

A Critical Analysis of Imamiyyah Jurisprudence and Iranian Law Regarding the Exploitation of Groundwater with Emphasis on Environmental Obligations and the Principle of La-Zarar

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Abstract

The excessive exploitation of groundwater in recent decades has become one of the fundamental environmental and legal challenges in Iran. This issue, beyond threatening vital resources and destroying ecosystems, has created a profound conflict between individual interests and public welfare. The present study, through a critical and comparative approach, examines the foundations of Imamiyyah (Shi'i) jurisprudence and the Iranian legal system concerning the exploitation of groundwater, seeking to clarify their relationship with environmental obligations and the principle of la-zarar (no harm). The findings indicate that in Imamiyyah jurisprudence, the principle of ownership and dominion (tasallut) over one's property is restricted by the rule of la-zarar and the consideration of public interest; therefore, it cannot serve as justification for harming shared resources or the environment. On the other hand, although Iranian legal documents and higher-order policies emphasize the protection of natural resources and sustainable development, their implementation suffers from structural weaknesses and conflicts between private rights and public interests. Consequently, to achieve environmental justice and prevent public harm, it is necessary to reinterpret and institutionalize the jurisprudential foundations of the la-zarar rule alongside the principles of environmental law in the country's water management policies.

Keywords: Imamiyyah jurisprudence, Iranian law, groundwater, principle of la-zarar, environmental obligations, environmental justice.

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1. Introduction

In Iran's predominantly arid and semi-arid climate, water—as the most vital element of development and the continuation of life—plays a fundamental role in both individual and collective existence. Under such conditions, groundwater, which for centuries has served as the main source of agricultural, industrial, and drinking water, has now entered a deep and

multidimensional crisis due to excessive extraction, unscientific exploitation, and weak resource management (Hashemi, 2020; Mahdavi, 2019; Yusufi, 2019). Beyond the destruction of natural ecosystems, this crisis has generated extensive social, economic, legal, and ethical consequences and has become one of the nation's most pressing challenges (Environmental Protection, 2018; Ministry of Energy, 2019).

In *Imamiyyah* jurisprudence, the exploitation of natural resources is governed by principles such as justice, the avoidance of harm (*la-zarar*), public welfare, and the revival of land (*ihya al-mawat*). These principles imply that individual ownership and use are confined within boundaries that prevent harm to others and the degradation of the environment (Moradi, 2020; Musavi, 2017; Naqibi, 2019). In this regard, the Iranian legal system, through the enactment of laws such as the *Fair Distribution of Water Act* (1982) and environmental protection regulations, has sought to balance private ownership rights with public interests (Karimpur, 2016; Saliminejad, 2017). However, the persistence of the water scarcity crisis reveals that this synergy between the jurisprudential and legal systems has yet to reach an effective level of functionality and interpretation (Hasanzadeh, 2021).

The central issue of the present research is to explain the relationship between *Imamiyyah* jurisprudence and Iranian law in the exploitation of groundwater, with emphasis on the principle of *la-zarar* and environmental obligations (Ansari & Katuzian, 2008; Mahdavi, 2024). In Islamic thought, water is not merely an economic resource but a divine blessing and part of the public property (*anfāl*), from which utilization is legitimate only within the framework of justice and the avoidance of harm to others (Makarem Shirazi, 2000; Musavi Ardabili, 2003; Tabatabaei, 1997). In earlier centuries, due to the abundance of natural resources and the small population, jurists viewed the scope of reviving public land and private ownership as extensive; however, today—when the water crisis has become a national threat—this question arises: is unrestricted exploitation of groundwater still legitimate within the framework of *Imamiyyah* jurisprudence, and how can the *la-zarar* rule be integrated with the principles of environmental justice and Iran's statutory law (Moradi, 2020; Nasiri, 2021)?

Addressing these questions can offer a new framework for redefining the relationship between private rights and public interests in the field of water resources. The importance of this research is evident from both jurisprudential and legal perspectives: from the jurisprudential perspective, Islam regards human beings as trustees of the earth, and numerous narrations from the Prophet Muhammad (PBUH) and Imam 'Ali (AS) emphasize purity, justice, and the prohibition of wastefulness in water consumption (Kulaini, 1987; Sadr, 1997; Tusi, 1987). From the legal and environmental perspective, the decline of groundwater levels and excessive extraction from both licensed and unlicensed wells underline the necessity of re-evaluating the nation's water policies (Babaei & Babaei Zakliki, 2022; Soltanifar, 2022).

From this standpoint, revisiting jurisprudential principles such as *la-zarar*, *preservation of anfāl*, and *revival of public land* (*ihya al-mawat*) can provide a theological and theoretical foundation for sustainable water management (Kanaani, 2008; Naiini, 1996; Najafi, 1984). A review of the literature shows that most previous studies in the field of water law have focused on technical or legislative dimensions, paying less attention to the interconnection between *Imamiyyah* jurisprudence and environmental considerations (Hashemi, 2020; Nasiri, 2021). Earlier works, while valuable in areas such as criminology and water law, have treated jurisprudential analysis superficially, and newer studies that seek to combine ethical and jurisprudential discussions have not yet offered a systematic analysis of the relationship between jurisprudence and law in sustainable water governance (Musavi, 2021; Ruhani, 2016).

Accordingly, the present study adopts a descriptive–analytical and comparative approach to bridge the theoretical gap between *Imamiyyah* jurisprudence, Iranian law, and environmental principles. The novelty of this research lies in integrating the foundations of *Imamiyyah* jurisprudence with modern theories of environmental justice and critically interpreting Iranian water-related laws based on the principle of *la-zarar*. This study demonstrates how the *la-zarar* rule can serve not only as a restriction on individual ownership but also as a guiding framework for fair policymaking in the exploitation of natural resources. Consequently, this principle can become the theoretical foundation for the formation of an “Islamic Environmental Jurisprudence”—a jurisprudence in which balance between humans and nature is grounded in justice and moral responsibility.

Furthermore, this study examines the practical capacities and challenges of Iran's water legislation—such as weak supervision, lack of effective enforcement mechanisms, and conflicts between private and public interests—and proposes jurisprudential and legal solutions to reform the country's water resource management system. Ultimately, the main axes of

this article include five sections: (1) explanation of the status of groundwater in *Imamiyyah* jurisprudence and the conditions of ownership; (2) analysis of the *la-zarar* rule in relation to the principles of environmental justice; (3) comparative review of water-related laws from a jurisprudential perspective; (4) examination of the implementation challenges and structural weaknesses of the legislation; and (5) presentation of jurisprudential and legal strategies for achieving sustainable and equitable water management in Iran. This comprehensive framework distinguishes the present research from previous studies and makes it an effective step toward convergence between jurisprudence, law, and environmental protection.

2. Critical Analysis of Imamiyyah Jurisprudence on Ownership and Exploitation of Groundwater with Emphasis on Environmental Obligations

Groundwater holds a fundamental position in the environmental, economic, and social structures of every nation. In Iran, due to its semi-arid climate and declining surface water resources, excessive dependence on groundwater has made the system of exploiting these reserves one of the most critical issues in public policymaking (Hashemi, 2020; Soltanifar, 2022). This situation necessitates a re-examination of the theoretical jurisprudential and legal foundations surrounding ownership, control, and protection of these resources (Moradi, 2020; Musavi, 2021). Although the concept of public ownership over *anfāl* has been articulated, environmental obligations and the consequences of unsustainable exploitation have received limited foundational attention (Musavi Ardabili, 2003; Naqibi, 2019). This article, through an analytical and critical approach, seeks to reveal the potential of *Imamiyyah* jurisprudence for presenting a sustainable model of groundwater exploitation while also addressing its conceptual and structural deficiencies (Ansari & Katuzian, 2008; Mahdavi, 2024).

