

Bottleneck Analysis and Countermeasures for Green Finance Empowering the Conservation and Intensive Utilization of Water Resources in the Poyang Lake Basin

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Abstract:

Under rigid water resource constraints, green finance is a key market-based tool to promote the conservation and intensive utilization of water resources. This paper constructs a theoretical analytical framework of "signal transmission—incentive compatibility—risk sharing" to explain the transmission mechanism of green finance driving water conservation, and uses it as a diagnostic tool to systematically examine the practical situation in the Poyang Lake Basin. The analysis shows that typical practices represented by Suichuan's "Water-Saving Loan" and Ji'an's "Two Mountains" transformation have achieved initial results, but the basin faces three bottlenecks: supply mismatch, maturity mismatch, and institutional mismatch. Green credit is surging in total volume, but special financing for water conservation is limited; short-term financial products are difficult to match the long-term return cycle of water infrastructure; and water ecological value accounting standards are inconsistent, while the trading market is thin, mutually constraining each other. Accordingly, this paper proposes breakthrough paths such as improving the management of water-related project libraries and special statistical systems, building a "Water-Saving Loan+" product portfolio and fiscal interest subsidy coordination mechanism, promoting the standardization of water-related rights pledge financing, and deepening the inclusive integration of water-related green notes in revolutionary old areas, in order to provide theoretical reference and policy reference for green finance empowering the implementation of the "Four Water Determinations".

Keywords:

Green Finance; Conservation and Intensive Utilization of Water Resources; Four Water Determinations; Water-Saving Loan; Poyang Lake Basin

1 Introduction

Water resources are both the most basic natural object and a strategic economic resource. In 2025, the Ministry of Water Resources further clarified that "controlling the total amount of water resources development and utilization" is the primary task, requiring acceleration of determining available water quantities and improving the provincial, municipal, and county-level water use total and intensity control indicator systems; in

2026, the General Office of the CPC Central Committee and the General Office of the State Council issued the "Opinions on Accelerating the Revitalization and Development of Revolutionary Old Areas", explicitly proposing to "scientifically, rationally and efficiently develop and utilize energy and resources". The Poyang Lake Basin covers many revolutionary old area counties such as Ji'an, Jiujiang, and Shangrao in Jiangxi, and its level of water resource conservation and intensive utilization directly relates to the coordinated development of ecological protection and economic and social development in the old areas. At present, with the acceleration of industrialization and urbanization, China's rigid water resource constraints are increasingly prominent. "Determining city by water, determining land by water, determining people by water, and determining production by water" (hereinafter referred to as "Four Water Determinations") has been shaped as the core criterion for basin water resource management in the new era. How to achieve a win-win situation of efficient water resource utilization and old area revitalization under rigid constraints has become a practical proposition urgently needing solution.

As an important link between ecological protection and economic development, green finance, through signal transmission, incentive constraints, and risk sharing mechanisms, can promote the transformation of water resource allocation from "administrative command-driven" to "price signal-driven", alleviate the systematic underestimation of water resource value, and provide financial and institutional support for the conservation and intensive utilization of water resources in the basin. However, in the current practice of green finance serving water conservation in the Poyang Lake Basin, there are still problems such as the disconnect between financial supply and financing demand, the mismatch between product maturity and project return cycles, and the lagging development of value accounting and trading markets, resulting in the empowering effect of green finance not being fully released. This paper attempts to construct a three-dimensional analytical framework of "signal transmission— incentive compatibility—risk sharing", examine the practical situation and bottlenecks of green finance serving water resource conservation and intensive utilization in the Poyang Lake Basin, and then propose breakthrough paths and countermeasures, in order to respond to the core proposition of how green finance can truly "empower" the implementation of the "Four Water Determinations".

2 Theoretical Logic of Green Finance Empowering Water Resource Conservation and Intensive Utilization

2.1 Rigid Constraints of "Four Water Determinations" and Financial Adaptation Needs

The core essence of "Four Water Determinations" is to take water resources as a rigid constraint, coordinate urban development, land use, population agglomeration, and industrial layout within the basin. Its essence is to achieve coordinated advancement of ecological protection and economic development through rational allocation of water resources. Its deep logic lies in that water resources are no longer an infinitely pleasurable production factor, but a scarce resource with a clear upper limit. Correspondingly, the allocation of water resources must shift from traditional administrative directive dominance to a dual-track model that emphasizes both administrative control and market incentives.

