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From Hydrological Data to Economic Governance: Expanding the Analytical Capacity of Water Accounts

The study builds on the hypothesis that the effectiveness of water resource management directly depends on the level of analytical maturity of water accounting systems. The traditional model, focused mainly on recording the physical parameters of the water balance, does not provide an adequate foundation for the formulation of strategic economic and environmental decisions. The integration of hydrological, ecological, and economic data within a unified analytical framework transforms water accounting into a tool of economic governance, capable of measuring not only water volumes but also its value, productivity, and contribution to sustainable development. The harmonization of statistical, hydrological, and economic methods enhances the analytical capacity of water accounting, making it an effective mechanism for assessing the state of natural assets and supporting decision-making at macro- and meso-levels.

The purpose of the article is to develop methodological foundations for the formation of analytical water accounts that integrate physical, economic, and institutional parameters in order to improve the effectiveness of decision-making systems in the field of water resource management. This approach reconsiders the role of water accounting as not merely a statistical but also a managerial instrument that connects physical resource flows with economic indicators of sustainability.

The article outlines the main directions of integrating environmental and economic water accounting systems, identifies analytical parameters capable of ensuring coherence between natural processes and economic decisions, and substantiates their potential for supporting sustainable development policy. For the first time, a conceptual understanding of water accounting is proposed as an integrated analytical system that combines hydrological, administrative, and economic levels of observation, ensuring a transition from the registration of natural indicators to the managerial interpretation of water resources as an economic asset.

As a result of the study, methodological principles have been developed for the formation of analytical water accounts that ensure a transition from a purely hydrological

dimension to a comprehensive economic and managerial approach. The expediency of using the water account as an instrument for integrating physical, economic, and institutional data to support decision-making based on harmonized water indicators has been scientifically substantiated. The proposed approach advances the modern understanding of analytical water accounting, within which water is regarded not only as a natural resource but also as an economic asset that affects productivity, sustainable development, and financial stability. The scientific novelty of the results lies in the formulation of a theoretical and methodological model of analytical water accounting as a mechanism for transitioning from descriptive hydrological recording to systemic economic and managerial analysis, which further develops the concept of an integrated system of water management.

Keywords: *water accounting, analytical water accounts, integrated water management, methodological principles, economic valuation of water resources, sustainable development statistics, environmental-economic indicators, decision-making systems, water use efficiency, system of environmental-economic accounting*

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Від гідрологічних даних до економічного управління: розширення аналітичного потенціалу водних рахунків

У центрі дослідження перебуває гіпотеза про те, що ефективність управління водними ресурсами безпосередньо залежить від рівня аналітичної зрілості систем водного обліку. Традиційна модель, зосереджена переважно на фіксації фізичних параметрів водного балансу, не забезпечує достатнього підґрунтя для формування стратегічних економічних і екологічних рішень. Інтеграція гідрологічних, екологічних та економічних даних у межах єдиної аналітичної системи перетворює водний облік на інструмент економічного управління, здатний вимірювати не лише обсяги води, а й її цінність, продуктивність і внесок у сталий розвиток. Висунута гіпотеза ґрунтується на припущенні, що гармонізація статистичних, гідрологічних та економічних методів підвищує аналітичну спроможність водного обліку, роблячи його ефективним механізмом оцінювання стану природних активів і прийняття управлінських рішень на макро- та мезорівнях.

Мета статті полягає у розробці методологічних засад формування аналітичних водних рахунків, які поєднують фізичні, економічні та інституційні параметри для підвищення ефективності системи прийняття управлінських рішень у сфері управління водними ресурсами. Такий підхід передбачає переосмислення ролі

водного обліку як не лише статистичного, а й управлінського інструменту, що забезпечує зв'язок між фізичними потоками ресурсів і економічними показниками сталості.

