Evaluation of Environmental Challenges of Jordan

[a]Alis Saad Shbaita, [b]Salih Gücel

[a] Department of Interior Architecture, Faculty of Architecture, Near East University, Nicosia, Cyprus
e-mail: s.id_alice@live.com

[b]Department of Landscape Architecture, Faculty of Agriculture, Near East University, Nicosia, Cyprus,
e-mail: salih.gucel@neu.edu.tr

Abstract

Rapid population growth and urbanization and the Jordan's economic crisis and industrialization are significant contributors to natural resource depletion and the worsening of environmental problems. The country's environmental issues need to be discussed on local, regional, and global scales. The country's current ecological issues are evaluated in this study and the institutional organization and political response that the Jordanian government has attempted to address is further discussed. The theoretical methods used through this process included examining all aspects of the problems set out, examining the current environmental issues within the context of regulations in Jordan. In addition analyses were conducted to satisfy the population's need to achieve environmental sustainability taking into account the importance and effectiveness of regional strategies in preserving and sustaining natural resources. Pollution or loss of natural resources have significant implications for Jordan. Environmental protection is a humanitarian responsibility because it is the basis of our livelihood, development, and survival. As a result, preservation of the environment must become part of the citizens' culture with state and private institutions promoting its importance in their lives in the country.

Keywords: Environmental challenges, Jordan, theoretical evaluation

Ürdün'ün Çevre Sorunlarının Değerlendirilmesi

Özet

Ürdün'deki hızlı nüfus artışı ve kentleşme ile ekonomik kriz ve sanayileşme, doğal kaynakların tükenmesine ve çevre sorunlarının kötüleşmesine neden olmaktadır. Ürdün'ün çevre sorunlarının yerel, bölgesel ve küresel ölçekte tartışılması gerekiyor. Bu çalışmada ülkenin mevcut ekolojik sorunları değerlendirilmekte ve Ürdün hükümetinin ele almaya çalıştığı kurumsal organizasyon ve siyasi yanıt da tartışılmaktadır. Bu süreçte kullanılan teorik yöntem, ortaya konulan sorunların tüm yönleriyle incelenmesi ve Ürdün'deki uygulamalar bağlamında mevcut çevre sorunlarının değerlendirilmesini içermektedir. Ayrıca, doğal kaynakların korunması ve sürdürülmesinde bölgesel stratejilerin önemi ve etkinliği dikkate alınarak nüfusun çevresel sürdürülebilirliği sağlama ihtiyacını karşılamak için analizler yapılmıştır. Kirliliğin veya doğal kaynakların kaybının Ürdün için önemli etkileri vardır. Çevrenin korunması insani bir sorumluluktur çünkü bu bizim geçim kaynağımızın, gelişmemizin ve hayatta kalmamızın temelidir. Sonuç olarak ülkede çevrenin korunması, devlet ve özel kurumlarla yurttaş kültürünün bir parçası haline gelmelidir ve yaşamlarındaki önemi idrak edilmelidir.

Anahtar kelimeler: Çevresel sorunlar, Ürdün, teorik değerlendirme

1. INTRODUCTION

Evaluation environmental challenges in the Middle East and North Africa deserves attention as it seeks urbanization and economic growth. The geographical location of these spaces is more vulnerable to climate change. Working on the sustainable development goals set by United Nations programs achieves cooperation with the international community (Aguir, 2021).

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The main priority is economic growth, and that environmental protection is a secondary consideration that must be addressed mainly in the future, but there is an urgent need today to develop clear policies to control the deterioration of the environment locally, nationally and globally (Farzanegan & Markwardt, 2018).

The scientific debate on global environmental change has led to agreement on three facts: First, the environment changes rapidly due to various environmental problems and damages, and second, humans are the cause of environmental change, and all causes fall through a subset of direct causes, directly changing aspects of the environment in ways that have an impact. Global Third, environmental change is global in scale because its consequences will be global. Frequent scientific consensus due to human-induced environmental change has led to some model approaches to address the issue, such as "sustainable development" and more recently, the green economy (Behnassi & McGlade, 2017).

