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NEGATIVE IMPACTS OF THE SUPERPHOSPHATE PLANT IN SAMARKAND ON THE ENVIRONMENT

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KALIT SO‘ZLAR/ КЛЮЧЕВЫЕ СЛОВА
Samarqand superfosfat zavodi, ekologik muammolar, atrof-muhit ifloslanishi, Sovet sanoatlashtirish siyosati, kimyo sanoati, mineral o‘g‘itlar, sulfat kislota, sanoat chiqindilari, oqova suvlar, atmosfera ifloslanishi, tuproq degradatsiyasi, Zarafshon daryosi havzasi, ekologik tarix, barqaror rivojlanish, ekologik boshqaruv, aholi salomatligi, O‘zbekiston

ANNOTATSIYA/ АННОТАЦИЯ
Mazkur maqolada Sovet davrida O‘zbekistonda faoliyat yuritgan yirik kimyo korxonalaridan biri bo‘lgan Samarqand superfosfat zavodining atrof-muhitga ko‘rsatgan salbiy ta’siri tarixiy-ekologik nuqtai nazardan tadqiq etilgan. Tadqiqotda zavodning tashkil etilishi, rivojlanish bosqichlari hamda qishloq xo‘jaligi ehtiyojlari uchun mineral o‘g‘itlar va sulfat kislota ishlab chiqarishdagi o‘rni yoritilgan. Arxiv hujjatlari, statistik ma’lumotlar, tarixiy manbalar va ilmiy adabiyotlar asosida korxona faoliyati natijasida yuzaga kelgan ekologik muammolar kompleks ravishda tahlil qilingan. Maqolada ishlab chiqarish jarayonlaridan hosil bo‘lgan zaharli chiqindilar, sanoat oqova suvlari va atmosfera emissiyalarining Samarqand viloyati ekologik holatiga ta’siri o‘rganilgan. Xususan, tozalanmagan oqova suvlarning Chashma soyiga va u orqali Zarafshon havzasiga tashlanishi suv resurslarining ifloslanishiga, qishloq xo‘jaligi yerlarining ekologik holati yomonlashishiga hamda aholi salomatligi uchun xavf tug‘ilishiga sabab bo‘lgani ko‘rsatib berilgan. Sulfat kislota ishlab chiqarish jarayonida ajralib chiqqan zararli gazlar va kimyoviy moddalar esa atmosfera havosining ifloslanishiga olib kelgan. Shuningdek, ishlab chiqarish chiqindilarining to‘planishi va ularni zararsizlantirish tizimlarining yetarli darajada rivojlanmaganligi ekologik muammolarni yanada kuchaytirgan. Tadqiqot natijalari Samarqand superfosfat zavodining ekologik oqibatlari Sovet davridagi markazlashgan sanoat siyosati bilan chambarchas bog‘liq ekanligini ko‘rsatadi. Ishlab chiqarish hajmini oshirishga qaratilgan siyosat ekologik xavfsizlik talablarining ikkinchi darajaga tushib qolishiga olib kelgan. Mazkur tadqiqot mintaqaning ekologik tarixini o‘rganish, sanoatlashtirishning uzoq muddatli oqibatlarini baholash hamda zamonaviy ekologik boshqaruv va barqaror rivojlanish strategiyalarini ishlab chiqishda muhim ilmiy ahamiyatga ega.

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ANNOTATION
This article examines the environmental consequences of the activities of the Samarkand Superphosphate Plant, one of the largest chemical enterprises established in Uzbekistan during the Soviet period. The study analyzes the historical conditions that led to the construction and expansion of the plant and investigates its role in supporting agricultural production through the manufacture of mineral fertilizers and sulfuric acid. Based on archival documents, statistical data, historical literature, and official reports, the research explores the impact of industrial activities on the natural environment of the Samarkand region. Particular attention is paid to the pollution of water resources, atmospheric air, and soil caused by industrial emissions, untreated wastewater, and the accumulation of chemical waste. The article demonstrates that the discharge of wastewater into local streams and canals, especially the Chashma stream connected to the Zarafshan River basin, contributed to the deterioration of water quality and posed risks to agricultural lands and public health. Furthermore, the operation of sulfuric acid production facilities resulted in the release of harmful substances into the atmosphere, negatively affecting both workers and nearby residents. The study also highlights deficiencies in environmental management, including the absence of effective wastewater treatment systems, inadequate waste disposal infrastructure, and insufficient environmental monitoring mechanisms. The findings reveal that the ecological problems associated with the Samarkand Superphosphate Plant were largely the result of Soviet industrial policies that prioritized production targets and economic growth over environmental protection. The article argues that the environmental degradation observed in the region reflects broader structural characteristics of the Soviet industrial system. By examining the historical experience of the Samarkand Superphosphate Plant, the study contributes to a deeper understanding of the relationship between industrial development and environmental sustainability and offers valuable insights for contemporary environmental policy and sustainable industrial management in Uzbekistan.

