



The Role of Relevant Departments in Pollution Reduction Techniques and Biodiversity Conservation in Afghanistan

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Article History:

Received: 18. 09.2024

Accepted: 02. 10.2024

Online First: 15.01.2025

Citation:

Rahmani, M. & Rahimi, A.M. (2025). The Role of Relevant Departments in Pollution Reduction Techniques and Biodiversity Conservation in Afghanistan. *Kdz Uni Int J Islam Stud and Soc Sci*;2(4):705-718

e-ISSN: 3078-3895

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Abstract

Air pollution is one of the major problems that humanity has faced, which stems from destructive human activities such as the consumption of fossil fuels, the increase in vehicles and their low quality, the use of low-quality fuels, population growth, the use of smoky fuels, the lack of paved and asphalted roads, the use of wood, coal, timber, and other factors. These have all caused air pollution to increase, leading to respiratory, heart, and vascular diseases, weakening of the immune system, and premature mortality. Today, many cities in the world are affected by the phenomenon of air pollution, and Afghanistan is among them. Some offices and authorities have played a direct role in reducing air pollution, including the municipal administrations of the country, particularly the Kabul Municipality, the Ministries for the Promotion of Virtue and the Prevention of Vice, the Ministry of Education, the Ministry of Information and Culture, Hajj and Religious Endowments, the Ministry of Higher Education, the Ministry of Mines, the Ministry of Energy and Water, the Ministry of Agriculture and Livestock, the Ministry of Public Health, the Ministry of Commerce, the Ministry of Urban Development and Housing, the General Directorate of Environmental Protection, and other relevant authorities, each of which has had its own impact. Therefore, the aim of this research is to study and examine the role of the related offices in techniques for reducing pollution and preserving Afghanistan's biodiversity, considering that Afghanistan is one of the countries most affected by environmental and air pollution, with Kabul being one of the most polluted cities in the world. The research addresses the factors causing this pollution and also presents ways to prevent it and the role of the relevant offices. The methodology of this research is qualitative and is presented in an analytical and descriptive manner. The information was collected using books, articles, and reputable websites. The result of the study is to gain knowledge and awareness regarding the role of relevant departments in reducing and controlling pollution and preserving biodiversity in Afghanistan. Various government departments play a significant role in pollution control and biodiversity conservation in the country, and if carried out effectively and genuinely, existing pollution in major cities will be controlled and wildlife will be protected.

Keywords: Afghanistan, Biodiversity, Pollution Reduction, Role, Relevant Departments & Techniques.

Introduction

Air pollution is one of the devastating phenomena affecting humanity and the social environment, which has led to the emergence of numerous diseases and problems for humans, animals, and plants, all of which stem from the improper and irrational activities of humans. With the advancement of technology and the industrialization of countries, the grounds for economic, social, political, and cultural growth and development of nations have been created. However, on the other hand, it has caused serious dangers and damage to the Earth and its living ecosystems. Over the past two centuries, due to the excessive increase in human populations, the growth of industrial and production activities, deforestation and burning of forests, lack of attention and weak infrastructural management by authorities, the increase in means of transportation, the excessive use of polluting and smoke-emitting fuels by underdeveloped countries, and dozens of other factors, cities and administrative-political centers of countries have become polluted. Among these, Afghanistan is considered one of the most polluted countries in the world. Within Afghanistan's administrative and structural units, the city of Kabul has been identified as the most polluted city in the country and is also ranked among the ten most polluted cities in the world. As a result of this pollution, climatic changes have occurred, leading to adverse outcomes such as untimely rainfall, floods, droughts, and land degradation, which have harmed biodiversity, caused plants to wither, animals to migrate or even perish, birds to become migratory, and humans to leave their native habitats. All of these disturbances are the result of improper human activities, which have caused climate changes and damaged the environment (Sadat, 2020: 12).