2.1. Reconsidering the Concept of Groundwater Ownership in Imamiyyah Jurisprudence: Balancing Public Ownership and Social Welfare

In *Imamiyyah* jurisprudence, natural resources—including groundwater—are classified as *anfāl*, that is, wealth belonging to the *Infallible Imam (AS)*, which, during the era of occultation, is entrusted to the *Guardian Jurist (Vali al-Faqih)* according to the theory of *Wilāyat al-Faqīh* (Makarem Shirazi, 2000; Najafi, 1984). Based on the views of renowned jurists such as Shaykh Tusi, *anfāl* encompass all things that are not owned by individuals, such as deserts, mines, forests, and subterranean water sources (Tabatabaei, 1997; Tusi, 1987). By classifying natural resources within the domain of *anfāl*, *Imamiyyah* jurisprudence establishes a theoretical framework for limiting private control and ensuring public justice (Kanaani, 2008; Sadr, 1997).

However, the effectiveness of this concept in contemporary legal and environmental contexts faces several challenges. Although the principle of *anfāl* is mentioned in the Constitution and statutory laws of Iran, there are no effective guarantees or supervisory mechanisms for its protection (Islamic Consultative Assembly Research, 2017; Saliminejad, 2017). Furthermore, among jurists, there is disagreement regarding the extent of the *Guardian Jurist's* authority in exploiting and allocating *anfāl* resources. Imam Khomeini, for instance, emphasized the public interest and considered broad actions by the *Guardian Jurist* permissible within the framework of the welfare of Muslims (Khomeini, 2008; Musavi al-Khuyi, 1997).

In practice, there exists a significant gap between jurisprudential theory and social behavior, as many farmers and private users regard groundwater as their personal property based on custom or administrative permits (Yusufi, 2019). However, according to Shahid Thani, private ownership over *anfāl* resources is legitimate only with the permission of the religious authority and the observance of public interest (Shahid Thani, 1993). Thus, merely emphasizing public ownership of natural resources without designing efficient participatory and legal frameworks cannot ensure social justice or environmental sustainability (Ansari & Katuzian, 2008; Moradi, 2020). It appears, therefore, that *Imamiyyah* jurisprudence requires theoretical reconstruction within a comprehensive and comparative framework that reinterprets the principles of public ownership in connection with intergenerational justice, social participation, and the safeguarding of natural resources as divine trusts for future generations (Mahdavi, 2019; Musavi Ardabili, 2003).

2.2. *The Jurisprudential Rules of “La-Zarar” (No Harm) and “Adam-Idrār” (Non-Injury) in the Exploitation of Water Resources*

The rule of *la-zarar* is among the most fundamental maxims of *Imamiyyah* jurisprudence, formed with reference to the Prophetic hadith “No harm and no reciprocal harm (*la ḍarar wa-la ḍirār* in Islam),” and, in the view of many jurists, it plays a limiting and negating role not only for declaratory (*waḍʿī*) rulings but also for obligatory (*taklīfī*) rulings (Ansari, 1995; Khomeini, 2008; Kulaini, 1987). On the basis of this rule, no person has the right to exercise a disposition that causes harm to another or damage to the public interest (Moradi, 2020). Jurists such as Shaykh Ansari, Muhaqqiq Naiini, and the author of *Jawahir al-Kalam* have emphasized the broad applicability of this maxim across all chapters of jurisprudence—from transactions and acts of worship to novel issues (Ansari, 1995; Naiini, 1996; Najafi, 1984). In the environmental sphere, and especially in the exploitation of water resources, the *la-zarar* rule has strong capacity to curtail harmful and destructive behaviors; for example, if excessive individual extraction of groundwater causes neighboring wells to run dry or destroys aquifers, such conduct—even if supported by legal or customary permits—would not be legitimate from a jurisprudential perspective (Karimpur, 2016; Mahdavi, 2019).

Nevertheless, the effective application of this rule at the institutional level faces challenges, because traditional jurisprudence often interprets “harm” within interpersonal relations and private disputes and has paid less attention to its structural and collective dimensions. In contemporary environmental problems—such as conflicts of interest between upstream and downstream communities along rivers—ascertaining harm and determining responsibility require complex scientific and managerial mechanisms that did not exist in the classical juridical system (Mahdavi, 2024; Musavi Ardabili, 2003). Hence, a transformation in the interpretation of the *la-zarar* rule is indispensable. Some contemporary jurists, such as Shahid Sadr, by expanding the notion of “public interest” and emphasizing governmental rulings (*aḥkām ḥukūmī*), have paved the way for a more institutional and macro-level articulation of this rule (Sadr, 1990). Likewise, Imam Khomeini states explicitly that preserving the order (*ḥifẓ al-niẓām*) and preventing major social harms may even justify the temporary suspension of primary rulings in favor of public welfare (Khomeini, 2008). Therefore, to apply the *la-zarar* rule effectively in natural-resource governance and environmental policy, it must be elevated from the level of interpersonal relations to the realm of high-level decision-making, sustainable planning, and public participation, so that *Imamiyyah* jurisprudence can attain the requisite efficacy in responding to today’s environmental crises (Islamic Consultative Assembly Research, 2017; Moradi, 2020).

2.3. *The Capacities of Imamiyyah Jurisprudence in Developing an Environmental Jurisprudence: The Necessity of Transitioning from an Exploitative Approach to an Ecological Outlook*

Grounded in foundational principles such as justice, public interest (*maṣlaḥa*), non-wastefulness, and the rights of others (*ḥaqq al-nās*), *Imamiyyah* jurisprudence possesses considerable capacity to provide theoretical and practical support for environmental protection (Moradi, 2020; Musavi Ardabili, 2003). The principle of justice—one of the most important objectives of the *Sharīʿa*—in the thought of *Imamiyyah* jurists is applicable not only to human relations but also to the regulation of the relationship between humans and nature (Musavi Ardabili, 2003; Tabatabaei, 1997). Likewise, the principle of “non-wastefulness,” rooted in Qur’anic teachings, has been elaborated in *Imamiyyah* jurisprudence and can function as a mechanism to constrain destructive behaviors in exploiting natural resources (Shahid Thani, 1993).

However, a review of classical juridical texts shows that these works were largely written from an anthropocentric standpoint; nature is often treated as a means to fulfill human needs, with less attention paid to the intrinsic value of the environment and natural entities. Rules concerning the ownership of water, the exploitation of mines, or the cutting of trees are typically analyzed within frameworks such as dominion (*salṭana*) and personal benefit (Najafi, 1984; Tusi, 1987). Even so, in the works of later jurists such as Imam Khomeini and Shahid Sadr, there are signs of movement toward social and governmental jurisprudence that can provide a platform for the evolution of environmental jurisprudence (Khomeini, 2008; Sadr, 1997). In this vein, the development of *maqāṣid-based* jurisprudence—founded on the overarching aims of the *Sharīʿa* such as the preservation of life, lineage, property, and social order—can facilitate a shift from traditional, individual-centric, problem-specific jurisprudence to a structural and ecological jurisprudence (Ruhani, 2016).

Moreover, updating environmental jurisprudence requires introducing modern concepts—such as the “rights of nature,” “ecological justice,” and “intergenerational responsibility”—into the juridical discourse. Although these concepts originate in modern environmental law, they are compatible with Islamic foundations such as human stewardship (*istikhlāf*), divine trusteeship, and balance in creation (Mutahhari, 2008). Consequently, for jurisprudence to play an effective role in resolving environmental crises, theoretical transformation, an interdisciplinary orientation, and rethinking traditional concepts are essential; otherwise, jurisprudence will remain confined to past limits and will lack the capacity to influence environmental policies and behaviors (Mahdavi, 2024; Moradi, 2020).

