Received: 25 September 2023 | Revised: 8 November 2023 | Accepted: 7 December 2023

DOI: 10.1002/wwp2.12166

RESEARCH ARTICLE

WILEY

Problems of prevention of criminal offenses related to the use of water resources in Kazakhstan

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Funding information
Funding information
is not applicable. No funding was received.

Abstract

The protection of the environment and its elements is the responsibility of modern society for the possibility of its development in the future. That is why the issues of protection of this category of relations are relevant today in the legal plane. It is important to establish not only an effective mechanism for punishing the guilty but also for preventing the commission of criminal offenses against natural objects. The purpose of the study is to identify effective approaches for the prevention of crimes related to the use of water bodies. In the study, the methods of analysis and synthesis, comparison, deduction, generalization, formal legal, and abstraction were applied. As a result, it was possible to determine that the current state of water bodies in Kazakhstan is deteriorating, so they may be at a crisis level in the future. In view of this, the paper investigated the composition of a criminal offense related to the illegal use of water bodies. This made it possible to determine the current position of the legislator on the regulation of this issue in the legal dimension. In addition, the methods and tools that are used in Kazakhstan to prevent the spread of this type of criminal offense were established. Based on this, their shortcomings were analyzed, and proposals were

developed to improve the process of preventing such crimes. Therefore, the place of environmental crimes in the modern criminal law doctrine was determined, and international experience in preventing such offenses was considered. The practical value of the findings is the possibility of using them to develop new national strategies and programs aimed at countering crimes in the field of water use.

KEYWORDS

crime, ecology, environmental protection, illegal water diversions, public awareness, water quality standards

1 | INTRODUCTION

Water resources are vital for sustaining life, ecosystems, and economic activities, making their conservation and responsible management imperative for the well-being of present and future generations. Globally, the state of water resources is a subject of growing concern. Increasing populations, rapid urbanization, industrialization, and the expansion of agriculture have placed unprecedented pressure on freshwater sources, resulting in a range of environmental challenges. Kazakhstan, as a vast and resource-rich country in Central Asia, is no exception to these global trends. The nation boasts numerous rivers, lakes, and groundwater reservoirs that are essential for agriculture, industry, and human consumption. However, the increasing demands on water resources, coupled with insufficient regulation and monitoring, have raised alarms about their sustainability and ecological health.

One critical issue that has emerged in recent years is the rise in environmental crimes related to water use in Kazakhstan. These crimes encompass a wide spectrum of activities, from illegal pollution to unauthorized extraction, leading to the degradation of water quality and the deterioration of aquatic ecosystems. Understanding the factors contributing to this increase in environmental crimes is essential for devising effective prevention and intervention strategies.

Environmental issues are becoming increasingly relevant in various fields, including legal. Pollution and deformation of natural objects necessitate the change of instruments for the legal regulation of this type of public relations (Kuybida et al., 2019). Thus, the issue of prevention of criminal offenses committed against the environment becomes relevant (Lynch, 2020; Sit et al., 2020). In 2020–2022, the number of such crimes increased by 34%, so it can be argued that there is a negative trend in the development of this legal institution (Jafaree et al., 2023). Of particular importance is the issue of preventing the spread of this type of criminal offense (committed against the environment) and improving the state of the environment as a whole. Notably, in Kazakhstan, there are legal regulations provided for by the Criminal Code of the Republic of Kazakhstan (2014) governing the features of water use by citizens, in particular Article 328. In addition, there is a system of special documents affecting the formation of unified approaches to the conservation of water bodies. Thus, legal regulation is clearly fixed

and provided for by legislation, which is why it is advisable to identify ideas to improve the process of its implementation (Hamilton, 2021). Prevention of criminal offenses in the field of water use will protect the interests of society and the future development of the state as a whole (Ahmed et al., 2021; Ukaogo et al., 2020). Based on this, the analysis of the object of this paper allows determining future areas and approaches for ensuring legal state policy in the field of water environment protection.

The issue of this study is to demonstrate promising changes and recommendations for the prevention of environmental crimes, in particular, in the use of water bodies. It is advisable to pay attention to the positions of researchers who have partially investigated this issue in different contexts. For example, L.A. Makeeva et al. (2022) and L.K. Erkinbaeva et al. (2020) noted that to prevent the commission of criminal offenses against the environment, it is advisable to use not only legal but also technical tools, including the latest digital mechanisms and devices. According to researchers, modern cameras, sensors, and other tools installed on natural objects can accelerate the detection of those responsible for harming them. Such conclusions express the impact of digitalization on approaches to preventing the spread of negative impacts on the environment. In turn, Temirgazin and Karamurzin (2020) investigated the doctrinal foundations of countering environmental crimes. In their opinion, in Kazakhstan, it is advisable to increase the level of importance of this type of criminal offense and strengthen the degree of responsibility of the perpetrators. The obtained conclusion allows expressing the impact of environmental crimes both on the legal environment in society and on the well-being of citizens. Seitayeva and Amankulov (2022) and N.A. Sartayeva (2022) examined the features of the formation of special bodies to increase the degree of monitoring of the state of the environment. They found that the level of prevalence of environmental crimes is extremely high and therefore supports the opinion regarding the formation of separate units for the implementation of preventive activities and the prevention of such crimes. It is advisable to apply the conclusions they have obtained when analyzing the activities of the current authorized bodies in the field of preventing criminal offenses against the environment and developing new or expanding their responsibilities. There is a need for comprehensive data collection and analysis regarding the state of water bodies in Kazakhstan. This includes data on water quality, quantity, and the health of aquatic ecosystems. Without this information, it is challenging to assess the true extent of environmental crimes and their impact. More research is needed to understand the specific challenges and opportunities for preventing environmental crimes related to water use in Kazakhstan. This includes exploring the effectiveness of existing legal frameworks and proposed solutions.