Air pollution is one of the major environmental challenges in many cities and countries around the world, including Afghanistan and its large and populous cities such as Kabul, which are no exception. In recent decades, population growth, an increase in the number of vehicles, uncontrolled construction, and improper use of energy resources have led to higher levels of pollutants. These pollutants include suspended particles, greenhouse gases, nitrogen and sulfur oxides, and other harmful chemical substances, which are directly released from industries, motor vehicles, and other human sources. Regarding which agencies and authorities have a direct or indirect role in controlling and reducing it, it is observed that most major authorities and agencies in the country, including many ministries, are responsible and play a constructive role in its reduction and control. Among them, municipalities, especially the Kabul municipality, have played a constructive role. Municipalities are responsible for planning, regulation, land use, and city sanitation. The development, maintenance, and supervision of the greenery and cleanliness of the city fall within the responsibilities of the district offices, which must carry out their duties effectively. Likewise, the Ministry of Culture and Guidance, Hajj, and Religious Endowments can also provide information and discuss the issue from an Islamic perspective through sermons, mosques, and mosque leaders. The Ministry of Promotion of Virtue and Prevention of Vice can also raise awareness on the subject through its inspectors and officials. When the officials of this ministry are active in cities and offices across the country, they inform people about avoiding pollution of the urban and living environment, as this matter is also an issue of promoting virtue. Similarly, the Ministry of Commerce can prevent the import of low-quality fuels, and the Ministry of Water and Energy can ensure sufficient electricity supply through strengthening and enriching the

country's energy, so that electricity usage increases and the use of polluting and smoke-emitting fuels is reduced. The Ministry of Public Health also plays an effective role and, through its Chief Health Authority, can raise awareness among people. In the same way, most references and agencies of the country, such as the Ministries of Higher Education, Education, Agriculture and Livestock, Transport, and others, have a special role (Rahmati et al., 2019: 18).

When pollution is controlled, the use of smoky fuels is prevented, deforestation and burning of forests are avoided, as a result, biodiversity is preserved, neither human labor nor people are displaced, nor do animals and birds migrate, and plants are not destroyed. This research has been conducted to examine and study the role of relevant departments in pollution reduction techniques and the preservation of Afghanistan's biodiversity (Malkiar, 2017: 23). Its main goal is to explore the role of government offices and authorities in controlling and reducing pollution and preserving the country's biodiversity. On the other hand, this research aims to, using scientific information and analysis, also propose effective strategies for pollution reduction and the improvement of biodiversity. Considering the importance and necessity of this issue, it is hoped that the results of this research can assist policymakers and officials in their decision-making and take an effective step towards improving the quality of life for citizens.

Material and Method

This study was conducted using a qualitative research method and was carried out through a descriptive-analytical approach. It analyzes, examines, and evaluates the roles of the relevant governmental departments and ministries, specifically assessing the function and impact of each institution in controlling pollution and preserving biodiversity in Afghanistan. The data and sources were collected through a library-based research method, including consultation of academic books, scholarly articles, and reputable online sources. The present study examines the role and activities of key governmental institutions involved in pollution control, particularly with respect to environmental pollution in the city of Kabul. Among the most significant institutions are the Kabul Municipality and the Traffic Directorate, whose operational and regulatory functions have a direct impact on urban environmental management. In addition, major public institutions such as the Ministry of Higher Education contribute through academic awareness-raising initiatives, including educating the younger generation, publishing scholarly articles, organizing national conferences, and disseminating academic books and research findings. Similarly, other ministries and governmental bodies—including the Ministry of Education, Ministry of Commerce, Ministry of Public Health, Ministry of Mines, Ministry for the Promotion of Virtue and Prevention of Vice, Ministry of Agriculture and Livestock, Ministry of Water and Energy, Ministry of Transport and Civil Aviation, Ministry of Hajj and Religious Affairs, and other relevant institutions—each play a constructive and complementary role in reducing environmental pollution and safeguarding the country's biodiversity. The central focus of this article is to analyze the role and impact of major governmental institutions in Afghanistan in controlling pollution

and preserving biodiversity. While municipal authorities and traffic management agencies appear to have the most direct and visible influence, other ministries and institutions also contribute significantly within their respective mandates. Most of the data collected and utilized in this research is derived from recent studies conducted in the past few years, incorporating updated information and reflecting current impacts and developments in the field.