2.4. *Aligning Jurisprudential Evolution in Islamic Schools with Environmental Needs: An Opportunity for Convergence*

Both branches of Islamic jurisprudence—*Imamiyyah* and *Sunni*—possess theoretical and jurisprudential capacity to address modern environmental challenges by relying on principles such as the prohibition of harm, the protection of common resources, and the observance of public welfare (Moradi, 2020; Musavi Ardabili, 2003). In *Imamiyyah* jurisprudence, the *la-zarar* rule (Kulaini, 1987) and the principle of causation (*tasbīb*), along with the theory of the general guardianship of the jurist in the era of occultation, provide a framework to safeguard the public interest and the rights of future generations against harmful exploitation of natural resources (Khomeini, 2008). In light of the maxim “preserving the order is among the most important obligations,” these foundations can also be extended to domains such as water-resource policymaking and environmental protection (Islamic Consultative Assembly Research, 2017; Sadr, 1997).

Within *Sunni* jurisprudence—particularly the *Mālikī* and *Ḥanbalī* schools—jurists such as ‘Izz al-Dīn ibn ‘Abd al-Salām have emphasized the necessity of safeguarding the public interest and preventing corruption on earth, which aligns naturally with environmental protection (Ibn Abdalsalam). Additionally, the principle of *sadd al-dharā’i’* (blocking the means) in the *Shāfi’ī* tradition can serve as a preventive tool in environmental policy. In the *Shi’i* tradition, the ethical and governmental teachings of *Nahj al-Balāgha* also guide the juridical outlook on nature; for example, the emphasis on responsibility toward people and lands, and on safeguarding public property and justice in the distribution of resources, underscores stewardship and accountability (Makarem Shirazi, 2000; Tabatabaei, 1997). Despite these shared foundations, the practical performance of *Imamiyyah* jurisprudence shows that—although it is rich in theory—it faces challenges in translating these principles into effective legal and institutional mechanisms, including the individualistic tenor of classical texts, under-developed institutional interpretations of rules, and insufficient attention to ecological transformations (Mahdavi, 2024; Musavi, 2021). Therefore, critical reassessment of juridical sources, acceptance of concepts such as the “rights of nature,” “intergenerational responsibility,” and “ecological justice,” and active engagement with environmental sciences are necessary conditions for turning *Imamiyyah* jurisprudence into an effective institution in the governance of natural resources and in addressing contemporary environmental crises (Mutahhari, 2008; Ruhani, 2016).

3. **An Examination of Iranian Positive Law Concerning the Extraction, Exploitation, and Protection of Groundwater Resources**

As one of Iran’s most vital natural resources—especially in arid and semi-arid regions—groundwater has consistently stood at the center of attention for legislators and officials. In light of the water crisis and reduced surface-water resources, the need to enact appropriate legislation for the conservation and optimal exploitation of these reserves is acutely felt (Karimpur, 2016; Saliminejad, 2017). In this context, the *Law on the Protection and Exploitation of Groundwater Resources* (1966) was devised as one of the most important legal instruments specifically aimed at preserving ecological balance and preventing unauthorized withdrawals from groundwater (Ministry of Energy, 2019; Saliminejad, 2017). As the principal legal framework, this law pursues important objectives toward conserving groundwater resources, yet in practice it faces numerous challenges that will be addressed in this section (Environmental Protection, 2018; Nasiri, 2021).

3.1. *Implementation Challenges of the Law on the Protection and Exploitation of Groundwater Resources: Oversight and Institutional Issues*

One of the most significant challenges in the effective enforcement of the *Law on the Protection and Exploitation of Groundwater Resources* is the lack of adequate oversight and the failure to allocate the necessary resources for effective monitoring. This has prevented many of the law's key objectives from being realized in practice. Although the statute expressly underscores the need to supervise withdrawals, in reality the shortage of financial resources and specialized personnel for monitoring and controlling unauthorized extractions has reduced the efficacy of oversight. Consequently, in many of Iran's arid and semi-arid plains, unauthorized withdrawals continue, exacerbating the water crisis and causing environmental damage in these regions (Environmental Protection, 2018; Yusufi, 2019).

Under these circumstances, a more precise analysis of the causes of the law's shortcomings requires examining multiple dimensions, including executive, legal, and institutional aspects. Insufficient executive and supervisory mechanisms, as well as inadequate budget allocations for strict enforcement across sectors—including natural resources—have contributed to these challenges (Islamic Consultative Assembly Research, 2017; Jafari Langrudi, 2022). While Article 3 of the *Law on the Protection and Exploitation of Groundwater Resources* explicitly emphasizes the necessity of state supervision over withdrawal volumes and water points, weaknesses in executive structures have resulted in the practical absence of effective oversight (Hasanzadeh, 2021; Ministry of Energy, 2019).

Institutional and Legal Problems: One of the main reasons for these challenges is the institutional and legal problems within the executive bodies responsible for supervising water resources. In this respect, weak institutional structures and multiple, dispersed organizations—each in charge of specific segments of water resources—have led to a lack of coordination in supervision and enforcement. This has reduced the effectiveness of executive and supervisory measures (Saliminejad, 2017). In fact, Article 4 of the Law also emphasizes the creation of supervisory mechanisms; however, neglect of intersectoral cooperation and deficiencies in coordination among organizations have prevented these supervisory measures from being effectively implemented in practice (Islamic Consultative Assembly Research, 2017; Ministry of Energy, 2019).

Shortage of Financial Resources and Human Capital: One of the practical obstacles to effective implementation of the Law is the shortage of financial resources and human capital for supervision. As stipulated in Article 5 of the Law, the competent agencies must possess the necessary capacities in terms of specialized personnel and financial resources to supervise water resources effectively. However, according to reports, financial constraints and a shortage of specialized experts within the responsible organizations have prevented many plains and arid regions of the country from receiving adequate oversight, and unauthorized withdrawals of groundwater continue (Environmental Protection, 2018; Musavi, 2021).

Lack of Alignment with Social and Economic Realities: Mohammad Hasanzadeh, a jurist and specialist in natural resources law, notes that, in many regions of Iran—especially rural and agricultural areas—supervision of water resources has been challenged due to a lack of alignment with the economic and social needs of local communities. In particular, economic hardships and low income in the agricultural sector have led farmers and users to continue unauthorized withdrawals from groundwater, since they view water as their only means of livelihood (Hasanzadeh, 2021).

Responding to the Law's Executive Needs: Finally, it should be noted that, in order to ensure the efficiency of supervision and prevent unauthorized withdrawals, it is essential not only to reform laws and supervisory structures but also to strengthen executive bodies in terms of information systems and smart oversight mechanisms. This requires developing specific strategies for coordination among executive agencies and deploying modern monitoring tools, including satellite data and remote-sensing systems. In the final analysis, despite the enactment of a comprehensive and up-to-date law on the protection and exploitation of groundwater resources, institutional, executive, and financial problems still hinder the achievement of the Law's objectives. To resolve these challenges, in addition to strengthening executive oversight and improving legal and institutional structures, attention to the social and economic needs of local communities and the development of modern monitoring tools appears necessary (Environmental Protection, 2018; Islamic Consultative Assembly Research, 2017; Ministry of Energy, 2019; Yusufi, 2019).