Rigid constraints mean that the scarcity of water use rights is institutionally confirmed and strengthened. When the total water use of a region is set as an unbreakable "ceiling", water use rights acquire property



rights attributes in the economic sense. However, for this property rights attribute to truly transform into market signals and incentive forces, effective intervention of the financial system is needed. One of the core functions of finance is inter-temporal resource allocation—casting currently idle funds into future assets. In the water resources field, this function manifests as the financial system promoting the flow of water resources from low-efficiency users to high-efficiency users, and from extensive water use to conservation and intensive water use, through credit evaluation and fund allocation for different water users. This is precisely the theoretical root of the inherent adaptation demand between the rigid constraints of "Four Water Determinations" and green finance.

From a practical perspective, water infrastructure construction and water-saving technology transformation have typical capital-intensive characteristics. Taking the Poyang Lake Basin as an example, projects such as irrigation district water-saving transformation, water network connectivity projects, and urban water supply pipeline leakage control all require substantial capital investment, while the traditional fiscal investment model faces the dual pressure of local financial constraints and excessively long project return cycles. Such projects have strong public goods attributes, long investment cycles, slow returns, and relatively high risks. The profit-seeking nature of traditional commercial finance leads to insufficient willingness to participate, while green finance, through innovative financing tools, broadening financing channels, and reducing financing costs, can fill the market funding gap, guide financial resources to tilt toward water resource conservation, and achieve precise adaptation between the rigid constraints of "Four Water Determinations" and financial resource allocation.

2.2 Three Transmission Mechanisms of Green Finance—Signal, Incentive, and Risk

Green finance's effect on water resource conservation and intensive utilization is not a simple process of fund supply, but exerts systematic efficiency through three interrelated transmission mechanisms.

1) Signal Transmission Mechanism

Green finance transmits price signals of water resource scarcity to the market through differentiated credit policies and pricing strategies. When financial institutions provide interest rate preferences for water-saving projects, this behavior itself constitutes a market "certification"—indicating that water-saving investment is a worthwhile investment direction. For example, the lower interest rate of "Water-Saving Loan" products compared to ordinary commercial loans essentially internalizes water conservation benefits into corporate financing costs, guiding enterprises to form rational expectations that "saving water means saving money, saving water means adding value". The deep significance of the signal transmission mechanism is that it can, to a certain extent, correct the long-standing systematic underestimation of water resource prices.

2) Incentive Compatibility Mechanism

Incentive compatibility means that institutional design enables participating entities to objectively achieve the overall expected goals of the system while pursuing their own interests. In the field of intensive water resource utilization, green finance, by incorporating water-related rights (water abstraction rights, water use rights, income rights from water rights trading, etc.) into the scope of pledgeable assets, constructs a positive feedback loop between borrower behavior and financial institution interests. When enterprises can obtain

pledge financing through saved water rights, reduce water fee expenditures through water-saving transformation, and improve green credit ratings, water conservation becomes internalized from an external administrative order into an autonomous business decision of the enterprise. Financial institutions pursue high-quality green assets, while enterprises pursue low-cost financing and brand premium. The behavior of both parties jointly promotes the realization of the goal of water resource conservation and intensive utilization.

3) Risk Sharing Mechanism

Water conservancy projects generally have the characteristics of large investment scale, long return cycles, and significant externalities, making it difficult for a single market entity to independently bear their risk exposure. Green finance, by introducing diversified risk sharing tools such as fiscal interest subsidies, guarantee credit enhancement, green insurance, and syndicated loans, reasonably allocates the uncertainty of water conservancy projects among different entities. For example, government financing guarantee institutions provide credit enhancement for water-related green projects, reducing the credit risk exposure of commercial banks; green insurance covers income losses caused by extreme hydrological events, stabilizing the credit expectations of financial institutions. The degree of perfection of the risk sharing mechanism directly determines the willingness and depth of financial institutions' participation in the water resources field.

The three mechanisms are mutually coordinated and progressive: signal transmission lays the cognitive foundation, incentive compatibility ignites the action engine, and risk sharing maintains the system's enduring stamina. Together they constitute the theoretical 动力 core of green finance empowering the "Four Water Determinations", and are the core logic of green finance empowering water resource conservation and intensive utilization. When problems such as information asymmetry, insufficient product adaptation, and institutional disconnection occur on the financial supply side, the "stalling" of the three mechanisms will lead to the difficulty of fully exerting the empowering effect of green finance.