Introduction. Environmental protection has become one of the most urgent global challenges of the twenty-first century. Rapid industrialization, urban expansion, and the intensive exploitation of natural resources have significantly increased the pressure on ecosystems, resulting in widespread air, water, and soil pollution. In many post-Soviet countries, including Uzbekistan, environmental degradation is closely linked to the industrial development policies implemented during the Soviet period, when economic productivity was often prioritized over ecological sustainability.

Ecology is one of the most pressing social problems of our time. Its solution is in the interest of all peoples, and the present and future of civilization depend significantly upon it[1]. Environmental problems have emerged in different ways in all countries of the world. It is not incorrect to view the environmental problems in Uzbekistan as a consequence of the industrialization policy of the Soviet era. Over years, water, soil, and air were polluted by waste from industrial enterprises.

It is well known that environmental pollution has far-reaching effects on life. The greatest danger is that due to the increase of chemical mutagens in the environment, dangerous mutations can occur in the human body. This leads to an increase in mentally and physically underdeveloped children, and in some families, no children are born at all.

Literature review. The environmental consequences of industrial development in Uzbekistan, particularly during the Soviet period, have attracted increasing scholarly attention in recent decades. Researchers have examined the relationship between economic modernization, industrial expansion, and ecological degradation, emphasizing that environmental concerns were often subordinated to production targets. In this context, the case of the Samarkand Superphosphate Plant represents an important example for understanding the ecological costs of industrialization in Central Asia.

General issues of environmental protection and sustainable development in Uzbekistan are discussed in the work of Karimov, who emphasizes that ecological security constitutes an essential component of national development and public welfare. According to the author, the irrational use of natural resources and the accumulation of industrial waste can create long-term environmental and social challenges [1, p. 508]. Although the study focuses primarily on contemporary environmental

policy, it provides a conceptual framework for evaluating historical ecological problems inherited from previous economic systems.

The historical and economic development of Samarkand has been examined in detail by Umnyakov and Aleskerev. Their research highlights the rapid industrial growth of the region during the Soviet era and describes the expansion of chemical, textile, and mechanical engineering enterprises [2, p. 126]. The authors note that industrial production became one of the dominant sectors of the regional economy, transforming Samarkand into a major industrial center. However, their work pays limited attention to the environmental implications of this process, thereby leaving space for further investigation of industrial pollution.

The role of Uzbekistan's industry within the broader economic structure of the Soviet Union has been analyzed by Haydarov. The author argues that industrial enterprises in Uzbekistan were integrated into the centralized Soviet economic system and primarily served the needs of all-union production chains rather than local development objectives [3, p. 48]. This perspective is particularly relevant for understanding why chemical enterprises such as the Samarkand Superphosphate Plant prioritized fertilizer production for cotton cultivation while environmental protection measures remained insufficient.

Geographical and socio-economic characteristics of Uzbekistan, including the Samarkand region, are presented by Akhmedov and Saidaminova. Their study provides valuable information regarding the natural resources, agricultural lands, population distribution, and industrial infrastructure of the region [4, p. 112]. These factors are important for assessing the environmental vulnerability of Samarkand, where industrial facilities were often located close to residential districts and water resources.

One of the earliest descriptions of Samarkand's industrial sector can be found in the work of Kavynev. The author documents the establishment of the superphosphate plant and outlines its production capacity, emphasizing its significance for agricultural development [5, p. 119]. While the publication reflects the optimistic discourse of Soviet industrial policy, it nevertheless provides valuable factual information concerning the plant's technological structure and production processes. Similar information is repeated in later studies devoted to the economic achievements of the region.

The industrial achievements of Samarkand during the 1960s are further described by Akramova, who notes the increasing production volumes of chemical enterprises and their contribution to the fulfillment of state economic plans [6, p. 83]. The study highlights the strategic importance of fertilizer production but does not address the environmental risks associated with sulfuric acid manufacturing and the accumulation of industrial waste. Consequently, contemporary researchers must supplement such economic analyses with ecological assessments.

