INSTITUTE FOR INTERNATIONAL LAW & HUMAN RIGHTS

Comparative Memorandum

Environmental Liability and Compensation Mechanisms: Implications for Iraq

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EXECUTIVE SUMMARY

Iraq's framework for environmental liability remains limited in its ability to ensure accountability and restoration. Although the current Law on Environmental Protection and Improvement of Environment (No. 27 of 2009) provides for fines and compensation, enforcement – especially against public institutions – remains weak, and there is no standardized method to calculate environmental damage.

The ongoing review of Iraq's draft Environmental Protection Law offers an important opportunity to strengthen both enforcement and restoration mechanisms. International practice demonstrates that effective environmental regimes combine three key elements: enforceability, financial accountability, and quantifiable restoration.

To support this process, this memorandum draws on comparative experience from the European Union, Spain, Germany, France, the United States, India, South Korea and China, focusing on two key areas: enforcement of environmental liability and valuation and compensation of environmental damage. These systems demonstrate how effective enforcement and credible valuation mechanisms can make environmental liability both practical and fair. Spain and Germany, for example, link liability to measurable restoration costs supported by financial guarantees; France and India use judicial penalties to compel compliance; and the United States, China, Germany, and Spain employ national technical standards to quantify ecological damage.

Building on these experiences, the memorandum proposes specific legislative and institutional reforms tailored to the Iraqi context. Key recommendations include:

- Qualify in the Law that any fines or compensation order issued under the Law on the Protection of Environment shall constitute a public receivable (al-duyūn al-'āmma) under the pertinent laws on Public Debt Collection and Federal Finance Management.
- Incorporate a legal provision which grants courts express authority to impose periodic fines on non-compliant ministries, municipalities, and private operators;
- Requiring financial guarantees for high-risk activities to ensure funds are available for restoration.

Additionally, decision makers should consider adopting standardized valuation guidelines for environmental harm and creating a national environmental compliance register to promote transparency and public oversight.

By embedding these measures into its environmental legislation Iraq can close enforcement gaps, ensure polluters pay damages, and establish a clear, credible system for environmental restoration and compensation. These actions would strengthen both environmental protection and public trust.

I. Introduction

Effective enforcement of environmental legislation is essential to ensure that environmental protection moves beyond policy statements into real, measurable action that deters violations and promotes accountability.

Iraq's current legal basis for environmental liability is Law No. 27 of 2009 on the Protection and Improvement of the Environment. As of September 2025, the Iraqi Council of Representatives (COR) is reviewing a new draft law on Environmental Protection to update and strengthen this framework. The current law provides a legal basis for implementing fines for environmental polluters, including imprisonment, as well as compensation for environmental damage. Primarily, the polluter is responsible for restoring the environment to its prior situation before the pollution occurred. According to the law, if the polluter fails to do so, the Ministry of Environment should restore the environment, and the polluter should bear the costs.

Two central issues continue to undermine the effectiveness of these punitive measures prescribed in Iraq's environmental law. The first is the lack of enforcement of fines imposed on public entities. Public institutions are a large polluter in Iraq, yet even when a court has affirmatively issued a fine against the institution under the Law, these penalties are rarely collected. By its own admission, the Ministry of Environment lacks the means to compel payment. This allows public institutions to avoid accountability for harming the environment and for breaking Iraqi law.

The second issue is the absence of a clear methodology for calculating environmental damage. Iraq does not have a codified method for quantifying environmental damage to soil, water, or biodiversity. Courts appoint expert committees, but in the absence of standardized formulas, compensation remains inconsistent and often symbolic. This is particularly problematic for water pollution cases, where there is no formula linking pollutant load, duration, hazard, and local sensitivity to a monetary figure covering both restoration and interim service losses. As a result, environmental harm is left uncompensated or under-addressed.

To illustrate how these challenges might be overcome, the following sections set out models from other jurisdictions that have developed mechanisms to address these shortcomings.

II. Enforcing Environmental Liability Against Public Institutions

According to Iraq's environmental legislation, polluters can be both private parties and public institutions, and both categories are subject to fines. The Law on Environmental Protection authorizes the Minister of Environment to issue warnings and suspend or halt operations for up to

30 days, renewable. Environmental observers (under Regulation No. 4 of 2012 on Ambient Air) may inspect facilities, verify pollution control systems, measure emissions, and report violations. The Environmental Police are equipped with judicial police powers in relation to environmental crimes to enforce court judgments and ministerial decisions.

