The Legal Concept of Environmental Damage in Onshore Oil Pollution: International Perspectives and Challenges in the Al Wahat Districts of Libya

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ABSTRACT:
The evolution of environmental damage has been examined in this paper, and how this evolution has impacted the way onshore oil pollution is treated under Libyan law, focusing particularly on Al Wahat Districts. The shift in perspective from a human-centric perspective, which limits harm to individual and property interests, towards an acceptance of a legal definition of environmental damage based on a balance of ecology and communal interests is highlighted. The international legal regime that addresses environmental damage includes the Lugano Convention, the CLC / FUND regime and the US Oil Pollution Act of 1990, and a brief overview of their different definitions of environmental damage and of limitations on the claim for compensation. From the information gathered in this review of historical developments, it is evident that Libyan law does not contain a clear and adequate definition of environmental damage and therefore will not be able to deal effectively with the hidden, cumulative, long-term and collective aspects of oil pollution resulting from onshore oil production in desert land. Empirical research into the experience of Al Wahat District, Libya, establishes a need to find an adequate legal definition of environmental damage that considers ecological, economic and social factors and a transition from an approach to compensating injuries resulting from wrongdoing to an approach based upon objective liability, the establishment of collective remedies, and the application of the principle "polluter pays", as a means of creating the conditions necessary for achieving adequate compensation and environmental justice in Libya through the introduction of legislation.

Keywords: Environmental Damage, Onshore Oil Pollution, Collective Environmental Harm, Al Wahat Districts (Libya).

Introduction

Defining the concept of environmental damage is one of the most complex legal issues in environmental law. Due to the difficulty of determining the nature of the "environment" itself (Khalatbari et al., 2016, p. 340). The differing legal understandings of the concept of the environment directly impact the determination of the scope of harm inflicted upon it. The concept of the environment oscillates between a narrow range - such as air, water, soil, flora, and fauna – and a broader conception that encompasses ecological interaction, landscape values, cultural heritage, and environmental services (Meynier, 2017, pp. 75-77). This divergence is also deepened by differing legal approaches to environmental protection, especially about whether environmental harm is viewed as an infringement of individual interests and private rights, or as harm to the environment itself as a separate legal value deserving protection in its own right. This conceptual fragmentation has concrete legal implications. As environmental damage constitutes the material foundation of civil liability. While certain liability regimes dispense with proof of fault, liability cannot arise in the absence of damage, which remains a prerequisite for compensation. The objective liability illustrates this principle clearly, as it is triggered by the occurrence of damage itself, provided that a causal link is established. Against this conceptual background, the international legal framework clearly reflects this divergence in practice. While instruments such as the Lugano Convention adopt a broad understanding of the environment—extending legal protection to natural resources, their interactions, and associated cultural and landscape values—liability regimes governing oil pollution damage, particularly in the marine context, most notably the Civil Liability Convention and the International Oil Pollution Compensation Fund system, follow a more restrictive approach, limiting compensation to defined categories of damage and reasonable reinstatement costs. By contrast, the United States Oil Pollution Act of 1990 recognises a wider range of environmental harm by extending compensation to the loss of natural resource services during the restoration period. This lack of international harmonisation has resulted in uneven levels of legal protection and persistent gaps in addressing pure ecological damage that is not directly linked to individual property interests.

In light of this international conceptual framework, the definitional divergence surrounding environmental damage becomes particularly evident in the Libyan legal system, which lacks an explicit and comprehensive legal definition of environmental damage, whether in general terms or in relation to oil-related activities. This conceptual gap is especially pronounced in cases of onshore oil pollution in the oil-producing areas of the Al Wahat Districts. Unlike marine oil pollution, which is governed by specialised international liability regimes with relatively defined notions of compensable damage, land-based oil pollution remains subject to an uncertain conceptual framework that fails to capture its full environmental dimension. The environmental damage which results from onshore oil exploration and production often has a cumulative effect on several parts of the environment (including soil, aquifers, and air quality), but it does not necessarily cause immediate or identifiable losses to the affected parties. This raises significant issues regarding how to define the environmental damage and if damages will be viewed legally as damages for loss or injury to particular interests or as damage to the environment as a whole. The lack of a clear conceptual framework to assess the environmental damage caused by onshore oil exploration and production indicates the shortcomings of current traditional liability models, and illustrates the need to incorporate recent international legal developments into a more situationally specific definition of environmental damage within the legal framework of Libya.

