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Protection of springs in forest areas

Hera Alvina Setiawan & Nathania Permata S.

University of Mataram, Jl. Majapahit No. 62, Gomong, Kecamatan Selaparang, Kota Mataram, Nusa Tenggara Barat, Indonesia
*e-mail: heraalvianas@unram.ac.id

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ABSTRACT

Spring water is an essential natural resource that supports ecological stability and human survival, making its protection a significant environmental and legal governance issue. Amid increasing water demand, climate variability, and forest degradation, the State is required to establish a regulatory framework to preserve spring water, particularly in protected forest areas. This study examines the legal regulations governing the protection of spring water in forest zones using a normative legal research method. This study adopts a statutory approach by reviewing the 1945 Constitution, the Water Resources Act, the Forestry Act, and the Environmental Protection and Management Act, as well as a conceptual approach to analyze the doctrines of state control, the ecological function of forests, and principles of environmental protection. The findings demonstrate that protecting spring water is a constitutional mandate reinforced by interrelated sectoral statutes. Forests perform a critical hydrological function; thus, the degradation of forest areas directly affects the quality and availability of water. The Environmental Protection Act provides preventive legal instruments, such as the Strategic Environmental Assessment, Environmental Impact Assessment, and environmental approval, to control harmful activities. Additionally, forest rehabilitation programs and the designation of protected local zones strengthen the conservation measures. Although the legal framework is comprehensive, its effectiveness is hindered by policy inconsistencies, weak supervision, and conflicts of interest in land use decisions. An integrated, multilayered statutory system regulates the legal protection of spring water in forested areas. However, its success depends on consistent law enforcement, intergovernmental coordination, and strengthened local regulations to ensure sustainable water availability for future generations of farmers.

Keywords: spring water protection, forest area, environmental law.

1. INTRODUCTION

Water holds essential value for life; in fact, water is irreplaceable in the same way as oxygen. Almost every aspect of human activity requires water for its sustenance. Water resources have become a widely discussed topic because of their vital role in sustaining life on Earth. The issue of *ulayat* rights over water has become crucial in light of its complex regulation, encompassing customary, economic, social, and environmental dimensions, as well as potential conflicts between indigenous communities' interests and national development. Therefore, the right to water is a fundamental human right (Siregar et al., 2018). The report demonstrates that inadequate maintenance of water availability leads to environmental degradation and jeopardizes the water supply.

As the population increases, the water demand increases proportionally. Meanwhile, according to the hydrological cycle, the amount of available water remains constant (Chairunnisa & Wibowo, 2021). Thus, population growth inevitably increases the water demand. Therefore, natural resource management must be carried out to ensure that the wealth of natural resources can truly be utilized for the prosperity of all people, not only the present generation but also future generations (intergenerational responsibility).

Given its vital nature, water is regulated by the Constitution of the Republic of Indonesia. Article 33, paragraph (3) of the 1945 Constitution of the Republic of Indonesia stipulates: "Land, water, and the natural resources within shall be controlled by the State and shall be utilized for the greatest prosperity of the people." As the holder of the highest authority, the State possesses the right and competence to regulate, manage, and supervise the utilization of natural resources, namely, all elements derived from nature that can be used to meet human needs, including water resources.

One embodiment of water regulation that reflects this constitutional principle is Law Number 17 of 2019 concerning Water Resources, which generally governs water management and sets forth the rights and obligations of the public to preserve water resources. In its general provisions, water resources are defined as water, water sources, and the water potential contained therein.

Furthermore, Law Number 41 of 1999 concerning Forestry affirms the role of forests in sustaining the hydrological cycle, including provisions for water conservation, protection of water resources, and regulation of groundwater and surface water circulation. Article 1, paragraph (1), point 8 stipulates that protected forests are forest areas with the primary function of safeguarding life-supporting systems by regulating water cycles, preventing floods, controlling erosion, deterring seawater intrusion, and maintaining soil fertility.

The management of water resources has become a critical global issue, particularly because of the impacts of climate change, population growth, water pollution, and resource-related conflicts. Therefore, one of the objectives of the Sustainable Development Goals (SDGs) (UN World Water Development Report, 2025), specifically Goal 6, is to ensure the availability and sustainable management of clean water and sanitation for all living beings. SDG 6 emphasizes ensuring universal access to clean and safe water and sanitation, as well as the sustainable management of water resources.