One of the severe challenges in the Middle East is the scarcity of water and its shortage; in the past, the Middle East was rich in water. There is a response to the increasing demand for water due to the progress in using resources, such as intelligent water management and innovation in irrigation technology, and wise investments. For example, Jordan has begun to control the pollution and pumping of groundwater more stringently. Expand the desalination business to meet the demand for drinking water; as in Jordan, it must provide water for irrigation to treat wastewater (Von Lossow & Shatat, 2020).

Until the 1970s, Jordan was a country with few environmental concerns. Because of modernization and overcrowding, there are concerns with ecological conditions. The rapid growth of the population has led the state to run out of water. Furthermore, urbanization has been a significant cause of air pollution and environmental degradation. It is essential to develop the land. The country's industrial method depletes natural resources, such as agricultural soil degradation due to long-term use and tree cutting. Environmental issues became apparent in the 1970s and 1980s, and as a result, there was much interested in dealing with ecological problems (Hadadin & Tarawneh, 2007).

Jordan's environmental problems are apparent on a local, regional, and international level. Most of the ecological issues Jordan faces today have been discussed in this article, institutional regulation, and the Jordanian government's political response.

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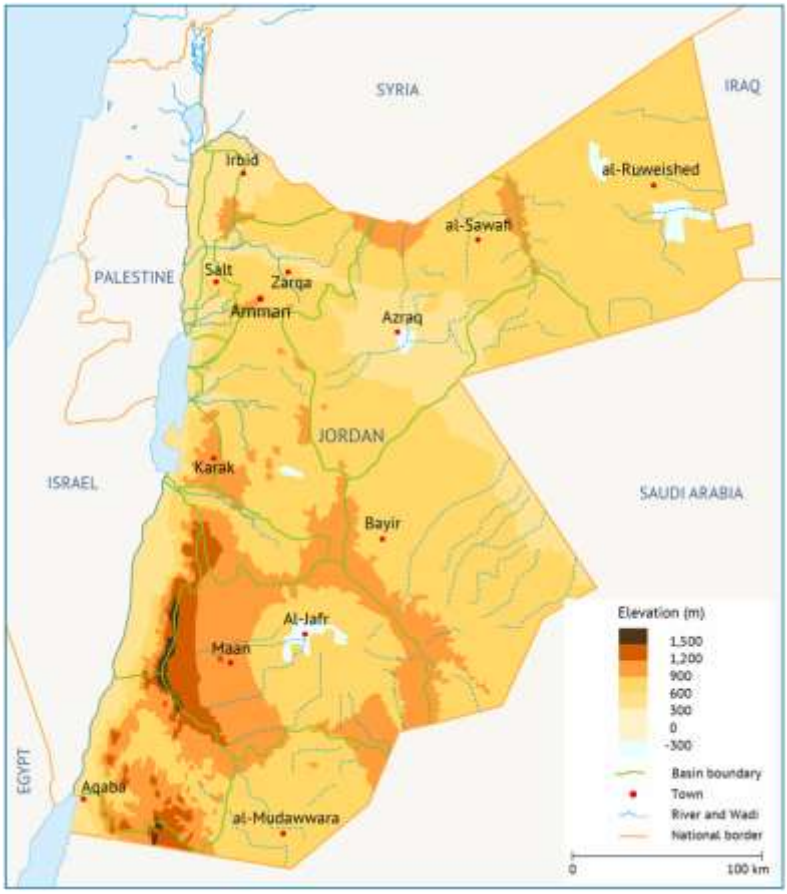

Figure 1: Map of surface and groundwater basins in Jordan
Source: Vanak for the Ministry of Water and Irrigation.

2. EVALUATION OF ENVIRONMENTAL CHALLENGES OF JORDAN

2.1 Local Effects (Land Quality)

The state of Jordan provides 10% of GDP from agriculture; this product, together with livestock, contributes 75%, 25%, to the sub-sector of the added value. The impact of agriculture on soil quality is enormous, as it affects the industrial sector and services. The agricultural area is 61,000 hectares, most of which is in the Jordan Valley (Al-Rashdan et al., 1999).

Surface gravity systems provide 45 percent of water supply to areas, while pressure piped systems provide 55 percent. However, good drainage is essential for the evaporation of salinity in the soil, harming the plants. Whereas, as happened in the period (1989-1991), a decline in soil quality due to insufficient drainage results in dry soil, resulting in decreased agricultural production.