The goal of this study is to fill the current conceptual gap that exists with regard to the definition of environmental damage from oil pollution in Libya, considering that there is no clear definition within Libyan law that establishes certain objectives under the rules of civil liability for the civil liability system. A lack of certainty with respect to the legal framework that governs civil responsibility for oil pollution leads to confusion at

various levels as to who will be responsible, when it would be appropriate and what type of compensation should be provided, etc. Thus, this study creates a definition for the concept of environmental damage resulting from oil pollution using international legal developments to inform the Libyan framework. The study's analysis will focus only on the conceptual and definitional aspects related to onshore oil pollution in Libya and will not include an examination of marine pollution or the various types of liability frameworks that would apply to marine-based oil spills.

Through its efforts to clarify the conceptual limits of environmental damage from oil pollution in Libya, this study will provide a foundation for a more cohesive theory and practice of environmental damage from oil pollution on land that can be used as a guide to better protect the environment in Libya.

Methodology

Environmental damage caused by onshore oil pollution has been conceptualized and defined solely through qualitative legal research using a doctrinal and conceptual analysis. It relies on a systematic review of international laws, judicial decisions and scholarly works on the evolution of the concept of environmental damage relating to oil activities. It also uses a comparative analytic methodology to compare the various international legal models relating to the Lugano Convention, the Civil Liability Convention and the CLC/FUND and the United States Oil Pollution Act of 1990 to highlight differences in the legal definitions of environmental damage and the extent to which it would be protected under different models. Libyan legislation is mentioned only to indicate the lack of a legal definition of environmental damage caused by onshore oil pollution, without an in-depth analysis of liability. Finally, to support the framework and link it to the actual environmental situation in the area, scientific and environmental studies conducted in the Al Wahat Districts are also included.

1. The conceptual evolution of environmental damage in international environmental

The emergence of the environmental damage concept has been developed in response to the evolution of International Environmental Law, as well as to changing attitudes regarding the definition of harm, both legally and philosophically. In the beginning, the concept was associated with protecting the rights of others (e.g., the owner of the damaged property) or protecting property; however, as time progressed and society evolved, the concept gradually morphed into something more complex and involved understanding that Environmental Damage is an independent legal value in society. Due to this evolution, there are several different methods for defining Environmental Damage and for defining what types of Environmental Damage are legally protected and whether there are compensable damages associated with Environmental Damage. This section provides a historical overview of the evolution of the Environmental Damage concept and its foundational philosophies in order to provide context for the International Legal Models that are utilized by different Countries to define Environmental Damage and provide compensations accordingly.

1.1 from individual harm to ecological harm: historical and intellectual foundations

The environmental damage definition has taken many years to develop and is tied to how the World had undergone industrialization and technological advancements starting in the second half of the 20th Century. Rapidly growing industry, increasing use of technology, urbanization, and the growing use of chemical products have significantly damaged our environments at unprecedented levels. In response to this, the legal community is coming to understand that environmental harm is not only between individuals but also has devastating effects on air, water, soil, and overall ecological balance (Vilks, 2022, p. 173).

These changes revealed that damage could exist beyond the individual and property level and included future generations of people to come. As a result of these changes, Larsson identified an important change in the legal definition of "harm." The former legal definitions of civil liability were centered on the classical doctrines of nuisance and neighborhood law and provided legal protection only to private property owners and an individual's "legal" interests. And, as a result of technological advancements and industrialization, it has become increasingly difficult to characterize damage caused by industrial or technological events as, merely, individual infringement. Rather, it has become clear that such damage disrupts the ecosystem as a whole, both now and for future generations (Larsson, 1999, p. 155).Hence, the gradual shift that occurred in the legal area of environmental law is indicative of a shift in society's perceptions concerning "harm." With the shift, the area of legal interest in environmental law has moved away from compensating individual victims to restoring and protecting the environment as a collective good or common interest.