Based on the above, a purpose was established, namely, to identify effective approaches for the prevention of criminal offenses in the use of water resources. The following tasks were set in the paper: to determine the current state of water bodies in Kazakhstan; to investigate the existing system of measures to counter environmental crimes; to establish their effectiveness and relevance; to develop recommendations for improving the effectiveness of preventive tools in the field of criminal offenses on the use of water bodies in Kazakhstan.

2 | MATERIALS AND METHODS

The method of analysis in the study was necessary to express the composition of a criminal offense related to the use of water resources. On its basis, the constituent elements of this crime were analyzed, and its signs were described. The analysis is required to examine the essence of

this type of criminal offense and establish the role of water bodies in the system of environmental elements. The synthesis method in the paper was applied to determine the combination of measures aimed at protecting the environment and legal mechanisms for countering crimes related to water bodies. This method is necessary for defining the research object and expressing the relationship between its structural elements, particularly preventive tools, and the level of crime in society.

The comparative method in the study was applied to international experience, specifically contrasting approaches to combating crimes related to the use of water resources in the People's Republic of China, Austria, the Republic of Korea, Japan, and Kazakhstan. On its basis, their advantages and disadvantages were outlined, which helped to create recommendations for improving the protection of the aquatic environment in Kazakhstan. Moreover, this method was required to examine the composition of a criminal offense related to the use of water resources, namely, to compare elements of its objective side.

The deduction method was used to express the state of water resources in Kazakhstan based on knowledge about global environmental problems. This method allowed describing the level of protection of these objects and prospects for its future development. The general understanding of the current state of ecology in the world, in particular in Kazakhstan, was interpreted in the study of the level of development of water resources and the need for their legal protection. The method of generalization in the study is necessary for the creation of recommendations aimed at the implementation of preventive measures in the field of crimes against water bodies. This method determined which regulations should be introduced into the Criminal Code of the Republic of Kazakhstan to improve the effectiveness of legal protection of ecology and the aquatic environment in general.

The object of the study lies in the legal plane, and therefore, the use of a formal legal method was required. On its basis, the content of legal regulations and documents ensuring the protection of water resources from their illegal use was highlighted. The formal legal method was used to examine Criminal Code of the Republic of Kazakhstan (2014), Water Code of the Republic of Kazakhstan (2003), Constitution of the Republic of Kazakhstan (1995), Austrian Criminal Code (1998), Environmental Code of the Republic of Kazakhstan (2021), Criminal Law of the People's Republic of China (1997), Penal Code (1907), and Criminal Act (1953).

The method of abstraction was applied to investigate a separate environmental problem, namely, the deterioration and deformation of the structure of the aquatic environment. Based on it, statistical data were analyzed to establish a specific level of development and protection of water bodies in Kazakhstan.

3 | RESULTS

The development of technologies, the globalization of enterprises, and the expansion of tools that provide services for consumers all affect the field of ecology. Technological advancements often lead to the construction of infrastructure, such as roads, buildings, and factories, which can result in habitat destruction and fragmentation. This disrupts ecosystems, displaces wildlife, and reduces biodiversity. Unfortunately, such interaction is negative, because it implies a deterioration of the environment, in particular water resources in Kazakhstan. This is evidenced by statistical data, according to which their volume has been decreasing for the last 3 years; therefore, by 2030, the volume of the aquatic environment in Kazakhstan is expected to decrease from 90 to 76 m^3 per year (Jafaree et al., 2023). Based on this, it can be established that

the problem of preventing the commission of criminal offenses related to water resources requires an operational solution. In the Criminal Code of the Republic of Kazakhstan (2014), there is Article 328, which provides for the responsibility of persons for pollution, clogging, or depletion of water. Thus, it is advisable to analyze statistical data on the number of criminal offenses registered in the Republic of Kazakhstan (RK) defined by this article in the period from 2017 to 2022 (Figure 1).

Based on the results obtained, the number of criminal offenses of this type is increasing; therefore, it is advisable to consider the composition and approaches to preventing its spread in Kazakhstan in the future. First, it is required to distinguish the object of this criminal offense, namely, the relations regulating the protection of water resources and their connection with other elements of the ecological system. Based on this, this norm provides for liability for the impact on the water environment that provokes changes in its properties and causes significant harm to other ecosystems, including animal, plant, forest, and agricultural systems (Loch et al., 2020; Zhang et al., 2022).

The objective side of this act is based on pollution, clogging, depletion, and other types of impacts that deform the natural state of waters (surface and underground), glaciers, and drinking water sources. Particular attention should be focused on the signs of the acts described above. In particular, water pollution is the saturation of surface or underground water supply sources with pollutants that affect water characteristics (both chemical and natural), the addition of impurities that are not provided for by regulations or exceed the maximum permissible concentration of foreign substances. As for water depletion, this action implies a steady reduction in reserves and a decrease in the quality of surface and groundwater. This list of acts is not exhaustive, because Article 328 of the Criminal Code of the Republic of Kazakhstan (2014) provides for other changes in the natural properties of water resources, which are reflected in their physical, chemical, or biological state. The described criminal offense, by its nature, is material, which necessitates the mandatory proof of causing considerable harm to human health, animal or plant life, fish stocks, forest, or agricultural systems. In this context, it should be noted that an example of such an impact can be the death of animals or plants or the removal of land from crop rotation because of its pollution. Establishing a causal link between the actions of the individual and the consequences is also crucial for the proper qualification of this criminal offense. As for the subject of such a crime, it can only be a physical, sane person whose age is from 16 years. The subjective side in this case is characterized by intent.