Several regions in Indonesia face water scarcity. According to a 2020 report by Bappenas, the area at risk of clean water scarcity is estimated to increase from 6% in 2000 to approximately 9.6% in 2045. In addition, the Meteorology, Climatology, and Geophysics Agency (BMKG) has warned that many regions will experience water shortages during the 2025 dry season because of shifting seasonal patterns and unpredictable rainfall.

These conditions indicate that the clean water crisis is caused not only by distribution or infrastructure issues but also by ecological factors such as diminishing spring sources, prolonged dry seasons, declining rainfall, and environmental degradation. This aligns with the importance of managing and protecting water resources, which is closely linked to the role of forests and the objectives of SDG 6 to ensure sustainable access to clean water.

Based on these conditions, the research problem of this study is as follows: How does the legal framework governing the protection of spring sources in forest areas in Indonesia operate?

2. METHOD

This study is normative legal research that examines written legal norms and principles governing the protection of spring sources within forest areas. The approaches employed include the Statute Approach, by reviewing the 1945 Constitution of the Republic of Indonesia, Law No. 17 of 2019 on Water Resources, Law No. 41 of 1999 on Forestry, Law No. 32 of 2009 on Environmental Protection and Management, and their implementing regulations. In addition, a Conceptual Approach is applied to understand state control, community rights to water, the protective function of forests, and ecological protection.

3. RESULT AND DISCUSSION

The legal framework governing the protection of spring sources within forest areas is based on Article 33, paragraph (3) of the 1945 Constitution, which affirms that the State shall control land, water, and the natural resources contained therein for the greatest prosperity of the people. The concept of "controlled by the State" in Article 33 of the 1945 Constitution is widely interpreted not as state ownership but as the state's authority to regulate, manage, and supervise these resources for the public's most significant benefit (Haryanto et al., 2020). This State control must be oriented toward people's welfare, considering efficiency, transparency, sustainability, and environmental considerations in every legal policy (Hoessein et al., 2020). This constitutional mandate forms the normative foundation for enacting the Water Resources Law.

The Water Resources Law is the primary regulation governing water management. This statute emphasizes the importance of sustainability, protection of conservation areas, and preservation of aquatic ecosystems. Spring sources are categorized as water resources that must be protected. Springs constitute groundwater that naturally emerges at the surface (Prastistho et al., 2018). The law stipulates that water management must focus not only on utilization but also on the conservation of recharge areas, including forests. Forests and trees are integral components of the hydrological cycle, regulating river flow, facilitating groundwater recharge, and contributing to atmospheric water cycling through evapotranspiration (Springgay et al., 2019). More than 70% of the Earth's freshwater originates from forested areas (Sumalatha et al., 2024). Accordingly, protecting spring sources cannot be separated from forest conservation in a holistic hydrological system.

Any discussion of forests is inseparable from Law No. 41 of 1999 on Forestry, which provides direct regulation of forests as life-supporting systems, including maintaining water regulation, preventing erosion, and controlling floods. Article 1, point 8, which defines protected forests, underscores their crucial role in regulating the water cycle, ensuring sustainable water availability, and minimizing the impacts of droughts (Lestari et al., 2020). Their ability to prevent flooding and control erosion is vital for safeguarding communities and infrastructure against natural disasters (Budiman et al., 2023).

Maintaining forested areas within agricultural or urban watersheds can regulate biogeochemical cycles, prevent erosion, reduce pollutant loads, decrease nutrient runoff, and lower water temperatures (Rigonato et al., 2023). Given the vital ecological role of forests in human life, the presence of spring sources within forest areas—particularly within protected forests—requires a higher level of legal protection, as these areas support ecological functions that must be preserved.

Further regulations are found in Law No. 32 of 2009 concerning Environmental Protection and Management (UUPPLH), specifically in Article 2, which establishes the principles of sustainability and benefit, public participation, justice, collective responsibility, transparency, and integration. Although not expressly referred to as the "precautionary principle" in Article 2, the spirit of prevention is firmly embedded throughout the law. Environmental pollution and/or damage must be addressed through preservation-oriented measures, including preventive, mitigative, and restorative measures (Imanika & Rohman, 2022). Environmental law enforcement is also preventive, aiming to avert environmental degradation and pollution (Nugraha et al., 2021).

Article 22(1) of the UUPPLH clearly states that any business and/or activity with significant environmental impacts must obtain an Environmental Impact Assessment (AMDAL). The AMDAL mechanism is essential as a preventive tool to avert environmental degradation and uphold environmentally sustainable development (Sup, 2019). The law stipulates that water resource degradation

constitutes environmental damage that must be prevented through administrative instruments, such as the Strategic Environmental Assessment (KLHS), Environmental Impact Assessment (AMDAL), and environmental permits.

