

International and Constitutional Efforts to Protect the Environment Through the Use of Artificial Intelligence Techniques

Ali Al-Hammouri¹, Tareq Al-Billeh²,
Habib Al-Billeh³, Nahed Alhammouri⁴ & Roua Belghit⁵

Abstract

The purpose of the study is to demonstrate the role of artificial intelligence in the ability to accelerate global efforts to protect the environment and conserve natural resources by monitoring air pollution and energy emissions. Monitoring attacks on forest areas, as well as describing the role of the constitutions of the world's countries, including the Jordanian Constitution, by adding constitutional texts addressing environmental protection using artificial intelligence technologies. The importance of this research lies in demonstrating international and constitutional efforts to protect the environment using artificial intelligence technologies by accelerating global and local efforts to protect the environment, conserve natural resources, and use digital tools to monitor air pollution and energy emissions. And monitoring attacks on forest areas, as well as describing the role of countries' constitutions, including the Jordanian Constitution, by adding constitutional texts addressing environmental protection using artificial intelligence technologies.

Keywords: Biodiversity, Environmental Protection, Artificial Intelligence, Satellites, Jordanian Constitution, International Conventions.

Introduction

Regarding the pollution of the constituent elements of the ecosystem, increasing global warming and climate change, this has necessitated the use of artificial intelligence techniques to combat environmental pollution, so that artificial intelligence addresses some environmental issues related to climate change, environmental diversity, ocean health, water security, air quality, and disaster management. Considering the trend toward relying on AI technologies to

¹ The Author is an Assistant Professor at the Faculty of Law at the Applied Science Private University, Al Arab St 21, Amman, Jordan, and the author is a practicing lawyer in Jordan as well. He can be accessed on a_alhammouri@asu.edu.jo

² The Author is an Assistant Professor at the Faculty of Law at the Applied Science Private University, Al Arab St 21, Amman, Jordan, and the author is a practicing lawyer in Jordan as well. He can be accessed on t_billeh@asu.edu.jo

³ The Author is a Lecturer at the Faculty of Arts & Humanities at the University of Jordan, Amman, Jordan. He can be accessed on habib.albillah@gmail.com

⁴ The Author is an Assistant Professor. He can be accessed on nahed99_hammouri@yahoo.com

⁵ The Author is an Assistant Professor at the Faculty of Law at Larbi Tebesi University, Tebessa, Algeria. He can be accessed on Belghit.roua@univ-tebessa.dz

protect the environment, data obtained through these systems must be transparent and fair, to find radical solutions to environmental problems (Subramaniam et al. 2022; Adil & Kafeel, 2021; Al-Billeh et al., 2023a).

Increasing the use of artificial intelligence technologies will contribute to the acquisition of environmental data, by using digital tools to conduct scientific analysis of environmental trends in climate, nature and pollution and to monitor any environmental abuses at the global level and at the local level (Adil & Kafeel, 2021; Subramaniam et al. 2022; Isa et al., 2022; AL-Hammouri et al., 2023a).

The importance of this research lies in demonstrating international and constitutional efforts to protect the environment using artificial intelligence technologies by accelerating global and local efforts to protect the environment, conserve natural resources, and use digital tools to monitor air pollution and energy emissions. And monitoring attacks on forest areas, as well as describing the role of countries' constitutions, including the Jordanian Constitution, by adding constitutional texts addressing environmental protection using artificial intelligence technologies (Adil & Kafeel, 2021).

This study aims to demonstrate the role of using artificial intelligence techniques and satellites to monitor air pollution and attacks on forest areas, and the statement of resolutions of the United Nations Environment Assembly of the United Nations Environment Program calling for the use of artificial intelligence techniques in environmental protection. Identification of international conferences and organizations that advocate the use of artificial intelligence technologies in environmental protection. As well as the importance of developing international conventions and constitutional texts at the country level that address environmental protection using artificial intelligence techniques (Subramaniam et al. 2022).