In addition, there are qualifying criteria, in particular, Part 2 of Article 328 of the Criminal Code of the Republic of Kazakhstan (2014) imposes liability for causing or creating a danger of causing significant harm, as well as committing offenses in specially protected natural areas or in areas with an extraordinary ecological situation. To determine the definition of "extraordinary ecological situation," it is required to refer to the provisions of the Environmental Code of the Republic of Kazakhstan (2021), specifically Article 404. According to this article, it is understood as an environmental condition that arises in a particular area of land or water where persistent adverse changes occur in the surrounding environment, as well as in the genetic resources of plants and animals, as a result of anthropogenic activities or natural processes. In Part 3 of Article 328 of the Criminal Code of the Republic of Kazakhstan (2014), special qualifying signs are such water pollution that caused the death of a person, especially major damage or mass illness of people.

Table 1 summarizes the key provisions and information from the mentioned regulatory documents and the constitution regarding water resources regulation in Kazakhstan.

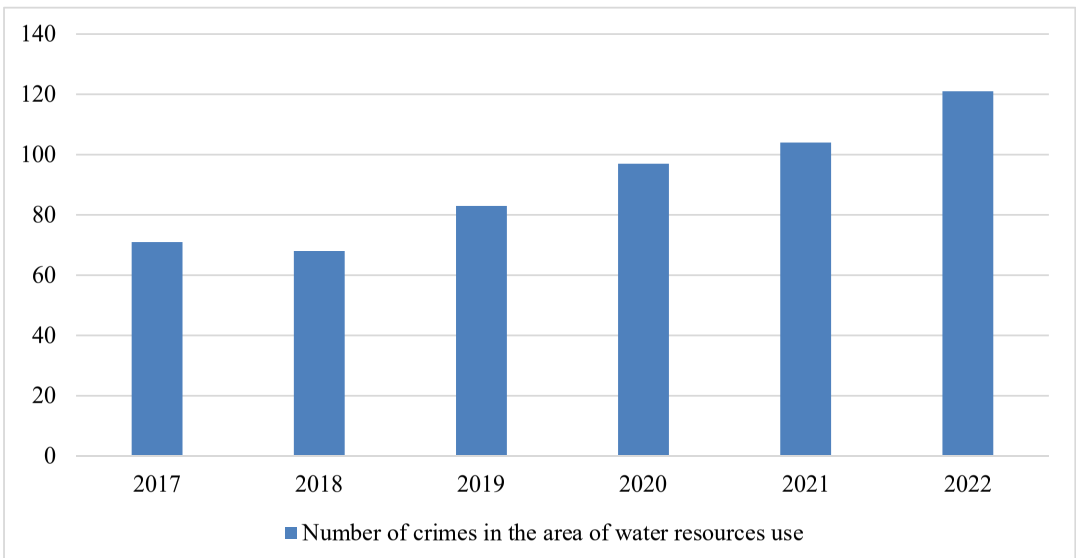

FIGURE 1 Statistics of criminal offenses under Article 328 Criminal Code of the Republic of Kazakhstan from 2017 to 2022. Source: The crime rate in Kazakhstan is decreasing every year (2023).

TABLE 1 Legal framework for water resource protection in Kazakhstan.

Regulatory document	Key provisions
Environmental Code of the Republic of Kazakhstan (2021)	- Lists water bodies subject to protection. - Defines citizens' interaction with water bodies. - Establishes permissible levels for discharges and anthropogenic actions. - Criminal liability for exceeding permissible levels.
Water Code of the Republic of Kazakhstan (2003)	- Details the structure of water resources. - Includes all water bodies within Kazakhstan's territory. - Specifies the use of water bodies by citizens.
Constitution of the Republic of Kazakhstan (1995)	- Article 31 emphasizes the necessity of protecting water resources as part of the environment.

To develop recommendations on reducing the number of criminal offenses in water resources use, it is advisable to consider the current measures implemented in the Republic of Kazakhstan. Notably, there is a permitting system according to which water users engaged in special water use (extracting 50–2000 m^3 of water per day) are required to obtain a permit. Thus, individuals who extract water up to 50 m^3 per day are not required to have a permit. However, they are obligated to notify the respective local executive body (Seitayeva & Amankulov, 2022). The introduction of permits for special water use is an important regulatory mechanism through which it is possible not only to monitor the aquatic environment but also to protect it from pollution. Accordingly, there are basin inspections in Kazakhstan, whose powers include the issuance of permits, in particular for the discharge of industrial, domestic, drainage, and other wastewater into surface water bodies, as well as the removal of water from surface water bodies, for example, using technical devices. In the context of the prevention of a criminal offense, this approach allows citizens to be granted the right to take water but with certain restrictions to avoid the deterioration of water resources. This affects the interaction of the state with individuals to provide the latter with legal instruments for water use in the volumes determined by law (Suzuki et al., 2020).