The KLHS is mandatory for the preparation and evaluation of spatial plans, policies, programs, and/or plans that may generate environmental impacts or risks (Prabowo, 2014). Accordingly, the KLHS ensures that environmental aspects, including water resource protection, are considered and incorporated at the earliest stage of policy formulation and development planning.

Environmental permits function as legal instruments that prevent the conduct of business actors or institutions. Such permits may also serve a repressive function by addressing environmental problems caused by human activity (Winarsi et al., 2023). However, following the enactment of the Job Creation Law, environmental permit requirements were abolished and incorporated into the business licensing mechanism, under the new nomenclature of "environmental approval."

Without these administrative instruments, the activity in question may be deemed illegal and subject to administrative, civil and/or criminal sanctions. This demonstrates that strong enforcement mechanisms support the legal framework for spring-source protection.

The UUPPLH expands the scope of protection through an ecosystem-based approach, ensuring that spring sources are protected not in a sectoral manner but as part of an interconnected forest ecosystem. Article 1, point 5 defines an ecosystem as an arrangement of environmental elements forming an integrated, holistic entity that mutually influences one another to produce environmental balance, stability, and productivity. This concept highlights the interdependent and holistic nature of the environment. Environmental management, including its supporting systems, cannot stand alone and must be integrated with the implementation of development across sectors (Herlina, 2017).

The integration of forestry, environmental, and water resource regulations demonstrates that Indonesia's legal framework adopts an ecosystem-based management approach that views natural resources and ecosystems as interconnected entities rather than isolated sectors. The UUPPLH is often described as an umbrella law for environmental-related legislation, including forestry and natural resources. This document demonstrates an effort to harmonize various sectors within an environment-oriented legal framework. In this approach, water and forests are not viewed as sectoral objects but as inseparable components of a single ecosystem. Any damage to forest areas directly affects water quality and availability, thereby justifying the need for layered legal protection through multiple regulatory instruments.

National policy instruments further strengthen this protection for children. SDG 6 on clean water and sanitation serves as a reference for national policymaking to ensure the sustainability of water resources. Reports from Bappenas and warnings from the Meteorology, Climatology, and Geophysics Agency (BMKG) regarding the potential for a water crisis affirm that spring protection is a national strategic concern. Therefore, the State is obliged to ensure water availability through forest rehabilitation, protection of recharge areas, and control of activities that disrupt hydrological systems.

Forest and land rehabilitation policies for restoring degraded land constitute vegetative conservation efforts aimed at preserving water resources (Pambudi, 2021). This means that the government improves environmental conditions by replanting various types of vegetation—trees and ground-cover plants that enhance soil absorption capacity—thereby improving soil structure, increasing rainwater infiltration, reducing surface runoff, and preventing erosion. The restoration of vegetation cover in damaged areas enables natural water retention, maintains groundwater availability, reduces flood risks, and preserves water quality. Thus, vegetative rehabilitation not only restores the ecological functions of forests but also ensures the sustainability of hydrological cycles and the resilience of local water resources.

Indonesia has implemented various programs to rehabilitate forests and land. Since 1978, reforestation and greening programs have been carried out, followed by the 2003 National Movement for Forest and Land Rehabilitation (Gerhan), which targeted the rehabilitation of millions of hectares of land (Hayati et al., 2025). The Ministry of Environment and Forestry is responsible for formulating plans and implementing forest and land rehabilitation, soil and water conservation, and measures to control water-related environmental hazards (Prastya & Poti, 2019).

From a legal perspective, forest areas containing spring sources possess a special status. When an area is designated as a protected forest or a conservation area, activities that may degrade water quality or reduce water discharge must be strictly limited. Regulations require the establishment of instruments such as Local Protection Areas (WPS), spring buffer zones, and absolute protection zones, which must not be used for activities that alter land cover. WPS is defined as a designated area surrounding spring sources intended for land-use practices that preserve water quantity, quality, and flow (Prameswari, 2018).

Spring buffer zones are established to protect springs from agricultural or other land-use activities that may damage water quality or the physical condition of the surrounding area. The Regulation of the Minister of Public Works and Housing No. 28/PRT/M/2015 on the Determination of River and Lake Buffer Zones provides that the minimum buffer radius for spring areas is 200 meters from the spring source. This principle emphasizes that spring protection focuses not only on the exact location where water emerges but also on the surrounding catchment area. Consequently, damage or reduction of forest cover around spring sources may be considered a violation of water resource conservation regulations.