Scientific and technological aspects of industrial development in Uzbekistan have been explored by Akhmedov, Gafurov, and Ahmedov. Their work discusses the modernization of industrial enterprises and technological innovations introduced in the republic [8, p. 30]. However, the authors primarily focus on production efficiency and economic performance, reflecting the dominant Soviet approach that often neglected environmental considerations.

Information regarding the industrial specialization of Uzbek cities is presented in the collective work edited by Zotov and Raimov. The authors provide statistical data on the production of mineral fertilizers, cotton fiber, silk, and other industrial goods in the Samarkand region [9, p. 169]. These data demonstrate the substantial scale of industrial activity and indirectly explain the growing pressure on natural ecosystems caused by expanding production capacities.

Particularly valuable for the present research are archival documents preserved in the National Archive of Uzbekistan. Materials from Fund R-2742 contain evidence concerning deficiencies in environmental protection measures, including the absence of dust collection systems, wastewater treatment facilities, and air purification technologies at several industrial enterprises [10, p. 39]. These documents reveal the practical environmental challenges that accompanied industrial growth and provide insight into the institutional weaknesses of environmental management.

Archival records from Fund 2598 are especially important for understanding the environmental impact of the Samarkand Superphosphate Plant. These documents contain detailed information about the plant's structure, production facilities, operational problems, and waste disposal practices [12, p. 5]. They indicate that the enterprise functioned for many years without adequate wastewater treatment infrastructure and discharged industrial effluents into nearby watercourses. Additional archival materials describe the sulfuric acid facilities, repair workshops, and other production units that contributed to environmental pollution [13, p. 6]. Furthermore, reports on technological malfunctions and increasing atmospheric emissions demonstrate the growing ecological risks associated with the plant's operation [14, p. 14].

The reviewed literature shows that existing studies have primarily focused on the economic achievements and industrial development of Samarkand during the Soviet period. Although some sources mention environmental issues, comprehensive analyses of the ecological consequences of the Samarkand Superphosphate Plant remain limited. Therefore, the present study seeks to fill this gap by integrating historical, archival, and environmental evidence to assess the negative impacts of fertilizer production on water resources, soil quality, air pollution, and public health in the Samarkand region.

Methodology. This study employs a historical-ecological research approach to examine the environmental impacts of the Samarkand Superphosphate Plant during the Soviet period. The research is based on the analysis of archival documents, official statistical reports, historical publications, and scientific literature related to industrial development and environmental conditions in the Samarkand region. Comparative and chronological methods were used to trace the establishment and expansion of the plant and to identify changes in environmental conditions over time. In addition, a content analysis of archival materials from the National Archive of Uzbekistan was conducted to evaluate evidence concerning industrial emissions, wastewater discharge, waste accumulation, and environmental management practices. The collected data were interpreted within the broader context of Soviet industrialization policies and their ecological consequences for the region.

Results. The Samarkand region is the industrial and cultural center of Uzbekistan after Tashkent. Already during the Soviet era, it occupied the fourth place among the cities of the fraternal republics of Central Asia in terms of industrial production and the growth of industrial sectors[2]. The enterprises of the Samarkand region mainly manufactured spare parts for cotton cultivation machinery and repaired them. However, many industrial enterprises in the region lacked skilled workers such as locksmiths, mechanics, and turners. In 1945, technical specialists of various nationalities began working in the MTS and MTM enterprises. However, these groups consisted of only ten people and were temporary. Therefore, even simple repairs to technical equipment in the industrial enterprises could sometimes not be carried out in a timely manner.

In the years following the Second World War, for the further development of the national economy, the Soviet government adopted the proposal of the Central Committee of the CPSU from the February 1957 Plenum on the reorganization of organizational forms of management in industry and construction. On this basis, the resolution of the seventh session of the Supreme Soviet of the USSR "On the further improvement of the organization of management in industry and construction" was passed. According to this document, the Supreme Soviet of the Uzbek SSR also issued a resolution on the management of industry and construction, on the basis of which four economic and administrative regions were established in the republic: the Tashkent, Fergana, Samarkand, and Karakalpakstan economic and administrative regions. Within each of these economic regions, national economic councils subordinate to the Council of Ministers of the Uzbek SSR were established[3]. The Samarkand economic region covered 44,800 km² of the republic's territory, which corresponded to 10 percent of the republic's area. Its population amounted to 3,556,000 people. The Samarkand economic region originally included the Samarkand, Bukhara, Kashkadarya, and Surkhandarya regions, which formed a unified complex in terms of development. The land area accounted for 12.3 percent of this area. The territory consisted of 26.8 percent arable land, 19.4 percent newly developed land, and 10.9 percent pasture land. The most important cultivation areas were located in the Zarafshan Valley and in Kashkadarya. The total area of the Samarkand region was 16.4 km² and comprised 16 districts, 11 cities, 3 urban districts, 12 municipalities, and 125 villages[4].