A broad understanding of environmental philosophy and law has led to a redefinition of the legal definition of environmental damage by moving away from a human-centered framework that has traditionally disadvantaged the rest of the biosphere. Industrial growth and the expanding magnitude of human activity destructive to the natural ecosystems of the world have given rise to many critiques of a human-centered framework being at the centre of the problem of the degradation of the ecology. The increased dialogue regarding the intrinsic value of Nature has put us in a time when the value of Nature should no longer be seen through a utilitarian lens, but simply as something that should be protected for the sake of its own existence.

Zhai demonstrates through his research that Aldo Leopold and Val Plumwood's environmental ethics work establishes a new environmental perspective which maintains the complete existence of ecological systems. Environmental protection has become an essential requirement which people must fulfill to maintain their survival and to protect ecological balance according to (Zhai, 2022, p. 3). Zhai provides the philosophical basis which enabled legal systems to define environmental damage because the concept evolved from its original form which treated environmental damage as an individual rights violation to its current state which recognizes environmental damage as a threat to ecosystems essential for human survival. The change received backing from three sources which included pollution measurement methods and environmental risk assessment techniques and economic discussions on sustainable development and the rise of public and governmental support for environmental protection (Sands, 2003, pp. 5-11). Accordingly, the evolution of the concept of environmental damage cannot be understood as a purely internal legal development. Rather, it reflects a complex interaction of historical, scientific, economic, and intellectual factors that redefined the relationship between law, society, and the environment. This shift paved the way for recognizing environmental damage as a distinct legal concept, grounded in the protection of ecological balance and collective interests, and laid the foundation for its subsequent international legal recognition.

The international implementation of environmental damage reached its first international demonstration when actual transboundary pollution cases occurred after the concept reached its full intellectual development which finally resulted in established legal principles and academic research (Kecskés, 2014, p. 19).The intellectual and conceptual change which occurred during this period extended beyond its academic boundaries because it started to develop into international law-based practices. The Trail Smelter arbitration case between United States and Canada from 1938 to 1941 serves as a fundamental example which demonstrates how international legal systems began to recognize environmental damage as a valid form of damage. The arbitral tribunal determined that States must prevent activities which create serious environmental damage from occurring within their jurisdictional boundaries according to this decision which

established environmental due diligence standards (De Gregorio, 2023, p. 350). The framework now defines international responsibility through environmental damage instead of assessing harm based on personal or financial losses.

The United Nations Conference on the Human Environment which took place in Stockholm during 1972 established the legal framework for this judicial development. The Stockholm Declaration which declared its first principle established that humans need proper environmental conditions to live with dignity which creates a direct connection between environmental protection and fundamental human rights (United Nations, 1973). The recognition of environmental damage as a legal concept based on rights, which originated from technical and scientific matters, strengthened the no-harm principle while establishing State responsibility for environmental protection.

These developments collectively exemplify the transition from individual harm to ecological harm as a legally documented concept, thereby providing the conceptual foundation for the diverse international legal approaches to environmental damage scrutinized in the following section.

1.2 international legal models of environmental damage: divergent definitions and compensation approaches

Divergent understandings of the environment have given rise to distinct international legal models for defining and compensating environmental damage. The two legal models differ because they identify different types of environmental damage which they classify as harmful to the environment they consider to have legal value and the non-physical environmental damage which they allow to be compensated. The three international frameworks show different results because they establish different methods of handling environmental damage according to their respective Lugano Convention and CLC/FUND regime and United States Oil Pollution Act of 1990 systems. The 1993 Lugano Convention on Civil Liability for Environmental Damage demonstrates its unified comprehensive approach through its complete regional decentralized framework. Article 10(2) defines the environment in an extensive manner by including both living and non-living natural resources and their reciprocal relations and cultural heritage elements and typical landscape characteristics. The Convention provides legal protection to environmental elements which exceed physical boundaries because it sees the environment as an ecological system which needs all its components to be legally safeguarded together with its cultural and aesthetic aspects (Council of Europe, 1993).