Courts play a central role in environmental enforcement: they impose imprisonment, detention, or fines under Chapter 9 of Law No. 27 of 2009, relevant articles of the Penal Code No. 111 of 1969 (Articles 496–497), and the Forests and Shrubs Law No. 30 of 2009. Fines are collected either directly by courts or by the Ministry of Environment's Legal Department, which is responsible for the enforcement and collection of government debts (Internal Regulation No. 1 of 2011). Municipal departments can also collect fines for minor environmental violations.

The central legal difficulty arises in relation to public institutions, which often resist or decline payment, thereby undermining the enforceability of sanctions imposed upon them.

To avoid this issue, other jurisdictions automatically channel fines into the general debt-collection machinery of the State, ensuring that government bodies are held financially accountable in the same way as private actors. For example, in **Spain,** under the **Law on Common Administrative Procedure (Arts. 99–103)**, once an environmental authority issues a final enforceable order, the obligation is immediately subject to the enforcement procedure.[1] Public institutions are not exempt from the enforcement of environmental debts. However, instead of seizure of bank accounts or property, obligations owed by public institutions are recovered through fiscal mechanisms overseen by the Ministry of Finance. The General Budgetary Law authorizes the State Treasury to recover debts owed by public bodies by offsetting them against budget allocations or by deducting amounts directly from funds due to the debtor institution.[2] In the case of municipalities, the Law on Local Treasuries (Royal Legislative Decree 2/2004) empowers the Ministry of Finance to retain sums from a municipality's share of national tax revenues in order to satisfy outstanding debts.[3] This framework ensures that environmental fines imposed on public authorities are not discretionary but are systematically enforced through the State's fiscal machinery.

In **South Korea,** environmental charges are explicitly brought under the **National Tax Collection Act**. The sectoral environmental laws provide that unpaid environmental fees or fines are treated with the same seriousness and enforceability as unpaid taxes.[4] By embedding environmental

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[1] Law 39/2015 of 1 October on the Common Administrative Procedure of Public Administrations (Ley 39/2015, de 1 de octubre, del Procedimiento Administrativo Común de las Administraciones Públicas), BOE-A-2015-10565, arts. 99–103 https://www.boe.es/buscar/act.php?id=BOE-A-2015-10565, last accessed 26 September 2025. *Translation from Spanish by the author (unofficial).*

[2] Law 47/2003 of 26 November on the General Budgetary Law (Ley 47/2003, de 26 de noviembre, General Presupuestaria), consolidated text, last amended 24 December 2022) https://www.boe.es/buscar/pdf/2003/BOE-A-2003-21614-consolidado.pdf accessed 26 September 2025.

[3] Spain, *Royal Legislative Decree 2/2004 of 5 March, approving the revised text of the Law Regulating Local Treasuries* (BOE), available online: https://www.boe.es/buscar/pdf/2004/BOE-A-2004-4214-consolidado.pdf.

[4] *See* Act on the Promotion of Saving and Recycling of Resources (Republic of Korea) Act No. 10893, 21 July 2011 (as amended) art 9-3(2), which provides:

receivables within existing fiscal structures, the law leverages a tested, powerful enforcement framework that public institutions cannot evade.

India's National Green Tribunal (NGT) was established as a dedicated court to resolve disputes relating to environmental protection, conservation of forests, and natural resources. It was established to provide "effective and expeditious disposal of cases" involving environmental law, reflecting the urgency of ecological issues**.** NGT applies a national methodology to compute environmental compensation for air, water, waste, and groundwater violations. When public agencies (e.g., city utilities) fail to run sewage or waste systems, the NGT has imposed monthly compensation on the departments themselves, directing deposits into restoration accounts and stating that States/Union Territories are liable to pay if targets are missed.[5]

French courts are authorized to issue periodic penalty payments for each semester (six-month period), if a public authority or other party fails to comply with a judicial order, for every period a public authority remains non-compliant.[6] In landmark air-quality litigation, the Conseil d'État (Supreme Administrative Court) ordered the French State to pay €10 million per semester of delay (later reduced as compliance improved) until lawful pollution limits were met.[7] The court continued to issue new fines for ongoing non-compliance. In 2022, it ordered **€20 million** in penalties (for failure to meet air quality limits in multiple zones.[8] In November 2023, the court again imposed another **€10 million** penalty for persistent non-compliance in Paris and Lyon.[9] Although the court's decision imposed a growing financial burden on the State, available documents suggest that part of the fines was paid and part remained subject to negotiation or adjustment during follow-up proceedings, demonstrating that judiciary pressure can translate into real fiscal costs, even if full compliance was gradual.[10]