3.2. Analysis of Legal Differences and Challenges Compared with Imamiyyah Jurisprudence

The executive challenges and theoretical differences that emerge when comparing the *Law on the Protection and Exploitation of Groundwater Resources* of the Islamic Republic of Iran with the principles of Imamiyyah jurisprudence reveal a considerable gap between theory and practice in water-resource management. Drawing on the principle of *anfāl*, Imamiyyah jurisprudence regards natural resources as the property of the Infallible Imam (AS) and, during the era of occultation, as falling under the guardianship of the jurist (*wilāyat al-faqīh*), permitting their exploitation only within the framework of the public interest—especially groundwater, which is counted among the *anfāl*, so that private appropriation without the permission of the religious authority is not legitimate (Mahdavi, 2019; Makarem Shirazi, 2000; Najafi, 1984). Moreover, the rules of “non-injury” and *la-zarar* play a preventive role in avoiding harm to resources and to others (Kulaini, 1987), and the principle of justice in allocating water emphasizes that exploitation must be equitable and for the public benefit (Khomeini, 2008; Sadr, 1997).

Despite this, national law in the field of groundwater exploitation faces executive and supervisory problems; weak control systems, administrative corruption, and a lack of coordination among executive bodies have led to excessive withdrawals and the neglect of jurisprudential and environmental considerations (Environmental Protection, 2018; Islamic Consultative Assembly Research, 2017). In Imamiyyah jurisprudence, the *Guardian Jurist* is responsible for preserving public resources and imposing sanctions on violators; yet, in practice, the current legal system lacks effective mechanisms to apply these principles. Even the *Fair Distribution of Water Act*, despite its emphasis on equity and public interest, encounters inadequate supervisory capacities and institutional constraints in implementation. Likewise, preventing wastefulness and harm to others is a foundational principle in Imamiyyah jurisprudence and includes prescribing deterrent punishments for offenders, but the absence of practical enforcement of these rules in Iran has diminished the efficacy of the laws. Therefore, although Imamiyyah jurisprudence has strong theoretical capacity to protect water resources and the environment, executive deficiencies and the lack of congruence between national laws and these principles have created serious challenges to sustainable water management; legal reforms grounded in jurisprudential foundations and the strengthening of institutional oversight are necessary (Karimpur, 2016; Moradi, 2020; Musavi Ardabili, 2003).

3.3. The Necessity of Strengthening Executive Oversight and Financial Resources

To overcome implementation problems in the domain of groundwater resources, robust reinforcement of oversight and the allocation of sufficient financial and human resources are essential. One of the most significant obstacles is weak supervision and fragmented management, which is especially evident in the exploitation of groundwater. The *Law on the Protection and Exploitation of Groundwater Resources* requires legal and executive reforms to achieve greater efficiency. In this regard, employing modern monitoring technologies—including intelligent well-monitoring systems and satellite data—can enable the detection of unauthorized withdrawals and prevent environmental damage (Environmental Protection, 2018; Musavi, 2021). In addition, strengthening sanctions, designing incentive policies to encourage optimal use, and raising public awareness about the importance of conserving water resources are other effective strategies (Islamic Consultative Assembly Research, 2017). A further fundamental challenge is the lack of integrated management among executive bodies such as the Ministry of Agriculture Jihad, the Ministry of Energy, and the Environmental Protection Organization, which operate in isolation and lack the coordination necessary to enforce the laws. This has resulted in legal inefficacy and limits progress toward sustainable exploitation of groundwater resources (Mahdavi, 2019; Ministry of Energy, 2019). Therefore, establishing a comprehensive and coordinated management system, strengthening executive oversight, reforming laws, and utilizing advanced technologies are all vital components for achieving sustainable and effective management of groundwater resources and can pave the way to curbing unauthorized withdrawals, protecting the environment, and realizing social justice (Soltanifar, 2022; Yusufi, 2019).

3.4. Proposed Solutions for Improving the Status of Iran's Groundwater Resources:

Given the serious challenges in groundwater management in Iran, it appears that a set of fundamental measures must be implemented in a coordinated manner to remedy the existing problems. One of the most important measures is strengthening supervisory mechanisms, which can help prevent unauthorized withdrawals and unsustainable exploitation of water resources. Supporting public education on water conservation and fostering a culture of sustainable use through media and educational institutions also plays a vital role in transforming social behaviors (Kanaani, 2008). According to the *Law on the Protection and Exploitation of Groundwater Resources* (enacted in 1968), the responsibility for supervising and regulating water withdrawals lies with the Ministry of Energy; however, due to weak enforcement and problems such as a shortage of financial and human resources, this oversight has not been effectively implemented (Kanaani, 2008; Ministry of Energy, 2019). Similarly, jurisprudential principles in the discussion of protecting water resources stress this matter, and many *Imamiyyah* jurists—such as Ayatollah Sadr and Ayatollah Khoei—have emphasized the necessity of preventing the waste of water resources and preserving them (Khuei, 1990; Khui, 2005; Sadr, 1997). Nevertheless, in practice, executive and supervisory problems have impeded the full realization of these principles.

Formulating Comprehensive and Long-Term Management Programs: A key necessity is to formulate comprehensive, long-term management programs for the exploitation of groundwater resources that place special emphasis on environmental and jurisprudential considerations. “Water resource management programs,” which have been employed in several countries to achieve sustainable exploitation, can serve as a model for Iran. In particular, Iran can learn from the experiences of arid and semi-arid countries; adapting those models to local conditions can offer effective solutions for mitigating the water crisis (Ministry of Energy, 2019; Yusufi, 2019).

Allocation of Financial and Human Resources: Another major obstacle in groundwater management is the shortage of financial and human resources. According to existing reports, allocations to various sectors responsible for supervising water resources, as well as education and research in this field, must be increased. These resources can be employed to adopt new technologies, improve supervisory infrastructure, and enhance human capacity within institutions involved in water-resource management (Environmental Protection, 2018; Soltanifar, 2022).

Legal Revisions and Expanded Public Participation: Revising existing laws and creating coordination among different executive bodies can be a fundamental strategy for improving groundwater management. At present, the Ministry of Agriculture Jihad, the Ministry of Energy, and the Environmental Protection Organization operate in a fragmented manner, which undermines the efficiency of the supervisory system. Establishing an integrated and coordinated management system among these bodies can significantly reduce fragmentation and existing weaknesses. Moreover, public participation in decision-making and increasing public awareness can play an important role in the sustainable exploitation of water resources. Educational campaigns designed in cooperation with public and private institutions can help change consumption patterns and enhance the protection of natural resources. Such participation, in addition to awareness-raising, can foster a sense of responsibility among the populace for the optimal use of water resources. Ultimately, considering executive problems and financial shortages, strengthening oversight, increasing financial allocations, and creating coordination among different executive bodies are absolutely necessary. At the same time, comprehensive, long-term management programs grounded in *Imamiyyah* jurisprudence and environmental considerations should receive special attention. In this regard, drawing on international experiences and tailoring them to Iran's local conditions can provide effective solutions for addressing the water crisis and protecting groundwater resources (Babaei & Babaei Zakliki, 2022; Karimpur, 2016; Nasiri, 2021).

4. A Comparative Examination of Jurisprudential Opinions and Legal Regulations Governing the Management of Groundwater Resources

The issue of groundwater resources in Iran is one of the most important legal and jurisprudential topics, intrinsically linked with environmental, social, and economic matters. In this regard, aligning *Imamiyyah* jurisprudential opinions with Iranian legal regulations on groundwater management can contribute to a fuller and deeper understanding of this subject. Given that, in *Imamiyyah* jurisprudence, principles such as “non-injury (*‘adam iḍrār*)” and “appropriation of permissibles (*ḥiyāzat al-mubāḥāt*)” explicitly emphasize sustainable exploitation and the protection of natural resources, Iranian law has also enacted

various statutes to manage water resources (Karimpur, 2016; Moradi, 2020; Musavi, 2017). A comparative appraisal of these two approaches can reveal the strengths and weaknesses of each and clarify the current challenges and opportunities in groundwater management.