The Lugano Convention functions as an advanced legal framework which establishes full environmental protection through both ecological and cultural heritage dimensions of environmental damage instead of safeguarding only those effects which can be economically measured. The legal system shows different ways to define environmental damages because it uses different methods to define what constitutes environmental damage. International legal practice has two main approaches according to Philippe Sands because one approach defines damage through specific natural resources while the other approach includes all landscape degradation and cultural heritage and environmental value damage (Sands, 2003, p. 877). Larsen establishes a clear distinction between two types of environmental damage when he describes pure ecological damage as environmental impacts which occur without direct economic loss and environmental damage to property which occurs when ecological harm causes damage to individual or economic interests (Kecskés, 2014, pp. 23-24).The analytical framework demonstrates how society began to accept environmental protection as a legal right which exists independently from private property rights.

International treaties aimed to provide broad definitions of "environmental damage" but have failed to achieve that goal. The 1972 Convention on Liability for Damage Caused by Space Objects is a first attempt at a definition of "damage," and it includes "loss of life, personal injury, and property damage to states, individuals, and international

organizations" (United Nations, 1973). This definition indicates a wide-ranging concept of harm that extends beyond just physical loss. In contrast, the international legal framework concerning marine oil spills has had a tendency to adopt limited liability standards, which have become the norm for many businesses.

The 1992 Civil Liability Convention (CLC 1992) together with the 1992 International Oil Pollution Compensation Fund (FUND 1992) provides specific definitions for environmental damage. Article 1(6) of the CLC limits compensation for environmental impairment to the costs of reasonable reinstatement measures actually undertaken or to be undertaken, together with preventive measures and related losses (International Maritime, 1992). The system offers economic and restorative benefits which exclude all forms of compensation that pertain to non-material ecological damage including biodiversity loss and aesthetic destruction and ecosystem integrity decline. The CLC/FUND system uses a restrictive framework which measures environmental protection through specific financial standards (Peplowska-Dąbrowska, 2018, p. 212).

The United States Oil Pollution Act of 1990 (OPA) establishes environmental damage standards which go beyond those found in other laws. The law 33 U.S.C. § 2706(d)(1) establishes liability for environmental damage assessment costs and the reduction in natural resource value which occurs until restoration works are finished (United States Congress, 1990). This method demonstrates how natural resource services and the time-based effects of environmental damage exist as shared public assets instead of existing as commercial products (Peplowska-Dąbrowska, 2018, pp. 213-216). The OPA enables public trustees to pursue environmental damage compensation for indigenous communities and affected States, which establishes environmental damage as a public harm that goes beyond local property interests. Environmental injury includes physical damage but also includes the loss of ecological functions and services which are vital for maintaining environmental health and supporting human welfare.

International models show that environmental damage must be evaluated according to three factors which include legal policies and actual harmful activities and the specific features of the impacted environment. The problem becomes more severe because onshore oil pollution creates complex environmental damage which affects soil and groundwater and vegetation and delicate ecosystems. The absence of a clear legal definition of environmental damage in Libya especially in the Al Wahat Districts (Jalu Awjila and Ajkhara) creates additional difficulties because desert ecosystems are vulnerable and need groundwater resources to survive. The development of a clear legal definition for environmental damage which comes from onshore oil pollution needs to be established for determining civil liability within the framework of Libyan legal provisions.

2. Towards a Context-Sensitive Legal Concept of Onshore Oil Pollution Damage in Libya

Understanding onshore oil pollution damage in Libya requires attention to its specific environmental characteristics and the absence of a clear legislative definition. The case of Al Wahat Districts demonstrates two major issues which exist in Libyan environmental laws because it needs special legal rules to manage the environmental effects of land-based oil pollution.

