LCOY YEMEN

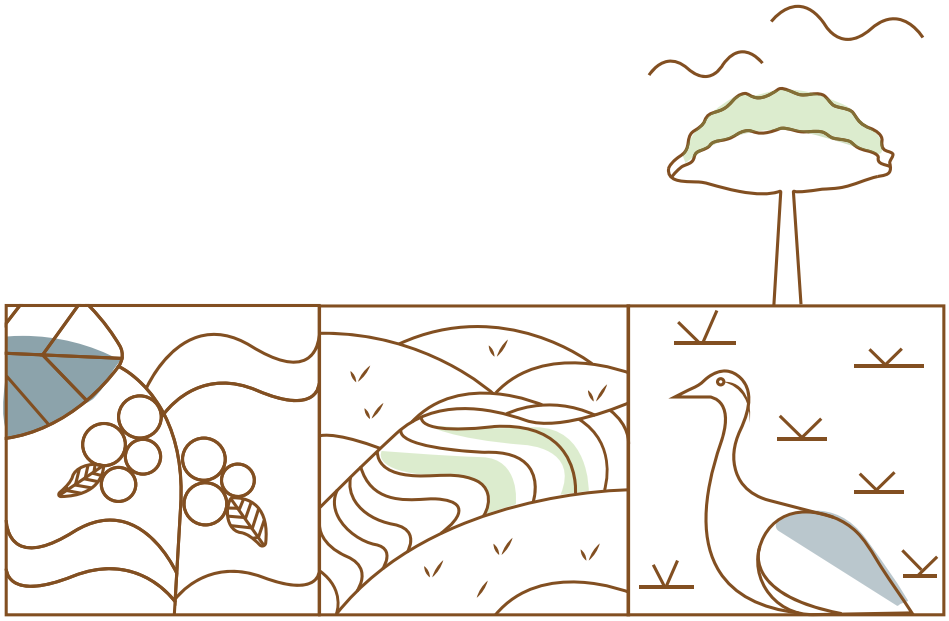
Local Conference of Youth - Yemen

2024

Yemen's National Youth Statement

officially endorsed by LCOY | a project of YOUNGO

OFFICIAL YOUTH CONSTITUENCY OF THE UNFCCC



WOMEN IMPACT

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Preamble

Believing in the fundamental right of every living being on this planet, and with a strong desire to play a role in creating and preserving life on Earth, we recognize the great responsibility we bear in addressing the impacts of climate change in our country, and extending our efforts regionally and globally, this National Youth Statement embodies the spirit and footsteps of every Yemeni youth who participated in its preparation, believing in the issues it addresses, and advocating for urgent actions to mitigate the effects of climate change on our country . The Yemeni youths also aim to be part of the solutions giving recommendations and harnessing the energies and ideas of their peers to play a significant role in protecting everything worthy in our afflicted country.

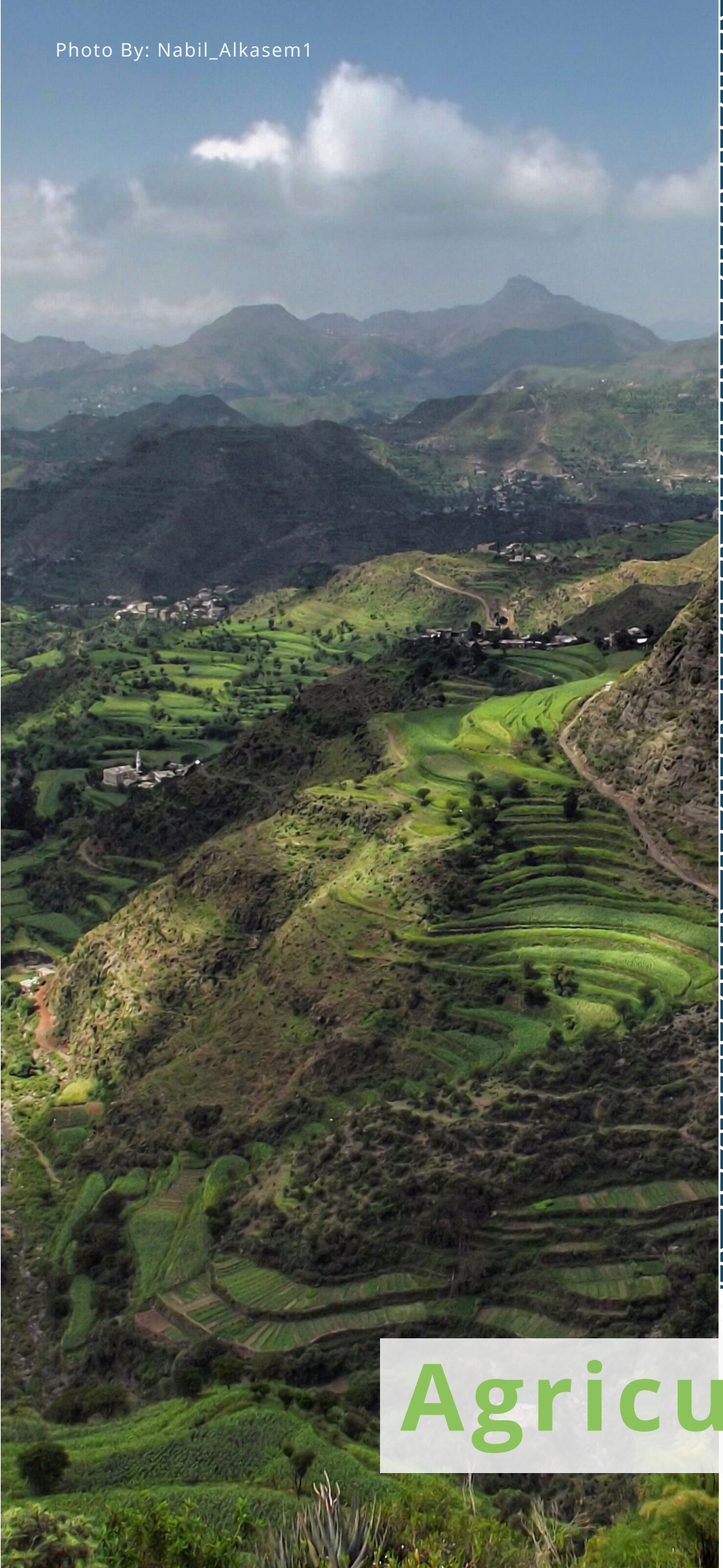
This statement aims to highlight a series of pressing issues affecting the agriculture and biodiversity sectors in Yemen. These sectors are among the most critical foundations of the social, economic, and environmental fabric of Yemen and are the most threatened by climate change and its devastating effects, leading to numerous disasters that jeopardize forms of life in our country.

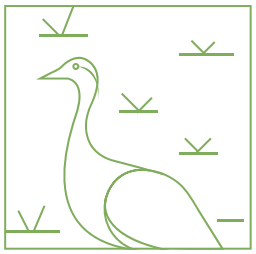
This statement is one of the key outcomes of the Local Conference of Youth (LCOY 2024) in Yemen. It was prepared based on a strategic mechanism through gathering opinions and demands of youth from various governorates through surveys, through also a series of virtual consultation sessions, and discussions with researchers and young specialists in climate and environmental fields in Yemen. It represents the efforts, aspirations, and bright future vision of every Yemeni youth who hopes to be part of the change and the creation of a better version of our country.

Our National Youth Statement will be delivered to all relevant stakeholders, including decision-makers and local entities in Yemen, as well as regional and global actors advocating for climate issues, to highlight the critical concerns

of Yemeni youth and their demands for solutions. This statement will also be part of the global youth statement which will be presented at the Global Conference of Youth 19 (COY19), in the Regional Conference of Youth in MENA region (RCOY MENA), and will have a share of coverage in the Global Youth Statement (GYS), which will be discussed and delivered at the Conference of Parties (COP29) to highlight the important issues for all youths and their demands in solving them.

LCOY Yemen team will strive to amplify the voices of all Yemeni youth, arranging meetings with relevant national governmental bodies to activate these demands and transform them into actionable decisions, projects, and interventions on the ground. This statement will serve as the cornerstone for a Yemeni environment capable of adapting to the impacts of climate change.





Theme 1

Agriculture

Overview

Agriculture is one of the most crucial pillars of the social fabric and economy in Yemen. The country is renowned for being one of the most fertile and diverse agricultural environments in the region and the world. Agriculture serves as a vital source of income and food for a significant portion of Yemenis, transcending its role as merely a source of income to become an integral part of the identity, culture, and pride of all Yemenis. The flourishing of agriculture in any country is a key indicator of the preservation of the environment in its good state, its ability to withstand climate change, and the maintenance of biodiversity. However, Yemen's precious agricultural heritage is now threatened by several factors that have weakened it, alongside the increasing impacts of climate change.