У статті окреслено основні напрямки інтеграції екологічно економічних систем обліку води, визначено аналітичні параметри, здатні забезпечити узгодженість між природними процесами та економічними рішеннями, а також обґрунтовано потенціал їх застосування для підтримки політики сталого розвитку. Уперше запропоновано концептуальне осмислення водного обліку як інтегрованої аналітичної системи, що поєднує гідрологічний, адміністративний та економічний рівні спостереження, забезпечуючи перехід від фіксації природних показників до управлінської інтерпретації водних ресурсів як економічного активу.

У результаті дослідження розроблено методологічні принципи формування аналітичних водних рахунків, що забезпечують перехід від суто гідрологічного виміру до комплексного економіко управлінського підходу. Науково обґрунтовано доцільність використання водного рахунку як інструменту інтеграції фізичних, економічних та інституційних даних для прийняття рішень на основі узгоджених водних показників. Запропонований підхід розвиває сучасне розуміння аналітичного обліку водних ресурсів, у межах якого вода трактується не лише як природний ресурс, а і як економічний актив, що впливає на продуктивність, сталий розвиток і фінансову стабільність. Наукова новизна одержаних результатів полягає у формулюванні теоретико методологічної моделі аналітичного водного рахунку як механізму переходу від описового гідрологічного обліку до системного економіко управлінського аналізу, що дістало подальшого розвитку в концепції інтегрованої системи водного менеджменту.

Ключові слова: водний облік, аналітичні водні рахунки, інтегрований водний менеджмент, методологічні принципи, економічна оцінка водних ресурсів, статистика сталого розвитку, екологічно-економічні показники, управлінські рішення, ефективність водокористування, система екологічно-економічного обліку.

Introduction. The current evolution of water accounting systems from a mere hydrological tool from a multidimensional analytical framework ushers in a new phase in the development of environmental-economic statistics. Conventional approaches to water balance assessment require updating in view of the increasing climate risks, the aggravating problem of fresh water scarcity, and the need for evidence-based governance decisions. These approaches have to evolve into holistic analytical systems capable to combine physical measurements of water flows with economic indicators of efficiency, productivity and resilience.

International standards such as the System of Environmental-Economic Accounting (SEEA) and the Australian Water Accounting Standard (AWAS) show a gradual trend to integration of hydrological, economic, and legal dimensions within a single statistical architecture. This expands the feasibilities for constructing analytical tools capable to assess not only the environmental integrity of water systems, but their contribution in the formation of national wealth and socio-economic resilience. However, a methodological gap between physical and monetary accounts limits the applicability of water accounting as an analytical tool for strategic governance.

The research objective is to conceptualize and elaborate approaches to enhancing the analytical capacity of water accounts through integrating hydrologi-

cal, economic, and environmental data in a single analytical system applicable decision-making on sustainable management of water resources. It can be achieved by analyzing international developments in water resource domain, assessing the feasibility of combining physical observations with economic reporting, determining the potential of analytical integration of water accounting within SNA and institutional premises for implementing these approaches in Ukraine.

Problems of enhancing the analytical capacity of water accounting are crucial because the consistency of statistical and economic indicators determines the quality of management decisions on water safety. The integration of hydrological data with the system of macroeconomic accounts increases the transparency of nature resources utilization, supports the monitoring of the progress towards SDG 6 “Clean water and sanitation for all”, and lays the basis for assessing the environmental policy efficiency.

The integration-based approach interprets water accounts as not as a set of tables or indicators, but as an analytical infrastructure translating physical data into knowledge required for strategic decision-making. The transition from hydrological dimension to analytical management opens up new opportunities for setting up an adaptive water policy focused on economic efficiency, environmental resilience, and social responsibility.

The review of the literature. The reviewed literature reflects a consistent evolution in the conceptualization of water accounting, tracing a shift from hydrological measurement toward its recognition as a central instrument of economic governance and sustainability management [1–3, 5, 10–12]. The foundational international standards developed under the United Nations and partner organizations form the statistical and methodological backbone for integrating water-related data into national economic accounts. Through the System of Environmental-Economic Accounting and its water-focused extensions, these frameworks establish a unified methodological space that connects physical water balances, environmental indicators, and economic valuation, thereby enabling informed decision-making and integrated management of water as both a biophysical and an economic asset [1–2].