However, it should be indicated that in such basin inspections, there is an insufficient number of qualified personnel who would direct their activities to the development of legal mechanisms for regulating the aquatic environment in Kazakhstan. In addition to development specialists, material and technical equipment is required, which affects the organizational and institutional potential of the state in the water sphere. To solve these problems and prevent special water use by citizens without obtaining a permit, it is advisable to increase the number of specialists in basin inspections, provide laboratories that allow analyzing water quality in a short time, and establish an uninterrupted document management system for keeping records of citizens collecting water. Such measures will make it possible to monitor water resources and prevent their pollution as a result of human activities.

In addition, water protection zones exist in Kazakhstan to prevent water pollution and the commission of this type of crime. The essence of the latter consists in the allocation of territories adjacent to the shoreline of water bodies and the establishment of prohibited implementation by citizens of certain types of activities on them. In fact, the use of such zones is possible, but with mandatory compliance with the requirements of legislation on environmental

protection. Such zones are defined and protected by local governments. For the described approach to be effective, it is necessary to establish strict control over compliance with the rules in water protection zones. An example of a violation of the established norms is the allocation of plots for construction in water protection zones, which is illegal and as a result contributes to water pollution with sewage, including household waste from settlements. Proceeding from this, the priority is the development of a legal mechanism aimed at increasing responsibility for unauthorized construction within water protection zones in the absence of special permits issued by authorized persons.

Table 2 provides a comparison of the approaches to criminalization and punishment for water-related violations in Kazakhstan, China, and Austria, as well as highlights the categorical approach in countries with limited freshwater resources.

Considering this, as well as the statistical data presented at the beginning of the study on the reduction of the volume of water resources on the territory of Kazakhstan, it is advisable to review the penalties for persons committing criminal offenses in this area. Accordingly, in addition to the disclosed approaches to the prevention of crimes, it is required to increase the degree of responsibility of persons due to the high priority of environmental protection, in particular water systems. Therefore, it is advisable to establish a new composition of the crime or expand the one provided in Article 328 of the Criminal Code of the Republic of Kazakhstan (2014) to encompass socially dangerous intentional acts of individuals that result in noise, emissions, and

TABLE 2 Cross-national analysis of legal approaches to water resource offenses.

Jurisdiction	Key provisions
Kazakhstan	- Criminalizes various offenses in the field of water resources. - Imposes penalties on individuals for violations. - Addresses issues related to illegal discharge and fishing of river resources. - Penalties may apply to legal entities. - Implementation of double punishment, fine for legal entity, and additional liability for individuals.
China (Criminal Law, 1997)	- Consolidates a wide list of criminal offenses related to water resources. - Criminalizes illegal import of hazardous waste. - Applies penalties to both individuals and legal entities.
Austria (Criminal Code, 1998)	- Establishes responsibility for acts against the environment and public criminal acts. - Defines responsibility for causing harm to water resources due to noise pollution. - Addresses deliberate waste management causing harm to water resources. - Introduces a new type of criminal offense related to noise and vibrations affecting the aquatic environment.
Other States (Penal Code, 1907; Criminal Act, 1953)	- Advocates for severe penalties for water use-related crimes. - Geographical limitations in freshwater resources contribute to strict penalties.

vibrations that have a negative impact on the natural properties of water resources. Furthermore, when comparing the approaches of Kazakh legislators with those of foreign lawmakers, it should be noted that the latter tend to predominantly establish formal compositions of criminal offenses in the field of water resource utilization. Considering this, they manage to reduce the level of latency of this type of crime, due to the absence of the need to prove the harm caused as a result of criminal acts. It also allows establishing a direct causal relationship between the actions of citizens and their consequences, which can facilitate law enforcement practice.

4 | DISCUSSION

The investigation of the issue of countering and preventing criminal offenses in the field of water use is widespread in the legal doctrine, as it relates to environmental protection. In the world, including Kazakhstan, a policy aimed at maximum conservation of natural resources, in particular water bodies, is spreading, and there are different approaches to its implementation. In particular, M. Zhuravel (2022) examined the experience of countering criminal offenses against the environment in Ukraine. He noted that this country is characterized by the use of punitive measures against perpetrators whose actions are aimed at harming the environment. The researcher drew attention to the fact that the list of articles in the section of crimes against the environment has been expanded, which indicates the criminalization of new acts of citizens in this area. This was especially reflected in the protection of the plant fund by adding Articles 246-1, 246-2, and 246-3 to the Criminal Code of Ukraine. Legislators justify such changes by the existence of an urgent need to reduce the level of the negative impact of human actions on natural objects. In this context, the state is obliged to use a single lever of influence, namely, criminal liability. After the amendments to the criminal legislation, this category of crimes has emerged from a number of minor criminal offenses, which makes it possible to ensure the inevitability of punishment of the perpetrators. The disclosed approach has common features with the described research results regarding the modification of responsibility and increasing its measures for acts that harm natural objects. In this context, the strengthening of criminal responsibility meets an important goal, namely, the preservation of the integrity and natural qualities of environmental elements.