Yemen is one of the countries threatened by drought, with the agricultural sector being among the most affected by water scarcity. Unregulated well drilling, poor management of water resources, and pollution of clean water sources have led many farmers to resort to using wastewater for irrigating their crops and fields. Moreover, dumping solid waste from various sources into seas and lands, along with unplanned urban sprawl, contributes to the deterioration of agricultural areas. These factors and interventions have resulted in soil degradation, reduced fertility, and a significant decline in the quality of agricultural products, posing a serious threat to the food security situation in Yemen. Global climate change issue and its impacts, adherence to traditional agricultural practices, and a lack of widespread investment in improving agriculture by leveraging applicable global experiences—combined with the aforementioned issues—necessitate urgent and responsible intervention to prevent the deterioration of this vital sector and to preserve it as much as possible for current and future generations.

The following will outline some of the issues facing the agricultural sector in Yemen, as well as urgent demands and recommendations from Yemeni

youth—who are considered one of the most significant factors of change in Yemen. These considerations should be taken into account by all relevant stakeholders and decision-makers. It is essential to work diligently and effectively to meet these demands, enhancing the resilience and adaptability of agriculture in Yemen to the impacts of climate change, while preserving the prosperity, richness, and diversity of our agricultural sector.

1.1

Pollution from Sewage and Its Role in Agricultural Deterioration

01

Current situation

In Arabian Peninsula heart, Yemen faces a water and environmental crisis that threatens its social and economic fabric [1]. With escalating conflict and deteriorating infrastructure, the issue of water and sanitation has become at the forefront of challenges facing the country [2]. This crisis manifests in multiple forms, from pollution of water sources to the spread of diseases and threats to food security.

The wastewater sources are numerous in Yemen, ranging from residential and industrial areas to hospitals and public facilities. These sources are mainly concentrated in major cities and densely populated areas, extending to rural regions. Under current conditions, most areas suffer from a lack of adequate sanitation systems, posing a significant health and environmental challenge to the country and a serious threat to the agricultural sector and food security situation.

Contaminated water seeps into agricultural lands, poisoning the soil with heavy elements such as lead, cadmium (Cd), copper (Cu), and zinc (Zn) at rates exceeding %40 and also getting the groundwater sources polluted. The soil and crops absorb these pollutants and heavy elements, negatively affecting their growth and quality and weakened plants become more susceptible to pests and diseases, which may lead to their destruction before harvest. Contaminated agricultural products pose a risk to consumers' health, and reduced productivity leads to food shortages and price increases. This ongoing cycle of pollution and land degradation contributes to exacerbating the food security crisis in the country, threatening both livelihoods and public health [3].

1 World Bank. (2023). «Yemen Development Report: Water and Sanitation Challenges»

2 Al-Amrani, Mohammed. (2023). «The Impact of Conflict on Water Infrastructure in Yemen». Journal of Yemeni Studies, Volume 15, Issue 2

3 Food and Agriculture Organization (FAO). (2024). «The Impact of Water Scarcity on Food Security in Yemen»

Studies have shown elevated levels of these pollutants in plants and soil, exceeding internationally permitted standards, with more than %30 of agricultural land in Yemen being affected. These practices contribute to the spread of a wide range of diseases, including gastrointestinal and liver diseases, kidney failure, as well as 30 types of diseases and infections in addition are one of the main reasons for the spread of the cholera epidemic [4].

Statistics have shown that 44,624 people in Yemen territories were exposed to infection due to irrigation with untreated wastewater in 2014. The risk of infection continues to threaten all residents of Yemen at present, posing a threat to food security [5].

02

Legal and Legislative Status

The legal and legislative framework in Yemen is anchored on constitutional and legal foundations aimed at protecting the environment and water resources. Article (35) of the Yemeni Constitution states that «protecting the environment is the responsibility of the state and society, and it is a national and religious duty for every citizen» [6]. This constitutional provision forms the cornerstone of environmental legislation in the country. On this basis, a number of key laws have been issued, most notably the Environmental Protection Law No. (26) of 1995 [7], and the Water Law No. (33) of 2002 [8].

The Environmental Protection Law aims to establish the legal foundations for protecting the environment from pollution in its various forms, including pollution resulting from wastewater. This law also defines the responsibilities of government agencies in

4 Sana'a Center for Strategic Studies. (2023). «Analysis of Water Policies in Yemen: Challenges and Opportunities»
5 Al-Araby Al-Jadeed: Lead-Poisoned Vegetables on Yemenis' Tables
6 Constitution of the Republic of Yemen, Article 35
7 Environmental Protection Law No. (26) of 1995, Republic of Yemen
8 Water Law No. (33) of 2002, Republic of Yemen

monitoring and managing liquid waste. As for the Water Law, it focuses on regulating the use and management of water resources and sets rules for protecting water sources from pollution.

To implement these laws, specialized bodies have been established, such as the General Authority for Environmental Protection and the General Authority for Water Resources [9]. These authorities are responsible for applying and enforcing laws, as well as developing executive regulations that detail the procedures and standards for treating wastewater and reusing it in the agricultural sector.

Despite the existence of this important legal framework, there are legislative shortcomings that have not been addressed in the relevant laws and regulations. For example, the Articles of Water and Environmental Protection laws do not include an explicit prohibition on farmers using untreated wastewater to irrigate their farms. These challenges hinder effective implementation efforts, especially in light of the difficult economic and political conditions in Yemen, which have led to weak enforcement mechanisms and a lack of resources allocated for implementing environmental programs and protecting water resources.

03

Key Interventions and Projects

The Yemeni government and international organizations have attempted to implement projects aimed at improving infrastructure related to water treatment. Among these initiatives was an ambitious project to enhance wastewater treatment and utilize treated water for irrigating agricultural lands. However, this project faced significant challenges. Additionally, other projects were launched, such as The Water Reuse Project in Aden and

9 General Authority for Environmental Protection, Republic of Yemen

the Sanitation Project in Al Hodeidah, but the lack of funding and resources halted the implementation of such projects.

Non-governmental organizations, such as UNICEF and the World Health Organization (WHO), initiated small-scale water treatment initiatives in rural areas; however, the success of these initiatives was limited due to insufficient funding and resources. While some projects succeeded in specific regions, they were unable to cover all affected areas.

The Ministry of Agriculture and Irrigation launched awareness programs for farmers about the risks of using untreated wastewater. However, due to the absence of practical and affordable alternatives, many farmers struggled to abandon this water source.

International organizations, such as the Food and Agriculture Organization (FAO) and the World Bank Group, provided technical and financial support; nonetheless, these projects encountered challenges and obstacles that hindered the implementation of many initiatives. Therefore, the ongoing issue of using ntreated wastewater requires comprehensive and sustainable solutions to protect public health and the environment.

04

Demands and Recommendations

1. We propose to activate the current laws regulating the mechanism and extent of permissible use of wastewater and its byproducts as a first step and establish monitoring units to enforce these laws and hold violators accountable.

2. We propose to evaluate and revise current laws and prepare updated legislative projects that align with current local and global conditions, contributing to enhancing the ability to utilize wastewater as a resource that can improve the agricultural sector in Yemen.

3. We strongly recommend to reactivate the departments of studies and scientific research in universities, alongside we recommend to establish specialized facilities for monitoring and evaluating soil and agricultural conditions.

4. We strongly urge improving, developing, and encouraging innovative and creative ideas that can enhance the optimal use of wastewater in agriculture at lower costs and with greater effectiveness.

5. We urge to establish specialized committees emanating from relevant authorities and ministries, such as the Ministry of Water and Environment, to conduct specialized studies on applicable global ideas and experiments in Yemen, and develop mechanisms for their adaptation to the local context.

6. We actively seek to invest in planning and implementation processes to ensure the success of these ideas and experiments by adopting the most

suitable and effective methods for treating, desalinating, and recycling wastewater, and reusing all extracted materials to improve and rehabilitate agricultural lands, alongside using treated water for irrigation.

7. We advocate to develop and improve infrastructure projects to manage wastewater networks and mitigate the impacts of sewage leakage into clean water sources used in agriculture, while also reducing damage to agricultural soil due to poor wastewater management or excessive use in agricultural processes.

8. We urge to establish wastewater treatment and filtration facilities to utilize all its components as a source of clean energy and biofuel, which will lower operational costs of these facilities and utilize surplus energy to supply agricultural lands with necessary energy (biogas or clean energy) and reduce reliance on non-renewable energy sources, while also providing raw materials for factories specializing in organic fertilizers and nutrients to improve soil quality, and contribute to the rehabilitation of degraded lands for agricultural use.

9. We call to implement awareness programs for communities and farmers on the importance of protecting agricultural lands from pollution caused by excessive use of wastewater during irrigation. Also, we recommend to emphasize compliance with established laws, develop guidelines for their application and monitor adherence to these guidelines to ensure the safety and improvement of the agricultural sector, making it resilient and adaptable to climate change and its various impacts.

10. We strongly urge to create an investment fund for innovative and creative youth ideas on the mechanisms and methods for optimal utilization of wastewater in agriculture, and adopt the application of these ideas on a national scale.