2.3 Analytical Framework: From "Financial Repression" to "Financial Deepening"

This paper's analytical framework takes "financial repression" as the diagnostic starting point, analyzes the bottlenecks of green finance serving water resource conservation, and through measures such as institutional improvement, product innovation, and information flow, promotes the transformation of green finance from "repression" to "deepening", achieving precise docking between financial resources and water resource conservation needs, and fully releasing the empowering effect of green finance.

Financial repression theory holds that when financial markets have problems such as information asymmetry, single products, and imperfect institutions, the efficiency of financial resource allocation will be greatly reduced, making it difficult to meet the effective financing needs of the real economy. Applying this theory to the field of green finance serving water resource conservation in the Poyang Lake Basin, the current green finance development in the basin is still in a state of "financial repression": the scale of green credit is insufficient, the product structure is single, and the maturity matching degree is low, making it difficult to meet the funding needs of water resource conservation projects; the fragmentation of value accounting standards and the lagging development of trading markets make it difficult to transform the ecological value of water resources into financial-recognized assets, restricting the deepening development of green finance. Financial deepening refers to gradually eliminating the above repression factors through institutional reform and prod-



uct innovation, so that the three transmission mechanisms of green finance can fully play their roles.

Based on the above logic, we regard the effectiveness of green finance serving water resource conservation as the result of the contest between "financial repression" factors and "financial deepening" forces.

3 Practical Situation of Green Finance Empowering Water Resource Conservation in the Poyang Lake Basin

3.1 Policy Evolution from Basin Ecological Compensation to Green Finance Reform and Innovation

The water-related policies of the Poyang Lake Basin have roughly experienced an evolution from "fiscal mechanisms mainly based on ecological compensation" to "equal emphasis on green finance reform and innovation and ecological compensation".

At the basin governance level, the issuance and implementation of the Poyang Lake water system water scheduling plan marks that basin water resource management has entered a stage of refined regulation. The Yangtze River Water Conservancy Commission of the Ministry of Water Resources requires relevant units to strengthen regional total water use and cross-section discharge flow (water volume) control management, ensuring basin water supply security and ecological security. At the same time, the national level explicitly requires that "the locations of Dongting Lake, Poyang Lake and the rivers entering and leaving the lakes should actively explore new ways of basin ecological protection compensation", incorporating ecological compensation and water resource protection into the same framework from the top-level policy design.

In recent years, Jiangxi Province has gradually built a policy system of "ecological compensation + green finance" around the ecological protection and water resource management of the Poyang Lake Basin. With the advancement of the "Four Water Determinations" policy, the policy focus has gradually shifted to green finance reform and innovation. In 2023, documents such as the "Jiangxi Province Green Finance Development Plan" were issued, explicitly proposing to support green finance product innovation in fields such as water resource conservation and water ecological restoration, and establishing supporting systems such as special green credit statistics and risk compensation; in June 2024, the Jiangxi Provincial Department of Water Resources, together with the People's Bank of China Jiangxi Branch and other departments, issued the "Notice on Carrying Out 'Water-Saving Loan' Financing Services", marking that "Water-Saving Loan" as a special green finance product has obtained provincial-level institutional endorsement. In 2025, Jiangxi Province's green loan balance reached 1,196.1 billion yuan, a year-on-year increase of 25.6%, and the green loan increment was 226.1 billion yuan, accounting for 51.7% of the total loan increment, making green finance the dominant force in the province's credit growth.

At the same time, combined with the revitalization and development needs of revolutionary old areas, Jiangxi Province combines green finance with the "red-green" integrated development of old areas, encouraging financial institutions to launch characteristic green finance products suitable for water resource conservation projects in old areas, providing policy support for the conservation and intensive utilization of water resources in revolutionary old areas of the Poyang Lake Basin.

3.2 Typical Practices of Suichuan's "Water-Saving Loan" and Ji'an's "Two Mountains" Transformation Exploration

Under the promotion of provincial policies, various localities in the Poyang Lake Basin have carried out distinctive green finance innovations around water resource conservation, with Suichuan's "Water-Saving Loan" and Ji'an's "Two Mountains" transformation being the most representative.