"*If a person on whom a penalty surcharge is imposed pursuant to paragraph (1) fails to pay the penalty surcharge, the Minister of Environment shall collect it in the same manner as delinquent national taxes."*

[5] Central Pollution Control Board, *Methodology for Assessing Environmental Compensation* (2019), available online https://cpcb.nic.in/uploads/ECMC/Environmental_Compensation_Charges.pdf accessed 26 September 2025.; *See also*: National Green Tribunal, *Order in Case No. ELHI/1/2023 (16 February 2023)*, available online: https://www.greentribunal.gov.in.

[6] Code de justice administrative, art L 911-7 (France) [Code of Administrative Justice, art L 911-7], available online: https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000006449415.

[7] *Air pollution: the Conseil d'État orders the French State to pay two fines of €10 million* (Conseil d'État, 17 October 2022), available online: https://www.conseil-etat.fr/site/Pages-internationales/english/news/air-pollution-the-conseil-d-etat-orders-the-french-state-to-pay-two-fines-of-10-million.

[8] RFI, *French State fined a further €20 million for inadequate action over air pollution* (18 October 2022), available online: https://www.rfi.fr/en/france/20221018-french-state-fined-further-%E2%82%AC20-million-for-inadequate-action-over-air-pollution.

[9] Bloomberg, *France fined further €10m for air pollution failures* (24 November 2023), available online: https://www.bloomberg.com/news/articles/2023-11-24/france-fined-further-10m-for-air-pollution-failures.

[10] Vie publique, *Air pollution: the Conseil d'État condemns the State* (November 2023), available online: https://www.vie-publique.fr/en-bref/292007-pollution-de-lair-le-conseil-detat-condamne-letat.

In **Kosovo,** the **Law on Enforcement Procedures** assigns the Private Enforcement Agents for the enforcement of administrative decisions, including fines against public institutions.[11] The mechanism of Private Enforcement Agents ensures the effectiveness of the enforcement proceedings, as the timelines for action are shorter and there is no backlog of cases, as opposed to the judiciary.

Beyond individual country examples such as Kosovo, South Korea, Spain, France, and India, broader analytical research provides complementary insights on enforcement effectiveness in the public sector. For instance, the report *The Effectiveness of Regulatory Penalties in the Public Sector* (2022) notes that monetary penalties alone are less effective in inducing compliance in public-sector bodies than in private firms, because public institutions usually lack a profit motive susceptible to fines.[12] Instead, the report argues, non-monetary pressures such as reputational accountability, internal disciplinary consequences, public disclosure, and transparency, often carry more weight in changing institutional behavior.

Legislative Recommendations

Based on experiences of other countries, the following legislative recommendations could be considered in order to improve the effectiveness of the enforcement of environmental legislation in Iraq:

- Increase Ministry of Environment powers to issue enforceable orders that automatically qualify as public receivables, collected by the Ministry of Finance or Tax Authority. Any fine, compensation, or monetary obligation imposed by the Ministry of Environment under this Law shall constitute a public receivable. The Ministry of Finance, through the General Commission for Taxes, shall enforce its collection in accordance with the procedures applicable to the recovery of public funds, including by offsetting the amount against the budget allocations or financial transfers of the debtor entity. Collected amounts shall be deposited into the Environmental Protection Fund to finance remediation, restoration, and monitoring activities.
- Authorize courts to impose *periodic penalty payments* (astreinte) on ministries, municipalities, and private operators that fail to comply with environmental orders.
- Establish expedited court proceedings for environmental cases, including enforcement stages, to prevent delay. Environmental cases should be accorded special priority and treated with speed at every stage of adjudication, recognizing their public interest nature and potential for irreversible harm. Specific procedural timeframes, such as mandatory deadlines for filing responses, holding preliminary and final hearings, issuing judgments,

[11] Law No. 04/L-139 on Enforcement Procedure, (31 January 2013). Available at: https://gzk.rks-gov.net/ActDocumentDetail.aspx?ActID=2870

[12] Information Commissioner's Office, *The Effectiveness of Regulatory Penalties in the Public Sector — Economic Analysis* (Evidence Note, June 2022) https://ico.org.uk/media2/migrated/4024372/ic-212626-m7r2-evidence-note-june-2022.pdf.

and executing enforcement orders, should be clearly defined and incorporated into pertinent laws concerning the criminal and civil procedures law. These timeframes could also be reinforced through directives issued by the Supreme Judicial Council to ensure uniform application across all courts, strengthen judicial accountability, and guarantee the timely and effective resolution of environmental disputes.