In turn, R. Glomseth (2020) considers it necessary to expand the powers of law enforcement agencies to perform additional functions in the field of countering environmental crimes. He developed this approach based on the experience of such countries as Italy, Norway, Brazil, and Israel, where separate special environmental police operate as a national militarized law enforcement unit. The researcher analyzed the scope of their powers and tasks and established the most important ones, among which: detection and documentation of environmental crimes; conduct of operational investigative activities aimed at identifying the perpetrators and applying coercive measures to them. Separately, he noted that the powers of this body also include the prevention of environmental violations. This approach is quite justified because it involves improving the implementation of environmental functions by the state. In addition, the establishment of a new law enforcement agency in the field of nature conservation also involves updating the legislative framework and addressing gaps in the activities of government agencies responsible for environmental protection (Tatsiy, 2021). Notably, what is common in the described position and this study is the development of a mechanism for improving the system of legal regulation of environmental protection, in particular water bodies. The proposed

approach has already been partially implemented in Kazakhstan through the activities of basin inspections, but they can be further developed by forming a separate law enforcement agency.

Similar to the previous work are the studies of G.T. Dzhabaildaeva et al. (2021) and R. Li et al. (2020), in which they investigate the development of a new institute of control in the form of public environmental inspectors. In their opinion, this approach is an effective tool for the prevention of criminal offenses related to the use of water resources. This idea was developed based on understanding the relationship between the activities of public associations and the prevention of environmental criminal offenses. In their studies, they highlight their main shortcomings conditioned by the low level of training of specialists and the lack of financial and organizational and technical support. These factors affect the effectiveness of activities to counteract crimes in the field of water resource use. The researchers propose to introduce the position of public inspectors, who will be elected by citizens or selected through a competition in each territorial community. Given their number, it should be noted that the training of such specialists should be systematic and gradual. Such an approach will help to strengthen the responsibility of inspectors in case of non-fulfillment of their official tasks, for example, monitoring the activities of business entities that affect the state of the environment, including water bodies (Luchenko & Georgiievskyi, 2021). It is important that such inspectors also monitor other entities, for example, state and municipal enterprises and individuals who interact and use water resources. Therefore, researchers agree on the priority of developing and implementing a new legal institution concerning the unhindered and systematic protection of water resources by duly authorized entities. As a result, it is expected that the activities of such inspectors will enable the identification and prevention of inadequate performance of nature conservation tasks by government bodies. They will also help prevent disregard for environmental safety by other entities. The proposed idea shares similarities with this study as it pertains to the upgrading of the mechanism for training and developing professional personnel in the field of monitoring water resource management (Gudkov et al., 2017). The implementation of the described approaches can be effective if inspectors comply with their mission in accordance with the prevention of criminal offenses against the environment (Bolat, 2020).

Unlike previous researchers, A.C. Hadjichambis et al. (2020) and Darvishmotevali and Altinay (2022) focused on the subjective aspects of the spread of crimes associated with water resource utilization. The common matter that they both noted is that most often violators of environmental legislation are subjects with a low level of ecological and legal consciousness. This is influenced by many factors: the place of residence of the individual, one's type of activity, lifestyle, and so on (Kirichuk, 2006). However, the issue of cultivating a uniformly developed ecological and legal consciousness among citizens remains relevant. The implementation of this approach is a complex process because it involves the coverage of a large scale of persons who need to acquire the necessary knowledge and skills and most importantly use it in their activities. A.C. Hadjichambis et al. (2020) propose to divide the population into categories of persons based on age and profession. Such differentiation will help to choose the most effective tools for preventive work with them. Moreover, this will increase the practical value of the knowledge they have acquired, because they will use it in accordance with their age characteristics and professional niche. For children and adolescents, it is essential to undergo additional educational disciplines aimed at cultivating ecological and legal consciousness, engaging them in joint projects focused on environmental protection is also crucial (Ibrayeva et al., 2018). As for adult citizens, Darvishmotevali and Altinay (2022) note that preventive mechanisms for them should meet their interests. Considering the spread of digitalization, it is possible to develop special applications for passing introductory courses for young people with a reflection

of the impact of their activities on the environment. It is also proposed to develop methodological materials at enterprises and require employees to familiarize themselves with them. This would enable them to understand how their activities can impact the state of natural objects and how to prevent pollution or other forms of degradation. Improving the education of citizens, including in the field of ecology, is one of the areas of the state policy of Kazakhstan. However, for the process of implementing preventive measures to be effective, it is required to consider the characteristics of the target audience they are aimed at. Thus, the use of universal tools is ineffective, because such an approach will not meet the interests of certain categories of the population. The conclusions described in the researchers' works have common features with the results of this study regarding the need to modify not only objective (legal) instruments, but also subjective factors (the level of environmental and legal consciousness) of citizens.

The role of technology in monitoring water resources, detecting violations, and enforcing protections is pivotal in addressing the growing challenges related to water quality and availability. As advancements in technology continue to accelerate, they offer innovative solutions for the effective management and conservation of water resources (Mazakov et al., 2020).

Satellites equipped with remote sensing instruments can track water quality parameters such as temperature, turbidity, and chemical composition. This allows for the early detection of pollution events and the assessment of water health over large areas. Remote sensing can identify sources of pollution, such as industrial discharges or agricultural runoff, by analyzing changes in water color and patterns over time (Miller et al., 2023). IoT sensors placed in water bodies and infrastructure provide real-time data on water levels, flow rates, and quality. These data (Salam & Salam, 2020) help authorities monitor water resources and detect abnormalities. These sensors enable the creation of early warning systems for floods, droughts, and pollution events, allowing for swift response and mitigation.