05

Relevant stakeholders

Ministry of Water and Environment - Ministry of Higher Education and Scientific Research - Ministry of Agriculture and Fisheries - Ministry of Transportation and Public Works - Ministry of Economic Affairs, Industry, and Investment - Ministry of Youth and Sport - National civil society and non-governmental international organizations - All agencies and organizations with vested interests in climatology and agricultural sciences.

1.2

Solid Waste and Its Negative Impacts on the Agricultural Sector

01

Current situation

Daily waste generation in Yemen is estimated to be between 0.55 and 0.65 kilograms per person in urban areas and between 0.3 and 0.4 kilograms per person in rural areas, with an expected annual increase of %3 nationwide, driven by population growth and increased internal migration from rural to urban areas. On average, waste collection rates stand at %65 in major cities and only %5 in rural areas [10]. Due to the absence of a comprehensive waste management system that keeps pace with this increase, this large quantity of waste is often handled in environmentally destructive ways, such as burning, burying in the soil, dumping in water sources, or piling it up in designated areas for all types of waste. And the consequences of these waste disposal methods are severe and highly damaging to the ecosystem in general, and to agriculture in particular.

The use of land in general, and agricultural lands or those near agricultural areas in particular, to landfill or pile up waste, leads to serious soil destruction and degradation, making it difficult to restore the lands without significant time, effort, and cost. Burying waste in the soil inevitably allows its materials and the chemical components they contain, once decomposed, to reach groundwater and cause pollution, harming the soil and agricultural crops when used. This also applies to other water sources contaminated with solid waste that is dumped into them and used for irrigating crops.

In most cities, if not all, direct incineration of waste is considered one of the most common methods of waste disposal, making it one of the most damaging practices to the environment in Yemen. When millions tons of waste are burned, they produce pollutants in equivalent mass, based on the principle of mass conservation, whether in the form of emitted gases, unburned solid waste, or ash resulting from combustion. Burning of solid

10 United Nations Development Program (UNDP), “Emergency Assessment of the Waste Situation in Yemen”, August 2015.

waste, along with the dire consequences of its byproducts, also leads to air pollution, which significantly contributes to the exacerbation of climate change and its impacts—one of the most affected sectors being agriculture.

The greater disaster of leaving this waste in landfills for extended periods is that it becomes a breeding ground for microorganisms that cause numerous widespread epidemics, as well as agricultural pests that, due to rain, seep into groundwater used for human, animal, or agricultural irrigation, thus affecting all these types and causing various epidemics.

Solid waste poses a significant environmental challenge in many countries, including Yemen, where it greatly affects the agricultural sector. Solid waste, such as plastics, glass, aluminum, heavy metals, agricultural residues, food waste, and industrial and medical waste constitutes major pollution sources that impact soil, water, and air quality.

Solid waste represents one of the most squandered sources of wealth and economic potential in our country. The ability to exploit this sector and the investment returns from it can enhance the agricultural sector and all other sectors, enabling them to adapt to and combat climate change, thereby creating thriving sectors that reflect the capacity for development in light of the significant impact of climate change worldwide.

02

Legal and Legislative Status

Dealing with waste responsibly is of paramount importance for environmental protection in Yemen. Legislation pertaining to waste management has played a pivotal role in this regard. The Environmental Law No. (26) of 1995 established the overarching framework for environmental protection in Yemen, encompassing responsibilities related to waste handling and management, hazardous waste and the mechanism of dealing with it, and

environmentally damaging activities, including offenses of pollution. Law No. 20 of 1999 [11] on the establishment of the City Cleaning and Development Fund and the amendments related to the mechanism of collecting and managing revenues to provide solid waste management services. Law No. 39 of 1999 [12], known as the Public Hygiene Law, which outlines roles, responsibilities, and ways to deal with different types of waste. These laws mandated both governmental entities, the private sector and the community to adhere to environmentally sound practices in waste management. Significant challenges persist in the effective implementation and enforcement of these laws which may exacerbate the problems stemming from inadequate solid waste management in Yemen, particularly in relation to the agricultural sector.

03

Key Interventions and Projects

Despite the modest efforts to mitigate the volume, quantity, and impact of various types of waste on the agricultural sector in particular and other affected sectors in general, the field of waste recycling is gaining increasing popularity and significant support from youth and civil society organizations.

In Lahj Governorate, the first waste-to-energy plant was inaugurated in 2021, funded by the United Nations Development Program (UNDP) with participation from numerous organizations and youth groups [13]. The energy generation, which is evidently intended to serve the agricultural sector, has contributed to creating a new positive approach to alleviating the waste problem and disposal methods. It has opened doors for everyone to participate and contribute to projects with no potential for loss. However, despite all

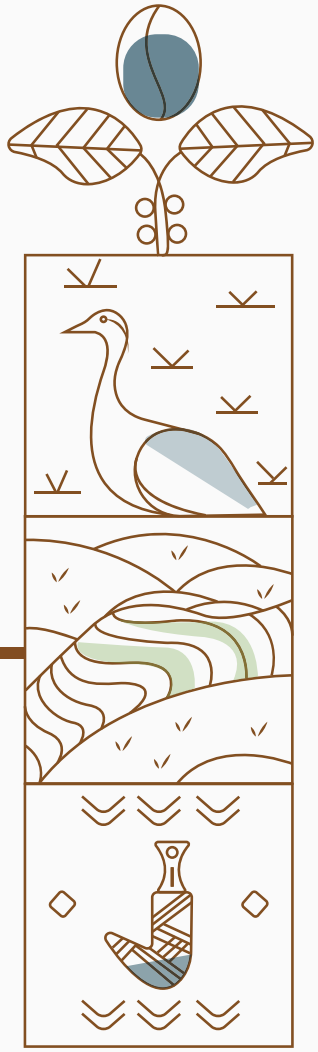
11 Law No. (20) of 1999: Establishment of the City Cleaning and Development Fund and subsequent amendments: Collection and management of revenues for the provision of solid waste management services.

12 Law No. (39) of 1999, known as the Public Cleanliness Law: Defines roles and responsibilities, and methods for handling various types of waste.

13 UN News, An initiative contributing to rid communities of waste by converting it into energy, December 2021.

these efforts, the project is currently facing setbacks due to lack of funding and the critical mass of investment that will contribute to the resumption and expansion of the project to become one of the sustainable projects that contribute to the preservation of the environment and the agricultural sector in Yemen.

Factories converting agricultural waste and food scraps into organic fertilizers, plastic recycling projects for reuse in either plastic remanufacturing or for use in producing other products such as agricultural pipes, and youth-driven innovative projects like plastic agricultural basins are growing day by day. These projects are attracting young entrepreneurs through their creative and exceptional ideas, contributing to revitalizing the waste recycling sector and transforming waste into wealth and successful ventures. Despite all these efforts and passionate attempts, there is still much to be done, especially given the lack of funding and serious and meaningful investment in such ideas and projects.



04

Demands and Recommendations

1. We call upon the government to update the current laws by drafting new legislation that aligns with the current waste management situation and requirements, and to activate these laws by establishing oversight committees to monitor their implementation and hold violators accountable.

2. We urge the implementation of a waste sorting mechanism at the household, residential, service and commercial institution levels in each area, and the designation of clear collection points for the sorted waste.

3. We strongly urge the introduction of a simple financial incentive for the delivery of sorted or recycled waste (Cash for Trash), and the allocation of a small financial amount in exchange for well-sorted waste. This has already been implemented for plastic water bottles in most governorates, and we want to see the same mechanism applied to all other recyclable waste.

4. We recommend the provision of necessary equipment for the sorting process, such as colored small containers, and the creation of a market for selling these products to promote their use, preferably using locally produced and recycled materials.

5. We strongly recommend the establishment of a waste collection and recycling network at the level of each residential block.

6. We strongly advocate for the appropriate recycling of the sorted waste collected, converting it into the same products with the same quality as

the original, such as plastic materials, or into new high-quality products suitable for widespread use, such as organic fertilizers in the agricultural sector or biofuel.

7. We propose the establishment of specialized facilities for the re-production of each type of sorted and collected waste, where these collection points become a source of raw materials for the products manufactured by the factory or facility, and the production of high-quality products that satisfy the local market and serve as a source of income and gradual economic revival.

8. We call for the adoption of modern waste treatment and disposal methods for the non-reusable waste, in order to mitigate the destructive effects of the traditional waste disposal process and to ensure the optimal utilization of the products resulting from the treatment process.

9. We call upon the government to create an investment fund for innovative and creative youth ideas on how to optimally utilize waste and its recycled products in the agricultural sector, and to adopt the implementation of these ideas on a nationwide scale.

10. We strongly recommend the development of waste management infrastructure to accommodate the increasing quantities of waste and align with the latest technologies and innovative approaches to waste management globally.

11. We advocate for widespread advocacy campaigns to reduce consumption and promote the rational use of resources, especially food, in order to mitigate the issue of waste and the resulting pressure on the agricultural sector, both directly through the need for increased production and indirectly through the impact of food waste on climate change and its effect on the agricultural sector.