Jordan's average fruit and vegetable crop production are equivalent to that of Syria and Egypt. Despite considerable investment in irrigation infrastructure, but irrigation performance is poor,

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with intermediate surface distribution systems varying from 38% to 70% for direct tube distribution systems (Adger et al., 2003).

The high subsidies provided to Jordanian farmers exacerbate this inefficiency, meaning that irrigation water was pumping in quantities more than agricultural land needs.

Farmers use fertilizers without taking into account the commonly recommended tolerances to protect crops, in addition to the soil's poor quality as a result of salinity. The Ministry of Agriculture does not always perform much pesticide residue analysis. According to the research work, these pesticides appeared in high concentrations in the waste grooves of some dam reservoirs. As a side benefit of the substantial use of pesticides in agricultural soil, the soil quality would deteriorate in the long run (Abu-Taleb & Salameh, 1994).

Desertification

Desertification causes the loss of topsoil, which is a justification for the loss of agricultural fields, as well as a lack of rest periods, which kills the land's biological capacities and is one of the causes of desertification for large areas, as the desert covers 90% of Jordan's land. Agricultural areas cover the northern highlands. While the state preserves these natural resources, increased housing density would reduce agrarian regions.

Since vast areas of pastures have been subjected to grazing on go and misuse due to Acquisition, the impact on wildlife in-country must assess. The Acquisition has resulted in the removal of Cultivated areas and degradation of agricultural land quality. The Ministry of Urban and Rural Affairs and Environment undertook a feasibility report for the Green Belt in the late 1980s. Which runs from north to south and is east of the capital, to use it as a natural buffer against desertification, but the implementation issues appear to not resolve (Abu-Taleb & Salameh, 1994).

Air Pollution

Jordan has a clean air climate due to its limited industrial base. However, several country areas where air pollution concentrations are higher than appropriate international standards (Fig. 2). Here are some examples:

1. In Zarqa's northern region, there is a large oil station and electricity generation facility.
2. Emissions from a cement plant outside the Amman area are unregulated.
3. Air pollution due to car exhaust in central Amman.
4. Significant quantities of phosphate soil are release during the loading phase at the port of Aqaba city.

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Fig. 2. Air pollution in Jordan - expressive.
Source: www.almadenahnews.com

Water Pollution

In Jordan, water scarcity is the source of water resource management, environmental quality, and fear during the distribution of supplies to the country's various regions. In Jordan's extreme water shortage, the severity of water is a looming problem that conservation initiatives or improved production cannot alleviate. The weather is semi-arid, and the population is rising significantly, which causes water scarcity, which influences Excessive pressure on limited water supply. The torrential rain of 1992 provided a respite for the fossil water layers in the subsequent summer season. However, the impact will not last in the area in the long run. A direct external driver of the imbalance between resource and demand is environmental issues caused by acute water shortages. Jordan recognizes the value of environmental protection when taking concrete action to solve water scarcity and meet consumer needs, but more criteria are essential. Jordan's major rivers are the Jordan, Yarmouk, and Zarqa (Fig. 1). Today, the Yarmouk River is of decent quality and situated on the Syrian-Jordan border, but the Zarqa River is a tragedy for the environment and flows entirely into Jordan (Fig. 3).

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The Zarqa River and heavily contaminated industrial and municipal waste discharge into the reservoir of King Talal Dam. Over the summer, this river is mostly sewage-fed. The Royal Scientific Society (RSS) concluded in many studies that stored water from it is only suitable for "salty crops." Because of the high sodium content (133 mg/l), they should not be Sprinklers used because they can damage the leaves of the plants. These crucial guidelines, however, have not been enforced or tracked.

Harvest in the Jordan ravine was seriously harming in the summer of 1991 due to pollution of irrigation water of King Talal Dam, which receives liquid trash of the Khirbet al-Samra therapy plant along the Zarqa River with losses totaling nearly half of the annual agricultural output value.

The quality of groundwater is critical since it accounts for 90% of the municipality's supply. Groundwater contamination was caused by two factors: the process of water extraction and waste leakage. The typical saline water tendency to intervene at higher aquifer scales after extraction is greater than the aquifers' regular replenishment, as seen by pollution from water abstraction.