Suichuan's "Water-Saving Loan" is a pioneering experiment of green finance empowering water resource conservation and intensive utilization in Jiangxi Province. In April 2024, Jiangxi Province's first "water right + water-saving loan" pledge loan project was successfully signed in Suichuan County, marking the official landing of a water-related green finance product jointly developed by government and banks. This product uses the water abstraction right legally obtained by the water abstractor as collateral to apply for loans from financial institutions, and its support scope covers multiple fields of water resource conservation and intensive utilization. On April 24, 2026, Suichuan County Yuanquan Water Service Technology Co., Ltd. successfully signed a 50 million yuan "Water-Saving Loan" financing contract with Shanghai Pudong Development Bank. The project funds are used for laying water source transmission pipelines, renovating water-saving processes in production workshops, renovating water supply and drainage and power supply systems, and purchasing water purification filling equipment and water source water quality and water-saving monitoring facilities. From the first pilot to large-scale replication, the evolution trajectory of Suichuan's "Water-Saving Loan" reflects the feasible path of water-related green finance from pilot to scale replication.

Ji'an's "Two Mountains" transformation exploration provides a more systematic observation sample. With the "Two Mountains" transformation breakthrough battle as the command, Ji'an City has carried out all-round exploration in green finance product innovation, cumulatively developing and landing more than 20 province-level "first" green finance products, including "Smart Agriculture Loan", "Water Abstraction Right + Water-Saving Right Pledge Loan", "Agricultural Low-Carbon Transition Loan", etc. Among them, the "Water Abstraction Right Loan" was first landed in Ji'an and then immediately promoted throughout the province, making water resource use rights "liquid assets" in the hands of enterprises. As of the end of August 2025, the green loan balance of rural commercial banks within Ji'an jurisdiction reached 2.33 billion yuan, a net increase of 490 million yuan from the beginning of the year. At the same time, Ji'an was the first in the province to deepen the basin ecological compensation mechanism, establishing multiple "Two Mountains" colleges, providing comprehensive support of institutions, technology, and talent for the realization of ecological product value.

In addition, Jiujiang, Shangyou and other places have also carried out related characteristic innovation practices. As of the end of 2023, Jiujiang City's green credit balance was 41.49 billion yuan, accounting for 23.5% of all loans, ranking first in the province. Since 2022, it has innovatively launched "Clean Water Loan", and in 2025 landed the province's first "biodiversity + wetland restoration" loan and a 500 million yuan Poyang Lake biodiversity protection indicator-linked syndicated loan; Shangyou County in 2025 successively landed Jiangxi Province's first 200 million yuan "VEP pledge loan" and the first "water abstraction right real estate mortgage loan", providing replicable samples for water resource rights pledge financing. Although these scattered explorations have not yet been condensed into a unified basin-wide system, they have constituted a rich collection of local experiences.



3.3 Initial Results and Structural Characteristics

After years of practice, green finance empowering water resource conservation and intensive utilization in the Poyang Lake Basin has begun to take shape. First, the total amount of green credit continues to expand, providing basic financial support for water-related fields. As of the end of 2025, Jiangxi Province's green loan balance was nearly 1.2 trillion yuan, with growth rates continuously higher than the average level of all loans for many years, and the scale of special water-related products such as "Water-Saving Loan" and "Water Abstraction Right Loan" also climbed simultaneously; second, product innovation spread in echelons along the path of "grassroots first creation—provincial adoption—full-domain promotion". From the first breakthrough in Suichuan to the landing of multiple first-created products in Ji'an, financing models have expanded from single project loans to multiple forms such as water abstraction right pledges, VEP pledges, and income rights from water rights trading pledges; third, policy supporting measures have gradually improved, with systems such as special green credit statistics, risk compensation, and fiscal interest subsidies gradually established, providing preliminary institutional guarantees for green finance water-related practices.

However, from the perspective of "financial deepening", the current results still show obvious non-equilibrium characteristics at the structural level. First, regional concentration: green finance resources are mainly concentrated in pilot cities such as Ji'an and Jiujiang, while green finance coverage in vast revolutionary old area counties is still insufficient; second, field concentration: credit investment is tilted toward large water conservancy projects and key water utilities, and the financing availability of small, medium and micro water-saving enterprises is relatively low; third, product concentration: short-term green credit with a maturity of 3-5 years is the absolute main body, and the supply of long-term financing products and equity financing tools is insufficient, making it difficult to adapt to the 10-20 year return cycle of water conservancy projects. The tension between total expansion and structural imbalance, and the contradiction between active product innovation and lagging institutional adaptation, constitute the most prominent practical challenges in the current basin green finance practice.