4.1. Jurisprudential Principles and Iranian Legal Rules in Groundwater Management

Imamiyyah jurisprudence—especially regarding the management of natural resources—offers a comprehensive and holistic approach that considers both the ethical-human and environmental dimensions of resource use, and it attaches special importance to the management of groundwater. A foundational principle in this framework is the “non-injury” rule, under which any activity or decision that harms natural resources—particularly the environment and groundwater—is prohibited and unlawful. This principle not only regulates the relationship between humans and the environment but also underscores the necessity of sustainable and responsible exploitation, simultaneously safeguarding resources and the rights of future generations (Moradi, 2020; Musavi Ardabili, 2003). Alongside non-injury, the “appropriation of permissibles” (*hiyāzat al-mubāḥāt*) functions as a jurisprudential mechanism for the use of natural resources. According to this principle, people may utilize natural resources, including water, but such use must be limited to essential needs and accompanied by preservation for the future—in other words, optimal and responsible exploitation grounded in justice and equity so that present needs are met while the rights of future generations are protected (Naiini, 1996; Najafi, 1984). This emphasis in *Imamiyyah* jurisprudence on intergenerational justice and sustainable use is a salient aspect that modern legislation has often underemphasized (Makarem Shirazi, 2000; Tabatabaei, 1997).

By contrast, Iranian legal rules—particularly the *Fair Distribution of Water Act* (1982)—primarily focus on the economic and social dimensions of water-resource management. These rules aim, by regulating extraction volumes and allocation, to prevent unauthorized withdrawals and water loss; however, they devote comparatively less attention to environmental sustainability and the preservation of resources for future generations (Hashemi, 2020; Saliminejad, 2017). Accordingly, the differences between *Imamiyyah* jurisprudence and national laws in water management reflect two distinct perspectives on environmental issues: whereas *Imamiyyah* jurisprudence emphasizes environmental sustainability, intergenerational justice, and future-oriented rights, Iranian legal rules concentrate more on equitable distribution and the economic utilization of resources (Karimpur, 2016; Nasiri, 2021). Achieving effective and sustainable groundwater management therefore requires establishing coordination and balance between *Imamiyyah* jurisprudential principles and Iranian legal rules—through developing laws and policies that simultaneously address environmental, economic, and social principles. Such interaction can ensure optimal management of water resources, meet current societal needs, and preserve natural resources for future generations, thereby shaping a comprehensive model of resource governance that honors ethical and environmental norms (Islamic Consultative Assembly Research, 2017; Ministry of Energy, 2019).

4.2. Comparative Analysis of Jurisprudential Opinions and Iranian Legal Regulations

A comparative analysis of *Imamiyyah* jurisprudential opinions and Iranian legal regulations in groundwater management reveals fundamental differences in the perspectives and approaches of these two systems. *Imamiyyah* jurisprudence, relying on philosophical and ethical principles—especially the rules of “non-injury” and “appropriation of permissibles”—examines the exploitation of natural resources within a moral and sustainable framework, centering environmental justice, resource preservation, and the rights of future generations (Moradi, 2020; Musavi, 2017). Based on this view, any use of groundwater must respect public rights and prevent environmental harm; exploitation is legitimate only to satisfy societal needs without threatening the sustainability of the resources (Khomeini, 2008). These jurisprudential foundations, emphasizing intergenerational justice and the human ethical responsibility toward nature, offer a holistic and preventive framework for water management—one that guards against overexploitation and environmental degradation (Makarem Shirazi, 2000; Sadr, 1997).

By contrast, Iranian legal rules—including the *Fair Distribution of Water Act* (1982)—are largely oriented toward operational, economic, and social aspects of resource management, aiming at efficient exploitation and distribution among users (Hashemi, 2020; Saliminejad, 2017). While these rules strive to prevent unauthorized withdrawals and wastage through

regulating extraction and allocation, they devote less attention to environmental sustainability and ecological balance and often address short-term needs and socio-economic interests. These shortcomings become especially evident in the face of environmental crises such as declining groundwater levels and recurrent droughts (Environmental Protection, 2018; Yusufi, 2019). The divergence between jurisprudential and legal perspectives has produced significant misalignment in policy implementation. *Imamiyyah* jurisprudence recommends that groundwater exploitation simultaneously satisfy societal needs and uphold the rights of future generations—observing environmental and ethical justice—whereas national laws place greater emphasis on economic and social utilization. For comprehensive and sustainable groundwater management, it is essential that Iranian legal rules be harmonized with *Imamiyyah* principles so that, in addition to equitable distribution and economic efficiency, environmental protection and resource sustainability are also prioritized (Karimpur, 2016; Moradi, 2020; Nasiri, 2021). Such integration can offer an effective and comprehensive pathway for groundwater governance in Iran—one that meets present needs while preserving resources for future generations.

4.3. *The Necessity of Integrating Jurisprudential and Legal Approaches for Sustainable Exploitation of Groundwater*

A critical, comparative assessment of jurisprudential and legal approaches to groundwater exploitation shows foundational differences as well as complementary strengths and weaknesses in managing natural resources. *Imamiyyah* jurisprudence, grounded in ethical and environmental principles—especially “non-injury” and “appropriation of permissibles”—emphasizes responsible and sustainable use of water resources so that environmental protection and the rights of future generations take priority and any harm to natural resources is prohibited (Kulaini, 1987; Moradi, 2020; Musavi, 2017). This approach places intergenerational justice and environmental ethics at the center of policy and groundwater exploitation. Conversely, Iranian legal rules, including the *Fair Distribution of Water Act*, focus mainly on economic and social dimensions, with primary objectives of efficient management, equitable distribution, and preventing unauthorized withdrawals—while paying less attention to environmental sustainability and ecological balance (Hashemi, 2020; Ministry of Energy, 2019).

These differences indicate that, for comprehensive and sustainable groundwater management, jurisprudential principles must be incorporated into the legal framework and effectively implemented at the executive level. Integrating the two approaches can yield a balanced framework that responds to the society’s economic and social needs while ensuring the protection of the environment and natural resources. Especially when confronting environmental crises, declining groundwater levels, and rising demand, employing jurisprudential principles as ethical and strategic criteria can reinforce the existing legal framework and concurrently secure intergenerational justice, sustainable exploitation, and resource conservation (Khomeini, 2008; Sadr, 1997). Consequently, synergy between *Imamiyyah* jurisprudence and Iranian legal rules can lead to a comprehensive management system that simultaneously guarantees the sustainability of water resources and environmental and social justice (Islamic Consultative Assembly Research, 2017; Mahdavi, 2024).

5. **Analysis of Judicial Documents and the Practical Procedures of Executive and Supervisory Bodies in the Enforcement of Relevant Regulations**

The management of groundwater resources in Iran—especially in semi-arid regions—faces multiple challenges. Despite the enactment of comprehensive laws and regulations in this field, executive and supervisory problems still hinder the sustainable exploitation of these resources. These problems are particularly evident within judicial and executive bodies. According to recent reports, executive bodies in Iran face serious challenges in monitoring and enforcing regulations related to groundwater resources. These issues directly affect the protection of water resources and their sustainable use. The following provides an analytical review of the foregoing points.