So, through this research, we will try to answer the questions that represent the problem of this research: what are the AI technologies used to protect the environment? What is the international framework for the use of artificial intelligence technologies in environmental protection? How are AI technologies used to protect the environment in Jordan's Constitution?

Methodology

This research will follow the comparative approach by analyzing the resolutions of the United Nations Environment Assembly, international conferences, and international organizations advocating the use of artificial intelligence technologies. Knowledge of the strengths and weaknesses of those resolutions and conferences and their adoption at the international and local levels.

The study also requires an analytical approach to analyze all the texts of the resolutions of the United Nations Environment Assembly, international conferences and organizations, and the texts of the Jordanian Constitution to identify their content, implications, and objectives. They will be criticized and commented upon, and the critical approach will also be followed, to highlight the opinions and trends of scholars on issues related to environmental protection using artificial intelligence techniques.

Results and Discussion

a. Artificial Intelligence Technologies Used to Protect the Environment

AI technologies can help analyze sets of environmental information, track changes in environmental conditions, and address vulnerabilities to reduce encroachment on environmental elements and provide opportunities for solutions that can have a positive impact on environmental protection. Environmental changes, air pollution, and forest attacks may be monitored using artificial intelligence techniques (Adil & Kafeel, 2021; Al-Billeh, 2023b; AL-Hammouri et al., 2023b; Madhloom & Antonopoulos, 2022).

i. Monitoring Environmental Changes Through the Use of Artificial Intelligence Technologies

It should be noted that environmental changes need to be monitored due to significant air, water, and soil pollution, which are the three main components of the ecosystem global warming and climate change in the world. Which threatens man's very existence on this Earth, artificial intelligence techniques have to be used to combat environmental pollution. Towards environmental sustainability pursued by the United Nations and how to use artificial intelligence to achieve sustainable environmental development (Subramaniam et al. 2022; Al-Billeh, 2023a).

ii. Monitoring Air Pollution Through the Use of Artificial Intelligence Technologies

Monitoring air pollution using artificial intelligence techniques using means that enable control of air pollution and distinguish the causes of air pollution faster and more precisely than conventional means. Also, in case of gas leakage, smart probes may enable us to act quickly based on the accuracy and speed available thanks to this modern technology. And on the other hand, the use of AI technologies can reduce air pollution in many ways such as self-driving cars, which, if used, will contribute to reducing the toxic gas emissions that typically emit from conventional vehicle fuels (Adil & Kafeel, 2021; Khashashneh et al., 2023; Al-Billeh et al., 2023b; AL-Hammouri et al., 2023c).

iii. Monitoring Forest Attacks Through the Use of Artificial Intelligence Technologies

Monitoring attacks on forests using artificial intelligence techniques is by monitoring the extent of environmental pollution, and monitoring natural sources such as water, biodiversity, environmental reserves, and temperatures while linking them all with environmental protection and issuing immediate alerts to the closest periodic action in the event of anything, whether fire or aggression (Subramaniam et al. 2022).

iv. Using Artificial Intelligence Techniques Which are Related to Satellites in Environmental Protection

Artificial intelligence techniques related to satellites can be used to protect the environment and preserve biodiversity. Satellite-related artificial intelligence (AI) can detect changes in agricultural land use, monitor vegetation and forestry, forecast natural disasters, monitoring and analyze their impacts. Organisms that may threaten a specific environmental area such as environmental reserves can also be monitored, identified and tracked, and eliminated using artificial intelligence techniques (Subramaniam et al. 2022; Al-Billeh & Al-Hammouri, 2023).

b. International Framework for the Use of Artificial Intelligence Technologies in Environmental Protection

The use of artificial intelligence technologies in environmental protection can open up enormous opportunities for achieving the Sustainable Development Goals (SDGs) set by the United Nations in the 2030 Agenda for Sustainable Development. Its applications provide innovative solutions, improved environmental risk assessment, better planning, and faster knowledge sharing (Adil & Kafeel, 2021).