12. We strongly urge the intensification of awareness and educational efforts for the community, especially children, on the importance of waste management and environmental protection, and to motivate young entrepreneurs to invest their

ideas and capabilities in creating projects that contribute to transforming waste into products and wealth.

13. We propose the provision of alternative materials for non-biodegradable or non-recyclable materials with other easily degradable and recyclable materials, and the establishment of exchange points for these materials at all levels, followed by the withdrawal of non-biodegradable and non-recyclable materials from the market and their replacement with the new, accessible, utilizable and affordable products.

14. We call for the utilization and importation of applicable global experiences and ideas that contribute to the implementation of the latest and best practices in waste recycling and management in our country.

05

Relevant stakeholders

Ministry of Water and Environment - General Authority for Environmental Protection - Cleaning and Improvement Fund - Local Authorities - Ministry of Economic Affairs, Industry, and Investment - Ministry of Youth and Sports - National civil society and non-governmental international organizations - All agencies and organizations with vested interests in climate and waste management.

1.3

Traditional Agriculture Effects and the Role of Hydroponics in Mitigating These Effects

01

Current situation

Traditional agriculture is a vital component in Yemen. Historically, it has been the backbone of economic, political, and social life, playing a key role in the strength and cohesion of communities. Despite its importance, agricultural practices have declined significantly in recent years. According to the 2018 Agricultural Statistics Book, the total cultivated area in Yemen for that year was approximately 1,084,001 hectares [14], marking a decrease from previous years. Traditional agriculture is one of the most essential forms of farming, and it is difficult to replace or eliminate it. However, certain associated practices threaten its sustainability and biodiversity, as well as the food security situation.

These practices include monoculture, excessive irrigation, and overuse of pesticides and chemical fertilizers. In an era where it is impossible to rely solely on outdated methods due to rapid advancements and increasing needs, alongside worsening climate change impacts, complete dependence on traditional agriculture poses a risk to Yemen's agricultural sector. The Food and Agriculture Organization (FAO) report indicates that %20 of food loss and waste occurs during the cultivation phase, primarily due to traditional practices and farmers' lack of knowledge and application of modern agricultural techniques [15].

Hydroponics is one of the most innovative methods in modern agriculture. This technique allows plants to grow directly in water with mineral components, similar to soil. Hydroponics offers numerous advantages over traditional agriculture, significantly contributing to increased production and achieving food self-sufficiency, thereby addressing hunger issues. In this method seeds grow faster compared to soil, and it does not rely on chemical fertilizers or pesticides, focusing instead on organic nutrients and natural pest control.

14 Editorial Board Special Report, ‹Agricultural Land Degradation in Yemen,› holmakhdar website, 2020.
15 Food and Agriculture Organization (FAO), ‹Report on the State of Food Security in Yemen,› 2019.

When comparing hydroponics to traditional agriculture, it becomes evident that hydroponics does not consume as much water as some might believe. This is because the agricultural medium is water-based, allowing for a closed-loop water cycle, in which the same water is reused for cultivation instead of relying on soil. Hydroponics can also be implemented in various environments, such as rooftops and areas near residential neighborhoods. By adopting such techniques alongside continuing traditional agriculture—while ensuring that traditional practices are environmentally friendly and free from harmful methods—along with utilizing modern agricultural technologies, it is possible to ease the burden on traditional farming. This approach serves as a means to adapt and enhance the agricultural sector's resilience to climate change, preserving its diversity and sustainability [16].

02

Legal and Legislative Status

Many laws and legislation were enacted in the country to govern traditional agriculture and mitigate potential detriments. For instance, Law No. (25) regulates the utilization of phytosanitary pests, with Article (3) specifically stipulating the imperative to circumvent the hazards and toxic ramifications of these pesticides on human, animal health and the environment [17]. Furthermore, Law No. (33), about water and its agricultural uses, encompasses in Article (48) provisions for bolstering and facilitating endeavors aimed at galvanizing farmers to adopt contemporary irrigation methodologies. The underlying objective is to rationalize water consumption and pivot towards modern agricultural practices [18]. Notwithstanding these legislative efforts, it appears that the relevant ministries are beseeched to promulgate novel legislation that places greater emphasis on facilitating the transition from conventional agricultural paradigms to cutting-edge farming techniques, such as hydroponic.

16 Eng. Wajeeh Al-Mutawakkil, ‹Soilless Agriculture Systems: Hydroponic Farming in the Northern Highlands,› General Authority for Agricultural Research and Extension.

17 Law on Regulation and Handling of Pesticides No. (25), Article No. (3), Republic of Yemen.

18 Water Law No. (33) of 2002, Article No. (48), Republic of Yemen.

03

Key Interventions and Projects

The Ministry of Agriculture and Irrigation has made some efforts to educate Yemeni farmers on the use of modern agricultural techniques. Financial institutions have committed to supporting the agricultural sector, especially in implementing modern farming technologies such as greenhouses and hydroponics. Additionally, the Small and Micro Enterprise Promotion Service (SMEPS) has provided support to farmers transitioning to hydroponic farming through financial grants. In 2013, hydroponic farming was introduced to Yemen for the first time [19].

The first experiment was conducted by Othman and Sultan Sudan from Al Sudan village in Dhibin district, Amran governorate, located 50 km from Sanaa. The owner of the hydroponic farm says that the idea of applying hydroponic farming occurred to him, and the two brothers were enthusiastic about implementing this new experiment. They modified their existing greenhouse to meet hydroponic farming standards and began installing equipment and the hydroponic system. After completing the project setup, they started growing tomatoes. However, they say that initially they faced many difficulties due to lack of experience. However, they were eager to succeed, therefore, they collaborated with an engineer, and as a result of the consultation and support, they expanded significantly, as did other residents in the area. Now, there are about 11 private hydroponic farms in Yemen. We still aspire and hope for the expansion of more such successful experiments to protect and prosper agriculture in our country.

19 Samah Al-Ja'rani, ‹Success Story of the First Hydroponic Farm,› holmakhdar website, 2020.

04

Demands and Recommendations

1. We strongly urge the gradual prohibition of pesticides and chemical fertilizers except under strict conditions, stringent standards, and in very limited quantities, replacing them with natural pest control methods and organic fertilizers.

2. We recommend replacing traditional irrigation methods with modern techniques to maximize the benefits for traditional agriculture while conserving water resources.

3. We call for the enforcement of laws that criminalize excessive use of toxic, harmful, and environmentally destructive substances, and the punishment of violators.

4. We advocate for the introduction of modern technology suitable for Yemen›s agricultural nature, along with the necessary equipment and methods to apply this technology in Yemeni agriculture, to help reduce the burden on traditional farming and its inability to keep pace with rapid development and increasing needs.

5. We propose expanding the areas used for hydroponic farming through a national strategy to establish supportive hydroponic farms alongside every farm using traditional agriculture as its primary approach.

6. We strongly recommend providing equipment, units, and all necessary requirements to establish model hydroponic farm systems through non-

refundable and unconditional funding programs, or facilitating easy loans without interest or at low rates, enabling farmers to easily access these means and equipment.

7. We urge the issuance of laws and policies supporting hydroponic agriculture, protecting farmers› rights, and developing long-term government policies supporting hydroponic farming.

8. We call for the establishment of a model hydroponic farm in each area for training, educating, and raising awareness among farmers about how to use this technology, introducing them to the significant benefits of its application in agriculture as an aid to traditional farming, and demonstrating the economic and environmental advantages of hydroponics compared to traditional agriculture and the ease of adopting this technique.

9. We recommend establishing advisory cooperative associations for farmers among themselves and between farmers and consultants to guide them and provide technical support, involving engineers, experts, and consultants in the process of establishing and designing these farms with farmers to provide technical support and periodic advice until ensuring the success of the first production and conducting regular inspection visits to ensure the sustainability of these farms.

10. We actively seek the launch and funding of media awareness campaigns about the benefits of hydroponic agriculture and its impact on productivity and sustainability, highlighting successful models of farmers adopting hydroponics to contribute to the widespread adoption of the technology.

11. We encourage coordination between government agencies and academic and research institutions in the field of hydroponic agriculture and its development.

12. We propose establishing partnerships between farmers and technology companies to provide technical and technological support.

13. We strongly advocate for reducing taxes and facilitating administrative procedures related to obtaining hydroponic farming equipment, alongside tax exemptions for profits from crops produced using hydroponics for at least one year from the time farmers activate the technology and start farming.

05

Relevant stakeholders

Ministry of Water and Environment - Ministry of Higher Education and Scientific Research - Ministry of Agriculture and Fisheries - Ministry of Economic Affairs, Industry, and Investment - National civil society and non-governmental international organizations - All agencies and organizations with vested interests in climatology and agricultural sciences.