- Mandate transparency and oversight through public reporting of unpaid environmental fines or obligations by public institutions. This could be implemented through the establishment of a unified Environmental Compliance and Sanctions. This register could be managed by the Ministry of Environment in coordination with the Ministries of Justice and Finance. The register should publicly disclose all final environmental fines, restoration orders, and compensation obligations – including those owed by public institutions – through an online platform updated quarterly. Governorates and municipalities would be required to submit semi-annual summaries of local violations, enforcement actions, and compliance progress to the Ministry of Environment, which would consolidate them into the national register. The Ministry of Justice would ensure publication, while the Ministry of Finance would report on payment and recovery status. This integrated system would promote transparency, enable parliamentary and public oversight, and strengthen fiscal accountability across all levels of government.

III. Evaluation of Environmental Damage

The second issue of concern in Iraq, which plays a main role in the establishment of an effective environmental legislative framework, is to ensure there is restoration and compensation for the environmental harm. A central difficulty in Iraq is the lack of a clear methodology for calculating environmental damage. While Iraqi law empowers the Ministry of Environment to seek compensation and restore harm, it does not provide strict liability rules or technical standards for quantification, which provides that the operator is liable regardless of fault; the mere fact that damage occurred due to a dangerous activity is enough.

Some jurisdictions close this gap by introducing strict liability for certain polluters, detailed regulation on restoration, and guidelines on calculating the environmental damage.

European Union's Environmental Liability Directive (ELD) obliges polluters to return natural resources and services to their baseline condition, but leaves valuation methods largely to Member States.[13] It does not prescribe a single mathematical formula or valuation table for damages.

[13] Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on Environmental Liability with Regard to the Prevention and Remedying of Environmental Damage [2019], available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004L0035.

Instead, it obliges polluters to restore the environment to baseline condition[14] and, where this is not fully possible, to provide equivalent or complementary remediation.

The Directive's Annex II describes methodologies (primary, complementary, compensatory remediation) but leaves technical details to Member States. Remediation follows three tiers: **primary** (restore resources/services to baseline), **complementary** (provide equivalent resources/services when primary remediation is insufficient), and **compensatory** (address interim losses until recovery is achieved). Compensatory measures cover lost ecological functions and services but not financial compensation to individuals.

For land damage, contaminants must be removed, controlled, or contained so the land poses no significant health risk. Risk is assessed by soil characteristics, pollutants, and dispersion potential, with land use determined by existing regulations or, if absent, the area's nature and expected development. Natural recovery without direct intervention must also be considered.

Authorities evaluate remedial options using best available techniques and criteria such as public health, cost, success likelihood, prevention of future harm, socio-economic and cultural factors, timeframe, and geographical relevance. If primary measures do not fully restore resources, complementary actions may be adopted elsewhere. Authorities may also decline further measures if significant risks are already eliminated and extra costs would be disproportionate to environmental benefits.

Under the ELD, strict liability applies to inherently hazardous activities listed in Annex III, such as large industrial emissions, landfills, water abstraction and discharges, handling dangerous substances, use of GMOs, and extractive or energy operations. In these cases, operators are liable for environmental damage regardless of fault, even if they comply with permits. For all other professional activities, liability is fault-based and limited to damage to protected species and habitats; sectors like farming, forestry, tourism, or construction are covered only if harm results from negligence or intent. In both regimes, liability is restorative, not punitive: operators bear the costs of returning the environment to its baseline or, where that is impossible, providing equivalent or complementary remediation.

The ELD covers damage to protected species and habitats, water, and land, each with tailored restoration procedures. Significance is assessed by factors such as the scale of harm, rarity and role of the species or habitat, ability to regenerate, and whether human health is affected (which is always deemed significant). Normal natural fluctuations or damage that quickly self-recovers are excluded.

Spain has a restoration-focused liability system that combines legal duties with ex ante risk assessment and mandatory financial guarantees. The main legal basis is Law 26/2007 on

[14] Baseline condition refers to the state of natural resources and the services they provide that would have existed at the time of damage if the harmful incident had not occurred, taking into account natural variations and ongoing trends.