i. Resolutions of the United Nations Environment Assembly of the United Nations Environment Program Calling for the Use of Artificial Intelligence Techniques in Environmental Protection

UNEP will contribute to providing technical expertise for the development and consolidation of an open and comprehensive global digital ecosystem based on digital standards and governance frameworks that integrate data sets and analyses of climate change, biodiversity loss, and pollution. Data sets from the public and private sectors will be used to produce timely and predictive practical insights that contribute to the automatic monitoring of global, national, and local progress toward key climate, biodiversity, and pollution targets for sustainable development goals and related internationally agreed frameworks,

including multilateral environmental agreements. Data sets will be disseminated in addition to providing analysis and guidance to help mitigate the direct environmental impacts of digital technology supply chains, energy needs, and e-waste, as well as to address risks arising from misinformation on digital platforms (Adil & Kafeel, 2021).

The use of artificial intelligence technologies will contribute to stimulating actions using digital public goods and digital technology to achieve greater efficiency, effectiveness, and transparency in advancing internationally agreed goals and targets on climate, nature, and pollution as well as decarbonization innovations. This will include partnerships with public and private actors to harness data, digital technologies, and computer sustainability to amplify and accelerate deeper structural transformations to drive markets, value chains, consumer behaviors, and decision-making towards sustainable results.

This investment is a prerequisite for stakeholders to effectively design and deploy digital technologies and related digital transformation policies to solve climate, biodiversity, and pollution challenges and support the relationship between the environment, digital technology, and e-governance. National digital infrastructure to produce digital public goods for the environment and support for e-government services will be assessed and stimulating participatory science, open innovation, and social cooperation through various digital challenges (Adil & Kafeel, 2021).

UNEP will integrate a range of digital technologies, processes, and practices into all of its areas to improve its functioning, and innovation and present its value. It will interact with stakeholders to build abilities. UNEP will seek to become a digital organization that treats data as a strategic asset that can drive ideas, innovations, and impacts, including improved project design, implementation, and evaluation.

ii. International Conferences and Organizations Advocating the Use of Artificial Intelligence Technologies in Environmental Protection

United Nations Member States were keen to demonstrate the importance of biodiversity conservation through the launch of a global initiative by UNEP called the "United Nations Decade for Ecosystem Restoration" during the period of (2021-2030) to restore the relationship between human beings and nature. So, ecosystem restoration is central to achieving sustainable development goals, particularly those related to climate change, poverty eradication, food security, and biodiversity conservation, and is also one of the pillars of international environmental conventions, such as the Ramsar Convention on Wetlands (Subramaniam et al. 2022)

Reference to the General Conference of the United Nations Educational and Cultural Organization (UNESCO), held at its 41st session in Paris from 9 to 24 November 2021 (Recommendation on artificial intelligence ethics) It states: "... the means of AI technology can bring benefits to the environment and ecosystems, and that reaping these benefits requires not ignoring, but addressing, the adverse consequences that such means can have on the environment and ecosystems, and that addressing ethical risks and concerns should not hinder innovation and development. It should provide new opportunities and encourage ethical research and innovation that closely link AI technology tools to human rights and fundamental freedoms, ethical values and principles and ethical thinking... The means of artificial intelligence technology should take into account the need for the environment and ecosystems to thrive, the need to protect them and promote their prosperity throughout the life cycle of artificial intelligence systems. The environment and ecosystems are among the existential imperatives of humans and other organisms, and must be able to enjoy the benefits of all advances in artificial intelligence. All actors involved in the life cycle of AI systems must abide by the provisions of international law and national legislation in force, as well as applicable domestic standards and procedures aimed at protecting and restoring the environment and ecosystems and achieving sustainable development, including cautious provisions, standards and procedures, and should reduce the environmental consequences of AI systems environment; including but not limited to carbon emissions from such systems to ensure that climate change and environmental change risk factors are reduced to the lowest extent possible and to prevent the unsustainable exploitation use and diversion of natural resources that contribute to environmental and ecosystems degradation.