Artificial intelligence (AI) algorithms (Garrido-Momparler & Peris, 2022) can analyze historical data to predict potential water resource issues, such as the likelihood of water scarcity or contamination in specific regions. AI can identify irregularities in water quality or usage patterns, aiding in the early detection of violations. However, while technology plays a crucial role, it should be complemented by robust regulatory frameworks, strong governance, and public engagement to ensure that water resources are protected and sustainably managed for the benefit of present and future generations (Nocheski & Naumoski, 2018).

In a rapidly growing city in Kazakhstan, the unchecked drilling of private wells for water supply has emerged as a pressing concern (Aitimbetova et al., 2023). This unrestrained practice has set in motion a series of adverse consequences, including the depletion of groundwater resources, land subsidence, and damage to critical infrastructure. Several underlying factors have contributed to the exacerbation of this issue. The absence of effective permitting and oversight mechanisms has allowed individuals and businesses to drill wells with minimal restrictions (Kyrychuk, 2010). This unregulated activity has resulted in an unsustainable drawdown of groundwater resources. The city's burgeoning population has escalated the demand for water resources, especially for domestic and agricultural purposes. This surge in demand has intensified the reliance on groundwater, further depleting this precious resource. The case study of groundwater depletion in this urban area of Kazakhstan underscores the need for proactive measures to safeguard this vital resource. By regulating well drilling, promoting water use efficiency, conducting hydrogeological research, and educating the public, it is possible to mitigate the adverse effects of groundwater depletion and ensure a sustainable water future for the growing city and its inhabitants (Koibakov & Umirkhanov, 2013a, 2013b).

Based on the above, it can be established that preventive measures to counteract crimes in the field of ecology, in particular water use, may be different in nature. Nevertheless, the most effective approach will be the simultaneous implementation of several types of tools to improve the legal and social mechanisms. As a result, it will be possible not only to prevent the spread of this category of crimes but also to involve the public in the protection of the environment and its reproduction in the future. Although the study identifies the composition of criminal offenses related to illegal water use, it may not establish a direct causal link between these offenses and the observed deterioration of water bodies. Investigating causal relationships can be complex and require more in-depth research.

5 | CONCLUSIONS

This study has unveiled several crucial findings that enrich our comprehension of safeguarding and conserving water resources in Kazakhstan. The study established that water resources in Kazakhstan are in decline in terms of both quality and quantity. This conclusion is drawn from rigorous statistical data, underscoring the scientific importance of acknowledging the degradation of aquatic ecosystems as a critical and pressing issue. The research conducted a comprehensive analysis of the elements constituting criminal offenses linked to water resources, particularly as outlined in Article 328 of the Criminal Code of the Republic of Kazakhstan. This in-depth examination contributes to legal scholarship and lays the groundwork for effective law enforcement. The study successfully identified an array of actions that harm natural elements and pose threats to human health and lives. Recognizing the various forms of harm inflicted on water resources is fundamental to devising preventative measures and enforcement strategies, further deepening our scientific grasp of the subject. Through its assessment of current preventative measures aimed at combatting water resource-related crimes, the research shed light on the efficacy of existing strategies and their potential for enhancement. These insights offer practical guidance to policymakers and environmental authorities. By examining the experiences of foreign countries such as China, Austria, the Republic of Korea, and Japan, the study highlighted diverse approaches to addressing water resource crimes. This international perspective broadens our understanding of strategies and solutions, facilitating cross-border learning and collaboration. The study proposed an expansion of the scope of criminal offenses related to water resource utilization in Kazakhstan. This recommendation draws from international experiences and underscores the imperative of safeguarding water resources by incorporating actions that negatively impact water properties and the integrity of the aquatic environment, including noise generation, emissions, and vibrations. Although not explored in great detail, the study acknowledged the potential for integrating digital technologies to prevent water resource crimes. This recognition underscores the evolving nature of environmental protection, with technology emerging as an increasingly indispensable tool.

This study's scientific significance is underscored by the following contributions to knowledge. The study provides a lucid assessment of the deteriorating state of water resources in Kazakhstan, shining a spotlight on the formidable challenges confronting environmental conservation. The examination of criminal offenses and preventative measures augments our comprehension of the legal framework governing environmental crimes, supplying valuable insights for policymakers and legal practitioners. Through the exploration of foreign countries' approaches, the study widens our perspective on addressing water resource crimes, fostering cross-cultural learning and the exchange of best practices. The study's recommendation to

expand the scope of offenses under Article 328 of the Criminal Code signifies a forward-looking approach to bolstering legal protections for water resources. Though briefly mentioned, the recognition of digital technologies' potential underscores the significance of embracing technological advancements in environmental protection.

In conclusion, this study serves as an invaluable resource for policymakers, legal scholars, and environmental advocates by offering insights into the challenges besetting water resources in Kazakhstan, the legal considerations for their preservation, and opportunities for reform and technological integration. Its findings contribute to the ongoing discourse on sustainable water management and environmental conservation, not only in Kazakhstan but also on a global scale.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

ETHICS STATEMENT

Not applicable, because this article does not contain any studies with human or animal subjects.