Environmental Liability, supported by regulations and ministerial orders that standardize risk analysis and require operators to secure financial coverage proportional to their environmental risk.[15] The law applies strict liability to high-risk activities and fault-based liability to other professional activities.[16] It also sets thresholds for significant damage, requires operators to propose remedial measures, and empowers authorities to approve and enforce plans. **Operators engaged in high-risk activities are required to maintain a financial guarantee sufficient to cover their environmental obligations.**

Regarding the methodology for quantification of environmental damage, Spain uses a practical toolkit that translates ecological damage into measurable restoration costs and ensures funds are available in advance. Operators must perform environmental risk analyses (ARM/MIRAT) using national standards (like UNE 150008)[17] to identify potential accidents, assess their likelihood and impact, and estimate restoration costs.[18] Spain has adopted a methodology named MORA which provides guidance on how to calculate the monetary value of restoring or replacing natural resources and guides the design of primary, complementary, and compensatory measures.[19] The Environmental Damage Index (IDM) is also used to measure severity and determine the amount of financial guarantee required.[20]

In high-risk sectors, operators prepare worst-case restoration cost scenarios and secure a bank guarantee or insurance to match. When damage occurs, authorities approve a remedial plan using MORA calculations and expert input, allowing immediate access to guaranteed funds for restoration. This system produces credible, enforceable figures for environmental damage and prevents unfunded liabilities.

Germany's main legal basis for environmental liability is the Law on the Prevention and Remediation of Environmental Damage which covers liability for damage to water, soil, and protected species/habitats.[21] Similar to Spain it establishes strict **liability for high-risk** activities

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[15] Spain, *Law 26/2007 of 23 October on Environmental Liability* (MITECO, 2007) , available online: https://www.miteco.gob.es/content/dam/miteco/images/es/brochureenvironmentalliabilityinspain_tcm30-523247.pd.
[16] Objective (strict) liability applies for Annex III activities and fault-based liability for others, with the primacy of remediation in kind, primary, complementary, and compensatory, over purely monetary damages.
[17] UNE 150008:2008 – *Environmental Risk Analysis and Assessment*, available online: https://www.en-standard.eu/une-150008-2008-environmental-risk-analysis-and-assessment/.
[18] Ministry for the Ecological Transition and the Demographic Challenge (MITECO), 'Guidance Document for the Development of Environmental Risk Analysis in Spain' (2011) https://www.miteco.gob.es/content/dam/miteco/images/es/guidancedocumentenvironmentalliabilityinspain_tcm30-523243.pdf, last accessed 26 September 2025.
[19] MITECO, 'Metodología MORA: Modelo de Oferta de Responsabilidad Ambiental' (2007) https://www.miteco.gob.es/content/dam/miteco/es/calidad-y-evaluacion-ambiental/temas/responsabilidad-mediambiental/Documento%20metodolog%C3%ADa_tcm30-177400.pdf, last accessed 26 September 2025
[20] MITECO, 'Aplicaciones ARM, IDM y MORA' (undated) https://www.miteco.gob.es/es/calidad-y-evaluacion-ambiental/temas/responsabilidad-mediambiental/aplicaciones-arm-idm-mora.html, last accessed 26 September 2025.
[21] Law on the Prevention and Remediation of Environmental Damage (Umweltschadensgesetz – USchadG), enacted 10 May 2007, entered into force 14 November 2007, *Bundesgesetzblatt* I, p. 666. Available at: https://www.gesetze-im-internet.de/uschadg/.

and fault-based liability for other professional activities, operationalizing the polluter-pays principle and prioritizing in-kind remediation (primary, complementary, compensatory).

The key tool that provides economic evaluation guidance in Germany is the Federal Environment Agency's *Methodological Convention on the Economic Valuation of Environmental Damage* (editions 2007, 2012, 2018).[22] The guidance is not binding law, but it functions as a national standard used by administrations, experts, and courts. Its key features are:

- Distinguishes tangible, repairable losses (e.g., material damage with market prices or repair costs as indicators) from intangible environmental losses (recreation, wellbeing, risk changes, ecosystem functions) that require stated- or revealed-preference methods[23] when market prices or restoration costs are inadequate.
- Treats costs as opportunity costs; uses market prices where competitive and undistorted, otherwise applies corrections (e.g., factor costs, world prices), and cautions against assuming constant prices for large policy changes or multi-country studies (tax/subsidy adjustments).
- Provides valuation tables/ranges for ecosystem services (soil fertility, groundwater, biodiversity, carbon, recreation), benefit-transfer protocols to carry values across comparable sites, and a structure to assemble claims as restoration costs, substitute services and interim service loss.