2.1 Characteristics of Onshore Oil Pollution Damage in the Al Wahat Districts

The definition of environmental harm from oil operations needs general legal principles and international treaties as its foundation yet requires detailed study of onshore oil pollution cases because land-based pollution presents different environmental and technical characteristics. Onshore oil pollution shows different dispersion patterns and higher soil infiltration rates and extended groundwater contact time when compared to marine oil pollution which operates under a dedicated international liability system that focuses on ships and ocean territories. The Al Wahat Districts of Libya show their most extreme

environmental differences between land and water in their delicate desert ecosystems.

The process of determining onshore oil pollution damage needs two main tasks which require researchers to find its main terrestrial sources. The oil industry operations which include all upstream processes from exploration to production create both severe environmental damage and widespread harm to natural resources. The waste management procedures used in seismic surveys during exploration create environmental risks because they produce waste from sound-wave and explosive methods that can affect both soil and nearby ecosystems (Irhoma, 2017, pp. 90-92). The pollution problem becomes worse during exploratory and production drilling operations because drilling muds and chemical additives and their waste products create risks of soil and groundwater contamination (Eugenio et al., 2024, pp. 2-3).

The production and development process generates substantial airborne and terrestrial pollutants through its additional drilling activities and its operation of processing and separation equipment and its gasoline flaring and venting and heavy machinery operations. According to Irhoma (Irhoma, 2017, pp. 93-95). industrial emissions together with operational waste from transportation and storage and refining and gas processing activities create terrestrial pollution in downstream operations. The oil facilities in Libya face increased environmental risk according to empirical studies which show that preventive measures have not been implemented and maintenance procedures are inadequate because facilities use outdated technologies (Irhoma et al., 2016) (Saad et al., 2018) (Al-Tuwail, 2022). The oil industry operates as a connected system because every operational phase creates an opportunity for coastal oil contamination.

The environmental damage which results from onshore oil pollution shows distinct characteristics which separate it from all other types of environmental damage including those regulated by general environmental law and marine pollution regulations. The existing characteristics of this environmental damage require the development of a distinct legal definition which will explain both its scientific aspects and its environmental effects in desert ecosystems found in the Al Wahat Districts.

1 - Deep-Seated Damage That Is Not Immediately Apparent

The nature of onshore oil pollution is hidden because its oil components travel through underground soil and create hidden oil deposits that cannot be easily found (Pan et al., 2021). The pollutants move at a slow pace which allows them to remain in the environment while they continue to destroy soil and groundwater conditions without showing any obvious signs of danger. Scientists have found that only advanced laboratory techniques and electrical resistivity tomography (ERT) subsurface imaging methods can detect oil-based pollutants which include polycyclic aromatic hydrocarbons (PAHs) in the environment (Adeniran et al., 2023), (Eugenio et al., 2024), (Irhoma et al., 2020).

The Al Wahat Districts show how pollution spreads through the environment in a hidden way. The Al-Nafoura oil field in Jalu conducted field studies which showed that untreated wastewater discharges increase salinity and nitrate levels in groundwater while creating polluted surface lakes that release hydrocarbons into soil and aquifers (Al-Mabrouk & Al-Fitouri, 2024). Groundwater testing in Jalu showed similar results because it showed that contamination levels exceeded Libyan irrigation standards while oil had contaminated aquifers (Alzwi et al., 2018).

The concealed and advancing damage through its hidden nature creates severe problems for proving evidence because it prevents determination of when damage occurred and makes it harder to prove who caused the damage which results in difficulties for proving compensation under standard fault-based civil liability.

Figure 1. Water Basins Associated with the Al Wahat Districts(Emhanna et al., 2022)

illustrates the environmental pollution resulting from oil exploration and production in the Al Wahat districts, by showing untreated wastewater ponds, posing a threat to soil and groundwater quality. In addition, this figure provides visual evidence of the mismanagement of wastewater. It assists the legal analysis in demonstrating causality between industrial activity and environmental damage as a necessary condition for asserting claims for compensation related to environmental civil liability.