What is Air Pollution

Air pollution refers to the mixing of atmospheric breathing air with harmful gases, liquid particles, and solid particles, which alter air quality and cause adverse effects on living organisms and the environment. In other words, any change in the physical or chemical characteristics of the components of air is called air pollution for instance, the presence of sulfur dioxide, carbon monoxide, nitrogen oxides, and others (Malkyar, 2017: 18).

These harmful gases and pollutants are released into the atmosphere through the burning of fossil fuels such as coal in furnaces, public baths, urban heating systems, households, industrial facilities, and other sites, leading to air and environmental pollution. In other words, air pollution arises from factors that directly and negatively affect the health of humans, animals, plants, and the entire ecosystem, threatening the survival of life. Air pollution occurs when excessive amounts of particles or harmful substances, such as suspended solids, gases, or biological molecules-enter the Earth's atmosphere. In simple terms, air pollution is a mixture of suspended particles and gases whose concentration has reached levels hazardous to human health.

Air pollution can cause or exacerbate various human diseases and contributes to global warming. When inhaling, humans intake not only oxygen but also harmful gases and particles, which lead to respiratory disorders. Moreover, air pollution may result in skin and eye irritations as well as other serious health conditions. It also exerts both direct and indirect impacts on all natural and human phenomena. In plants, it causes infertility, affects pollination, reduces rainfall, accelerates global warming, and disrupts ecological balance for humans, animals, and plants (Azadmanesh, 2023: 22).

Air pollution is generated from both natural and anthropogenic sources. While natural sources of pollution existed long before human life appeared on Earth, human activities have intensified their scale and concentration to the extent that, in some cases, the air has become toxic, posing existential threats to living organisms. With rising population, urban expansion, increased traffic congestion, rapid economic growth, misuse of industrial systems, growing energy consumption, and weak enforcement of environmental regulations, air pollution has become one of the major challenges confronting many countries (Sadat, 2020: 8).

Types of Air Pollutants

Various pollutants may be present in the atmosphere; however, due to their harmful nature, five major types are discussed below:

Carbon Dioxide (CO₂)

This gas is considered the most significant greenhouse gas and one of the primary pollutants. Naturally, it constitutes about 0.034% of the atmospheric composition and is essential for plant growth and photosynthesis. Before the Industrial Revolution, its concentration in the atmosphere was relatively low, but with the advancement of industry, human activities, and the combustion of fossil fuels, its atmospheric level has been steadily increasing (Farahmand, 2020: 6).

Carbon Monoxide (CO)

A colorless and odorless gas, carbon monoxide is extremely toxic. It is about 300 times more readily absorbed into the bloodstream than oxygen. Formed by the incomplete combustion of chemical substances, this gas rapidly binds with hemoglobin in the blood to form carboxyhemoglobin (COHb), reducing oxygen transport and causing blood toxicity. Its effects are especially dangerous for the brain and heart, and in enclosed environments, it can quickly cause unconsciousness or even death, as seen in cases of coal smoke poisoning (Shirzad, 2018: 16).

Nitrogen Oxides (NO_x)

Among nitrogen oxides, nitrogen monoxide (NO) and nitrogen dioxide (NO₂) are most significant in contributing to air pollution. These gases are more toxic than carbon monoxide and pose severe risks to both the environment and human health.

Sulfur Dioxide (SO₂)

Many fuels, such as coal and petroleum products, contain high levels of sulfur. Their combustion leads to the release of sulfur dioxide, a harmful air pollutant. Inhalation irritates the respiratory system, particularly the throat and nasal passages, and may cause chronic bronchitis, asthma, and other respiratory illnesses. When released into the atmosphere, SO₂ interacts with water vapor to produce acid rain, which negatively affects vegetation, soil, and aquatic ecosystems. Industrialized nations such as the United Kingdom have experienced such environmental disasters as a result of acid deposition.