When environmental damage occurs, German authorities first calculate the cost of restoring the site to its original state. If full restoration isn't possible or will take time, they then calculate the cost of additional or compensatory measures to make up for the loss. When ecological services, like soil fertility or biodiversity, can't be directly restored, authorities use standardized economic values from the Federal Environment Agency's *Methodological Convention* to estimate the remaining loss.[24]

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[22] German Environment Agency (UBA), *Methodological Convention 3.2 for the Assessment of Environmental Costs: Value Factors* (October 2024), available online: https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/methodological_convention_3_2_value_factors_bf.pdf.

[23] Revealed preference methods infer values from actual behaviour in related markets. For example, hedonic pricing (how house prices vary with air quality) or travel cost method (how much people spend to visit a natural site). These methods rely on real-world transactions but are limited to "use values."
Stated preference methods use carefully designed surveys to ask people directly what they would be willing to pay (or accept) to secure or avoid changes in environmental quality. Examples are contingent valuation (asking willingness to pay to protect a habitat) and choice modelling (asking respondents to choose between hypothetical scenarios with different environmental attributes). These can capture non-use values but are hypothetical.

[24] Germany, *Methodological Convention 3.2 for the Assessment of Environmental Costs* (Federal Environment Agency), available online: https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/methodological_convention_3_2_value_factors_bf.pdf.

This approach doesn't use fixed price lists; instead, it provides a consistent method for evaluation. It allows faster and more uniform assessments while still adapting to each case's ecological context. Germany's framework combines a clear legal duty to restore with a standardized way to translate environmental harm into credible, court-accepted numbers. Restoration always comes first, and financial valuation is used only for what can't be physically restored, making the system practical, fair, and effective.

In the **United States**, the quantification of environmental damages is not treated as a single formula, but rather as a structured process. Both the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[25] and the Oil Pollution Act (OPA)[26] define natural resource damages in legal terms. **They require responsible parties to compensate for the cost of restoring or replacing injured resources, the value of ecological and human-use services lost during the period before restoration is complete, and the costs of conducting the assessment itself**. These statutes are implemented through detailed regulations, particularly 43 C.F.R. Part 11[27] for CERCLA and 15 C.F.R. Part 990 for OPA,[28] which describes the methodologies trustees must use in practice.

The process begins with establishing a baseline. This means determining the condition of the resource before the pollution event (e.g. how the river, wetland, fishery, or forest would have functioned had the spill or release never occurred). Baseline determination relies on historical monitoring data, ecological models, or reference sites. Once the baseline is fixed, the next step is the determination of the injury (what specific harm the resource has suffered). For example, water samples may show toxic concentrations beyond regulatory thresholds, bird populations may decline in measurable numbers, or wetlands may exhibit lost capacity for nutrient cycling or water filtration. The injury is established when resources show measurable adverse changes attributable to the release.

Once an injury is established, the question becomes: how much service has been lost? This is where ecological concepts intersect with valuation. Natural resources are seen not only as physical things but also as providers of services, such as commercial fish harvested by fishermen, recreational opportunities for communities, clean water filtration, and biodiversity functions. Quantification involves measuring how much of these services have been diminished. A wetland, for instance, may have lost half of its water purification function, or a fishery may have lost a third of its annual catch potential. The temporal dimension is equally important, because damages are not only about the immediate harm but also about how long the resource will remain below baseline. The trustees[29] calculate how many years or decades it will take for the resource to recover

[25] *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), 42 USC §§ 9601–9675 (US).
[26] *Oil Pollution Act of 1990* (OPA), 33 USC §§ 2701–2762 (US).
[27] Natural Resource Damage Assessments, 43 CFR Part 11 (US).
[28] Natural Resource Damage Assessments, 15 CFR Part 990 (US).
[29] The responsible authority.

naturally, or for restoration projects to restore it to its former capacity. The interim period represents a lost stream of services for which compensation must also be sought.