2 - Long-Term and Difficult-to-Treat Damage

Onshore oil pollution is characterised by its long-term persistence, especially in hot, arid environments where hydrocarbons degrade very slowly and may remain in soil and groundwater for decades. Oil contamination alters soil's physical and hydraulic properties by forming hydrophobic layers that restrict water and air movement, leading to reduced soil fertility, vegetation loss, and disruption of beneficial microbial activity (Gordon et al., 2018, pp. 115-116).

As a result, soil remediation becomes a lengthy, technically complex, and costly process requiring advanced restoration methods (Kasundra et al., 2019, p. 93). Field research conducted in the Al Wahat Districts confirms these findings (Emhanna et al., 2022). documented extensive discharge of untreated wastewater and solid waste, resulting in soil saturation with hydrocarbons and heavy metals, the formation of open oil lakes near agricultural land, and irreversible changes to soil and groundwater properties.

The environmental damage assessment process needs to establish the permanent impact of damage because it determines whether environmental restoration work remains viable. When restoration to the pre-damage state becomes practically impossible, compensation for damages requires a shift from restorative compensation to monetary payments which help reduce actual damage. The presence of ongoing cumulative pollution creates additional obstacles for establishing responsibility which demonstrates the necessity of flexible liability systems that include strict liability and the polluter pays principle to ensure operators remain accountable for long-lasting environmental damage.

Figure 2. Waste from one of the Service companies operating in the Al Wahat Districts was Dumped Near the Jalu Farms, showing the Soil Being Saturated with Toxic Chemicals. (Darman, 2013).

Figure 2 reflects environmental pollution in the Al Wahat areas. The figure shows the accumulation of industrial waste from oil company activities and the soil saturation with toxic substances, particularly near farms in Jalu. These figures help clarify the extent to which environmental damage is linked to corporate behaviour, strengthening the evidentiary basis for compensation under civil liability provisions.

3 - Widespread Damage Extending to Multiple Elements of The Environment

Oil pollution that originates from land sources impacts multiple areas by damaging soil and water and air and ecosystems and human health. The presence of oil spills results in soil and water resource degradation which makes those resources unfit for ecological and human use, while the activities related to oil production emit greenhouse gases and harmful pollutants which result in air pollution and climate change and serious health effects (Kermani & Ebadi, 2012, pp. 655-656).

Libya's Al-Wahat cities which include Jalu and Awjila and Ajkhara, experience this phenomenon through their dense black clouds that result from oil and gas emissions which create persistent odors and recurring health problems among residents according to information from the Libyan News Agency 2021. Environmental activists establish that these pollutants continue to remain in the air for multiple days, which creates a persistent risk to both air quality and public health and environmental safety ("Black clouds cover the sky of Al-Wahat cities due to oil and gas extraction emissions, with reported respiratory cases among residents,").

Oil pollution creates severe damage to plant life and animal populations because it pollutes their natural habitats and destroys vital food and water resources which sustain biodiversity and ecological equilibrium. The Al-Wahat areas have experienced multiple camel fatalities because local reports indicate that Ajkhara animals fell into unguarded oil drilling pits which resulted from environmental oversight and incomplete safety protocols of oil companies. The oil operations demonstrate their environmental effects and their economic effects on local communities through their pollution activities and drilling operations which destroy natural pastures and create threats to the livelihoods of livestock-dependent communities ("Repeated incident: A camel drowns in oil excavation pits near Ajkhara,").

Figure 3. This figure shows camel fatalities resulting from falling into oil located near drilling and exploration areas operated by an oil company in the municipality of Ajkhara.

The environmental damage which affects multiple regions of the environment creates difficulties for establishing legal responsibility and determining how much damage should be paid. The harm of this situation extends beyond individual financial losses to encompass shared public rights which involve access to natural resources and the enjoyment of a healthy environment. The existing damage needs complete legal solutions which

recognize shared environmental damage as a legal concept and extend compensation to cover both ecological restoration costs and public health protection expenses and all direct material losses.