Policy frameworks such as the 2030 Agenda for Sustainable Development underscore the role of water accounting as a tool for operationalizing sustainability objectives, particularly in developing coherent indicators of water use efficiency and ecological balance [4–5]. At the same time, applied studies demonstrate progress in compiling physical supply and use tables and asset accounts, which serve as analytical instruments for assessing water productivity and monitoring policy performance at regional and global levels [6, 7].

Scholarly attention increasingly focuses on the governance dimension of water accounting, highlighting its contribution to institutional transparency, accountability, and evidence-based decision-making [8, 9, 10, 12]. Integrating SEEA Water and SEEA-CF principles into national systems enhances the consistency and comparability of data, supports cross-sectoral coordination, and facilitates the alignment of water resource management with broader sustainability goals [9, 11]. These developments reflect a gradual transformation of water accounting from a descriptive statistical exercise into a mechanism for economic and ecological regulation.

Contemporary research extends the application of water accounting to corporate, municipal, and regional contexts, illustrating its role in sustainability reporting and resource optimization [14, 16]. Such practices correspond with the paradigms

of green economy and circular transition, where environmental accounting becomes a driver of ecological innovation and a diagnostic instrument for assessing the compatibility of economic activity with planetary boundaries [15, 21, 22].

Recent works situate water accounting within the conceptual space of foresight and resilience studies, interpreting it as a strategic instrument for adaptive policy design and long-term sustainability governance [17–19]. This integrative approach emphasizes the link between environmental-economic statistics and macro-level transformation strategies, reinforcing the need for comprehensive, interoperable data systems that can inform sustainable growth trajectories and global water security policies [18–20]. Emerging research directions expand the analytical scope of water accounting by incorporating elements of environmental markets, ecosystem service valuation, and pollution regulation [13, 24]. The convergence of statistical and institutional approaches highlights that the analytical potential of water accounts depends not only on methodological harmonization but also on governance capacity to translate quantitative data into actionable policy frameworks [20, 22–23].

Overall, the reviewed literature indicates a paradigmatic transition from the collection of hydrological data to the establishment of water accounting as a multifunctional analytical framework that connects natural processes with economic decision-making. This evolution directly aligns with the conceptual orientation of the present study “*From Hydrological Data to Economic Governance: Expanding the Analytical Potential of Water Accounts*”, which aims to substantiate the integration of physical, economic, and ecological dimensions within a unified architecture of international water accounting and management.

Our study builds on the hypothesis that the efficiency of water resource management is conditional on the analytical maturity of water accounting systems. The conventional model focused on recording of physical parameters of water balance does not provide for a sufficient base for strategic economic and environmental decisions. When hydrological, environmental, and economic data are integrated within a single analytical system, the water accounting will assume the features of a tool for economic management, capable to measure the scopes of water along with its value, productivity, and contribution in the sustainable development.

Harmonization of statistical, hydrological, and economic methods will enhance the analytical capacity of water accounting, making it an effective mechanism for assessing the status of natural assets and decision-making at macro- and meso-level. This integration enables for creating adaptive management models focused on optimization of water use, environmental balance, and enhancing the economic performance of water safety policies.

The purpose of the article is to propose a methodological framework for analytical water accounts combining physical, economic, and institutional parameters for enhancing the efficiency of decision-making on water resource management.

This approach calls for rethinking the role of water accounting as not only a statistical tool, but also a management tool linking physical flows of resources with economic indicators of sustainability. The article outlines principal areas of integrating environmental-economic systems of water accounting, their potential applications for support of the sustainability policy, and analytical parameters capable to ensure a consistency between natural processes and economic decisions.

Research results. The water accounting is a system for observation, collection, and systematization of information about quantity, quality, and regeneration

of water resources within a given region or water basin. Its empirical base is hydrological data showing natural processes of formation, movement, and consumption of water. The hydrological accounting, by recording physical data of water balance (stocks, inflows, losses, and runoffs), generates the primary level of knowledge about functioning of water systems. Although these data have a high scientific value, they are not capable of either estimating the economic efficiency of water use or profitability of water intensive industries or tracking the impact of water scarcity on the production structure and the social welfare.