In 1954, a superphosphate plant was established in Samarkand, which produced mineral fertilizers for agriculture. Since 1958, the plant produced sulfuric acid from Karatau phosphorites imported from the Kazakh SSR[5]. Other raw materials were obtained from the Kola Peninsula (formerly Khibinogorsk). The sulfuric acid plant was considered a source for the primary production of technical equipment in the fields of radio engineering, electrical engineering, and telemechanics. By a resolution of the Central Committee of the CPSU of May 1954, the Samarkand Chemical Plant assumed a leading position among global chemical enterprises regarding the implementation of the plan. In particular, the production of Samarkand chemical enterprises increased by 2.6 percent in the years 1960–1966.[6] The plant produced approximately 320,000 tons of superphosphate and 120,000 tons of sulfuric acid annually. In addition, the plant produced 1250–1800 tons of sodium fluorosilicate and selenium concentrate annually. The main component of the solid waste, pyrite

cinders, was collected in an amount of about 250,000 tons and transported by rail to cement plants along with the dust from the purification facilities.

In the republic, the focus was placed on the production of mineral fertilizers, building materials, and the repair of electrical equipment. The building materials plant, which had existed since 1948, was also an enterprise based on chemical technology and a leading supplier of concrete products for construction. The chemical enterprises of the republic were closely networked with each other, with the chemical plants in Ahangaran, Samarkand, and Bekabad occupying leading production positions. Therefore, the superphosphate plant in Samarkand occupied a special position. Several auxiliary workshops were established there, and the production of mineral fertilizers, defoliants, and organic fertilizers from chemicals was initiated. By the end of 1957, over 100 tons of mineral fertilizers for agriculture, 600 tons of semi-finished cotton products, around 80,000 meters of silk fabrics, 3,000 pairs of shoes, and other finished goods were produced in the region, representing an increase of 7 percent compared to 1956[7]. The cast iron foundry "Krasny dvigatel" in Samarkand produced 22,000 tons of cylinder liners and pistons for tractors annually[8]. 20.6 percent of the gas produced in the republic, 6 percent of mineral fertilizers, 17 percent of cotton fibers, 10.4 percent of raw silk, 21.3 percent of knitwear, as well as the majority of elevators and refrigerators were grown or manufactured in this region[9].

Until the opening of the Angren coal mine, coal was transported from the Karaganda and Kuzbass mines from Kazakhstan in order to supply the industrial enterprises in Samarkand with sufficient energy. The coal was used exclusively for heavy industry. The population had no share in this coal. The natural gas reserves were more abundant than the coal reserves, and the natural gas extracted in the country was supplied to the industrial enterprises. In the 1960s, the construction of the Sharkoq-Bukhara-Samarkand-Tashkent main pipeline enabled the supply of natural gas from Bukhara to all industrial enterprises in the Samarkand region. Additionally, the hydroelectric power plant on the Dargam Canal contributed to the electricity supply of the industrial enterprises.

In Samarkand, the construction of industrial enterprises in densely populated areas also led to a change in the ecological balance. In 1968, the furniture factory of the Samarkand region lacked dust extraction and drying systems, and in some enterprises, there were no air purification systems at all, which inevitably led to water pollution[10]. In particular, the spread of chemical waste during the manufacture of chemical and organic fertilizers in industrial enterprises that are important for agriculture exacerbated social problems. The development of industrial enterprises in the Samarkand region played an important role in production and the employment of the population. In 1959, employment in Samarkand's industrial enterprises was distributed as follows. The strength of the material and technical base of these enterprises had a significant influence on the growth of labor productivity. Uzbekistan's share in the export of semi-finished products abroad via the center was also high.