5.1. *Existing Problems in the Enforcement of Regulations and Supervision:*

An examination of the practical procedures of judicial and executive bodies in Iran shows that, notwithstanding the adoption of comprehensive laws related to groundwater resources, the enforcement of these laws is beset by serious structural problems. One of the most important challenges is the lack of coordination between governmental and judicial agencies, which has created

managerial and supervisory gaps and intensified unauthorized withdrawals from water resources ([Islamic Consultative Assembly Research, 2017](#); [Talebzadeh & Hasannajad Divkelaei, 2019](#)). In many areas—particularly semi-arid and arid zones—executive bodies such as the Ministry of Energy and the Department of the Environment are unable to monitor water resources effectively because of shortages in monitoring technologies and limited access to timely information; this information gap causes many violations to go unpursued. In addition, the weakness and inefficacy of the sanctioning system is another factor perpetuating the groundwater crisis. Although water-related offenses carry penalties for unauthorized withdrawals, the severity and effectiveness of these penalties are often insufficient and fail to provide the necessary deterrent, such that individuals and entities continue illegal abstraction without fear of legal consequences ([Environmental Protection, 2018](#); [Islamic Consultative Assembly Research, 2017](#)). These circumstances indicate a serious gap in the national legal and executive system that requires immediate and coordinated reforms. The proposed reforms include strengthening intersectoral cooperation between judicial and executive bodies, increasing the severity and effectiveness of penalties, streamlining executive procedures, and developing smart, data-driven monitoring systems to enable the detection and prevention of unauthorized withdrawals. Moreover, enhancing the training and professional capacity of staff in supervisory and judicial bodies can improve institutional performance and accelerate law enforcement. Ultimately, only through structural reforms, strengthened inter-agency coordination, and heightened legal deterrence can effective and sustainable management of groundwater be achieved and environmental crises and the degradation of water resources be prevented ([Environmental Protection, 2018](#); [Islamic Consultative Assembly Research, 2017](#)).

5.2. *Challenges of Executive Bodies in Monitoring and Control:*

One of the principal challenges in monitoring groundwater resources in Iran is the limitation of human and financial resources in the executive bodies responsible for their management and protection—particularly the Ministry of Energy and the Department of the Environment. Budget constraints and shortages of specialized personnel constitute serious obstacles that diminish these bodies' ability to fully implement laws and sustainable policies and that hinder effective oversight of unauthorized withdrawals, especially in arid and semi-arid regions ([Environmental Protection, 2018](#)). Budget limitations have prevented executive bodies from acquiring modern monitoring technologies such as geographic information systems (GIS), remote sensing, and data mining; consequently, identifying unauthorized abstraction and controlling the status of water resources has become difficult. Likewise, shortages of technical, environmental, and legal experts at field and managerial levels have reduced the efficacy of monitoring programs, and many violations—particularly in remote and underserved areas—remain unaddressed. These executive and technical weaknesses not only reduce the accuracy of monitoring but also limit the implementation of protective and sustainable policies and, in regions where unauthorized abstraction from aquifers exceeds permissible levels, increase the risk of degradation of water resources and the incidence of environmental and social crises. To overcome these challenges, fundamental reforms are necessary, including increased financial resources, recruitment and empowerment of specialized personnel, development and deployment of modern monitoring technologies, and strengthened intersectoral coordination in law enforcement. In addition, improving the training and skills of staff in executive bodies can enhance the effectiveness of oversight and water-resource management and, ultimately, help ensure the sustainable protection of groundwater resources and the realization of sustainable development goals in the country ([Environmental Protection, 2018](#); [Ministry of Energy, 2019](#)).

5.3. *Proposed Solutions for Improving Oversight and Enforcement of Regulations:*

Multiple solutions have been proposed for improving oversight and enforcement of regulations related to groundwater, which can be grouped into four main axes. First, strengthening local oversight is of great importance, because central supervision—owing to geographic distance and executive limitations—cannot fully meet local needs, particularly in arid and semi-arid regions where groundwater is under pressure from unauthorized abstraction; establishing regional supervisory units can enable more precise monitoring, rapid responses to violations, and the preservation of water-resource sustainability ([Talebzadeh & Hasannajad Divkelaei, 2019](#)). Second, enhancing inter-agency cooperation between executive and judicial

bodies—including the Ministry of Energy, the Department of the Environment, and judicial authorities—plays a vital role in information exchange and improving the efficiency of oversight; creating integrated platforms and joint monitoring systems can increase coordination and transparency and prevent delays in executive processes and the rise of violations ([Islamic Consultative Assembly Research, 2017](#)). Third, reforming the sanctioning regime—particularly for offenses involving unauthorized groundwater abstraction—is essential; increasing the severity of penalties, including substantial fines and imprisonment, can have a deterrent effect and, within the framework of judicial justice and ethical principles, prevent the continuation of violations ([Environmental Protection, 2018](#)). Fourth, public education and culture-building—through workshops, media, and awareness campaigns—promote the importance of water protection at the societal level and increase social responsibility in the use of natural resources ([Ministry of Energy, 2019](#)).

An analysis of the practical procedures of supervisory and executive bodies indicates that poor inter-agency coordination, shortages of human and financial resources, inadequate sanctions, and technical constraints are among the most significant barriers to sustainable exploitation of water resources. Accordingly, the simultaneous implementation of these four solutions can raise the effectiveness of oversight, reduce violations, and ensure the sustainability of water resources and environmental protection, while public education fosters active community participation in resource conservation ([Environmental Protection, 2018](#); [Islamic Consultative Assembly Research, 2017](#); [Ministry of Energy, 2019](#)).

6. Evaluation of the Effectiveness of the Iranian Legal and Jurisprudential System in Ensuring the Sustainable Exploitation of Groundwater

The management of groundwater resources is among the most critical environmental, social, and economic challenges in countries with arid and semi-arid climates such as Iran. Given the growing water demands and the decline in natural resources, the sustainable use of groundwater has become a key issue in policymaking and legislative development. Accordingly, the Iranian legal and jurisprudential system must provide mechanisms that, while protecting environmental rights, enable the sustainable and balanced exploitation of water resources. This section evaluates the effectiveness of Iran's legal and jurisprudential framework in this regard, highlighting its strengths, weaknesses, and existing challenges.

6.1. Review of Iranian Legal Regulations on Groundwater Exploitation:

In Iran's legal system, groundwater management is governed by a collection of laws and regulations whose primary objectives are to protect water resources, ensure fair distribution, and prevent unauthorized withdrawals. These include the *Fair Distribution of Water Act* (1982), the *Law on the Protection and Exploitation of Groundwater Resources* (1966), the *National Water Resource Management Law* (2015), and the *Law on the Optimal Utilization of Water Resources* (2016). Each of these laws emphasizes sustainable use and regulatory oversight ([Karimpur, 2016](#); [Ministry of Energy, 2019](#); [Saliminejad, 2017](#)).

The *Fair Distribution of Water Act* was enacted to allocate water resources according to actual user needs and to prevent unauthorized extractions. It also established mechanisms for supervision and punishment of violations, but in practice, effective local implementation remains difficult due to logistical and geographical limitations ([Environmental Protection, 2018](#); [Hashemi, 2020](#)). The *Law on the Protection and Exploitation of Groundwater Resources* focuses on sustainable use and the management of licensing for withdrawals; however, in practice, its sanctions have not provided adequate deterrence ([Islamic Consultative Assembly Research, 2017](#)). The *National Water Resource Management Law*, as a more recent legislative development, emphasizes integrated management of water resources, the creation of monitoring and warning systems to detect unauthorized withdrawals, and the use of online databases to enhance transparency and accuracy in supervision ([Yusufi, 2019](#)). Similarly, the *Law on the Optimal Utilization of Water Resources* aims to reduce water waste across agricultural, industrial, and urban sectors by introducing standards for efficient groundwater use, though it still requires stricter oversight and more effective implementation ([Environmental Protection, 2018](#)).

