chemical composition, ecology, and atmospheric consequences.

Currently, due to the rapid development of countries, numerous problems related to changes in the Earth's atmosphere are emerging. This is undoubtedly dangerous for ecosystems and biosystems. This article presents information on the study of sustainable strategies for eliminating air pollution and promoting a clean and healthy environment. It also highlights the results of measures taken to reduce air pollution sources, ensure sustainable development, and find long-term solutions.

Problems related to air pollution are worsening every year. Preventing this threat is of paramount importance to human health.

Air pollution negatively impacts the balance of atmospheric processes. This means that harmful substances disrupt the Earth's radiation balance by absorbing and scattering sunlight. They alter weather patterns. This, in turn, significantly contributes to climate change.

LITERATURE ANALYSIS: Everyone should contribute to a healthy lifestyle. It's essential to conduct inspections in areas where environmental pollution is observed. During such raids, it is necessary to regularly monitor enterprises, industrial facilities, greenhouses, etc. that violate environmental standards [2,6]. In particular, it is necessary to identify those who use tires, bitumen, fuel oil, used motor oil, film, rubber, wool fiber and other materials for heating purposes, take appropriate measures and provide them with advice. Urban air pollution can be reduced by expanding the market share of clean vehicles [2,9].

Changes in the Earth's atmosphere caused by rapid development of countries have serious consequences for health, since pathogens of all diseases initially accumulate in the respiratory tract. This can lead to cardiovascular disease, lung

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cancer, asthma, and premature death. It is especially dangerous for children and the elderly who already have health problems [4,7,14].

Air pollution is caused not only by emissions from various industries, but also by natural and anthropogenic factors, fossil fuels, and certain beneficial chemicals (insecticides and pesticides). Agricultural and automobile emissions play a particularly significant role. The interaction of pollutants in the atmosphere forms smog and acid rain, which further harms ecosystems [2,7].

RESEARCH METHODOLOGY: This study utilized the following methods. Statistical research and comparative analysis were employed to examine the problems associated with atmospheric air quality in developing countries. Analytical methods were also used to examine the benefits and drawbacks of global development for human health. These methods established that eco-technological tools should be used to address the processes and problems associated with air pollution. These methods demonstrated that clean transportation is a unique tool for reducing air pollution. At the same time, it was established that it is essential to reduce sources of air pollution. It also became clear that sustainable development is essential for a healthy lifestyle.

DISCUSSION AND RESULTS: Along with policy, governance systems, thanks to modern technological innovations, contribute to the development of measures to mitigate the effects of climate change. In this context, sustainable urban planning, industrial and agricultural practices, climate change, as well as economic and social aspects play a major role. They serve to inform and inspire action to ensure clean air and a healthy environment.

At present, it is necessary to expand the use of new innovative devices for cleaning the atmosphere from various toxic microparticles [1,10,11]. Let's take a look at some of these eco-friendly vehicles:

- Sprayers and nozzles are used to atomize liquids, suspensions, and powders into fine droplets or particles to disperse toxic microparticles over long distances. They are used to create aerosols or mists. At the same time, such transport methods are also used in horticulture for various insecticides. In industry and medicine, they rely on the creation of pressure, which disrupts the flow and breaks it into microparticles as it passes through very small microobstacles.

- Mechanical sprayers, such as household cleaners, use a pump to create pressure that forces liquid through a hose, turning it into a mist.

- Engine injectors, such as those found in diesel engines, create high pressure to spray fuel into a special chamber where it is atomized for better mixing with air.

- Spray dryers are used to produce powders from solutions or suspensions, where the droplets are instantly dried by atomization in a stream of hot air.

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- Aerosol cans contain active ingredients and a propellant - compressed gas. These devices operate by dispensing a spray when a valve is pressed.

In addition to those already mentioned, there are many other types of atomizers that perform unique tasks in the following areas: In everyday life – for air purification and humidification; in perfumery – as a nutrient; in industry – as a dye, coating and for drying; in agriculture – to protect plants from excessive influence; in medicine – to treat respiratory infections, and so on [3,12,13].

Based on international experience in the environmental modernization of large cities, it is necessary to develop measures to reduce air pollution. Modern solutions for improving atmospheric quality must be implemented. This requires the use of modern innovations [5,8]. For example, it is necessary to introduce the use of dispersing devices that spray toxic microparticles over long distances (Fig). The installation locations for this equipment must be carefully selected.



Fig. ***Image source*** **- https://www.gazeta.uz/uz/2025/11/26/water-spray/**

Climate change also impacts ecosystems, leading to biodiversity loss, vegetation damage, soil degradation and water pollution.

Based on the above, it can be said that atmospheric pollution is extremely dangerous not only for human health, but also for all ecosystems and biosystems on Earth.

It is crucial to implement effective strategies to preserve the natural state of biosystems and ecosystems [5].

Despite large-scale efforts to reduce air pollution, the problem remains unresolved due to a number of obstacles. The number of environmental factors hindering the achievement of sustainable air quality is not decreasing, but rather

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growing. All measures aimed at combating air pollution require both local and regional initiatives and global cooperation. The use of renewable energy sources such as solar, wind and hydropower needs to be controlled. We need to find ways to reduce our use of fossil fuels, which in turn will reduce emissions from electricity production.

Green transport prevents industrial pollution. For example, it controls emissions of pollutants such as sulfur dioxide, nitrogen oxides, particulate matter, and volatile organic compounds. This is the foundation for minimizing pollution. Emissions can be reduced by increasing investment in public transport infrastructure and using electric and hybrid vehicles.

Experts, including those monitoring air quality, should develop monitoring networks, control mechanisms, and reporting requirements by developing regulatory standards. Such actions, or similar outreach efforts, raise awareness of air pollution issues, mobilizing people to protect a clean environment.

CONCLUSION. Based on the above, we can conclude that environmental pollution causes an imbalance in the atmosphere. Improving the quality of the atmosphere can be achieved by taking steps to reduce these environmental problems. To achieve effective results, modern innovations must be used rationally. This includes the rational use of dispersion devices that disperse toxic microparticles over long distances. At the same time, it is advisable for each person to make their contribution to the formation of a healthy lifestyle.

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