Water is used for irrigation from Azraq Oasis, which is situated 103 kilometers east of Amman, and for home supplies in the regions of Irbid and Amman. Water withdrawals in this basin started exceeding healthy harvests in 1982, and water levels have now dropped from 3-5 meters. In this basin, subsequent salinity measurements revealed a rise from 500 mg/l to 700 mg/l.

The contamination of the groundwater basins was caused by waste leakage in Amman, Jordan's capital. The quality of groundwater in this area is deteriorating, and groundwater supplies will not be sufficient to meet the region's needs in the immediate future. In the winter of 1992, heavy rain and high stocks caused a temporary halt to the issue. If environmental protection were not enforcing now, remediation and cleanup of some of the resources mentioned would become essential. Water treatment cost is too high - a significant burden for Jordan - but inaction can have important health and production consequences. Two factors determine the costs of water treatment:

The time frame of the process also reaction may be permanent, rendering the entire groundwater layer useless. In addition, water should be allocated to the municipal and industrial sectors for irrigation during the purification cycle to meet the needs of the residents (Abu-Taleb & Salameh, 1994).

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Figure 3: Zarqa River exposed to wastewater flow (Photo by Muhammad Abu Ghosh). Source: alghad.com

Seaboard and Nautical Environments

Jordan's only seawater source is 25 kilometers stretch of the Gulf of Aqaba's northern coast (Fig. 4), including tourist attractions, sports, and an industrial complex in Aqaba, which has a population of 60,000 people. Trade fishing has not been advanced, and since the mid-1950s, the fishing percentage has decreased more than expected.

The city's wastewater is discharged into t sands of the region in Aqaba, with the sewage water flowing into the water of the Aqaba coast due to the general course of water direction during the aquifer to the beach. One of the region's environmental issues is this. The Gulf of Aqaba is home to 1000 tropical fish species and 100 coral reef species, all of which are vulnerable to the harmful effects of loading in stations, containing phosphate dust that spreads through the air and water. As a result, desalination plant preparation would have a detrimental impact on marine life, which is the Gulf of Aqaba's second environmental catastrophe. Furthermore, ocean warming impacts coral reefs, a global environmental problem affecting the country and addressing as part of global environmental issues.

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Figure 4: Aqaba Port.
Source: doc.aljazeera.net

2.2 Regional Effects

Jordan is dealing with some regional environmental problems, including sharing water supplies with neighboring countries, such as the Jordan River, Jordan shares with Syria, Lebanon, Palestine, and Disi, and groundwater with Saudi Arabia. Environmental issues at the regional level in the south include a significant lack of water supplies and ecological problems and the lack of agreements with neighboring countries to share shared resources (Abu-Taleb & Salameh, 1994).

Dead Sea and the Water Levels

The Dead Sea is a locked area with high salinity at the lowest point on the land's face. Freshwater was drained from the Jordan River, flowing water, springs, and rainwater to compensate for the extreme evaporation rate it was subjected to, which amounts to (up to 1.6 meters/year) (Fig. 5). The Dead Sea reached for balance at a deep of 392 meters beneath sea level, taking into account seasonal inconstancies (Akash et al., 1997).

Nonetheless, due to the Jordan River's water share with neighboring countries and the high percentage of their use of river water, the volume of water pump to the Dead Sea has decreased, with pumping reaching 1,900 million cubic meters in the early 1950s 550 million cubic meters in 1991.

According to previous rates, evaporation rates in the Dead Sea decreased from 392 meters to 407 meters below sea level over the past three decades. Still, water pumping caused the level to gradually increase, lowering from 392 meters to 407 meters below sea level.

The staggering annual average decline of up to 0.85 meters in the last few years we expected to affect the region's climate and life (Fig. 6). In any case, the ascent in the water level of the Dead Sea and its insurance from dry season to save the climate by siphoning new water into it was the

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explanation behind the lessening in the groundwater level, which influenced the nature of the groundwater, as there is no direct relationship between are the ranks of the Dead Sea and the groundwater.