Despite this comprehensive legal framework, numerous executive shortcomings—such as limited human and financial resources, poor coordination among executive institutions, weak sanctions, and insufficient application of modern monitoring technologies—have prevented these laws from fully achieving their goals. A lack of transparency, inefficiency in monitoring

systems, and difficulties in implementing online supervision platforms have reduced the effectiveness of the legislation, allowing unauthorized withdrawals to persist. Therefore, fundamental reforms in legal and executive structures, strengthened oversight, improved inter-agency coordination, more deterrent penalties, and the effective adoption of modern technologies are necessary to achieve sustainable groundwater use and prevent environmental and social crises in Iran (Islamic Consultative Assembly Research, 2017; Moradi, 2020).

6.2. Analysis of Jurisprudential Principles and Their Impact on Sustainable Groundwater Exploitation:

In *Imamiyyah* jurisprudence, several foundational principles emphasize the protection of natural resources, particularly groundwater. The most important among these is the principle of “non-injury” (*la darar*), which serves as a basis for preventing harm to both the environment and others. This rule stipulates that the exploitation of natural resources must not cause intentional or unintentional harm to individuals or the environment (Moradi, 2020; Naqibi, 2019). It can thus provide a legal framework for preventing unauthorized withdrawals and misuse of water resources while ensuring their sustainable utilization—especially considering the limited availability and vital importance of these resources, which necessitate social justice and respect for public rights (Mahdavi, 2019; Musavi Ardabili, 2003).

In addition, the principles of *hiyāzat al-mubāḥāt* (appropriation of permissibles) and public rights affirm legitimate and responsible use of natural resources, stipulating that the exploitation of publicly accessible resources must align with societal needs without violating the rights of others (Naiini, 1996; Najafi, 1984). In the context of groundwater, these principles endorse responsible and limited use while rejecting excessive or unauthorized exploitation. Conversely, Iranian legal regulations place greater emphasis on economic aspects, equity in resource distribution, and management efficiency, paying less attention to environmental protection and ethical principles in water-resource use (Hashemi, 2020; Karimpur, 2016). Hence, *Imamiyyah* jurisprudence can serve as a complementary ethical and moral framework for groundwater conservation—provided that these principles are harmonized with the country’s executive and judicial mechanisms and effectively implemented (Mahdavi, 2024; Moradi, 2020). The divergence between legal and jurisprudential perspectives underscores the importance of integrating moral and social values into the legal framework to guarantee sustainability, environmental preservation, and the rights of both present and future generations. This synergy can foster responsible and effective groundwater management.

6.3. Challenges in Implementing Legal Regulations and Jurisprudential Principles:

Despite the existence of comprehensive legislation and strong jurisprudential principles for the protection of groundwater, their effective implementation faces several obstacles. The most significant challenge is the lack of coordination between executive and judicial bodies. This misalignment prevents unified and coherent supervision, rendering many policies and executive decisions ineffective in practice (Islamic Consultative Assembly Research, 2017; Ministry of Energy, 2019). Often, executive and judicial institutions operate independently, leading to overlapping responsibilities, weakened comprehensive monitoring, and failure to achieve national goals in groundwater protection.

Additionally, shortages of financial and human resources remain serious barriers to law enforcement and effective supervision—especially in arid and semi-arid regions, where water resources are limited and under pressure. In such conditions, many violations go unpunished. The weakness of the sanctioning system is another major problem; lenient and inadequate penalties for unauthorized withdrawals eliminate incentives for compliance and allow violations to persist. Increasing financial penalties, imposing temporary or permanent suspensions on illegal operations, and enforcing stricter restrictions could create more effective deterrence (Environmental Protection, 2018; Islamic Consultative Assembly Research, 2017).

Beyond legal and executive issues, deficiencies in management and the lack of modern monitoring technologies—including online surveillance systems, remote sensing, and GIS—have reduced the precision and effectiveness of oversight, limiting the practical enforcement of both legal and jurisprudential frameworks (Environmental Protection, 2018; Yusufi, 2019). Consequently, the combination of managerial inefficiency, weak sanctions, limited resources, and underuse of modern

technologies has rendered both laws and jurisprudential principles less effective in protecting groundwater. Comprehensive reform is therefore essential.

6.4. *Recommendations for Improving the Efficiency of the Legal and Jurisprudential System in Sustainable Groundwater Use*

To ensure sustainable groundwater exploitation and enhance the effectiveness of Iran's legal and jurisprudential systems, several key recommendations can be proposed:

1. **Strengthening inter-agency cooperation:** Collaboration between governmental and judicial institutions can lead to more effective enforcement of laws. Coordination through the establishment of intersectoral committees can prevent conflicts in implementation (Islamic Consultative Assembly Research, 2017; Ministry of Energy, 2019).
2. **Reforming sanctions for violations:** Enhancing penalties—especially for unauthorized withdrawals—and imposing heavy fines can reduce violations and help guarantee sustainable protection of water resources (Environmental Protection, 2018; Karimpur, 2016).
3. **Public education and awareness:** Public training on the importance of groundwater conservation and the need to uphold jurisprudential and environmental principles can foster a culture of stewardship and responsibility in society (Kanaani, 2008).
4. **Utilization of modern technologies:** Adopting advanced technologies for monitoring water withdrawals and detecting violations can improve oversight and strengthen law enforcement (Soltanifar, 2022; Yusufi, 2019).

In summary, although the Iranian legal and jurisprudential frameworks are theoretically capable of supporting sustainable water use, in practice, executive deficiencies, weak supervision, and inadequate sanctions have prevented these frameworks from achieving their goals. By implementing the above recommendations—enhancing inter-agency cooperation, reforming penalties, utilizing modern monitoring technologies, and promoting public education—the current system can be improved, ensuring sustainable groundwater exploitation and the long-term preservation of Iran's vital water resources (Mahdavi, 2024; Moradi, 2020).

7. **Critical Analysis of Deficiencies, Contradictions, and Gaps in Jurisprudential and Legal Documents with Emphasis on Environmental Implications**

The management of groundwater resources, due to its environmental, economic, and social importance, has long been addressed within *Imamiyyah* jurisprudence and Iranian law. However, in many instances, both the jurisprudential and legal frameworks related to the protection of water resources suffer from structural and interpretive weaknesses that hinder their effective and sustainable implementation. This section presents a critical analysis of the deficiencies, contradictions, and gaps found in Iranian jurisprudential and legal documents, with a special focus on their environmental consequences.

7.1. *Deficiencies in Jurisprudential Sources Concerning Groundwater Exploitation:*

Imamiyyah jurisprudence contains multiple foundational principles that emphasize the protection of natural resources and the environment—particularly groundwater. Among the most important of these is the *la ḍarar* (non-injury) principle, which prohibits causing harm to others and to the environment, providing a jurisprudential foundation for preventing excessive or improper extraction of water resources (Naqibi, 2019). Similarly, the principles of *ḥiyāzat al-mubāḥāt* (appropriation of permissibles) and *ḥaqq al-‘āmmah* (public right) endorse legitimate use of natural resources, but their practical application faces significant challenges stemming mainly from weak enforcement mechanisms, insufficient oversight, and inconsistent interpretations (Ansari & Katuzian, 2008).

One critical issue is the lack of clear distinction between public and private rights in the use of natural resources, which has led to unauthorized and excessive withdrawals—particularly in arid and semi-arid regions of Iran where water is scarce (Jafari Langrudi, 2022). Weaknesses in supervisory and executive structures have diminished the practical influence of jurisprudential principles, allowing unregulated extractions to persist despite these principles' potential as powerful instruments

for environmental and water-resource protection. Moreover, the continuing decline of groundwater levels, the drying of wells, and the depletion of aquifers underscore the urgency of revising national and local regulations. Such revisions should include the precise determination of extraction limits and conditions, strengthened field monitoring, and the adoption of modern technologies for oversight. Furthermore, harmonizing jurisprudential interpretations with environmental conditions and contemporary social needs—as well as integrating jurisprudential principles into executive regulations—are essential to preventing misuse and ensuring sustainable resource protection. In sum, although *Imamiyyah* jurisprudence provides robust ethical and legal frameworks for the protection of natural resources, the current deficiencies in jurisprudential sources, weak executive laws, and inadequate monitoring have greatly limited their practical effectiveness. Legal and institutional reforms are therefore necessary to ensure sustainable groundwater use and environmental preservation (Mahdavi, 2024; Moradi, 2020).