4 The "Triple Mismatch" Bottlenecks of Green Finance Empowering Water Resource Conservation

4.1 Supply Mismatch—Structural Gap Between Credit Scale and Financing Demand

Supply mismatch is the most explicit bottleneck at present. Its essence is that the total expansion of green finance has not effectively transformed into special financing supply in the field of water resource conservation, forming a significant structural gap. From the supply side, as of the end of 2025, Jiangxi Province's green loan balance was nearly 1.2 trillion yuan, while the "Water-Saving Loan" financing scale, according to incomplete statistics, was only about 2.1 billion yuan, accounting for less than 0.2% of the total green loans. From the demand side, during the "15th Five-Year Plan" period, the water conservancy construction investment demand in the basin is conservatively estimated at more than 500 billion yuan. The total investment of the Jinggang Irrigation District project in Ji'an alone reaches 13.4 billion yuan, and there are also huge funding gaps in urban and rural water supply pipeline leakage control, irrigation district modernization transformation, and industrial water-saving and emission reduction. The huge disparity in volume between supply

and demand reflects a structural imbalance in which green finance resources are seriously insufficiently tilted toward the field of water resource conservation.

Investigating the causes, information asymmetry and the absence of special statistics are two key obstructions. On the one hand, water conservancy projects are scattered across multiple departmental management lines such as water conservancy, housing and urban-rural development, and agriculture and rural affairs, lacking a unified project information collection and docking platform, making it difficult for financial institutions to systematically identify qualified water-related financing targets. On the other hand, the current green finance statistical system does not list "water resource conservation and intensive utilization" as an independent subject, and the scale of products such as "Water-Saving Loan" is submerged in extensive categories such as "infrastructure green upgrading", making policy effects difficult to accurately assess and failing to form effective assessment incentives and resource guidance.

4.2 Maturity Mismatch—Structural Imbalance Between Short-Term Financial Tools and Long-Cycle Returns

Maturity mismatch, compared with supply mismatch, more deeply touches the sustainability of green finance empowering water resource conservation. Water conservancy infrastructure projects have the natural attributes of large investment scale and long return cycles: from planning and design to the full release of water-saving benefits, irrigation district water-saving transformation usually takes 8 to 15 years, and large projects such as water network connectivity even have return cycles exceeding 20 years. However, the maturity of current mainstream water-related green credit products such as "Water-Saving Loan" is mostly concentrated in 3 to 5 years, forming a significant gap between the short-term nature of financial tools and the long-term nature of project returns.

This structural imbalance in maturity directly leads to the systematic amplification of liquidity pressure on project entities. During the project construction period or early operation period, water-saving benefits have not yet fully emerged, but loans have already entered the principal and interest repayment stage, worsening the asset-liability maturity structure of enterprises. Out of risk prudence considerations, financial institutions tend to further shorten maturities and add guarantee conditions, raising financing thresholds. Thus, maturity mismatch forms a self-reinforcing negative cycle: the shorter the maturity, the higher the risk premium; the higher the risk premium, the worse the credit availability. To break this dilemma, it is not simply a matter of requiring banks to break through the prudent boundaries of asset-liability management to lengthen single loan maturities, but rather to seek systematic maturity matching solutions in dimensions such as product portfolio design, fiscal interest subsidy coordination, and bond market continuation.

4.3 Institutional Mismatch—Dual Lock-in of Fragmented Accounting Standards and Underdeveloped Trading Markets

The core prerequisite for green finance to serve water resource conservation is that the ecological value of water resources is quantifiable and tradable. However, the current Poyang Lake Basin has an institutional mismatch of fragmented ecological value accounting standards and underdeveloped trading markets, restricting the deepening development of green finance.



In the dimension of accounting standards, although VEP pilots have been carried out in Shangyou, Ganzhou, Suichuan, Ji'an, etc., there is still a lack of unified technical specifications for water ecological value accounting across administrative regions and the entire basin. Different localities and projects adopt differentiated accounting models and evaluation parameters, which are difficult to compare with each other and cannot be mutually recognized. The Bijia Mountain project in Shangyou County relies on scientific research forces to convert carbon sequestration and water conservation benefits into monetary indicators. Whether this practice is replicable elsewhere and whether its accounting results can be fairly accepted by the financial system lack institutional confirmation. The inconsistency of accounting standards makes it difficult to form a unified quantitative standard for the ecological value of water resources, making it difficult for financial institutions to accurately assess the ecological and economic benefits of water resource conservation projects, increasing the difficulty of credit risk assessment.