Decisions of international organizations concerning the environment are not different from other decisions on dealing with various issues in all areas. Some organizations have the power to make binding decisions, which have bound legal effects and whose breach entails international responsibility. Such decisions may not be binding. Failure to implement them entails only moral obligations without any responsibility (Rabhi & Rashid 2020; Almanasra et al. 2022; Al-Jundi, 2004; Al-Billeh & Al-Qheiw, 2023).

In the area of international cooperation, IUCN is also assisting in the field of expertise for environmental management, as well as assistance to countries in the enactment of national environmental legislation and the development of ecosystems, as well as in the preparation of environmental projects, such as a draft law on environmental protection in various countries of the world (Bouton, 2019; Alshible et al. 2023; Al-Kandri, 2021; Al-Billeh & Abu Issa, 2022).

c. Using Artificial Intelligence Techniques in Environmental Protection in Jordan's Constitution

Constitutionalizing AI technologies for environmental protection in the Constitution of Jordan provides a fundamental safeguard for the legalization of laws and regulations aimed at protecting the environment by using these modern technological means (Saad, 1993; Mehani, 2021; Omar, 2008). Therefore, various countries of the world seek to take advantage of and strengthen these technologies by explicitly stipulating them in their constitutions for constitutional protection (Al-Hasban, 2011; Mazeed, 2008; Fahmy, 2011).

i. Environmental Protection in Jordan's Constitution

The right to a healthy and balanced environment is an indispensable social imperative in legal systems, so if a healthy environment does not exist, it becomes impossible to protect certain elements of public order, and thus there is no need for the individual to recognize his or her rights unless his or her physical structure is sound and capable of benefiting from the enjoyment of constitutional rights and freedoms (Al-Billeh, 2022d; Al-Baz, 2003; Al-Feel, 2013; Al-Hammouri & Al-Billeh, 2023).

Referring to the provisions of the Jordanian Constitution, it is noted that there was no constitutional regulation for environmental protection, and even the recent constitutional amendments to the Constitution of 2022 had not added any special chapter dealing with environmental rights, and the use of methods based on artificial intelligence techniques to enshrine environmental protection (Al-Billeh & Abu Issa, 2023a; Al-Billeh, 2022b; Bouat, 2017; Al-Khawajah et al., 2023).

ii. The Importance of Developing Constitutional Texts that Address Environmental Protection Using Artificial Intelligence Techniques

The industrial revolution led to the use of artificial intelligence technology, which contributes to solving environmental challenges and climate change problems, so constitutional texts that addressed environmental protection using artificial intelligence techniques had to be developed (Abdel Hafiz, M. 2007; Al-Khawajah et al. 2022; Alkhseilat et al., 2022).

The use of artificial intelligence techniques has led to an improvement in environmental management in addition to the use of clean and renewable energy, electric vehicles, and other artificial intelligence technologies (Kandri, 2021; Al-Billeh, 2022e; AL-KHALAILEH et al., 2023). Therefore, AI technologies are an opportunity for transformation to address some environmental issues such as climate change, environmental diversity, and disaster handling. Other AI

applications are used to monitor water and its pollution level as well as energy consumption, reduce waste quantity, control air pollution, and control ecosystems (Al-Hyajnah, A.N, 2021; Al-Billeh, 2022c; Bashir, 2011; Al-Billeh & Abu Issa, 2023b; Deepika & Senthil, 2022).

It can therefore be said that it is necessary and important to develop constitutional texts that address environmental protection using AI techniques (AL-Hammouri et al. 2023; Al-Billeh, 2022a; El Momini, 2004; Al-Billeh, 2023c; Selita, 2019). The proposed constitutional text to be added to the Jordanian Constitution should read: "The country shall guarantee environmental protection using AI techniques under the provisions of the laws and regulations in force".