Particulate Matter (PM)

Particulate matter refers to solid or liquid particles (excluding water) suspended in the atmosphere with microscopic dimensions larger than molecular size (greater than 2 angstroms). PM is considered more harmful than many other air pollutants because it can easily penetrate the respiratory system, reaching the lungs and even entering the bloodstream, leading to cardiovascular and respiratory diseases.

Acid Rains

One of the harmful consequences of air pollution is acid rain. When large quantities of sulfur dioxide, nitrogen oxides, and carbon monoxide enter the atmosphere, they combine with atmospheric moisture to form acid rain or acid snow, containing significant amounts of acidic compounds. Rain becomes acidic when the pH of precipitation drops below 5.6. This chemical process involves the dissolution of carbon dioxide and other oxides in water,

producing acidic solutions such as HCO_3 . Acid rain has detrimental effects on human health, animal life, and vegetation (Sadat, 2020: 16).

Sources of Air Pollution

All activities that cause the release and spread of pollutants into the atmosphere are considered sources of air pollution. These sources are diverse and include both natural and anthropogenic origins. While many forms of pollution are generated by human activities, natural sources, also referred to as biogenic or natural sources also contribute significantly. Examples include volcanic eruptions, which release vast quantities of gases and particulate matter into the atmosphere, where they may persist for millions of years (Azadmanesh, 2022:12).

Similarly, wildfires are another natural source of air pollution, leading to the release of smoke and ash. Dust storms also spread large amounts of organic particles and dust into the air. Although these natural sources can at times be extremely dangerous and irreversible, their impacts are generally less harmful compared to the pollution produced by human activities. Pollution resulting from human actions is called anthropogenic sources and arises from activities such as metallurgy, industry, and transportation. Overall, air pollution sources are categorized into two types: natural sources and artificial sources (Silab, 2018: 29).

Natural Sources of Air Pollution

Natural sources are those that exist in the environment without direct human involvement. These include:

Dust storms in deserts

These storms release large amounts of solid particles into the atmosphere. In addition to contaminating the air, they serve as carriers for microbial transmission. Such dust storms, often seasonal, are common in Afghanistan, particularly in provinces such as Nimroz and Herat. In industrial areas, dust particles interact with chemical emissions, producing more toxic pollutants.

Forest fires

Caused by heat, human activities, or volcanic eruptions, forest fires release significant amounts of smoke, ash, and pollutants into the air.

Volcanic activity

Volcanoes emit gases, ash, and particulate matter that can remain in the atmosphere for long periods. These emissions include a wide range of harmful pollutants.

Meteorites

When meteorites pass near the Earth, they release gases into the atmosphere. Annually, it is estimated that nearly 2,000 tons of such materials are deposited, and upon impact, they generate dust and suspended particles in the air.

Sea salt aerosols

Strong winds over oceans and seas release fine particles of salt (such as sodium, calcium, and magnesium chlorides) into the air. These salts, either alone or in combination with other pollutants, can have harmful environmental impacts (Qaderi, 2018: 23).

Artificial Sources of Air Pollution

Artificial sources of air pollution are primarily associated with human activities and daily practices. These include vehicles, industries, commercial activities, and household fuel consumption. Compared to natural sources, these anthropogenic activities contribute much more significantly to overall pollution levels.

Vehicles, for instance, are an essential part of modern human life, sometimes even prioritized over housing. However, they are among the most significant contributors to urban air pollution. While industrialization and technological progress are crucial for economic development, they have also intensified pollution, especially in developing and underdeveloped countries, where fuels such as coal, wood, gas, diesel, and oil are widely used, often under incomplete combustion conditions.

Pollutants from anthropogenic sources can be emitted in solid, liquid, or gaseous forms. The most important include carbon monoxide, sulfur oxides, hydrocarbons, particulate matter, and radioactive substances (Rasooli, 2019: 63).