On the other hand, the water resource rights trading market is lagging in development. Although Suichuan, Jinggangshan and other places have landed practices such as VEP financing and water abstraction right pledge loans, the overall market transaction scale is relatively small, and cross-regional water rights trading and ecological product trading mechanisms are imperfect. It is difficult for the ecological value of water resources to be transformed into stable income for enterprises through market transactions, resulting in the incentive compatibility effect of green finance being constrained, and mechanisms such as income rights from water rights trading pledges being difficult to fully play their roles. Insufficient market thickness means that water-related rights as collateral lack a smooth disposal and realization channel—even if banks formally accept them, once default occurs, it is difficult to realize them efficiently. This dilemma appears to be a market development problem on the surface, but in reality it is rooted in the deep defects of inconsistent accounting standards and imperfect rights circulation systems. Thin markets restrict the development of pledge financing, and inactive pledge financing in turn inhibits market expansion. The two are mutually causal, forming a typical lock-in dilemma. In addition, the insufficient connection between green finance and systems such as ecological compensation and water resource management further exacerbates the institutional mismatch problem.

The above three mismatches are not isolated but intertwined and transmitted layer by layer: institutional mismatch leads to the difficulty of fair pricing of water ecological value, deepening information asymmetry and risk assessment difficulty for financial institutions; information asymmetry and difficulty in pricing risks in turn exacerbate supply mismatch and maturity mismatch. The superimposed effect of the three mismatches makes the theoretical transmission mechanism of green finance empowering water resource conservation and intensive utilization face obvious blockage in actual operation.

5 Optimization Paths and Countermeasures for Green Finance Empowering Water Resource Conservation in the Poyang Lake Basin

5.1 Improve the Project Library and Special Statistical System to Alleviate Information Asymmetry

Supply mismatch in water-related financing stems largely from information barriers between supply and

demand. Projects are scattered across departments, and financial institutions lack channels to systematically identify quality water assets. Institutional development should therefore advance along two tracks: project aggregation and statistical accounting.

1) Build a standardized “Water Conservancy Green Project Database.”

Projects such as irrigation district renovation, water network connectivity, industrial water conservation and emission reduction, and urban water supply network leakage control are managed by water conservancy, housing and urban-rural development, agriculture and rural affairs, ecology and environment, and other departments. Information is fragmented, making asset screening and risk assessment difficult. It is recommended that the provincial water conservancy department take the lead, together with local financial regulators, to formulate management measures for a Poyang Lake Basin water conservancy green project database. Entry criteria should be clarified, with investment scale, expected water-saving benefits, payback period, risk level, and guarantee method included in a standardized registration template. The database should be dynamically updated and managed by level, aggregated at provincial and municipal levels, and reserve a dedicated entry for county-level small, medium, and micro water-saving projects, so it does not become a channel only for large projects. It should also be connected to banks’ credit approval systems, with third-party verification, to ensure authenticity and credibility and enable financial institutions to screen eligible water-related financing targets at low cost and high efficiency.

2) Add a special statistical category for “conservation and intensive use of water resources.”

In the current green finance statistical system, water-saving loans, water withdrawal right pledge loans, water ecological protection loans, and other water-related products are grouped into broad categories such as “green upgrading of infrastructure” and “ecological and environmental industry.” Their scale and structural changes cannot be independently observed, policy effects cannot be precisely evaluated, and effective assessment pressure on financial institutions is hard to form. It is recommended that the People’s Bank of China Nanchang Central Sub-branch establish a special category in the revised green finance statistical system, bringing water-related green credit, green bonds, water right pledge financing, and other products into separate accounting, with quarterly statistics and annual publication. Public data can provide a continuous, comparable information basis for policymaking and quantitative grounds for targeted assessment and window guidance, guiding financial institutions to treat water resources as an independent direction for green asset allocation rather than an appendage of the broad infrastructure category.

3) Promote information interconnection between the project database and the statistical system to form a closed loop of “registration—disbursement—feedback.”

The database carries financing demand information, while the statistical system records disbursement results. If separated for long, dynamic monitoring of supply-demand matching becomes difficult. It is recommended that a data interface be embedded in the project database to connect with special statistics, enabling full-chain management of demand publication, credit disbursement tracking, and water-saving benefit feedback. After completing water-related credit disbursement, financial institutions should return core fields such as loan amount, term, and interest rate to the database; the statistical system will automatically aggregate them and generate a basin-level water-related financial operation report. This closed-loop mechanism can



help authorities grasp in real time the gaps and structural features of supply-demand matching and provide evidence for subsequent dynamic policy adjustment.