Valuing environmental losses often requires economic methods. When resources have a market price, such as fish, timber, or crops, losses can be measured directly. Many environmental goods, however, lack market prices. For these, the U.S. applies several approaches. Restoration costs link damages to the expense of repairing or replacing resources, like replanting wetlands or restocking fish. Non-market valuation includes surveys (asking the public their willingness to pay), the travel cost method (measuring recreation-related spending), and benefit transfer (using values from similar studies). Replacement costs methods may also be used, such as estimating the price of a water treatment facility to substitute for a river's natural filtration. Once these scientific and economic steps are completed, trustees move to damage determination. The final damage figure is the sum of three components: the cost of primary restoration (restoring the resource to baseline), compensatory damages for interim losses, and the reasonable costs of conducting the assessment. The law emphasizes that these figures are not merely punitive but restorative, designed to return the public to the position it would have enjoyed had the injury never occurred.

The Exxon Valdez oil spill of 1989 is an example of how this framework works.[30] The spill devastated fisheries, marine mammals, bird populations, and coastlines in Alaska. Trustees quantified the damages across multiple dimensions. There were **market losses in fisheries**, which could be **calculated directly.** There were **non-market losses in recreation and tourism, measured through contingent valuation surveys of the public's willingness to pay for clean beaches and healthy wildlife**. There were also **ecological service losses**, such as seabird populations and marine habitat, valued **through restoration cost studies**. The outcome was a $900 million settlement earmarked for **restoration projects and compensatory measures**.

In **China** national guidelines (GB/T standards) are used to assess ecological and environmental damage, with specific rules that apply to soil, groundwater, surface water, air pollution, and valuation methods. The "General Outline" series sets the overall framework, from establishing a baseline and proving causation to defining the scope of harm, restoration options, and quantification.[31] Media-specific standards detail how to measure injuries in soil, groundwater, water, and sediment, while valuation standards provide costing methods such as virtual abatement costs to translate pollution loads into benchmarks when direct restoration is impractical.[32]

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[30] U.S. Government Accountability Office, *Natural Resources Damage Assessment: Information on Study of Seabirds Killed by Exxon Valdez Oil Spill* GAO/RCED-92-22 (November 1991), available online: https://www.gao.gov/assets/rced-92-22.pdf.

[31] Ministry of Ecology and Environment of the People's Republic of China, *Specifications for Ecological Damage Compensation* (31 December 2020), available online: https://www.mee.gov.cn/ywgz/fgbz/bz/bzwb/other/qt/202012/t20201231_815714.shtml.

[32] Ministry of Ecology and Environment of the People's Republic of China, *Technical Guidelines for Ecological Environment Damage Assessment* (31 December 2020), available online: https://www.mee.gov.cn/ywgz/fgbz/bz/bzwb/other/qt/202012/t20201231_815717.shtml.

The Ministry of Ecology and Environment and the State Administration for Market Regulation continue to expand and update these standards, adding guidance on recovery-effect evaluation and ensuring a consistent national toolkit. In practice, the system requires determining baseline conditions, analyzing causation, quantifying injuries, designing restoration plans, and then monetizing damages through restoration costs or approved valuation proxies. By combining this restore-or-compensate mandate with clear appraisal standards and strong enforcement, China has created a way to turn legal responsibility into consistent, court-ready compensation figures that can be collected and applied to real remediation.

International Jurisprudence

Case law provides no uniform method for valuing environmental damage, largely because many landmark cases, such as *Bhopal*, *Exxon Valdez*, and *Deepwater Horizon*, settled before courts had to rule on quantum. The International Court of Justice (ICJ) first addressed this issue in *Costa Rica v. Nicaragua*, where Costa Rica sought over $6.7 million using an "ecosystem services" approach that monetized lost environmental goods and services, while Nicaragua argued for much less at $188,504.00 based on the cost of preserving an equivalent area until natural recovery. Rejecting both extremes, the ICJ combined aspects of each method to award only $122,708.39 without relying on expert testimony under Article 50 of its Statute.[33] The judgment resembled an itemized list of what the Court considered reasonable but gave no guidance on how reasonableness should be assessed. This uncertainty highlights the absence of a consistent framework and underscores the need for a multidisciplinary approach, drawing on law, economics, quantum analysis, and environmental science.

Legislative Recommendations for Iraq

Building on international experience and jurisprudence, the following recommendations aim to close legislative gaps in assessing environmental damage and to strengthen the implementation of environmental law:

- Adopt strict liability for inherently hazardous activities (modeled on the EU Annex III system, and fault-based liability for other professional activities but limit it to significant environmental harm (as in the ELD).
- Mandate primary restoration to baseline conditions as the default; complementary and compensatory measures where full restoration is impossible or delayed. Moreover, operators of high-risk activities should be required to periodically document and report

[33] *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua), Compensation Owed by the Republic of Nicaragua to the Republic of Costa Rica, Judgment, I.C.J. Reports 2018, p. 15.* Available online: https://www.icj-cij.org/case/150.

baseline and ongoing environmental conditions to the Ministry of Environment as part of the licensing and risk-assessment process.