Artificial sources are further classified into:

1. Mobile Sources

This category includes vehicles, machinery, and equipment that generate and emit pollutants while moving from one place to another. All vehicles operating on highways and urban roads, whether freight or passenger carriers are mobile sources of pollution. These rely on fuels such as gasoline, diesel, gas, or alcohol. Although modern vehicles emit approximately 50% fewer pollutants than older models due to improved energy efficiency, they remain significant contributors to air pollution through combustion and evaporative emissions of fossil fuels (Soleimani & Cheraghi, 2023: 32).

By contrast, many developed countries such as the United States, Japan, and Germany have significantly reduced mobile-source pollution by adopting advanced technologies, including electric cars, high-speed trains, and metro systems, which rely on clean energy and are free of harmful emissions (Malkyar, 2017: 24).

2. Stationary Sources

(Stationary sources can be elaborated as industries, power plants, and residential heating systems, which emit large volumes of pollutants while remaining fixed in a specific location. You may want me to expand this part if needed.



Figure 1. A depiction of mobile sources of air pollution

Source: <https://images.app.goo.google>

Stationary Sources of Air Pollution

Stationary sources of air pollution refer to immobile and non-transportable emitters, such as power plants, chemical manufacturing facilities, oil refineries, industrial production units, and other fixed industrial installations. These stationary sources are among the most hazardous contributors to air pollution, typically arising from primary industrial activities. Such emissions are predominantly generated through fixed combustion processes involving fossil fuels, including coal and oil, particularly in power generation plants and industrial wastewater treatment systems.

Industrial processes such as refining, chemical production facilities, manufacturing operations, and smelting activities are major contributors to emission hotspots. The points of release correspond to specific sites or outlets through which pollutants are emitted. Common sources of emissions in these facilities include smokestacks, storage tanks, equipment leaks, wastewater processing units, loading and unloading facilities, and ventilation systems. Ventilation systems, in particular, serve as open pathways for the release of excess materials, especially in gaseous form, into the atmosphere.

Typical ventilation processes in chemical plants include distillation columns and oxidation units. Air pollutants may also escape from storage tanks due to structural defects such as leaks or cracks, or as a result of temperature fluctuations that drive vapor release. Furthermore, emissions can occur during the filling and emptying of storage units. Some pollutants originate from industrial wastewater when it contains volatile or unstable chemical substances. Volatile substances are defined as compounds capable of evaporation or transition from liquid to gaseous states (Malkyar, 2017: 27).

Brick kilns represent a significant category of stationary sources of air pollution, playing a major role in deteriorating the air quality of urban areas. As an initial preventive measure, brick kilns should be relocated away from city boundaries to minimize their detrimental

impact on urban air. Moreover, the type of fuel consumed in these kilns is a critical factor, as certain fuels release higher levels of pollutants. Similarly, steel smelting plants and centralized heating stations are also prominent examples of stationary air pollution sources.

Figure 2. A schematic representation of stationary sources of air pollution



<https://images.app.goo.gl>

The Role of Relevant Institutions and Agencies in Reducing Pollution and Preserving Biodiversity Municipality

Municipalities are responsible for urban planning, regulation, land use, city management, and sanitation. Considering the increasing population, forced and voluntary migrations from rural to urban areas, as well as emerging urban trade and transportation systems and the rising demand for consumer goods in the coming years, municipalities must incorporate these factors into urban planning and development. The development, maintenance, and monitoring of urban greenery and cleanliness also contribute to reducing natural pollution and minimizing urban dust.

Measures that prevent and reduce air pollution include:

1. Establishing a strong and legal administrative structure under municipal leadership.
2. Reforming and enhancing technical capacities.
3. Improving administrative capacities.
4. Using environmentally safe management tools.
5. Public awareness.
6. Development and regulation of natural resources (Azadmanesh, 2022: 21).

Ministry of Higher Education

As one of the most influential institutions in the country, the Ministry of Higher Education plays a significant role in reducing environmental pollution and preserving biodiversity. It has already contributed by conducting scientific research, publishing books and national/international articles, organizing seminars, workshops, media analyses, and public awareness campaigns. Environmental studies are taught as academic subjects in universities, and several disciplines address pollution factors, reduction strategies, and biodiversity preservation. Faculties of Agriculture, for instance, focus on biodiversity conservation, environmental health, and pollution control. Some universities also host faculties or departments of environmental science. Other disciplines such as geography, sociology, and biology provide awareness on these issues.