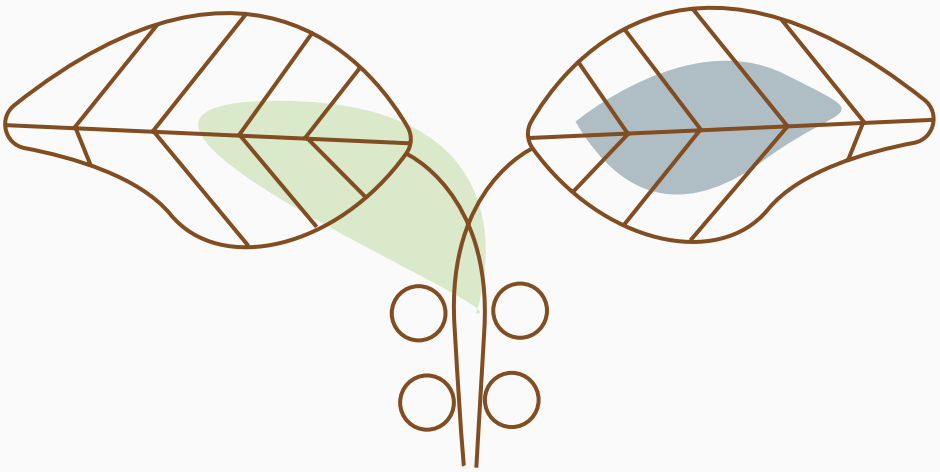
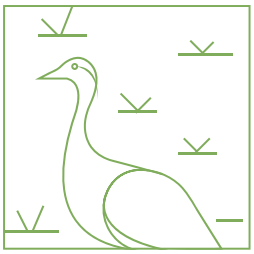


Photo by: Kristina Makeeva/ @hobopeeba



Theme 2

Nature and Biodiversity

Overview

Yemen, the jewel of the Arabian Peninsula, is located in a strategic area of the peninsula, specifically in its southwest. It overlooks two of the world›s most important seas from the south and west, the Red Sea and the Arabian Sea, which host a great diversity of marine life including coral reefs and marine creatures, alongside numerous islands, most notably Socotra Island. Socotra Island is considered one of the world›s most important islands due to its unique biodiversity and rare living organisms that exist in small quantities only on this island. Yemen is also characterized by its diverse climate and unique topography that provide a favorable environment for many living organisms. Additionally, Yemen is an agricultural country par excellence, with vast green areas and a large number of terrestrial nature reserves such as Hawf Reserve in Al-Mahra, Bura›a Reserve in Hodeidah, and Ottma Reserve in Dhamar. Yemen is a country rich and diverse in living organisms and plants, and is distinguished by its biodiversity, which is recognized by all local, regional, and international entities. This recognition has drawn attention to Yemen in various ways, both positively and negatively, unfortunately.

The ongoing conflict, along with many harmful practices such as urban sprawl, unsustainable hunting and logging, and increasing neglect of biodiversity in various regions of Yemen, coupled with climate change and its escalating effects, are impacting Yemen›s environment day by day, particularly its unique biodiversity.

These factors have caused deterioration in Yemen›s environment and a decline in its biodiversity, which is considered rich and unique. These factors and others require urgent and special attention to ensure the sustainability of Yemen›s environment and preserve its biodiversity for future generations.

In the coming pages, we will explore the issues facing biodiversity and the environment in Yemen, as well as urgent demands and recommendations from

Yemeni youth that should be considered by relevant stakeholders and decision-makers. We must work seriously and effectively together to implement these recommendations with the aim of enhancing Yemen›s environment›s resilience and adaptation to the effects of climate change, and to preserve Yemen›s unique nature, rarity, and biodiversity. By focusing on these aspects, we seek to contribute to protecting biodiversity in Yemen and conserving its natural resources comprehensively. All concerned parties (stakeholders) must take these challenges seriously and work collaboratively to achieve positive change that contributes to improving the quality of the environment and life for Yemeni citizens now and in the future.

2.1

The Impact of Accelerated Climate Change on Biodiversity in Marine Environments

01

Current situation

Yemen overlooks two of the world's most strategic seas, with its coastlines extending along the Red Sea to the west and the Arabian Sea to the south. This provides it with a vast diversity of marine ecosystems and living organisms. The marine environment of Yemen is among the richest globally in biodiversity as Yemen's coasts host a variety of coral reefs, which are considered some of the most productive and biodiverse ecosystems, as one of the key roles of corals, alongside seagrasses, is to provide vital habitats for numerous marine organisms [20].

The Red Sea is known for its unique biodiversity, harboring over 1,200 species of fish, many of which are endemic to the region. Meanwhile, the Arabian Sea is home to many unique marine species, including various types of sea turtles that migrate to Yemen's coasts to lay their eggs. Additionally, many other living organisms thrive in Yemen's waters. The coasts also host a variety of seabirds that use this area as a nesting habitat. Seagrasses are a crucial part of the marine ecosystem, providing shelter for various marine creatures [21]. Coral reefs are among the most sensitive marine systems to climate change, facing threats like rising water temperatures and increased ocean acidity. These reefs form a complex system that contributes to marine stability and ecological balance [22].

The direct and indirect impacts of climate change on Yemen's marine environment, alongside the evident degradation of coral reefs, have led to one of the most severe crises threatening biodiversity in Yemen's marine ecosystem. The phenomenon of «Coral Bleaching» is one of the most notable effects faced by reefs; this process occurs when

20 Al-Mansi, A. (2018). «Marine Biodiversity in Yemen: An Assessment of Current Status and Future Trajectories.» Journal of Oceanography.

21 Seil, B. F., et al. (2012). «Coral Reef Ichthyological Research in the Red Sea: Current State and Future Challenges.» Marine Biology.

22 Bruckner, A. W. (2002). «A Global Perspective on Anthropogenic and Environmental Threats to Coral Reef Ecosystems.

corals lose their vibrant colors due to stress from rising temperatures and changes in ocean acidity. Studies suggest that approximately %50-30 of the coral reefs in the Red Sea may have been damaged or eroded due to climate change [23].

Many marine species, including fish and mollusks, are experiencing changes in their habitats due to the degradation of coral reefs, leading to declines in the populations of fish and other organisms that depend on these habitats for shelter and food. Coral reefs are pivotal for biodiversity, influencing every living organism in that environment and degradation of these reefs results in a general decline in biodiversity.

Human erratic behaviors significantly exacerbate the effects of climate change on the marine environment, with overfishing being one of the greatest threats to marine biodiversity. As overfishing and random fishing practices reduce the populations of key marine species. Pollution from plastic waste, chemicals, and industrial waste, which often ends up in marine waters, alongside pollution from commercial shipping spills, contributes to the deterioration of the marine environment. This increases the vulnerability of coral reefs and affects water quality, rendering it unsuitable and leading to the death or migration of marine organisms, causing ecological imbalances. Urban sprawl and unplanned tourism development also disrupt the natural habitats of marine organisms like coral reefs. Also certain activities, such as coastal construction and unsustainable tourism, contribute significantly to environmental degradation [24] [25].

Many marine organisms are affected by climate change and erratic behaviors, but coral reefs remain the most at risk. Climate change and erratic human behaviors pose serious threats to biodiversity in Yemen's marine environment, necessitating immediate action to preserve coral reefs and other marine creatures. Local and international efforts must be made to protect these rich ecosystems and ensure their sustainability in the face of future challenges.

23 Hawkins, J. P., et al. (2015). «Climate Change and Its Effects on Coral Reef Ecosystems: A Comprehensive Analysis.» Coral Reefs.

24 Intergovernmental Panel on Climate Change (IPCC) (2021). «Climate Change 2021: The Physical Science Basis - Sixth Assessment Report.

25 McCauley, D. J., et al. (2015). «Marine Defaunation: Animal Loss in the Global Ocean.» Science, 347(6219), 1255641.

02

Legal and Legislative Status

In Yemen, there is a set of laws and regulations aimed at protecting marine environments and biodiversity. The Environmental Protection Law No. (26) of 1995 includes provisions related to the protection of marine environments, specifying the responsibilities of individuals and various entities in maintaining the environment. Article (9) requires individuals and entities to avoid activities that harm the environment. Additionally, there is Law No. (11) of 1993 concerning the protection of the marine environment from pollution, which addresses the impacts of human activities on biodiversity and emphasizes the need for environmental impact assessments before project implementation. The legal framework also includes Law No. (42) of 1991, which regulates the fishing and exploitation of aquatic life and its protection. This law aims to organize fishing activities in accordance with sustainability standards and to limit overfishing that leads to the degradation of coral reefs [26]. Climate change and erratic behaviors pose serious threats to biodiversity in Yemen. It is crucial to enhance the effective implementation of existing laws to protect the marine environment, prevent further degradation and preserve the rich biodiversity of the Red Sea and the Arabian Sea.

26 Official Portal of the Public Prosecution Office, Office of the Attorney General, Republic of Yemen.

03

Key Interventions and Projects

Biodiversity in marine environments, particularly coral reefs and other marine organisms, is a major focus for organizations working in environmental and climate protection, both locally and internationally. There are numerous interventions including the establishment of marine protected areas, coral reef restoration projects, and the cultivation of coral seeds to expedite their regeneration and compensate for losses. These efforts also involve rehabilitating coral ecosystems by planting new coral species and providing suitable conditions for their growth, alongside initiatives to support natural coral reefs through the creation of artificial reef zones.