Water accounts, on the contrary, create a consistent model integrating hydrological and economic data, with each physical indicator corresponding with economic one. In international standards such as System of Environmental-Economic Accounting for Water (SEEA-Water) and the related SEEAW framework, physical tables of stocks and flows of water are aligned with SNA. This enables to track the relationship between scopes of water resources and production, consumption, and revenues, creating an evidence-based framework for the sustainability policy.

The transition from hydrological accounting to building water accounts means a qualitative increase in the analytical capacity of the water management system. If hydrological data answer the question “how much water is available”, water accounts enable to clarify “how it is used and with what efficiency”. They enable for combining physical characteristics of resources with socio-economic indicators, creating a new level of interpretation of the relationship between natural processes and economic decisions.

In this context, water accounts should be regarded as not only a statistical tool, but as an analytical model of management, combining various types of data: hydrological, environmental, economic, and institutional. This integration enables for the transition from fragmentary measurements of water use to system-based management of water resource as an economic asset.

The proposed approach involves interpretation of water accounts as the central link between hydrological observations and economic policy. It aims to create a single analytical space where water resources are treated as the natural basis of life activities and a factor of production efficiency. This approach will enhance the analytical function of water resources and create a background for their integration in the macroeconomic planning system.

The results of this study give evidence of the demand for further development of scientific understanding of water accounting as a multi-tiered system capable to combine scientific, economic, and management logic of analysis. The proposed specification of the conceptual meaning of water accounts deepens their interpretation as a methodological background for creating analytical tools of sustainable development, and increases the practical value of statistics in taking strategic decisions on water resource management.

Although the term “hydrological accounting” has not been officially recognized in international statistical classifications, it could be expedient in distinguishing the levels of information detailing in the water management system. Practically, hydrological accounting denotes a set of procedures for collection, verification, and summing up of data on natural stocks and movements of water, creating a physical base for constructing more elaborate water accounting systems. These data constitute the primary level of observations at which the analytical structure of water accounts is built. Hence, hydrological accounting can be interpreted as the empirical

dimension of a system, and water accounts as its analytical dimension showing the links between physical, economic, and management parameters of water resource utilization.

This interpretation of hydrological accounting, not being in conflict with international standards, can deepen understanding of the process of transition from natural to economic type of accounting. It enables to describe the logic of the evolution of the information base for water resource management: from collecting data on water quantity to systemic analysis of its economic value, efficiency of utilization, and impact on the resilience of development (Table 1).

Table 1

The evolution of approaches to water accounting systems and water accounts

Phase	Principal characteristic	Type of data	Purpose	Examples of systems
Hydrological accounting	Recording of physical data of water balance (inflows, runoffs, losses, evaporations)	Physical	Monitoring of water stocks, control over hydrological regime	National hydrological services, databases on runoffs
Water accounting	Combination of physical and administrative indicators of water use for management purposes	Physical and administrative	Regulation of water use, resource allocation, control over compliance with norms	State accounting of water use (Ukraine), reporting systems of water management agencies
Water accounts	Integration of hydrological, economic, and statistical data within a single analytical system	Physical, economic, and institutional	Taking strategic decisions, assessment of water use efficiency, sustainability policy setting	SEEA Water, WA+, IWMI WA,

Source: developed by the authors

Hence, the proposed approach enables to treat water accounts not in an isolated matter, but as a logical continuation of hydrological and administrative accounting. Its scientific expediency is in creating an analytical bridge between physical processes of the water cycle and the economic management system. This gives evidence of the gradual evolution of the water accounting concept from a purely descriptive level to a management and analytical one. The developed approach deepens scientific understanding of the structure of environmental-economic analysis by interpreting water accounts as the mechanism underlying integration of information about nature in the sustainability policy. It lays the basis for building national water management systems that consider the real economic value of water resources and their contribution in the social welfare (Table 2).