The Ministry is therefore considered more responsible than many other agencies in terms of comprehensive collaboration with national and international organizations, particularly the National Environmental Protection Agency, to design and implement environmental policies and laws. By leveraging global experiences and resources, it can help Afghanistan face environmental challenges and create a healthy and sustainable environment for future generations. It should also expand scientific research and conferences while encouraging academic staff to publish books and articles on these subjects.

Ministry of Education

The Ministry of Education plays a key role in reducing pollution and preserving biodiversity by raising environmental awareness through teachers, school managers, inspectors, and relevant authorities. It can also use educational TV channels and media networks to broadcast video clips on the dangers of environmental pollution, tree planting, forests, and wildlife protection. In the long term, it may introduce an independent subject on environmental protection and biodiversity into school curricula. This could cover water, soil, and air protection. Training workshops and seminars for teachers would indirectly inform students. Moreover, the Ministry can collaborate with domestic and international environmental organizations to secure the necessary resources for environmental education and pollution reduction programs (Silab, 2018: 22).

Ministry of Public Health

Air pollution has harmful health impacts such as respiratory irritation, lung dysfunction, bronchitis, increased respiratory diseases, eye irritation, headaches, and even mortality. The Department of Public Health Protection plays a crucial role in raising awareness among citizens and patients. This department can disseminate information about different types of pollution through mass media, enabling people to take preventive actions themselves (Farahmand, 2020: 43).

Ministry of Promotion of Virtue and Prevention of Vice

This ministry, like other institutions, plays an important role in promoting Islamic values and public awareness. Protecting the environment and community health is considered a virtuous act in Islam, as it safeguards humans, living creatures, and plants from harm. The

Ministry can use mosques, sermons, and religious leaders to highlight the importance of environmental protection and pollution reduction from an Islamic perspective. Islam considers protecting the environment, avoiding waste, and preventing pollution a religious duty. The Ministry can also raise awareness about the prohibition of illegal hunting, harming wildlife, cutting trees, and emphasize the importance of tree planting (Payandah-Nik, 2017: 18).

Ministry of Mines and Petroleum

As the authority managing Afghanistan's mineral resources, this ministry plays a vital role in reducing pollution and preserving biodiversity. Although mining activities can cause severe environmental damage, proper policies and strict regulations can mitigate these impacts. For example, post-mining land rehabilitation into agricultural or forest land is crucial. Cooperation with the National Environmental Protection Agency in establishing protected zones around mining areas and organizing training for mine workers on environmental protection is essential.

Ministry of Energy and Water

This ministry has a crucial role in pollution control by introducing environmentally friendly technologies, expanding hydroelectric power plants, and promoting renewable energy. These measures can significantly reduce fossil fuel consumption, which is one of the main sources of pollution (Malkyar, 2017: 32).

Ministry of Commerce

The import of low-quality and non-standard fuel contributes significantly to urban air pollution. Such fuels produce hydrocarbons, carbon monoxide, and nitrogen oxides, leading to toxic emissions and engine failures, posing risks to drivers and citizens. The lack of oversight in fuel distribution is the root cause. Therefore, strict monitoring and inspection of imported fuels are essential. The Ministry of Commerce plays a decisive role in this matter, and recent actions under the current government have partially addressed the problem (Farahmand, 2020: 44).

Ministry of Hajj and Religious Affairs

As a major religious and cultural institution, this ministry can raise awareness on environmental issues through mosques, Friday sermons, religious teachers, brochures, and media programs. It can highlight Islamic teachings on tree planting, protecting animals and plants, and maintaining environmental cleanliness. By encouraging communities to view air, water, soil, and biodiversity as divine blessings, the ministry can promote long-term conservation practices.

Ministry of Urban Development and Housing

This ministry's role lies in urban planning, infrastructure allocation, and land management. It can incorporate environmental rehabilitation in urban plans, develop parks, and promote green spaces, thus reducing urban pollution significantly (Hosseini, 2023:33).