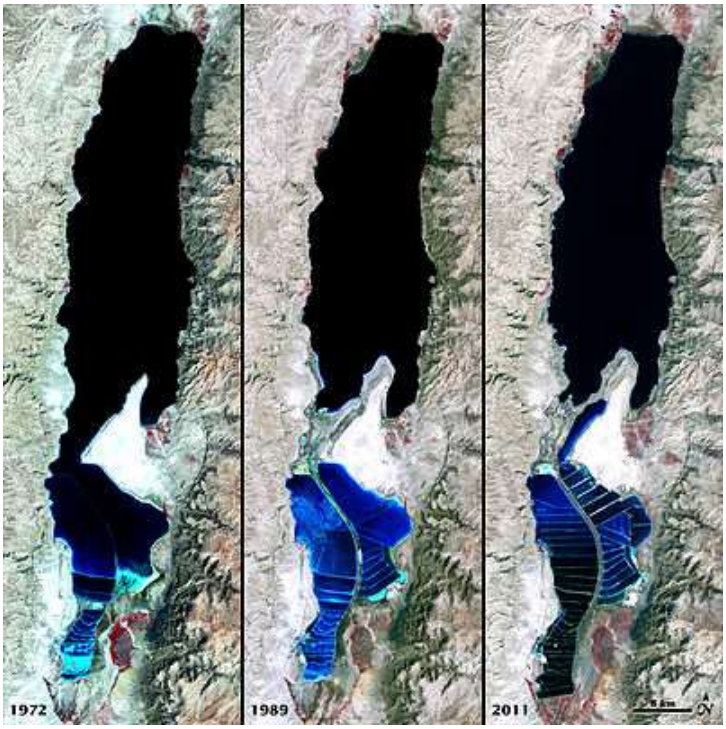

Figure 5: The Dead Sea (1972-2011) - NASA Earth Observatory.
Source: ar.wikipedia.org

Figure 6: The Dead Sea water level continues to drop.
Source: sawaleif.com

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The Quantity and Quality of the Jordan River Water

The Jordan Stream's water is very salty for a variety of reasons. Water flows into the waterway from both banks, so the Jordan Waterway receives salty spring water from (Occupied Israel) opposite bank.

Occupying Israel did this work to protect the quality of the Sea of Galilee, which is one of the primary sources of water, but it also harmed the Jordan River's water, rendering it unfit for use, as the Jordan River's salinity reached 5000 parts per million before it reached the Dead Sea, while the Dead Sea's salinity is 300 thousand parts per million.

Where signs of salinization exist on Jordan River-irrigated soil, and this cannot prevent, we may reduce the area of soil exposed to Jordan River water passing through it and provide enough irrigation water for the rest of the soil the plant's needs (Abu-Taleb, M. F., & Salameh, E. 1994).

Non-Renewable Groundwater Resources

Many desert and semi-desert areas developed underneath the surface of aquifers due to periods of arid climate in the past, and they are referred to as fossil waters, with the Disi groundwater being one example (Figure 7). The Disi groundwater is the largest in the Peninsula of Arabia and one of Jordan's water sources, but it is subject to various restrictions (Andersen et al., 2017). Disi water can be used in the southern area because it is the nearest and least costly to transport, but it must using cautious because it is a non-renewable resource.

Figure 7: Disi aquifer.
Source: www.ammanjo.net

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Disi water started to be used in irrigation works to grow wheat and supply municipalities to distribute water to the city of Aqaba in Jordan in the late 1970s, and in the early 1980s, Disi water using in the irrigation process of wheat in the desert in the Kingdom of Saudi Arabia. In the beginning, both nations removed a total of 6 million cubic meters. The gross output in 1989 was 195 million cubic meters (55 million cubic meters from Jordan and 140 million cubic meters from Saudi Arabia).

Many environmental issues have arisen, either directly or indirectly, due to using this water to irrigate crops. For starters, the high intrinsic value of water usage (for municipal and industrial purposes, for example) in Oman means that the expense can be restored to existing water shortages and used more effectively to solve water quality and quantity issues elsewhere. Another: When irrigation water flows into the aquifer, it has a detrimental impact because it pollutes the groundwater, worsening over time. Third: The increased use of Disi water, as well as the decrease in water level, harms its salinity and mineral content. As a result, water pumping levels in Saudi Arabia, wells in Tabuk, which exceed 120 meters, have been decreased. In Jordan, 9 meters, pumping has been discontinuing in some regions.