Analysis of methodological principles underlying analytical water accounts is worth separate attention. Building up advanced water management accounts calls for alignment of three information structures: hydrological, administrative-statistical, and economic. This approach is based on the methodological conception of data integration, with natural observations interpreted as not as isolated measurements, but as components of a single system for analytical management.

**The evolution of approaches to water accounting:
from hydrological to analytical level**

Criterion of comparison	Hydrological approach	Analytical (economic and managerial) approach
Principal purpose	Measurement of scopes of water flows and balances	Analyses of the relationship between water resources on the one hand, and economic productivity and sustainable development, on the other
Type of data	Physical indicators (stocks, run-offs, consumption)	Integrated data (physical, economic, institutional)
Analytical deepness	Descriptive level	Explanative and prognostic levels
Applications of results	Technical control of water systems	Taking strategic management and economic decisions
Institutional basis	Hydrometeorological services	Cross-industry systems for water resource management
Degree of integration	Limited combination of indicators	Systemic alignment of hydrological, economic, and political parameters
Expected effect	Assessment of the physical status of water resources	Efficiency enhancement of water management and economic resilience

Source: developed by the authors

The first principle is consistency, meaning that accounts are built in the form of interlinked tables of water stocks, flows, and use. This principle ensures recording of the full water balance in not only physical coordinates, but also in socio-economic ones. Accordingly, accounting units are not only river basins or aquifers, but economic industries, administrative territories, and institutional sectors.

The second principle is the two-dimensionality of the data structure, combining physical indicators such as scopes, stocks, losses, pollution with their economic equivalents such as value, revenue, tax or environmental-economic payments. It enables to interpret water as not only a natural good, but as an asset possessing a market, social and ecosystem value.

The third principle is institutional consistency, aligning the data between various entities of accounting, e.g. government departments, water management organizations, statistical, statistical services, and economic institutes. This coordination is requisite to avoid duplication of information and ensure comparability of data between the levels of management.

The fourth principle is analytical integration, setting links between water accounts and other sectoral accounts of SNA. It enables to analyze the relationship between water use, production, energy consumption, and national income. This approach opens up new possibilities for economic modelling and forecasting of the water scarcity impact on the macroeconomic stability.

The fifth principle is adaptability and scalability, making analytical water accounts applicable at various levels of detailing, from local to national. It results in building a multilevel analytical system that can be used for both strategic planning and operative monitoring of the efficiency of water resource management.

The above principles underlie a unified structure wherein water is interpreted as a component in the economic circulation rather than a mere natural substance. This enables for the assessment of water potential as a production factor, with determining its economic return and identifying the reserves of increasing the management efficiency (table 3).

Table 3

A comparative characteristic of methodological principles underlying analytical water accounts

Principle	Content	Expected outcome
Integrativity	Physical, economic, and institutional parameters combined within a single analytical system	Holistic perception of water as a natural resource and an economic asset
Analytical consistency	Established systemic links between hydrological indicators, economic indicators of productivity, and management characteristics	Possibility of cross-sector, cross-region, and cross-country comparative analyses
Comparability	Harmonized techniques of collection, processing, and presentation of data in compliance with international standards	Integration of national water accounts in the global system for environmental-economic accounting
Transparency and reproducibility	Documented procedures for collection of data and computations, with openness of algorithms	Increased trust to analytical results and accountability of management decisions
Interoperability	Compatibility of information systems and databases between hydrological, statistical, and administrative institutions	Creation of a technical framework for effective international exchange of information

Source: developed by the authors

Analytical water accounts lay the basis for deeper understanding of the relationship between natural resources, economic activities, and social consequences of water use. Their implementation enables to transform data on water balances from a descriptive indicator into a strategic management stool enabling to predict changes in the water cycle, to assess the policy efficiency, and to take economically sound decisions on water resource allocation.