Conclusion

The right to environmental protection is an indispensable social imperative in legal systems, so all elements of the environment must be protected from any aggression, and until such control is activated it is possible to use artificial intelligence techniques. The United Nations has sought to advocate for the use of artificial intelligence techniques to support environmental protection so that the use of artificial intelligence technology tools can benefit the environment and ecosystems. UNEP has contributed to the responsibility for integrating environmental standards objectives and sustainability into the global digital economy and using digital tools to integrate environmental data and analysis into the work of the United Nations Organization to contribute to reducing environmental issues.

Finally, it is necessary to introduce provisions in the Jordanian Constitution regulating environmental protection through the use of artificial intelligence techniques, and having a special chapter in the Jordanian Constitution regulating environmental rights, identifying effective means of protecting the environment including artificial intelligence techniques.

References

- Abdel Hafiz, M. (2007). *International Environmental Law and Pollution Phenomenon*. Egypt: Arab Renaissance House.
- Adil, M., & Kafeel, A. (2021). A review on emerging artificial intelligence (AI) techniques for air pollution forecasting: Fundamentals, application and performance. *Journal of Cleaner Production*, 322. <https://doi.org/10.1016/j.jclepro.2021.129072>
- Al-Baz, D. (2003). *Constitutional Basis for Environmental Protection against Pollution in Kuwait*. Kuwait: Scientific Publishing Council.
- Al-Billeh, T. (2022a). Judicial oversight on the administrative contracts in the Jordanian legislation and the comparison: the modern qualitative

- jurisdiction of the administrative judiciary. *Indian Journal of Law and Justice*, 13 (2), 1 - 28. <https://ir.nbu.ac.in/handle/123456789/4763>
- Al-Billeh, T. (2022b). The Correction of the Invalidity of the Civil Trials Procedures in Jordanian and Egyptian Legislation: The Modern Judicial Trends. *Kutafin Law Review*, 9 (3), 486-510. <https://doi.org/10.17803/2713-0525.2022.3.21.486-510>
- Al-Billeh, T. (2022c). The Impact of the Comprehensive Ban Due to the COVID-19 Pandemic on the Quality of Ambient Air in Jordan. Study for 15th March to 15th April of 2020 Period. *Journal of Environmental Management and Tourism*, 3(59): 802 - 811. DOI: [https://doi.org/10.14505/jemt.v13.3\(59\).19](https://doi.org/10.14505/jemt.v13.3(59).19)
- Al-Billeh, T. (2022d). Freedom of Religious Belief and the Practice of Religious Rites According to the Jordanian Legislation: Difficult Balance Between International and Regional Requirements as well as the National Legislative Controls. *Balkan Social Science Review*, 20, 117-137. <https://js.ugd.edu.mk/index.php/BSSR/article/view/5503/4660>
- Al-Billeh, T. (2022e). Legal Controls of the Crime of Publishing a Program on the Internet in Jordanian Legislation. *Pakistan Journal of Criminology*, 14 (1), 1-14.
- Al-Billeh, T. (2023a). Disciplinary Measures Consequent on the Judges' Misuse of Social Media in Jordanian and French Legislation: A Difficult Balance between Freedom of Expression and Restrictions on Judicial Ethics. *Kutafin Law Review*, 10(3), 681-719. <https://kulawr.msaf.ru/jour/article/view/224>
- Al-Billeh, T. (2023b). Jurisdiction Regarding Administrative Proceedings in Jordanian and French Legislation: Views on the Administrative Judiciary in 2021. *Int J Semiot Law*. <https://doi.org/10.1007/s11196-023-10064-5>
- Al-Billeh, T. (2023c). The Situations Related to the Functioning of the Administrative Judiciary in Jordan for the Year 2020: A Step Forward. *International Journal for Court Administration*, 14(3), DOI: <https://doi.org/10.36745/ijca.453>
- Al-Billeh, T., & Abu Issa, H. (2022). The Community Penalties in the Jordanian Criminal Law: What are the Alternatives to Liberty-Depriving Penalties? *Pakistan Journal of Criminology*, 14 (3), 1-18. <http://www.pjcriminology.com/wp-content/uploads/2023/03/1.pdf>
- Al-Billeh, T., & Al-Hammouri, A. (2023). Guarantees of Juvenile Trial Procedures in Jordanian Legislation: The International Standards towards Reformatory Justice for Juveniles. *Pakistan Journal of Criminology*, 15 (1), 1-16. <https://www.pjcriminology.com/wp-content/uploads/2023/07/1.Tareq Billa Paper Final Draft.pdf>
- Al-Billeh, T., & Al-Qheiw, M. (2023). OBJECTION OF THIRD PARTIES OUTSIDE THE LITIGATION IN ADMINISTRATIVE JUDICIAL JUDGMENTS IN THE JORDANIAN AND FRENCH LEGISLATION.