7.2. *Contradictions in Iranian Legal Regulations on Water-Resource Management:*

Iranian law includes multiple statutes concerning groundwater management, such as the *Fair Distribution of Water Act* (1982) and the *Law on the Protection and Exploitation of Groundwater Resources* (1966). While these laws emphasize equitable distribution and the prevention of unauthorized withdrawals, contradictions within the legal framework and weaknesses in enforcement have reduced their overall effectiveness (Nasiri, 2021).

A major contradiction in Iranian legislation lies in the tension between private and public rights regarding water resources. Although the state generally assumes supervisory and distributive authority over water in the public interest, in practice, private property rights of landowners often conflict with these public interests—particularly when private owners illegally extract groundwater from their lands (Karimpur, 2016). This conflict undermines the ability of existing laws to achieve environmental objectives and ecological balance. The inconsistency between private and public rights represents one of the fundamental challenges in Iran's water governance system. While the government, as the representative of the public, has the legal right to manage and allocate water based on collective welfare, its supervisory authority—especially in arid and semi-arid regions—faces significant legal and institutional limitations.

As a result, landowners who have invested in private wells often view groundwater as their property, even when their use conflicts with environmental regulations. The absence of an integrated approach that simultaneously addresses both public and private rights has prevented the full realization of environmental goals embedded in these laws. Given the importance of water-resource conservation in Iran, particularly in water-scarce regions, existing legislation and policies must be revised to reflect current environmental realities and emerging needs. Legal reforms should aim to resolve these conflicts and establish more effective and coherent systems for groundwater management (Hashemi, 2020; Islamic Consultative Assembly Research, 2017).

7.3. *Gaps in Executive and Supervisory Regulations within Iranian Law:*

One of the most critical problems in Iran's legal documentation concerns gaps in monitoring and enforcement mechanisms related to groundwater management. Although several laws have been enacted to govern these resources, effective implementation—particularly at the local level—remains weak. Limited human and financial resources, coupled with a lack of coordination among executive agencies, have allowed unauthorized extractions to continue unchecked. These enforcement gaps are especially consequential in Iran's arid and semi-arid zones, where groundwater plays a crucial role in sustaining livelihoods and ecosystems (Yusufi, 2019).

The core issue lies in the inability to conduct precise and effective oversight of water withdrawals. Despite the existence of detailed legislation aimed at groundwater conservation and the prevention of illegal extraction, deficiencies in personnel, equipment, and funding have made it difficult to enforce these regulations nationwide. Additionally, poor coordination among the multiple agencies responsible for water management—such as the Ministry of Energy, the Department of the Environment, and regional water authorities—has further weakened enforcement efforts. Consequently, unauthorized withdrawals continue, with few effective interventions to halt them. These enforcement gaps have produced severe environmental repercussions, including falling groundwater levels, drying wells, and deteriorating aquifers—all of which threaten Iran's water security.

Addressing these issues requires strengthening oversight mechanisms, improving coordination among responsible agencies, and developing integrated systems for effective and sustainable water management ([Environmental Protection, 2018](#); [Ministry of Energy, 2019](#)).

7.4. *Environmental Consequences of Existing Deficiencies, Contradictions, and Gaps:*

The environmental consequences of the deficiencies, contradictions, and regulatory gaps in Iran's jurisprudential and legal frameworks are profound. Excessive groundwater extraction—especially across Iran's plains—has led to significant declines in water tables and the drying of wells and *qanats*. These processes affect not only agriculture and drinking-water supplies but also contribute to soil erosion and the loss of biodiversity in several regions. Unregulated water withdrawals and inadequate monitoring exacerbate these crises, resulting in broader environmental degradation ([Mahdavi, 2024](#); [Yusufi, 2019](#)).

Insufficient enforcement and ineffective legal deterrence have triggered a cascade of ecological impacts, including declining aquifer recharge rates, desertification, and heightened vulnerability to drought. Overexploitation of groundwater, particularly in rural and agricultural zones, poses serious threats to Iran's ecological stability and national water security. In the long term, these crises may escalate into severe droughts, further reducing the availability of usable water. In arid and semi-arid regions, where dependence on groundwater is high, the consequences could be catastrophic—ranging from biodiversity loss and agricultural collapse to threats against national food and water security.

Preventing such outcomes requires both legislative reform and the strengthening of monitoring and enforcement mechanisms at national and local levels. Enhancing coordination among institutions and updating existing laws to reflect modern environmental and technological realities would provide a more effective defense against the ongoing degradation of Iran's natural water systems. Moreover, achieving this goal necessitates synergy between private and public legal domains—ensuring that individual rights are respected while collective goals for environmental protection and sustainable resource management are fulfilled ([Environmental Protection, 2018](#); [Islamic Consultative Assembly Research, 2017](#); [Mahdavi, 2024](#)).

8. Conclusion

The findings of this research indicate that although Iran's jurisprudential and legal frameworks contain comprehensive principles and regulations at the theoretical level, their practical implementation faces considerable challenges. Within *Imamiyyah* jurisprudence, principles such as *la ḍarar* (non-injury) and *ḥiyāzat al-mubāḥāt* (appropriation of permissibles) play a decisive role in the protection of natural resources and the sustainable use of groundwater. These principles emphasize respect for the rights of others and the prevention of environmental degradation. They can serve as moral and legal foundations for preventing the overexploitation of water resources; however, their practical application encounters administrative, supervisory, and judicial obstacles.

On the legal side, despite the existence of multiple laws—such as the *Fair Distribution of Water Act* (1982), the *Law on the Protection and Exploitation of Groundwater Resources* (1966), the *National Water Resource Management Law* (2015), and the *Law on the Optimal Utilization of Water Resources* (2016)—Iranian legislation has largely focused on economic aspects, equitable distribution, and the prevention of unauthorized withdrawals. In practice, limitations in human and financial resources, poor coordination among executive and judicial bodies, and weak enforcement mechanisms have prevented these laws from achieving their intended goals. Moreover, insufficient use of modern technologies such as GIS and online monitoring systems has reduced the accuracy of supervision, allowing unauthorized withdrawals to persist.

This situation is particularly critical in Iran's arid and semi-arid regions, where pressure on groundwater resources is greater, leading to serious environmental and social consequences. Based on the research findings, several key recommendations are proposed: first, strengthening local oversight and establishing regional executive units to closely monitor water withdrawals and reduce violations; second, increasing inter-agency cooperation and information sharing among the Ministry of Energy, the Department of the Environment, and the judiciary to improve coordination and operational efficiency; third, revising and strengthening sanctions to ensure effective deterrence—through higher fines, the suspension of illegal activities, and the imposition of stricter extraction limits; fourth, employing modern monitoring technologies and developing precise information

systems to track and control unauthorized withdrawals; and fifth, implementing broad public education and awareness programs to highlight the importance of water conservation and the environmental consequences of overextraction.

In conclusion, harmonizing jurisprudential principles, legal frameworks, and environmental imperatives—together with strengthening executive, supervisory, and technological capacities—is essential for achieving sustainable groundwater exploitation and preventing water and environmental crises in Iran. This integrated approach can create a balanced relationship between human needs and the protection of natural resources from both ethical–jurisprudential and legal–environmental perspectives.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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