Within the framework of governmental authority, both central and regional governments have specific roles. Since decentralization, regional governments have borne greater responsibility for managing and providing clean water, including through environmental conservation (Yumanda & Vidriza, 2022). Regional governments may establish spring protection policies through regional spatial plans (RTRW), environmental regulations, and conservation programs. Notably, West Nusa Tenggara Province has enacted Regional Regulation (Perda) No. 1 of 2023 on Spring Protection and Preservation, aimed at protecting and preserving spring sources to ensure sustainable clean water availability. However, regional authorities must remain aligned with the principle of state control, meaning that local governments must not issue permits that contravene forest functions or damage spring sources.

The primary challenge in spring protection is not the lack of regulation, but rather implementation and law enforcement. Water resource governance in Indonesia is significantly challenged by misalignment between environmental sustainability goals and socio-economic development priorities. Public decision-making often prioritizes anthropogenic considerations over hydrological factors, resulting in institutional mismatch and ecological dysfunction (Pambudi & Yanti, 2023). Legally, however, spring protection is a state obligation, not a policy preference.

Based on the foregoing regulations, the legal framework governing the protection of spring sources within forest areas is comprehensive and integrative. Forests and mountain ecosystems provide more than 75% of the world's renewable freshwater supply and deliver drinking water to over half of the global population (FAO et al., 2021). Given the vital role of protected forests within hydrological systems, any activities that may alter these systems must be supported by strict preventive measures (Yanis & Pane, 2019). Such stringent protection aims to maintain ecological balance and ensure the long-term availability of clean water for human life. Several countries also implement differentiated forest management in drinking water protection areas to ensure spring water quality and stable water discharge (Kundrík & F., 2006).

Indonesian law provides multi-layered protection through constitutional mandates, water resource legislation, forestry law, environmental law, and regional regulations. The next challenge lies in ensuring harmonization and consistent implementation of these regulations so that spring sources can be preserved for present and future generations.

4. CONCLUSION

The protection of spring sources within forest areas in Indonesia is grounded in a strong and comprehensive legal framework, ranging from the 1945 Constitution to various sectoral statutes such as the Water Resources Law, the Forestry Law, and the Environmental Protection and Management Law. Collectively, these regulations affirm that spring sources constitute an integral component of forest ecological functions, thereby requiring their prudent use with due regard for the principles of sustainability, prevention, and the control of water-related environmental risks. The national legal framework also underscores the importance of integrated ecosystem management, wherein forests, groundwater, recharge

areas, and catchment zones are viewed as a unified ecological system that must be preserved to ensure the continuity of the hydrological cycle.

Nevertheless, the effectiveness of spring protection depends not only on the existence of legislation but also on consistent implementation, policy harmonization, and robust enforcement. Challenges such as development-related conflicts of interest, weak law enforcement, and ongoing forest degradation continue to pose significant threats to the sustainability of water sources. Therefore, stronger coordination between central and regional governments is required, along with the strict application of preventive instruments such as Strategic Environmental Assessments (KLHS) and Environmental Impact Assessments (AMDAL), and the strengthening of local regulations oriented toward conservation. With aligned policy execution and effective oversight, the protection of spring sources within forest areas can be ensured, thereby sustaining the availability of clean water for all communities, both present and future generations.

Ethical Approval

The study fell outside the scope of procedures that require ethical approval.

Informed Consent Statement

Not Applicable

Authors' Contribution

HAS contributed to the conceptualization of the study, formulation of research objectives, research design using a normative legal method, statutory approach and identification of relevant legal instruments (the 1945 Constitution, Water Resources Act, Forestry Act, and Environmental Protection and Management Act), conceptual analysis of state control doctrines and environmental protection principles, synthesis of findings, and drafting the original manuscript. NPS contributed to the legal materials collection and verification, organization of statutory and doctrinal sources, analysis of preventive legal instruments (SEA, EIA, and environmental approval) and conservation measures (forest rehabilitation and protected local zones), critical evaluation of implementation gaps (policy inconsistencies, weak supervision, and land-use conflicts), and reviewing and editing the manuscript.

Disclosure Statements

The authors declare that they have no conflicts of interest.

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The data supporting this study are unavailable publicly due to privacy considerations but may be obtained from the corresponding author upon request.

Notes on Contributors

Hera Alvina Setiawan

Hera Alvina S. is affiliated with University of Mataram

Nathania Permata S.

Nathania Permata S. is affiliated with University of Mataram

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