- Revista Relações Internacionais do Mundo Atual*, 4(42), 76-101.
<http://revista.unicuritiba.edu.br/index.php/RIMA/article/view/e-5951>
- Al-Billeh, T., & Abu Issa, H. (2023a). The Role of the Environment Committees in the Nineteenth Parliament for the Year 2020 in Studying Matters Related to Environmental Affairs in Jordan. *Journal of Environmental Management and Tourism*, 1(65), 168-175.
[https://doi.org/10.14505/jemt.14.1\(65\).16](https://doi.org/10.14505/jemt.14.1(65).16)
- Al-Billeh, T., & Abu Issa, H. (2023b). Jordanian Women's Political Participation in The Nineteenth Parliament Elections (2020): The Beginning of the Political Rise of Jordanian Women?. *Dirasat: Human and Social Sciences*, 50(5), 244 -255. <https://doi.org/10.35516/hum.v50i5.961>
- Al-Billeh, T., Al-Hammouri, A., Al-Khalaileh, L., & Derbal, I. (2023a). The Impact of Administrative Control Authorities on Sustainable Development in Jordanian Legislation: What are the Challenges Facing Administrative Control Authorities in Achieving Sustainable Development?. *Journal of Law and Sustainable Development*, 11(5), e1129. <https://doi.org/10.55908/sdgs.v11i5.1129>
- Al-Billeh, T., Alkhseilat, A., & AL-Khalaileh, L. (2023b). Scope of Penalties of Offences in Jordanian Public Office. *Pakistan Journal of Criminology*, 15 (2), pp. 341-356, <https://www.pjcriminology.com/publications/scope-of-penalties-of-offences-in-jordanian-public-office/>
- Al-Feel, A. (2013). *Explaining Environmental Pollution in Environmental Protection Laws in Arab Countries*. Cairo: National Center for Legal Issuances.
- Al-Hammouri, A. & Al-Billeh, T. (2023). Specificity of Criminalisation in the Jordanian Environmental Protection Law. *Pakistan Journal of Criminology*, 15 (2), pp. 357-371, <https://www.pjcriminology.com/publications/specificity-of-criminalisation-in-the-jordanian-environmental-protection-law/>
- AL-Hammouri, A., Al-Billeh, T., & Alkhseilat, A. (2023a). The Extent of Constitutionalizing the Environmental Rights as One of the Anchors to Keep a Healthy, Clean Environment: A Difficult Balance between the International Agreements and the Jordanian Constitution's Restrictions. *Journal of Environmental Management and Tourism*, 1(65), 89 -97.
[https://doi.org/10.14505/jemt.v14.1\(65\).09](https://doi.org/10.14505/jemt.v14.1(65).09)
- Al-Hammouri, A., Al-Billeh, T., & Derbal, I. (2023b) Mechanisms for Protecting Children's Rights from the Effects of Climate Change. *Pakistan Journal of Criminology*, 15 (4), pp. 639-653, <https://www.pjcriminology.com/publications/mechanisms-for-protecting-childrens-rights-from-the-effects-of-climate-change/>
- Al-Hammouri, A., Al-Billeh, T., Khashashneh, T., AL-Khalaileh, L., & Belghit, R. (2023c) Penal Protection Contained in the Framework Law on Waste Management and Instructions for the Management of Electrical and Electronic Waste. *Pakistan Journal of Criminology*, 15 (4), pp. 103-118,