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REFERENCES

Ahmed, S. S., Bali, R., Khan, H., Mohamed, H. I., & Sharma, S. K. (2021). Improved water resource management framework for water sustainability and security. *Environmental Research*, *201*, 111527. https://www.sciencedirect.com/science/article/pii/S0013935121008215, https://doi.org/10.1016/j.envres.2021.111527

Aitimbetova, A., Batyrkhanova, A., Nurtayeva, A., Isayeva, R., & Bektureyeva, G. (2023). Environmental Assessment of Solid Waste Pollution of Urban Areas (on the example of Shymkent, Republic of Kazakhstan), *10*, 1209–1217, https://doi.org/10.5109/7148441

Austrian Criminal Code. (1998). https://policehumanrightsresources.org/content/uploads/2016/08/Criminal-Code-Austria-1998.pdf?x19059

Bolat, J. (2020). State policy of the Republic of Kazakhstan on ensuring environmental safety and environmental protection. *Khabarshy Vestnik. Bulletin*, *4*(63), 48–51. http://sp.kaznpu.kz/docs/jurnal_file/file20210125122853.pdf#page=48

Constitution of the Republic of Kazakhstan. (1995). https://adilet.zan.kz/rus/docs/K950001000_

Criminal Act. (1953). https://elaw.klri.re.kr/eng_service/lawView.do?hseq=28627&lang=ENG

Criminal Code of the Republic of Kazakhstan. (2014). https://online.zakon.kz/Document/?doc_id=31575252

Criminal Law of the People's Republic of China. (1997). https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/5375/108071/F-78796243/CHN5375%20Eng3.pdf

Darvishmotevali, M., & Altinay, L. (2022). Green HRM, environmental awareness and green behaviors: The moderating role of servant leadership. *Tourism Management*, *88*, 104401. https://www.sciencedirect.com/science/article/pii/S0261517721001205, https://doi.org/10.1016/j.tourman.2021.104401

Dzhabaildaeva, G. T., Bekezhanov, D. N., & Rzabay, A. I. (2021). Problems of legal protection of land in the Republic of Kazakhstan. *Kyrkuiyek*, *3*(70), 32–35. https://kostacademy.edu.kz/akademija/ooniirid/zhurnal/gilim3_69_2021.pdf#page=32

Environmental Code of the Republic of Kazakhstan. (2021). https://adilet.zan.kz/rus/docs/K2100000400

Erkinbaeva, L. K., Bekezhanov, D. N., & Teleuev, G. B. (2020). Law and digital technologies in ensuring environmental safety. *Kazakh-American University*, *4*(50), 32–37. http://surl.li/hbesr

Garrido-Momparler, V., & Peris, M. (2022). Smart sensors in environmental/water quality monitoring using IoT and cloud services. *Trends in Environmental Analytical Chemistry*, *35*, e00173. https://doi.org/10.1016/j.teac.2022.e00173

Glomseth, R. (2020). Trond Eirik Schea: Director of the Norwegian National Authority for investigation and prosecution of economic and environmental crime and senior. In *Public prosecutor, Norway. Trends in policing* (pp. 20–32). Routledge. https://doi.org/10.4324/9781003081357-3/trond-eirik-schea-rune-glomseth

Gudkov, D., Shevtsova, N., Pomortseva, N., Dzyubenko, E., Yavnyuk, A., Kaglyan, A., & Nazarov, A. (2017). Aquatic plants and animals in the Chernobyl exclusion zone: Effects of long-term radiation exposure on different levels of biological organization. Genetics, Evolution and Radiation: Crossing Borders, The Interdisciplinary Legacy of Nikolay W. Timofeeff-Ressovsky, 287–302. https://doi.org/10.1007/978-3-319-48838-7_24

Hadjichambis, A. C., Reis, P., Paraskeva-Hadjichambi, D., Činčera, J., Boeve-de Pauw, J., Gericke, N., & Knippels, M. C. (2020). *Conceptualizing environmental citizenship for 21st century education*. Springer. https://doi.org/10.1007/978-3-030-20249-1

Hamilton, M. (2021). *Environmental crime and restorative justice*. Palgrave Macmillan Cham. https://doi.org/10.1007/978-3-030-69052-6

Ibrayeva, A., Sannikov, D. V., Kadyrov, M. A., Zapevalov, V. N., Hasanov, E. L., & Zuev, V. N. (2018). Importance of the Caspian countries for the European Union energy security. *International Journal of Energy Economics and Policy*, *8*(3), 150–159.

Jafaree, A., Gohari, S., Hoseinee, S., & Sadatee, S. (2023). Sociological analysis of punishment in the field of water crimes. *Political Sociology of Iran*, *5*(11), 2938–2953. http://jou.spsiran.ir/article_157092_en.html

Kirichuk, G. Y. (2006). Peculiarities of accumulation of the ions of heavy metals in the organism of freshwater mollusks. *Hydrobiological Journal*, *42*(6), 93–103. https://doi.org/10.1615/HydrobJ.v42.i6.80

Koibakov, S. M., & Umirkhanov, M. G. (2013a). Icebreaker unit. *World Applied Sciences Journal*, *25*(8), 1251–1254. https://doi.org/10.5829/idosi.wasj.2013.25.08.13423

Koibakov, S. M., & Umirkhanov, M. G. (2013b). Model research of ice jams. *World Applied Sciences Journal*, *25*(8), 1158–1160. https://doi.org/10.5829/idosi.wasj.2013.25.08.13382

Kuybida, V. V., Nekrasova, O. D., Kutsokon', Y. K., Lopatynska, V. V., & Truskavetska, I. Y. (2019). Summer fish kills in the Kaniv Reservoir. *Hydrobiological Journal*, *55*(1), 103–106. https://doi.org/10.1615/HydrobJ.v55.i1.110