A number of initiatives have been launched to enhance the adaptive capacity of coastal communities to the impacts of climate change. These projects include awareness-raising and training programs for the sustainable management of water resources, marine organisms, and fishing practices. Additionally, awareness campaigns have been organized to educate local communities about the importance of preserving biodiversity and environmental sustainability.

Despite these interventions and efforts, the threat of climate change and random human behaviors in the marine environment, affecting living organisms and coral reefs, remains significant. This situation requires the commitment of coastal nations benefiting from the biodiversity of the Arabian and Red Seas. Collaborative efforts and adherence to laws at all levels, alongside intensified interventions and investments in marine environmental protection and biodiversity, are still insufficient. Furthermore, the expansion of conflicts exacerbates the degradation of marine biodiversity, severely limiting the success and sustainability of projects aimed at protecting Yemen's marine biodiversity.

04

Demands and Recommendations

1. We call upon the full implementation of global agreements signed and ratified by Yemen and to enhance international cooperation in protecting the territorial waters and marine environment shared by the Red Sea and Arabian Sea countries to develop solutions and implement joint projects to preserve marine biodiversity in Yemen and all related countries.

2. We strongly urge a comprehensive assessment of the laws, policies, and regulations established to organize and protect the marine environment and biodiversity in Yemen. We propose issuing updated legal frameworks that align with the current state of Yemen›s marine environment and regional conditions, in accordance with the agreements, to achieve maximum impact and reach effective adaptation and mitigation.

3. We emphasize the strict enforcement of laws across all community sectors by establishing oversight committees to ensure compliance, particularly among fishermen, coastal visitors, and commercial shipping companies, while holding violators accountable.

4. We invite the resumption of scientific studies and research in the marine environment through diving expeditions and marine trips that promote awareness of the marine environment and assess the current status to identify the risks facing marine organisms and coral reefs, which are home to most of these species.

5. We strongly advocate for the formation of scientific committees to monitor the marine environments of both the Arabian and Red Seas, to track

changes in water conditions and marine life, assess the dangers posed by climate change, and report immediately to relevant authorities for timely intervention.

6. We demand a complete ban on using coastlines and marine waters as waste dumps of all kinds and quantities and we request that commercial vessels adhere to proper maintenance before sailing to prevent any leaks of materials into the seas and to avoid dumping waste, holding non-compliant vessels accountable.

7. We recommend increasing the number of marine protected areas, particularly in regions with threatened coral reefs, to facilitate their rehabilitation, replanting, and growth monitoring, thereby revitalizing areas to attract marine life and preserve ecological balance.

8. We draw attention to the need for modern technologies to measure the impacts of climate change on the marine environment, monitor coral cover, and support coral reef restoration efforts.

9. We propose expanding the areas designated for artificial reefs to support natural coral reefs and enhance their resilience, providing opportunities for new coral growth.

10. We call for designated fishing seasons in marine waters and the establishment of clear and strict standards to regulate fishing practices, supported by oversight and guidance committees for fishermen to urge the criminalization of illegal fishing methods, such as the use of chemicals, to protect marine organisms and biodiversity.

11. We advocate for training programs for fishermen to embrace biodiversity conservation principles and implement sustainable fishing practices that meet their needs while protecting the marine environment out of a sense of responsibility and belonging and having widespread awareness campaigns targeting all community sectors to highlight their essential role in preserving Yemen's marine environment and biodiversity.

12. We recognize the importance of promoting scientific tourism for local and international researchers to keep pace with global changes and apply the best practices and

technologies for marine conservation and foster international cooperation among Red Sea and Arabian Sea countries in scientific research and the implementation of best practices.

13. We strongly advocate for extensive investment in all activities, projects, and specialized interventions aimed at developing and protecting Yemen›s marine environment.

05

Relevant stakeholders

Ministry of Water and Environment - General Authority for Environmental Protection - Ministry of Tourism - Ministry of Foreign Affairs - Ministry of Industry and Trade - Ministry of Transport - Ministry of Higher Education and Scientific Research - Ministry of Information - National civil society and non-governmental international organizations - All agencies and organizations with vested interests in climate and environment.

2.2

Climate Change and Its Impact on Yemeni Islands and Their Unique Biodiversity

01

Current situation

The Yemeni islands constitute a vital and significant component of the natural, geographical, and cultural landscape of the Republic of Yemen. Numerous unique islands are scattered throughout Yemen's territorial waters, extending along the western coast in the Red Sea, as well as in the Gulf of Aden and the Arabian Sea along Yemen's southern coast. The number of Yemeni islands is estimated at approximately 186, distributed across the Red Sea, Arabian Sea, and Gulf of Aden. Among these 186 islands, only six are inhabited [27]. Each of these islands is distinguished by its unique topography, climate, environment, and exceptional and rare biodiversity.

Among the most prominent islands located in the Red Sea are Kamaran Island, the Hanish Archipelago, and Perim Island, which holds a strategic position in the Bab el-Mandeb Strait and serves as the southern gateway to the Red Sea. The most significant islands in the Arabian Sea include the Socotra Archipelago, with Socotra Island being the largest in this archipelago, along with Samhah, Darsah, and Abd al Kuri islands.

Socotra Island is considered one of the most important islands globally due to its unique nature and rare biodiversity. Nicknamed the «Virgin Island,» Socotra is one of the largest islands in the Arab world and one of the largest in the western part of the Indian Ocean. The Socotra Archipelago is characterized by its enchanting and unique biodiversity, with Socotra Island alone hosting more than 680 rare plant species, approximately %30 of which are not found anywhere else in the world. This has led to its recognition as the «Islands of Biodiversity» or the «Miracle Islands.» The Global Environment Facility has classified it as one of the last repositories of pristine nature [28]. Socotra Island boasts several features, including diverse ecosystems and organisms with unique characteristics that make them

27 186 Islands with Vast Resources, Special Report by the Editorial Team, Green Dream Website, November 2019.
28 Tourist Destinations in Yemen, National Information Center, Yemen.

resistant to changes and capable of adapting to harsh conditions [29]. Socotra dragon tree (dracaena cinnabari) is among the most famous species, distinguished by its unique trunk and distinctive leaves. The island also harbors rare species of birds, lizards, and wildlife [30].

The Yemeni islands face multiple challenges and significant threats due to the wave of climate change and its effects that have impacted the entire world. The damages resulting from climate change on the islands manifest in various aspects, including coastal erosion due to rising sea levels, changing weather patterns, and increased exposure of the islands to hurricanes that devastate the nature of these islands. These damages have, in turn, led to the destruction of natural habitats for marine and terrestrial creatures. Socotra Island is considered one of the islands suffering the most from the deterioration of its biodiversity and the destruction of natural habitats. Many unique species on Socotra Island face the risk of extinction due to habitat loss and environmental degradation [31]. Arbitrary human behaviors contribute to exacerbating environmental damage and intensifying the impact of climate change on the nature and biodiversity of the islands. Among the most prominent of these behaviors is urban expansion, where random construction leads to the destruction of natural habitats and wildlife. Poaching contributes and exceeding the permitted limits in the excessive use of natural resources contributes to the deterioration of biodiversity. Pollution resulting from human behaviors such as littering or industrial and commercial activities at both individual and community levels is one of the causes of habitat deterioration for both terrestrial and marine organisms [32].

The Yemeni islands are natural and cultural gems that deserve protection and more attention. Despite the significant environmental challenges they face, these islands possess enormous potential that could greatly contribute to sustainable development, therefore, preserving and developing these islands is vital for the future of Yemen, its environment, and the region in general.

29 Western, D. (2002). *Endemism and Conservation in the Socotra Archipelago*.

30 Tabor, G. (2010). *Socotra: An Island of Biodiversity and Endemism*.

31 Ahmed, A. A., Mohamed, A. Y., & Lopes, J. C. (2020). Climate Change and Its Impact on Marine Biodiversity: The Case of Socotra Archipelago. *Marine Ecology Progress Series*, 635, 112-.

32 Harris, S. G., & Thacker, R. (2022). Human Impacts on Ecosystems: The Case of Socotra Island. *Biodiversity and Conservation*, 31(2), 345365-.

02

Legal and Legislative Status

In an era of increasing awareness about the importance of the environment and climate, environmental laws emerge as vital tools for regulating the relationship between humans and nature. These laws aim to achieve a balance between economic and social development and the preservation of natural resources, contributing to ensuring environmental sustainability for future generations. These laws include, for example, Law No. (26) of 1995 on environmental protection, Law No. (20) of 1995 on urban planning, along with other laws such as Law No. (16) of 2004 on protecting the marine environment from pollution, and Law No. (42) of 1991 on regulating the fishing and exploitation of aquatic life and their protection [33].

These laws incorporate within them the environmental aspect and biological diversity of the Yemeni islands. If properly implemented and enforced, they contribute to preventing all causes that affect the environment, natural resources, and biodiversity enjoyed by Yemeni lands and islands. They also regulate in their articles the relationship and important requirements for preserving the environment between society and the ecosystem, ensuring their optimal continuation and prosperity.