- Introduce clear restoration guidelines modeled on Germany's Methodological Convention and U.S. NRDA rules. The new Law on Environmental Protection should specify that the Ministry of Environment, through its Directorate of Environmental Protection and Improvement and in coordination with the Ministries of Finance, Planning, and Water Resources, must issue detailed technical standards defining (a) baseline determination, using monitoring data, ecological models, or reference sites, (b) thresholds for significant damage, and (c) methodologies for primary, complementary, and compensatory restoration (d) benefit transfer, and (e) non-market valuation when direct pricing is impossible.
  The guidelines should adopt formulas pertinent to water, land/soil, and biodiversity. The provision should also require the Ministry to adopt these guidelines within 12 months of the law's entry into force, with progress subject to parliamentary oversight by the Council of Representatives' Environment Committee.
- Impose mandatory financial security (bank guarantee, insurance, or environmental bonds) for high-risk operators, scaled to risk analysis (Spain's model), and standardize risk assessments with government-approved tools to set the guarantee amount.
- Incorporate ecosystem services valuation as a recognized method, reflecting ICJ jurisprudence (Costa Rica v. Nicaragua).
- Allow courts flexibility to balance cost-of-restoration and ecosystem services approaches to avoid disproportionate awards.
- The environmental law should include a provision requiring the Ministry of Environment to prepare and implement a national capacity-building plan on methodologies for assessing environmental damages—both market and non-market (including ecosystem services), for the civil servants and judicial experts. This could be adopted in cooperation with the judiciary.

IV. Conclusion

Iraq's current framework for environmental liability falls short of addressing effective restoration and accountability. The reliance on fault-based responsibility leaves hazardous activities inadequately regulated, as liability is triggered only when negligence or intent is proven. This gap means that many polluters avoid responsibility despite clear evidence of harm. Compounding this, Iraq lacks standardized methodologies for quantifying environmental damage, leaving courts and experts without clear criteria to calculate losses to soil, water, and biodiversity. The result is inconsistent, often symbolic compensation that does little to restore the environment or deter further harm.

Equally problematic is the weak enforcement of penalties against public institutions. Although Iraqi law foresees fines and restoration orders, public bodies regularly refuse to comply, and the Ministry of Environment lacks the power to compel payment. This undermines the principle that polluters must pay, creating a two-tiered system in which state institutions pollute with impunity while private actors face sanction.

Overcoming these deficiencies requires legislative change. Iraq's environmental laws must introduce strict liability for inherently hazardous activities, codify restoration obligations including complementary and compensatory measures, and establish binding technical guidelines for quantification of environmental damage. Stronger institutional tools are also essential: the Ministry of Environment should be empowered to issue orders enforceable through the Ministry of Finance's debt collection mechanisms, courts should be enabled to impose periodic penalties for non-compliance, and high-risk operators should be required to secure financial guarantees to fund remediation before operations begin. Finally, providing expedited judicial proceedings for environmental cases would ensure that ecological harm is addressed swiftly, preventing delays that risk irreparable damage.

The Institute for International Law and Human Rights (IILHR) remains committed to supporting our Iraqi partners in translating these recommendations into effective legislation and achieve lasting impact. Our team remains ready to assist in answering any further questions or requests for more in-depth analysis

About IILHR

The Institute for International Law and Human Rights (IILHR) www.iilhr.org is a non-profit charity registered in Washington, D.C., Brussels, Baghdad and the Kurdistan Region of Iraq. IILHR helps states in the early stages of democracy develop the capacity to strengthen the rule of law and build respect for human rights. With a staff of diplomats, parliamentarians, human rights activists, jurists, and attorneys, IILHR has a strong track record of implementing successful programs that help local partners strengthen support for human rights and the rule of law.

IILHR has been a strong, supportive presence in Iraq since 2007. It collaboratively engages with leaders of both the Iraqi government and civil society to strengthen approaches to human rights issues. IILHR partners with leading civil society leaders, jurists, academics, legislators, and policy makers to ensure that its work is built on a foundation of Iraqi jurisprudence and practice.