2.3 Global Influences

Global changes, such as climate alteration and greenhouse gas emissions, have a detrimental impact on Jordan's environment, including water supply for irrigation and plant needs (Stone, 2008).

The discrepancy between the studied strategy and its implementation to handle agricultural irrigation operations in Jordan also reveals an asymmetry between the resource that can save and the amount of agricultural consumption on water. Now we understand why Jordan is paying such a high price for agricultural irrigation and sustainable growth. Furthermore, potential global warming would cause a decrease in the water level in the Dead Sea and increase the level of groundwater in Jordan in areas where the soil salinity is high.

The rising ocean temperatures result from global warming, which predicts to hit 1.5-4 degrees Celsius. The number of coral reefs in the Red Sea near Aqaba may drastically reduce. A phenomenon is known as "bleaching." when coral reefs lose the colored algae, they used to coexist, and they will die. According to studies proposed by some scientists for global warming, which contributes to abnormally high sea temperatures.

2.4 Institutional Approach And Policy Responses

In 1986-1990 the Jordanian government adopted a strategy for economic and social growth. This plan deals with the environment as a broad field. As plan's mechanism of action was studied and developed according to the evaluation of some environmental problems over the years including stopping pollution of water and soil, preservation of natural life, and management of natural resources.

Jordan has shown its understanding of environmental problems and willingness to formulate policies and laws to address them in recent years. In the early 1980s, the Royal Society for the

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Protection of the Wild (RSSCN) create. The government provides total funding and support to the organization, which aims to raise environmental awareness. In 1990, the government worked with the International Development Agency and the International Union for Protection of Nature (IUCN) to establish a national ecosystem. This study contained information about national institutional collaboration and legal restrictions for dealing with potential environmental issues (Jordan & Lenschow, 2009).

Government sponsorship of international conferences and symposia in collaboration with environmental organizations, like the conference World Health Organization which hold at (1983), the United Nations Environment Program which holds at (1983) and the conference UNESCO hold at (1987), and others, demonstrates national awareness. Assigning scientists to conduct studies and assessments on environmental problems, preserve natural life in forests, and protect soil quality under the Ministry of Agriculture and other ministries (Cameron & Abouchar, 1991).

The most productive environmental science institutions in Jordan are the Royal Science Society (RSS) and the Studies of Water and University Studies Center (WRSC). The Royal Scientific Society generates no-profit organization instituted in 1970 to supply scientific and technical supply to Jordan's public and private section for projects growth. The Potable Water and Sanitation Center, on the other hand, was established in 1983 at the University of Jordan to support national efforts in the development of water supplies and the protection of water from environmental influences. Contamination of drinking water is one of the most severe environmental issues. More effort is needed, has been halted due to a reduction in financial resources available to support these efforts due to the economic recession.

Environment Authority

Jordan formed the Environment Department in 1980 to plan a policy in line with the most pressing environmental issues at the time, as it was one of 30 governments to declare their support for a global strategy to protect the environment in March of that year, prompting the rest of the countries to create national strategies and studies to address their environmental issues by the WCS policy.

Her Majesty Queen Noor presided over the establishment of the National Environment Committee the following year, indicated by the formation of a committee to formulate environmental protection plans that included members from all bodies and ministries under the Prime Minister's administration. The first achievement was the four-year independence of the environment sector in the five-year development plan, which began in 1986.

In the sixth month of 1988, the Council of Ministers authorized the formation of a steering committee, led by the Minister of Municipal Affairs, to create environmental plans and policies in collaboration with the sectors responsible for environmental work. The Kingdom of Jordan and the International Union for Conservation of Nature (IUCN) signed an agreement in 1988 to establish a plan to protect the ecosystem and its resources.

They subsidize the US Agency for International Development for the past understanding by working between the two teams to create plans inside the WCS controls. Jordan approved a plan for preserving the environment and its wealth in the fifth month of 1991, under the Minister of Municipal Affairs (McEachern, 1991). The next stage is implementing the strategies that occurred

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previously, and their results appear during the following years according to the efforts made by all parties to implement the recommended plans.