These three measures, advanced together, aim to clear information flow at the institutional infrastructure level. As water-related project information moves from fragmentation to integration and water-related financial data from obscurity to visibility, banks' transaction costs for identifying quality water assets will fall significantly, and supply mismatch is expected to gradually move from a structural gap toward supply-demand alignment.

5.2 Build a "Water-Saving Loan+" Product Portfolio and Fiscal Coordination Mechanism to Bridge the Maturity Gap

Maturity mismatch arises from the conflict between the short-term nature of financial instruments and the long-term returns of water conservancy projects. A maturity-matching scheme should be built through product mix, fiscal coordination, and risk mitigation.

Open a relay channel of "Water-Saving Loan + green bonds." Large irrigation districts and backbone water networks need short-term liquidity during construction and long-term funds during operation. It is recommended that during construction, "Water-Saving Loans" provide 3–5 years of liquidity support; after water-saving benefits emerge in operation, green corporate bonds or project revenue bonds can be issued for re-financing, extending maturities to 10–15 years. This forms a chain of "short-term loans first, long-term bonds following." For example, the Jinggang Irrigation District, with total investment of 13.4 billion yuan and a payback period of over 15 years, could receive syndicated "Water-Saving Loans" during construction and issue green bonds after returns stabilize, using future revenue for debt service. This eases construction-period pressure and prevents debt repayment burdens from piling up in the early operation stage.

Establish a performance-oriented fiscal interest subsidy and risk compensation mechanism. Banks demand higher rates and stricter guarantees for long-cycle water projects because longer terms accumulate uncertainty. Provincial and municipal finance departments should set up special "Water-Saving Loan" interest subsidy funds in proportion, linked to water savings and emission reduction performance: the better the results, the higher the subsidy ratio. This upgrades subsidies from simple cost compensation to an incentive-compatible tool, lowering financing costs and encouraging project entities to internalize water-saving goals. A risk compensation fund should also share part of principal losses on eligible long-term loans, reducing banks' credit risk exposure and weakening their incentive to shorten maturities or add collateral.

Introduce green insurance as a risk mitigation tool. Water projects face hydrological fluctuations, policy changes, and lower-than-expected returns. Insurers should be encouraged to develop products such as water-saving project revenue insurance and extreme hydrological event insurance, transferring tail risks to the insurance system. If water-saving revenue falls short due to hydrological anomalies or force majeure, insurance payouts can cover part of loan principal and interest, providing an additional buffer. The core value is that third-party risk sharing reduces banks' sensitivity to single-project uncertainty, giving them more flexibility on maturities and forcing standardization of project assessment and risk disclosure.

These three measures work together: "Water-Saving Loan + green bonds" addresses maturity continuation;

fiscal subsidies and risk compensation reduce the risk premium of long-term financing; green insurance provides a backstop for extreme risks.

5.3 Unify Accounting Standards and Build a Solid Institutional Foundation for Water-Related Rights Pledge

The institutional mismatch lies in the simultaneous failure and mutual reinforcement of the “measurement” and “monetization” of water ecological value. The solution requires unifying accounting standards and connecting the pledge system, so that water-related rights possess asset attributes that the financial system can identify, accept, and dispose of.

Fragmented accounting standards are the first barrier. Although VEP pilots in Shangyou, Ganzhou, and Suichuan, Ji'an, have gained experience, their models, parameters, and certification procedures differ, making results hard to compare across regions or accept by financial institutions. It is recommended that provincial natural resources and ecology departments lead, with financial regulators, in formulating the Technical Specification for Accounting the Value of Water Ecological Products in the Poyang Lake Basin. It should balance ecological rigor and financial operability: indicator selection and model construction need ecological support; value ranges, confidence levels, and applicable conditions must be compatible with bank credit assessment logic, so reports can be directly embedded in financing review. Unified standards can provide credibility for project evaluation and a comparable, aggregable basis for cross-regional ecological compensation and rights trading.

With pricing but no institutional channel, water-related rights still cannot become qualified collateral. The full process of confirmation, valuation, and disposal should be connected. In confirmation, include water withdrawal rights, water use rights, and water rights trading income rights in the unified movable property financing registration system, granting publicity and credibility and removing banks' concerns about authenticity and exclusivity. In valuation, cultivate third-party institutions with both hydrological science and asset appraisal capacity, or establish joint assessment between monitoring agencies and appraisal associations, providing independent and standardized opinions. In disposal, explore a provincial water rights reserve fund to purchase pledged water rights at agreed prices upon default, offering a fallback exit; and open a water conservancy asset transfer section on property rights trading platforms to expand trading scope and market depth.