4 - Collective Harm Affecting the Interests of Society as A Whole

The onshore petroleum pollution is collectively caused by several areas of the globe and continues to impact the environment over the long term. Because of this, onshore petroleum pollution damages multiple environmental resources and harms entire communities instead of isolated locations or individuals (Pouikli, 2017, p. 375). The continual effects of these impacts on future generations are a result of the combined factors that include economic and technical aspects along with ineffective management throughout the oil extraction processes. These combined factors lead to the contamination of soil and water sources and result in long-lasting harm to future generations.

The character of onshore oil pollution occurs through multiple affected groups which include farmers and herders and local communities who depend on natural resources. The public goods status of essential environmental elements which include clean air and water and ecosystem stability leads to collective harm because these elements produce environmental damage which affects both social and economic systems. The public character of pollution requires a legal framework which protects environmental resources that belong to all citizens. The collective nature of environmental destruction requires legal solutions which extend beyond conventional civil liability frameworks that protect individual rights. The effective regulation system requires a structure which combines state environmental protection duties with absolute civil liability standards that apply to oil operators working in dangerous environments (Orlando, 2014, pp. 2-18).

Figure 4. Photos one of the Neighborhoods and Farms Showing the Smoke Rising as a Result of the Emitted Gases (Sputnik, 2020).

Figure 4 depicts one facet of environmental pollution associated with oil production operations in Jalu. The figure shows smoke generated from gas emissions in the residential areas and nearby farms. These emissions contribute directly to deteriorating air quality, environmental impacts, implications for human health, crop damage, and disruptive consequences for the ecological conditions in the area.

The legal system of Libya does not provide any definition for environmental damage yet which includes the specific case of oil pollution that occurs on land. The Protection and Improvement of the Environment Law No. 15 of 2003 and the Petroleum Law No. 25 of 1955 do not provide any definition which can adequately describe the extensive hidden environmental harm that occurs throughout the area. The existing law deficiencies create obstacles for civil legal cases while establishing the need for environmental definitions which specifically apply to Al Wahat Districts.

2.2. A Proposed Definition for Onshore Oil-Related Environmental Damage in Al Wahat Districts

The complexity of onshore oil pollution impacts environmental damage because its technical aspects and its long-term impact on soil and groundwater create challenges for assessment. Theoretical legal definitions establish general frameworks which need to be adapted to onshore oil pollution in Libya's Al-Wahat desert because of its distinct environmental conditions and the specific ways in which this pollution spreads and damages the environment. The legal system has shown how Sands and Larson and Kecskes created two distinct approaches to environmental damage assessment. The international community demonstrates two different approaches which lead to this situation.

The 1992 CLC/FUND Conventions restrict their definition of environmental damage to restoration costs but the U.S. Oil Pollution Act of 1990 permits damages for natural resource loss and public service loss while allowing public trustees to file claims for public damages. The comparisons between jurisprudence and treatises prove that environmental damage definition remains a critical matter which influences civil liability assessment. The Libyan legislative framework which includes Law No. 15 of 2003 about environmental protection and improvement lacks a definition for environmental damage which applies to general situations and to specific cases of onshore oil pollution.

The environmental damage which results from onshore oil pollution now exists as a defined concept which connects to environmental characteristics of onshore oil pollution and background information.

"Any deterioration affecting elements of the terrestrial environment as a result of the dumping or leakage of crude oil or components of the petroleum industry into the soil, groundwater or air, whenever this leads to these elements losing their ecological, economic and social characteristics or functions, whether this deterioration constitutes purely environmental damage affecting the environment itself as a collective interest, or has an environmental dimension in the properties as a result of damage to agricultural and grazing lands and water sources on which the population depends."