Environmental Law

The Environment Law encompasses all laws, rules, and other agreements, and the general law is how citizens interact with the environment and its sources. It aims to conserve and protect nature and decide the quantity and terms with which natural resources using.

Air and water quality controlling by environmental law (Fig. 8). These laws minimize pollution and protect against various issues, including ozone depletion, controlling the quantity and quality of water usage, handling pollution with wastewater, and directing water flow on the ground. Since the legislation does not prohibit pollution, it must be treated or reduced. It does, however, impose penalties on those who are responsible for emissions. Environmental legislation regulates chemical safety requirements and limits, such as methods of use and the number of chemicals used. We are protecting wildlife by monitoring hunting locations, times, and methods.

The first federal environmental legislation, the Ports and Rivers Act, was enacted in 1889. It contains fines for dumping waste into bodies of water without approval from the authorities. Moreover, there is a fine for changing a seafront, a harbor, or even a watercourse. Water and clean air, effective environmental response, compensation and tasks, potentially endangered species, national environmental policy, and resource management are all essential federal environmental laws.

Important initiatives have arisen due to the introduction of environmental legislation in response to the needs of the place and time, such as the conference on maintaining landscapes, which resulted in the power plant's work is halted. The Environmental Protection Agency (EPA) is the source of most environmental legislation, consisting of forty laws and numerous regulations. Services for certain facilities provided by other federal organizations (wildlife, parks, forests, land administration) (Tarlock, 1979).

Figure 8: Water sources (www.almamlakatv.com)

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Structure for the General Assembly (Iucn) Eighteenth Meeting

It urges governments in the organization's member countries to:

- exercise caution when using non-renewable and irreplaceable resources.
- Reducing the amount of toxic waste dumped into bodies of water:

1. recycle as much as possible to ensure that the whole resource recycling in the future. (Petroleum products, gases generated by coal, gas, and oil combustion, minerals, nitrates and phosphates resulting from the use the intensity of fertilizers and agriculture)
2. Commitment to sustainably using renewable resources.
3. By recycling planned organic waste, we will reduce emissions in fossil waters and rivers while also the agricultural soil fertility.
4. We are supporting renewable energy supplies such as (sun, wind, water).
5. It is supporting cutting-edge manufacturing processes and innovations that do not pollute the atmosphere.
6. It motivates consumer goods manufacturers to recycle all of the materials that go into their productions.
7. Calling on governments to follow the following guidelines when developing and developing rural and urban areas:

- In rural areas, we will appropriate management, protect renewable natural resources, and ensure their long-term use.
- In urban areas, we focus on waste reduction and recycling, reducing the use of material and energy (McEachern, J. 1991).

3. CONCLUSION AND RECOMMENDATIONS

Global environmental disruption during the past decades has reached an intolerable peak, with devastating effects on regions and populations, which are historically considered less responsible for their underlying causes. The concept of sustainable development showed the international community's broad awareness of the importance of the need to manage the environmental crisis in balance with economic and social necessities (Behnassi & McGlade, 2017). Sustainable Development fulfills the needs of the present without affecting the ability of generations to achieve their own needs (Issa & Al Abbar, 2015).

Jordan's environmental condition evolves, but it remains vulnerable to the effects of certain factors. Jordan's rapid population growth, industrial emissions, and the influx of hundreds of thousands of people from abroad have contributed to the country's rapid growth. As a result, many of its natural resources have been reduced consumption, and the country's extreme water over-exploitation has caused the aquifers to be drained and polluted (Hadadin & Tarawneh, 2007). Jordan faces several environmental issues as a result of a disparity between resources and the water supply. As a result, this paper investigates Jordan's environmental problems, which include local, regional, and global environmental issues.

The paper also addresses the evolution of current policy in response to these challenges, recommending that potential decision-making strategies to be flexible, rigorous, and time to

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effectively deal with environmental issues. Finally, the paper addressing Jordan's environmental problems makes recommendations for enhancing and expediting the creation of effective environmental policies. The paper also emphasizes the value of scientists and researchers being more active in government decision-making to implement more scientifically informed policies than previously.

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