Thanks to the cotton processing plants in the Samarkand region, it exported 382,000 tons of semi-finished cotton products into the republic and abroad in 1965, and 408,000 tons in 1966. In 1965, Samarkand produced 23 percent of the silk of the neighboring republics, 23.9 percent of the mineral fertilizers, 13 percent of the wine, 22 percent of the canned goods, and 3.2 percent of the semi-finished cotton products[11]. 80 percent of the products of the Samarkand silk factory were processed as semi-finished products and delivered to silk factories in Russia, France, and Italy. In 1966, silk production increased by 38 percent compared to 1960. With the development of industrial enterprises, their territorial expansion also expanded. Thus, in the years 1961/62, numerous enterprises were put into operation in the republic. However, the construction of wastewater treatment plant complexes was not completed in most of them. The industrial enterprises had primarily negative impacts on the water, and since no special areas were designated for the wastewater of the enterprises, it was discharged into nearby ditches and streams. In 1967, the Prosecutor's Office of the Uzbek SSR addressed a letter to the Council of Ministers of the Uzbek SSR, in which it pointed out, in particular, the violation of nature conservation regulations. According to the letter, untreated wastewater was discharged into all rivers and canals of the republic, especially into bodies of water in large cities such as Tashkent, Angren, Almalyk, Samarkand, Andijan, Chirchik, and Yangiyul. In particular, the superphosphate plant in Samarkand had already been operating in an unfinished state for 15 years, and products were being manufactured in additional workshops in poorly repaired buildings. By 1963, a tire retreading plant for SFZ vehicles was also put into operation in Samarkand. The party resolutions, decrees, reports, and the funds contained therein, peppered with high-flown slogans, did not correspond to the funds in the state budget, or the allocated money was misappropriated and did not reach its destination. Nevertheless, the amount of superphosphate produced in the plant reached 400,000 tons by 1961[12]. The plant had a sulfuric acid facility, a facility for the production of simple superphosphate, another superphosphate facility, an oxygen facility, as well as workshops for repair work[13]. However, the plant was located in the immediate vicinity of the Chashma stream, which flowed through the center of Samarkand, and wastewater was discharged into this stream. On the map of the Samarkand region, the Chashma stream flows through the areas adjacent to the former Gagarin, M. Gorki, Titova, and Agalyk streets. Metalworking enterprises, mechanical engineering companies, and other enterprises of the food and light industries used water from the Chashma stream to clean various technical equipment. Also, at the Samarkand Special Economic Enterprise (SFZ), the emission of toxic substances into the air increased by 16 percent in 1962 compared to 1961 due to malfunctions at the sulfur furnaces, and the pollution of the workshops was very high. The factory's warehouses were filled with surplus products; the amount had increased from 33,200 rubles on January 1, 1961, to 71,000 rubles [14]. This unpleasant situation arose primarily because the planning of the food, light, meat, dairy, and cotton ginning industries in previous years did not provide for wastewater treatment plants. At that time, there was neither a special service nor a laboratory for wastewater treatment in the republic.

Discussion. The findings of this study demonstrate that the environmental problems associated with the Samarkand Superphosphate Plant were not isolated incidents but rather part of a broader pattern of Soviet industrial development, where production targets were prioritized over environmental protection. The rapid expansion of chemical industries in Samarkand contributed significantly to economic growth and agricultural productivity; however, it also generated serious ecological consequences that affected water resources, soil quality, air conditions, and public health.

One of the most significant environmental issues was the discharge of untreated industrial wastewater into natural water bodies. Historical evidence indicates that the Samarkand Superphosphate Plant released wastewater directly into the Chashma stream, which passed through densely populated districts of the city. Since wastewater treatment facilities were either absent or incomplete, harmful chemical substances entered local waterways without adequate purification. The contamination of surface water not only reduced water quality but also threatened agricultural irrigation systems connected to the Zarafshan River basin. As a result, pollutants originating from industrial processes spread beyond the immediate vicinity of the plant and affected wider ecological systems.

The production of sulfuric acid and phosphate fertilizers created additional environmental risks. Sulfur dioxide emissions, fluoride compounds, acid aerosols, and other chemical pollutants released during manufacturing processes contributed to atmospheric contamination. Archival materials indicate that technical malfunctions in sulfur furnaces increased toxic emissions and worsened working conditions within production facilities. The absence of effective air filtration technologies allowed harmful substances to disperse into surrounding residential areas. Long-term exposure to such pollutants may have increased the incidence of respiratory diseases, eye irritation, allergic reactions, and other health disorders among workers and nearby residents.