Stagnation and lack of development proportionate to the current situation, in addition to deficiencies in law enforcement, are considered among the most important reasons contributing to the deterioration of the environment in the Yemeni islands and the loss of their unique biodiversity. We need a serious pause to identify all obstacles that prevent the implementation of these laws, and to work on solving them as quickly as possible.

33 Official Website of the Public Prosecution, Office of the Attorney General, Yemen.

03

Key Interventions and Projects

In light of all the challenges and threats facing the Yemeni islands and their biodiversity, a number of projects aimed at protecting this diversity have been launched. Among these projects is the Natural Reserves Management Project in Socotra, implemented by the Ministry of Water and Environment, which aims to protect endangered species and develop sustainable management strategies for reserves. The Sea Turtle Conservation Project in Socotra Islands was also implemented by the Research and Biodiversity Center, targeting the protection of sea turtle nests and enhancing protection efforts on the islands' beaches. Additionally, the Yemeni Wildlife Protection Society implemented a project to protect migratory birds in the Red Sea islands, which seeks to protect bird breeding sites and provide a safe environment for them.

The field of biodiversity and nature, especially in the Yemeni islands, receives great attention from government agencies and local and international organizations. However, the rapid acceleration of climate change and its impact on these islands may dissipate these efforts, sometimes making them seem modest and not contributing significantly to environmental conservation. We do not deny the efforts made, but we seek to expand their scope and maximize their impact, so that they bear fruit in protecting the nature of the Yemeni islands and their rare biodiversity.

04

Demands and Recommendations

1. We call upon the declaration of all Yemeni islands in the Red Sea and Arabian Sea as natural reserves to restore ecological systems and recover what has been lost due to mismanagement or climate change.

2. We strongly urge the promulgation of a law dedicated to the protection of Yemeni islands, regulating natural resources, and defining responsibilities and duties for individuals and entities on these islands, with clear penalties for violations that endanger the islands and their biodiversity or weaken them in any way that increases their vulnerability to climate change.

3. We strongly recommend the implementation of rehabilitation projects and the establishment of long-term cohesive infrastructure, while providing essential services to the inhabitants of these islands through a carefully studied plan that ensures the execution of these projects while fully preserving natural resources and biodiversity.

4. We advocate for the formation of regulatory and supervisory committees in each district or area of the islands to organize and monitor wildlife and marine fishing practices, ensuring no rare trees are uprooted for firewood or grazing beyond permitted limits, and adherence to international standards and laws regarding fishing and logging, with immediate reporting of any violations by residents or entities for legal accountability.

5. We encourage the provision of suitable and environmentally friendly services for island residents as alternatives to natural resources, aiming to mitigate their depletion and the risk of extinction.

6. We propose projects to compensate for the loss of wildlife and marine species, both plant and animal, depleted due to mismanagement, while providing all necessary conditions for their growth and reproduction, and working to minimize resource exploitation as much as possible.

7. We strongly advocate for carefully planned urban development for these islands, especially the inhabited ones, to mitigate the risks of urban sprawl on habitats of rare plant and animal species and to preserve their habitats and existing ecosystems.

8. We call for the establishment of permanent awareness committees aimed at educating island residents and incoming tourists about the importance of these islands, introducing them to rare plant and animal species, and highlighting the risks they face if policies and laws are not followed, along with the types of penalties for violations that endanger this biodiversity.

9. We strongly advocate for the encouragement and recruitment of exploratory and research teams to study living species with the aim of optimizing their benefits and identifying measures to protect them, while also developing mechanisms to enhance the islands› biodiversity resilience and adaptability to climate change.

10. We invite the promotion of both domestic and international tourism to invest tourism revenues in the development, improvement, and protection of the islands, while providing clear guidelines, standards, and strategies for how to behave and interact with the natural landscapes in a way that does not harm or damage the islands› biodiversity.

11. We recommend implementing educational programs through training courses, workshops, and field sessions that raise awareness about the unique and rare biodiversity of Yemeni islands and how to preserve it, both socially and through various media.

12. We encourage environmentally friendly economic projects on the islands, especially those initiated by young entrepreneurs, and conducting environmental impact

assessments for any new or existing projects to prevent future harm to the islands› biodiversity.

13. We propose comprehensive plans and strategies to enhance the islands› preparedness against any natural disasters, such as floods or hurricanes, by activating early warning systems and establishing strong, resilient infrastructure, including natural barriers like mangrove trees or recycled materials like compressed plastic walls.

14. We strongly urge the application of best practices and global experiences in optimizing investment in these islands, along with strategies to protect them from climate change and its impacts.

15. We stress the need for increased governmental funding and international financial support for environmental protection programs and projects on the islands.

05

Relevant stakeholders

Ministry of Environment with its various bodies and offices - Ministry of Tourism - Ministry of Civil Service - Ministry of Higher Education and Scientific Research - Ministry of Foreign Affairs - Ministry of Education - Ministry of Public Works and Roads - Ministry of Industry and Trade - Ministry of Social Affairs and Labor - Private sector - National civil society and non-governmental international organizations especially organizations working in the field of environment and climate.

Photo By: Saleh Al-OBEIDI

2.3

Impact of Green Space Degradation and Poor Natural Resources Management on Biodiversity in Nature Reserves

01

Current situation

Nature reserves are geographical areas dedicated to protecting and conserving biodiversity, natural habitats, and unique environmental resources. These areas are carefully managed to ensure the preservation of plant and animal species and their protection from harmful human activities. Nature reserves are characterized by several features, such as biodiversity, legal protection, sustainable management, as well as their use for research and educational purposes. Worldwide, more than 100,000 of these protected areas collectively cover %12.5 of the Earth's surface. There are also more than 5,000 marine protected areas covering approximately %1.2 of the ocean area. Natural areas provide many crucial contributions to the preservation of unique habitats [34].

The Republic of Yemen possesses numerous nature reserves, some of which have been officially declared as reserves to protect plant and animal biodiversity from extinction, while others are still under study. These reserves are characterized by stunning nature and enchanting scenery. In addition to plant and animal biodiversity, Yemen has areas rich in environmental diversity that qualify to be nature reserves, giving it a variety of climatic and natural environments, which have resulted in multiple types of regions and environments with diverse forms of rare wildlife, marine life, plants, and animals of national and regional importance. Yemen is abundant with these areas that still maintain their nature and diversity. The number of nature reserves in Yemen has reached six so far: Hawf Reserve, Ottma Reserve, Wetlands Reserve (Aden), North Kamaran Island Reserve, Bura'a Reserve, and Socotra Reserve. There are still other reserves in preparation to be declared as nature reserves [35].

These reserves face significant challenges due to accelerating climatic and environmental

34 Glazer, A. N. (2013). Natural Reserves and Preserves. In Encyclopedia of Biodiversity: Second Edition.
35 Natural Reserves, Tourism in Yemen, National Information Center, Yemen.

changes. These changes include rising temperatures, alterations in rainfall patterns, excessive hunting, predation and logging, rising sea levels, in addition to pollution, increasing human activities, urban encroachment, and exploitation of natural resources in the reserves beyond their capacity for regeneration. These factors collectively lead to negative impacts on the ecosystems within the reserves, threatening their sustainability and ability to support wildlife.

The recent emergence of extreme climatic phenomena, such as severe drought, rising temperatures, cold waves, and increased intensity of tropical storms and hurricanes, has led to countless challenges and new uncertainties regarding the preservation of the integrity of communities and ecosystems, including reserves worldwide. This serves as a major warning, as we fully rely on ecosystems to control the risks of climate change and protect biodiversity through protected environments to maintain ecological balance [36]. Moreover, human activity has already altered the structure and function of the ecosystem, eroding the short-term resilience of many ecosystems, which are expected to be more vulnerable to further climate changes, especially in developing countries like Yemen.

02

Legal and Legislative Status

In light of increasing environmental challenges at both local and global levels, preserving biodiversity and protecting natural habitats have become fundamental priorities for every country. In this context, environmental laws and legislations play a vital role in regulating and managing nature reserves, which are considered the first line of defense against biodiversity loss and environmental degradation. In the Republic of Yemen, nature reserves are an integral part of environmental conservation and natural resource strategies.

36 Arenas-Wong, R. A., Robles-Morúa, A., Bojórquez, A., Martínez-Yrízar, A., Yépez, E. A., & Álvarez-Yépiz, J. C. (2023). Climate-induced changes to provisioning ecosystem services in rural socioecosystems in Mexico. Weather and Climate Extremes, 41.

Specialized Yemeni laws are responsible for regulating the protection and management of these reserves to ensure their sustainability and protection from environmental and human pressures.

Yemeni laws related to nature reserves reflect Yemen's commitment to protecting its unique natural heritage and are based on global and local environmental protection principles. Since the issuance of the Environmental Protection Law in 1995, and other laws that include provisions for nature reserves and how to preserve them, a robust legal framework has been provided to regulate reserve management and determine necessary procedures for their protection. The laws rely on enhancing cooperation between various government agencies and applying strict scientific and administrative standards to ensure effective protection. They also seek to ensure the sustainability of natural resources and the balance of ecosystems, reflecting Yemen's keenness to preserve its unique biodiversity and sustain its natural environments.