- <https://www.pjcriminology.com/publications/penal-protection-contained-in-the-framework-law-on-waste-management-and-instructions-for-the-management-of-electrical-and-electronic-waste/>
- Al-Hasban, E. (2011). The Constitutional System of the Right in Environment in Constitutional Systems: Analytical, Comparative Studies, *Dirasat: Shari'a and Law Sciences*, 38 (1), 293. <https://journals.ju.edu.jo/DirasatLaw/article/download/2861/6533>
- Al-Hyajnah, A.N, (2021). *The Environmental Law: The General Theory of Environment Law with Environmental Legislative Explanation*. Jordan: Dar Al-Thaqafah.
- Al-Jundi, G. (2004). *International Environmental Protection Law*. Jordan: Tawfeeq Press.
- Al-Kandri, M. (2021). The administrative judge's role in environmental disputes. *Kuwait Law College International Journal*, 9(1): 145-205. <https://journal.kilaw.edu.kw/wp-content/uploads/2021/07/145-206-Dr.-Mohamad-H.-Al-Kandari.pdf>
- AL-KHALAILEH, L., MANASRA, M., Al-Billeh, T., ALKHSEILAT, A., ALZYOUD, N., & AL-KHAWAJAH, N. (2023). Legal Regulation of Civil Liability for Environmental Damage: How Appropriate are Civil Liability Provisions with the Privacy of Environmental Damage?. *Journal of Environmental Management and Tourism*, 14(5), 2174 - 2186, [https://doi.org/10.14505/jemt.v14.5\(69\).02](https://doi.org/10.14505/jemt.v14.5(69).02).
- Al-Khawajah, N., Al-Billeh, T., & Manasra, M. (2023). Digital Forensic Challenges in Jordanian Cybercrime Law. *Pakistan Journal of Criminology*, 15 (3), 29-44. <https://www.pjcriminology.com/publications/digital-forensic-challenges-in-jordanian-cybercrime-law/>
- AL-KHAWAJAH, N., ALKHSEILAT, A., AL-BILLEH, T., MANASRA, M., & ALWERIKAT, N. (2022). Criminalization of the Transmission of the Coronavirus COVID-19 and Its Impact on the Right to a Healthy Environment. *Journal of Environmental Management and Tourism*, 13(7), 1881-1887. [https://doi.org/10.14505/jemt.v13.7\(63\).08](https://doi.org/10.14505/jemt.v13.7(63).08)
- Alkhseilat, A., Al-Billeh, T., Almanasra, M., & Alwerikat, N. (2022). Criminal Behavior as a Basis for Criminal Responsibility for the Crime of Introducing Substances Hazardous to the Environment in Jordanian Legislation. *Journal of Environmental Management and Tourism*, 7(63), 1851 - 1858. [https://doi.org/10.14505/jemt.v13.7\(63\).05](https://doi.org/10.14505/jemt.v13.7(63).05)
- ALMANASRA, M., Alkhseilat, A., Al-Billeh, T., ALWERIKAT, N., & ALSHARQAWI, A. (2022). Criminal Responsibility for the Crime of Discharging Polluting Substances for Water Sources in Jordanian Legislation. *Journal of Environmental Management and Tourism*, 13(7), 1948–1948. [https://doi.org/10.14505/jemt.v13.7\(63\).15](https://doi.org/10.14505/jemt.v13.7(63).15)
- Alshible, M., & Abu Issa, H., & Al-Billeh, T. (2023). The Extent of Considering Environmental Crimes as A Manifestation of Economic Crimes. *Journal*