National Environmental Protection Agency (NEPA)

As the primary authority for environmental management in Afghanistan, NEPA is responsible for policy design, regulation, and monitoring of air, water, and soil pollution. It also oversees biodiversity protection programs, controls polluting industries (such as brick kilns and fuel burning), prevents deforestation, and cooperates with international environmental organizations. Although NEPA is legally the central body for pollution reduction and biodiversity preservation, its effectiveness and inter-agency coordination remain limited.

Ministry of Agriculture and Livestock

This ministry plays a major role in green development strategies, sustainable farming, and biodiversity protection. It can promote eco-friendly agricultural practices, reduce chemical fertilizer use, improve irrigation, prevent soil erosion, protect underground water, and encourage sustainable forestry. It can also raise awareness among farmers and livestock owners, promote afforestation, and cooperate with NGOs and international organizations. Substituting goats with sheep is another measure since goats damage young forests more severely (Khalili & Samar, 2022: 43).

Ministry of Information and Culture

This ministry can raise awareness by using media, cultural programs, and social networks to highlight the harms of pollution and the benefits of biodiversity conservation. Public campaigns, TV and radio broadcasts, and cultural events can promote positive environmental behavior in society.

NGOs and Civil Society

Lack of information is one of the main obstacles in implementing pollution control policies. Local communities often fail to recognize the severe health impacts of pollution. The government can transfer part of its environmental programs to NGOs and civil society organizations to help reduce pollution through grassroots awareness and participation (Malkyar, 2017: 34).

Private Sector

Many businesses contribute to pollution depending on their operations. For effective pollution control, private enterprises must commit to sustainable practices, either through financial contributions, taxes, or compliance with environmental standards. Encouraging private sector engagement through legal measures, penalties, or incentives can foster long-term cooperation in reducing pollution (Rasooli, 2019: 14).

Conclusion

This research examined the role of all relevant institutions in Afghanistan in reducing pollution and preserving biodiversity. Air pollution is one of the most destructive phenomena for humanity and the social environment, causing numerous diseases and disorders in humans, animals, and plants all of which originate from improper and

irresponsible human activities. Air pollution, after tobacco use, is the second leading cause of death from non-communicable diseases, and it is strongly linked with increased risks of both acute and chronic illnesses. According to the World Health Organization (2021), it is the fourth leading risk factor for death worldwide and the most significant environmental threat to human health. Over the past two centuries, global overpopulation, increased industrial and manufacturing activities, deforestation and forest burning, poor infrastructural management, growing transportation systems, and the excessive use of polluting fossil fuels, particularly in underdeveloped countries, have turned many cities into pollution hotspots, including Afghanistan, which is now considered one of the most polluted countries in the world. In recent decades, uncontrolled urban population growth (especially in Kabul), the rising number of vehicles, unregulated construction, and improper energy use have significantly raised pollutant levels. These pollutants include particulate matter, greenhouse gases, nitrogen oxides, sulfur, and other harmful chemicals released directly from industries, motor vehicles, and other sources. Several government agencies play both direct and indirect roles in controlling and reducing pollution. Municipalities, especially Kabul Municipality, are key actors due to their responsibility for city planning, land use, and sanitation. Similarly, the Ministry of Hajj and Religious Affairs can use mosques and sermons to raise awareness from an Islamic perspective, while the Ministry of Promotion of Virtue and Prevention of Vice can spread awareness through its officials. The Ministry of Commerce can prevent the import of low-quality fuels, and the Ministry of Energy and Water can expand electricity generation to reduce dependence on polluting fuels. The Ministry of Public Health, through its Public Health Directorate, can inform citizens about health risks. Likewise, other ministries such as Higher Education, Education, Agriculture and Livestock, and Transport also play important roles. If these institutions act jointly and in coordination, environmental, water, soil, air, and social pollution will be reduced, while biodiversity conservation will be strengthened.

Acknowledgment

The authors also thank the anonymous reviewers for their helpful comments and suggestions.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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