In this context, periodic review and development of laws and legislations are essential to keep pace with environmental changes and increasing challenges. Strengthening the application of these laws and adherence to them is considered an important step towards protecting nature reserves and ensuring their continuity as vital habitats for biodiversity in Yemen. Part of the importance related to protecting nature reserves should be allocated to implementing laws aimed at preserving them.

03

Key Interventions and Projects

The establishment of nature reserves was the first intervention by the Yemeni government to preserve Yemen's unique biological and environmental diversity. Effective management of these reserves, along with involving local populations in activities and projects related to their conservation through awareness-raising and activating the principle of participatory

management, and encouraging sustainable nature tourism, are considered fundamental efforts to protect plant and animal biodiversity in Yemen. However, due to rapid global climate change and its escalation, these traditional efforts have become insufficient to address the increasing negative impacts, which has increased pressure on nature reserves and led to a significant threat to biodiversity. Therefore, large-scale national and international projects with notable impact have become necessary to prevent the further deterioration of nature reserves and the loss of their biodiversity.

04

Demands and Recommendations

1. We strongly urge the completion of studies on areas nominated to be declared as nature reserves, their urgent declaration as such, and the initiation of studies on new areas and spaces to be nominated as nature reserves.

2. We advocate for increasing the number of nature reserves with the aim of reaching a stage of recovery for ecosystems in the Republic of Yemen and revitalizing its biodiversity through the establishment of reserves.

3. We propose creating a specialized law project for the protection of Yemeni nature reserves, regulating their natural resources, and defining the responsibilities and duties of every individual and entity in these reserves, with clear penalties for violating the law and endangering or weakening their biodiversity in any way that contributes to increasing the impact of climate change on them.

4. We recommend activating the principle of participatory management of nature reserves between local authorities and local residents of these reserves, with a clear statement of roles and responsibilities, ensuring all parties› commitment to what has been agreed upon and to geographical divisions, along with full compliance with reserve policies and laws.

5. We strongly advocate for providing alternatives to logging, grazing, and overfishing by offering parallel services and environmentally friendly job opportunities that are compatible with the nature, culture, and qualifications of local residents, while ensuring their thorough and effective training and

development in the chosen fields.

6. We propose establishing projects to enhance and strengthen the infrastructure of nature reserves to serve local residents, as well as increase the reserves› resistance to climate change and its effects, and their ability to adapt more effectively.

7. We urge the organization of urban sprawl through effective and well-studied planning and the application of urban plans on the ground to eliminate the problem of urban encroachment and its destructive impact on nature reserves.

8. We recommend implementing projects to build water basins and artificial lakes, alongside strong and resistant dams that can withstand the effects of heavy rains and torrential floods, as well as water retention for use in agriculture and prevention of soil erosion in reserves due to floods.

9. We call for compensating the loss of plants and green spaces by conducting massive campaigns to plant trees and vegetation in nature reserves and fertile areas capable of growing dense vegetation cover.

10. We propose developing strategic plans and projects to transform cities into green cities by studying all spaces that can be utilized and converted into green areas, such as rooftops of all types of buildings or house courtyards.

11. We strongly recommend creating projects to reclaim lands threatened by desertification or desert lands and cultivate them to increase green spaces as much as possible and mitigate the problem of desertification, with the possibility of using organic plant fertilizers resulting from solid waste treatment in the reclamation process.

12. We advocate for activating contract farming, which is an agreement with farmers on crops to be planted in certain seasons to avoid crop stagnation in a single period, whether in reserves or other agricultural environments.

13. We propose allocating specific areas for cultivating qat trees, since it is currently

impossible to eliminate them, and preventing their cultivation from exceeding designated agricultural areas according to proposed standards and policies.

14. We encourage promoting domestic tourism and field trips to nature reserves for learning and knowledge purposes, as well as educating visitors about the importance of nature reserves and their biodiversity to the Yemeni environment.

15. We strongly recommend enhancing the ability of nature reserves to adapt to and resist climate change, starting from the preventive principle to defensive, resistant, and adaptive approaches to these changes.

16. We propose creating gene banks to store and preserve seeds of rare plants and working on increasing their scientific reproduction and use in agriculture in cases of emergency and risk of extinction for plant species in nature reserves.

17. We encourage and invite exploratory and research teams aimed at exploring and conducting studies on types of living organisms to optimally benefit from them and learn what can be avoided to protect these organisms, as well as developing mechanisms to increase the ability of biodiversity in these reserves to resist and adapt to climate change.

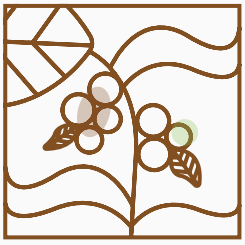
18. We strongly advocate for extensive investment in protecting nature reserves and increasing green spaces in rural and urban areas.

19. We recommend benefiting from applicable global experiences and reflecting them on the reality of reserves in Yemen to obtain optimal benefit from these experiences.

05

Relevant stakeholders

Ministry of Environment with its various bodies and offices - Ministry of Agriculture and Irrigation - Ministry of Social Affairs and Labor - Ministry of Civil Service - Ministry of Higher Education and Scientific Research - Ministry of Public Works and Roads - Ministry of Industry and Trade - Ministry of Education - Private Sector - National civil society and non-governmental international organizations especially organizations working in the field of environment and climate.



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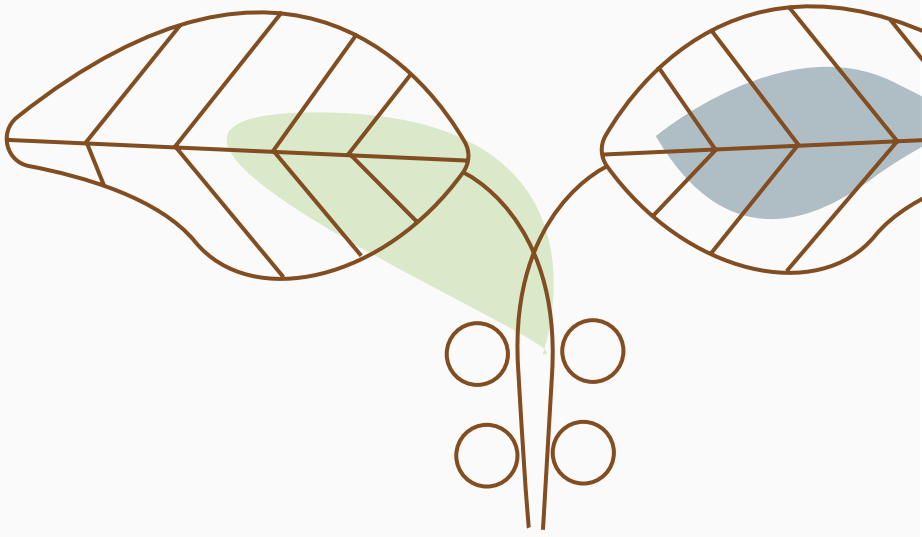

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Additionally, we extend our sincere thanks and appreciation to the Socotra Wildlife Association for its crucial role in providing environmental expertise and local knowledge, which added significant value to the statement as a key partner in its formulation and in the LCOY Yemen.

Conclusion

While Yemen is considered a developing country affected by climate change, rather than a contributing developed nation, the national responsibility for protecting the environment and biodiversity rests with all segments of Yemeni society, from the state to the individual. In a time when discussing climate change and paying attention to it has become urgent, ignoring the environmental damage caused by this rapid change and the destruction of biodiversity is unacceptable. This issue is no longer merely a recreational concern or a fleeting interest; it is a serious matter that requires prompt action and the implementation of strict decisions, alongside widespread interventions, to mitigate the accelerating destruction of our environment and our planet as a whole.

The national youth statement from the Local Conference of Youth addresses a small part of the impacts faced by Yemen across various sectors, highlighting two key sectors directly linked to the Yemeni environment and other aspects such as social, economic, and cultural life, along with food security and livelihoods: agriculture and biodiversity. We, the youth, demand that all the aforementioned requests be taken into account. Given that Yemen is suffering from one of the worst humanitarian crises in the world, allocating a portion of the funds and grants provided by countries and organizations working in this field for projects aimed at mitigating the devastating effects of climate change and enhancing the resilience and adaptation of other sectors is one of our primary demands as Yemeni youth.

We also call on the authorities to sign and ratify the Paris Agreement, activate the committees related to Nationally Determined Contributions (NDCs), update national strategies and laws, and facilitate environmentally friendly business projects. Furthermore, Support initiatives that seek to create a tangible developmental impact in mitigating climate effects, whether from the private sector or local and international civil society organizations, as well as

all relevant bodies. Additionally, we emphasize the importance of involving youth in the decision-making process and supporting their ideas, enabling them to play an active role in addressing the threat of climate change. And we hope that these demands will bear fruit in the near future.

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