Kyrychuk, G. Y. (2010). Peculiarities of cabohydrate metabolism in Planorbarius purpura under the effect of cadmium and zinc ions. *Hydrobiological Journal*, *46*(2), 64–74. https://doi.org/10.1615/HydrobJ.v46.i2.80

Li, R., Zhou, Y., Bi, J., Liu, M., & Li, S. (2020). Does the central environmental inspection actually work? *Journal of Environmental Management*, *253*, 109602. https://doi.org/10.1016/j.jenvman.2019.109602

Loch, A., Pérez-Blanco, C. D., Carmody, E., Felbab-Brown, V., Adamson, D., & Seidl, C. (2020). Grand theft water and the calculus of compliance. *Nature Sustainability*, *3*(12), 1012–1018. https://doi.org/10.1038/s41893-020-0589-3

Luchenko, D., & Georgiievskyi, I. (2021). Administrative restrictions in ports: Practice of crew rotations during covid-19 pandemic. *Lex Portus*, *7*(3), 7–31. https://doi.org/10.26886/2524-101X.7.3.2021.1

Lynch, M. J. (2020). Green criminology and environmental crime: Criminology that matters in the age of global ecological collapse. *Journal of White Collar and Corporate Crime*, *1*(1), 50–61. https://doi.org/10.1177/2631309X19876930

Makeeva, L. A., Urazbaeva, S. E., & Mukanov, S. S. (2022). Study of ecological problems of the environmental character of the forests of the Republic of Kazakhstan. *Endless Light in Science*, *1*, 161–165. http://surl.li/hbezz

Mazakov, T., Jomartova, S., Ziyatbekova, G., & Aliaskar, M. (2020). Automated system for monitoring the threat of waterworks breakout. *Journal of Theoretical and Applied Information Technology*, *98*(15), 3176–3189.

Miller, M., Kisiel, A., Cembrowska-Lech, D., Durlik, I., & Miller, T. (2023). IoT in water quality monitoring—Are we really here? *Sensors*, *23*(2), 960. https://doi.org/10.3390/s23020960

Nocheski, S., & Naumoski, A. (2018). Water monitoring IoT system for fish farming ponds. Industry *4.0*.

Penal Code. (1907). https://www.japaneselawtranslation.go.jp/en/laws/view/3581/en

Salam, A., & Salam, A. (2020). Internet of things in water management and treatment. In *Internet of things for sustainable community development: Wireless communications, sensing, and systems* (pp. 273–298). Springer.

Sartayeva, N. A. (2022). Scientific support of legislative work to improve legislation on the activity of law enforcement authorities: Returning to scientific publications of N.A. Sartayeva. *Bulletin of the Institute of Legislation and Legal Information of the Republic of Kazakhstan*, *3*(70), 263–270. https://doi.org/10.52026/2788-5291_2021_70_3_263

Seitayeva, J. S., & Amankulov, A. M. (2022). Building an effective training system for law enforcement staff in the field of countering global threats. *Academic Thought*, *3*(20), 86–92. http://surl.li/hbfao

Sit, M., Demiray, B. Z., Xiang, Z., Ewing, G. J., Sermet, Y., & Demir, I. (2020). A comprehensive review of deep learning applications in hydrology and water resources. *Water Science and Technology*, *82*(12), 2635–2670. https://doi.org/10.2166/wst.2020.369

Suzuki, T., Hidaka, T., Kumagai, Y., & Yamamoto, M. (2020). Environmental pollutants and the immune response. *Nature Immunology*, *21*, 1486–1495. https://doi.org/10.1038/s41590-020-0802-6

Tatsiy, V. (2021). Re-codification of the civil law of Ukraine: On the way to European integration. *Global Journal of Comparative Law*, *10*(1–2), 1–4. https://doi.org/10.1163/2211906X-10010001

Temirgazin, R. H., & Karamurzin, T. A. (2020). The role of the Constitution of the Republic of Kazakhstan and other normative legal acts in the system of measures to prevent man-made criminal offenses in the Republic of Kazakhstan. *Bulletin of Alikhan Bokeikhan University*, *46*(2), 159–163. https://vestnik.semuniver.kz/index.php/main/article/download/317/320

The crime rate in Kazakhstan is decreasing every year. (2023). https://forbes.kz/news/2023/03/16/newsid_297178

Ukaogo, P. O., Ewuzie, U., & Onwuka, C. V. (2020). Environmental pollution: Causes, effects, and the remedies. *Microorganisms for Sustainable Environment and Health*, *2020*, 419–429. https://doi.org/10.1016/B978-0-12-819001-2.00021-8

Water Code of the Republic of Kazakhstan. (2003). https://online.zakon.kz/Document/?doc_id=1042116

Zhang, H., Li, H., Gao, D., & Yu, H. (2022). Source identification of surface water pollution using multivariate statistics combined with physicochemical and socioeconomic parameters. *Science of the Total Environment*, *806*(3), 151274. https://doi.org/10.1016/j.scitotenv.2021.151274

Zhuravel, M. (2022). Determination of the subject of investigation of crimes related to violations of environmental legislation (legal analysis). *Law Journal of Donbass*, *3*(80), 69–73. https://doi.org/10.32782/2523-4269-2022-80-3-69-73

How to cite this article: Sabyr, A., Ramazanova, A., Koishybaiuly, K., Zhanibekov, A., & Apakhayev, N. (2024). Problems of prevention of criminal offenses related to the use of water resources in Kazakhstan. *World Water Policy*, 1–15. https://doi.org/10.1002/wwp2.12166