The damage discussed in this article has been identified through studies of the field of Al-Wahat (the Western Desert). There are two main types: Pervasive (widespread) or Slow Release. The first type (Pervasive) is characterized by a slow infiltration through the soils over many years, whereas the second type (Slow Release), results from natural decay of hydrocarbons in the desert, which takes longer than in other areas. Both types affect soil, water, air, plants, animals and humans. Both types of damage are "collective," meaning that the entire community is affected by the depletion of shared resources, especially groundwater. Because of these unique characteristics, this kind of technical analysis of damage has influenced the legal interpretations of liability. Because the damage is cumulative and continues to accumulate, it may not be possible to identify the exact moment of occurrence or to establish the liability of any individual operator. Proving causation under the traditional civil liability criteria is exceedingly challenging. Consequently, many of the new concepts in the field of law have developed into different approaches for environmental damage, mainly through the creation of concepts of Strict and Joint Liability between Operators and the introduction of the concept of Public Nature of Environmental Damage. Therefore, in many jurisdictions, public authorities (or collective entities) can bring action on behalf of the Public Environment (as reflected in the OPA 1990).

The legal principles of pollutant responsibility and prevention methods now function as vital instruments that hold oil companies accountable while they restore public environmental damage to its original state.

The concept of environmental damage from onshore oil pollution according to jurisprudence and practical analysis develops into two distinct types of harm. The study area exhibits both cumulative effects and general impacts which extend throughout the desert land and require legal solutions that go beyond existing civil liability standards to create a specialized system for understanding its unique aspects in the Libyan Al-Wahat Districts.

Conclusion

The study has tracked the development of environmental damage concepts in international environmental law to determine their applicability for addressing legal issues related to onshore oil pollution in Libya which particularly affects the Al Wahat Districts. The research shows that environmental damage concepts have expanded from their initial human-centered framework which focused on individual property rights to a complete eccentric perspective that views environmental elements as independent legal entities which need safeguarding.

The analysis of historical and philosophical and jurisprudential development shows that international law has created different methods for establishing environmental damage definitions and compensation processes. The Lugano Convention and the U.S. Oil Pollution Act use broad definitions that recognize both environmental functions and shared community interests whereas the CLC/FUND system limits itself to compensation based on measurable economic restoration expenses. The study shows that different international systems for defining environmental damage continue to operate without establishing a common definition while showing that liability systems develop according to existing policy requirements.

The paper demonstrates that the existing Libyan legal framework has a crucial gap in both its fundamental concepts and its existing laws. The two laws Law No. 15 of 2003 on the Protection and Improvement of the Environment and Petroleum Law No. 25 of 1955 fail to establish any specific definition for environmental damage which includes damages caused by onshore oil pollution. The Al Wahat Districts face a particular issue because their delicate desert ecosystems and groundwater resources and their hidden pollution problem require a different approach than traditional civil liability systems.

The paper presents a legal definition of environmental damage which stems from onshore oil pollution that takes into account both international environmental standards and Libya's actual environmental conditions. The proposed definition establishes a connection between legal principles and actual oil pollution on land which creates a complete basis for civil responsibility and environmental safeguards and compensation systems used in Libya.

Key Findings

- Environmental damage has developed into an international legal concept that protects multiple public values through its recognition of ecological harm as a separate legal right.
- The international legal systems demonstrate different methods to handle environmental damage because they use either comprehensive systems which include all elements (Lugano Convention, OPA 1990) or specific economic systems (CLC/FUND 1992) to deal with oil pollution.
- The process of oil contamination on land differs from maritime oil spills because it moves through different methods, reaches different depths, lasts for different time periods, and interacts with both earth materials and water sources, especially in the desert areas of Al Wahat Districts.
- Al Wahat environmental damage manifests through concealed deep-rooted destruction which maintains its presence for extended periods and creates

environmental damage that affects various ecological aspects through its nature that affects all people.

- The Libyan environmental and petroleum legislation fails to define environmental damage which hinders civil claims and legal responsibility for onshore oil pollution.
- The concealed and cumulative nature of onshore oil pollution requires a different approach because traditional fault-based civil liability systems do not provide effective solutions for proving causation and establishing temporal links.
- The legal framework of environmental damage needs to define two types of ecological harm which includes pure ecological damage and property-related ecological damage. The implementation of strict liability and the polluter pays principle and preventive responsibilities will enable Libya to achieve proper compensation and environmental equity and sustainable resource management.

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