When water-related rights achieve a closed loop of “confirmable rights—valuable assets—easy liquidation,” banks can move beyond reliance on traditional fixed-asset collateral and allocate more credit to water conservation.

5.4 Deepen “Red-Green” Integration in Revolutionary Old Areas and Embed Water-Related Green Notes into Inclusive Finance Reform Pilots

Most counties in the Poyang Lake Basin have dual identities: they are revolutionary old areas or former Central Soviet areas, and also core parts of the Poyang Lake Ecological Economic Zone, with abundant water resources and green ecology. Policy design for water conservation and intensive use therefore cannot be solved only within the green finance framework; it should combine the dual momentum of old-area revitalization and inclusive finance reform to seek multiplier effects.



A feasible entry point is to include water-related green notes in the eligible collateral of inclusive finance reform pilot zones. Ganzhou and Ji'an, as national pilot zones, already have advantages in collateral innovation and small-micro financing facilitation. It is recommended that water-saving and emission-reduction project revenue certificates, water ecological product rights certificates, and other water-related green notes be listed in the eligible collateral catalogue. Such notes are repaid from future water-saving revenue or ecological value; their risk profile complements fixed-asset collateral and better suits asset-light small, medium, and micro water-saving enterprises and county-level projects. Local banks in pilot zones can create a separate special line for water-related green note pledges within inclusive credit quotas, offer targeted interest rate concessions, lower financing thresholds for grassroots water-saving projects in old areas, and extend green finance from large projects to fields and villages.

The pilot can also link with financial support for old-area specialty industries. Old areas often cultivate tea, bamboo, eco-tourism, and other industries dependent on quality water. Water-saving renovation lowers water costs, while water ecological protection enhances landscape value. By bundling "Water-Saving Loans" and water-related green notes with specialty industry chain financing needs, and designing scenario-based financing schemes such as "water-saving + tea," "water-saving + bamboo," and "water-saving + eco-tourism," a small water-saving entry point can leverage a major article on industrial revitalization. This path of developing industry through water and enriching farmers through green also responds to the central government's call for scientific and efficient resource development in old areas, and explores an inclusive path for industrial development under the rigid "four water and four determinations" constraints.

Funding

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References

- [1] Chen Yanyu, et al. Analysis of the low-carbon transition effect of green finance policies on high-carbon enterprises and its water consumption heterogeneity [J]. *Water Economics*, 2025, 43(06): 38-44.
- [2] Han Xu, Liu Xiaoming, Liu Wenting, et al. Spatiotemporal characteristics and driving factors of the coupling coordination between green finance and high-quality economic development in the Yellow River Basin [J]. *Economic Geography*, 2023, 43(09): 121-130.
- [3] He Xiangyu. Green finance supporting ecological protection and high-quality development in the Yellow River Basin: theory, problems and strategies [J]. *Chongqing Social Sciences*, 2024, (10): 115-128.
- [4] Hu Yan. Application of asset securitization in water resource ecological compensation—taking the Henan section of the Yellow River Basin as an example [J]. *Finance and Accounting Communication*, 2022, (08): 147-152.
- [5] Li Ying. Research on the impact of green finance on the realization of ecological product value under the "Two Mountains" concept—an empirical analysis based on panel data of the Beijing-Tianjin-Hebei region from 2012 to 2023 [J]. *Price: Theory & Practice*, 2025, (09): 46-52.

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- [6] Ma Jun, Chen Qiuyu. Research on the water environment governance effect of green finance in the Yangtze River Delta region [J]. Resources and Environment in the Yangtze Basin, 2025, 34(04): 744-756.
- [7] Ma Jun, Zhang Yanjun, Cheng Changgao. Exploration of China's water conservancy investment and financing models under the new development concept [J]. Water Economics, 2024, 42(02): 65-72.
- [8] Yang Ziming, Wang Ling, Guo Jingyi. Research on green finance models for the realization of basin ecological product value [J]. Contemporary Economic Research, 2023, (07): 113-119.
- [9] Liu H., Wang S., Wang K. Dynamic Capabilities and Signal Transmission: Research on the Dual Path of Water Utilization Reduction Impacting Firm Value [J]. Sustainability, 2026, 18(2): 1-30.
- [10] Tang X., Ma Y. Does Green Finance and Water Resource Utilization Efficiency Drive High-Quality Economic Development? [J]. International Journal of Environmental Research and Public Health, 2022, 19(22): 14930.