- of Environmental Management and Tourism*, 1(65), 23-31.
DOI:10.14505/jemt.v14.1(65).03
- Alwan, M., & Al-Moussa, M. (2007). *International Human Rights Law, Protected Rights*. Amman: Dar al-Thakafah.
- Bashir, H. (2011). *Environmental Protection in the Light of International Humanitarian Law*. Egypt: National Centre for Legal Issuances.
- Bouat, M. (2017). The Environmental Rights Between the Objective and Procedural Content. *The Academic Journal of Human and Social Studies*, 18: 282-292. <https://www.asjp.cerist.dz/en/downArticle/552/9/2/73785>
- Bouton, S. (2019). *The role of international organizations in protecting the environment*. Master Thesis. Larbi Ben M'hidi University.
- Deepika S., & Senthil, S. (2022). Credit card fraud detection using moth-flame earth worm optimisation algorithm-based deep belief neural network. *International Journal of Electronic Security and Digital Forensics*, 14(1), 3 – 75. DOI: 10.1504/IJESDF.2022.120021
- El Momini, M. (2004). *Legal Protection of the Environment*. Amman: Constitution Commercial Printing Press.
- Fahmy, K. (2011). *Legal Aspects of Environmental Protection against Pollution*. Alexandria: Dar al-Fikir al-Gamie.
- Isa, H. A., Alwerikat, N., & Al-Billeh, T. (2022). The Concept of the Public Employee in Jordanian Law: Different Constitutional, Administrative, and Criminal Law Definitions. *BiLD Law Journal*, 7(2s), 331–337. <https://bildbd.com/index.php/blj/article/view/318>
- Khashashneh, T., Al-Billeh, T., Al-Hammouri, A., & Belghit, R. (2023) The Importance of Digital Technology in Extracting Electronic Evidence: How Can Digital Technology be used at Crime Scenes?. *Pakistan Journal of Criminology*, 15 (4), pp. 69-85, <https://www.pjcriminology.com/publications/the-importance-of-digital-technology-in-extracting-electronic-evidence-how-can-digital-technology-be-used-at-crime-scenes/>
- Madhloom, O., & Antonopoulos, I. (2022). Clinical Legal Education and Human Rights Values: A Universal Pro Forma for Law Clinics. *Asian Journal of Legal Education*, 9(1), 23-35. <https://doi.org/10.1177/23220058211051031>
- Mazeed, Y. (2008). *Environment and Environmental Legislation*. Amman: Al Hamid Publishing and Distribution House.
- Mehani, W. (2021). Achieving environmental justice in the frame of activating the sustainable development requirements- a study for some modules of the leading countries in the area of enabling environmental justice. *Human resources development Journal*, 16(2): 340-372. <https://www.asjp.cerist.dz/en/downArticle/183/16/2/158122>
- Omar, O. (2008). *Environmental Protection locally*. Amman: regionally and internationally.

- Rabhi, L., & Rashid, H. (2020). The Role of the Decisions of International Organizations in Protecting the Environment. *Academic Journal of Legal and Political Research*, 4 (2), 1-11.
<https://www.asjp.cerist.dz/en/downArticle/441/4/2/126825>
- Saad, A. (1993). *Extrapolation of Civil Liability Rules in Environmental Pollution Disputes*. Cairo: Arab Renaissance House.
- Selita, F. (2019). Improving Access to Justice: Community-based Solutions. *Asian Journal of Legal Education*, 6(1-2), 83-90.
<https://doi.org/10.1177/2322005819855863>
- Subramaniam, S., Raju, N., Ganesan, A., Rajavel, N., Chenniappan, M., Prakash, C., Pramanik, A., Basak, A.K., & Dixit, S. (2022). Artificial Intelligence Technologies for Forecasting Air Pollution and Human Health: A Narrative Review. *Sustainability*, 14(16), 1-36.
<https://doi.org/10.3390/su14169951>