Another important issue concerns the accumulation and disposal of industrial solid waste. The production of superphosphate fertilizers generated large quantities of pyrite cinders, chemical residues, and other by-products. Although part of these wastes was transported to cement factories for secondary use, significant volumes remained stored near industrial facilities. Improper storage practices created opportunities for soil contamination through the infiltration of toxic substances into the surrounding environment. Over time, the accumulation of industrial waste may have reduced soil fertility and negatively affected agricultural productivity in adjacent areas.

The environmental consequences of industrial activities were further intensified by inadequate urban and industrial planning. During the Soviet period, industrial enterprises were frequently constructed near residential districts and water resources to facilitate production and transportation processes. In Samarkand, the location of the superphosphate plant near the Chashma stream increased the vulnerability of both natural ecosystems and local communities. The lack of designated waste disposal zones, environmental monitoring systems, and specialized laboratories for wastewater analysis significantly limited the ability of authorities to prevent or mitigate pollution.

The ecological challenges observed in Samarkand also reflect broader structural problems within the Soviet economic model. Industrial enterprises were evaluated primarily according to production volumes and plan fulfillment, while environmental expenditures were often considered secondary. Consequently, investments in pollution-control technologies, wastewater treatment plants, and environmental safety measures lagged behind industrial expansion. Official reports and archival documents reveal

that many enterprises continued operating despite incomplete infrastructure and unresolved environmental deficiencies. This situation demonstrates the contradiction between economic modernization and environmental sustainability that characterized many industrial regions of the Soviet Union.

From a contemporary perspective, the historical experience of the Samarkand Superphosphate Plant offers important lessons for sustainable industrial development. The environmental damage caused by inadequate waste management and insufficient pollution control illustrates the necessity of integrating ecological considerations into industrial policy. Modern industrial enterprises must adopt cleaner technologies, effective monitoring systems, and comprehensive environmental management strategies to prevent similar problems. Furthermore, historical analyses of environmental degradation contribute to a better understanding of the long-term consequences of industrialization and support the development of more sustainable approaches to economic growth.

Overall, the case of the Samarkand Superphosphate Plant demonstrates that industrial success achieved without adequate environmental safeguards can result in substantial ecological and social costs. The evidence suggests that water pollution, atmospheric contamination, and improper waste disposal not only damaged natural ecosystems but also posed significant risks to human health and regional development. These findings highlight the importance of balancing industrial production with environmental responsibility in order to ensure sustainable development for future generations.

Conclusion. Industrial enterprises established in the former Soviet Union produced exclusively for cotton cultivation. The goal was the development of the national economy of the entire country, not just of the Uzbek population. However, the wastewater of the superphosphate production plant established in the Samarkand region, which served cotton cultivation, had negative impacts on the environment and health. The lack of technical support from the Samarkand SFZ company led to the discharge of toxic waste into nearby streams and canals, whereby the water of the Zarafshan River became heavily polluted and unusable for agriculture.

The study concludes that the Samarkand Superphosphate Plant played a significant role in supporting agricultural production and industrial development in Uzbekistan during the Soviet period. However, the economic benefits generated by the enterprise were accompanied by considerable environmental costs. The production of mineral fertilizers and sulfuric acid resulted in the release of harmful emissions, the accumulation of industrial waste, and the discharge of untreated wastewater into nearby streams and canals. These factors contributed to the deterioration of water quality, soil contamination, and atmospheric pollution in the Samarkand region.

The research findings indicate that insufficient environmental regulations, the lack of wastewater treatment facilities, outdated production technologies, and inadequate waste management practices intensified the ecological impact of the plant. The proximity of industrial facilities to residential areas and water resources further increased environmental and public health risks. As a result, local ecosystems experienced long-term degradation, while the population was exposed to adverse environmental conditions.

The historical experience of the Samarkand Superphosphate Plant demonstrates the environmental consequences of industrial policies that prioritized production growth over ecological sustainability. The case illustrates the importance of integrating environmental protection measures into industrial development strategies and highlights the necessity of effective pollution control systems, environmental monitoring, and responsible resource management. Understanding the ecological legacy of Soviet-era industrialization contributes to a more comprehensive assessment of regional environmental history and provides valuable lessons for achieving sustainable industrial development in contemporary Uzbekistan.

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