Within the sustainable management of water resources, water accounts constitute an analytical interface between the hydrological reality and the national accounting system. This enables to estimate the dependence of economic growth on the water environment status, and the impact of changes in water balances on the macroeconomic stability, employment, and social welfare. This analytical integration enables to combine indicators of physical scopes of resources with value-based parameters, to reveal an economic return from the water potential and its role in the formation of national capital.

Special importance of analytical water accounts stems from their ability to estimate the water use efficiency across sectors. The alignment of indicators by economic sector enables for identifying the segments with irrational water use, with devising economic stimuli to reduce losses and enhance productivity. Besides that, such system helps create a framework for environmental audit and estimate the val-

ue of ecosystem services, thus consolidating the link between natural resources and national welfare accounts (Table 4).

Table 4

The analytical functions of water accounting at various levels of management

Management level	Principal purpose of accounting	Key analytical indicators	Practical applications
Local	Monitoring of water status and water use efficiency	Scopes of water intake and consumption, losses in networks, ratio of water reuse	Optimization of water use, planning of investment in water infrastructures
National	Integration of data on water in the economic reporting system	Indicators of water productivity, water intensity of GDP, balances of water use	Setting up public policies on water safety and sustainable development
International	Assurance of comparability and compatibility of statistical systems	Harmonized indicators of SEEA Water, accounting tables and indices	Cross-country coordination, monitoring of progress towards SDGs

Source: developed by the authors

In the SDGs context, analytical water accounts have the function of a coordinating tool enabling for monitoring of the relationship between environmental and socio-economic parameters. They lay the basis for assessment the progress towards SDGs related with water resource management, adaptation to climate change, and reduction of environmental risks. Integration of these data in the public governance system enhances the accountability, reduces information asymmetries between political entities and a broader community, and provides for an evidence base for decision-making on water and environmental policies. Hence, analytical water accounts are not only a tool for quantitative measurement, but the key to systemic governance of the sustainable development. Their implementation ushers in the transition from reactive to preventive approach in water management, creating an information base for setting a policy aligning economic goals with environmental constraints.

Further studies of analytical water accounts should be focused on elaborating tools for modelling the relationship between water flows, economic indicators, and environmental risks. This will enable one to proceed from descriptive presentation of data to predictive analysis as a groundwork for assessing scenarios of water safety and resource resilience of economic systems.

Special attention needs to be drawn to the unification of methods for assessment of water assets, because existing statistical systems use various approaches to estimating the value of resources, their amortization, and ecosystem services. Harmonization of these approaches is a required condition for creating an integrated database enabling for comparability of results across countries and sectors. The practical significance of the proposed methodological principles is their applicability as a tool for public and corporate governance. At national level, analytical water accounts can be a component of the system for environmental audit and budget planning, enabling to show real costs and benefits of water resource utilization. In corporate practices, these accounts are capable to enhance the transparency of reporting, improve the risk management system, and increase the environmental responsibility of businesses (Table 5).

Table 5

**The logical structure of transition from hydrological data
to analytical water accounts**

Level	Content	Principal function	Analytical result
Hydrological	Measurement of natural parameters of the water balance	Observation of water flows	Data on quantity and dynamics of water resources
Accounting	Systematization of information about water use in economic activities	Regulation of water use	Statistical indicators of consumption and losses
Analytical	Integration of physical, economic, and institutional parameters	Support of strategic governance	Comprehensive assessment of efficiency and resilience of water management

Source: developed by the authors

Scientific conceptualization of the transition from hydrological data to economic governance via analytical water accounts opens up new possibilities for building a global methodological framework for sustainable water management. This approach enables to combine analytical, administrative, and political tools aimed at aligning the objectives of economic growth, environmental stability, and social welfare.

Conclusions. This study aimed at elaborating a methodological framework for building analytical water accounts combining physical, economic, and institutional parameters, to enhance the efficiency of decision-making on water resource management. Several results were achieved.

The theoretical essence of water accounting was reinterpreted as a multi-tiered model capable of transforming hydrological data into a comprehensive tool for economic analysis and strategic governance. It was demonstrated that (i) the conventional model for hydrological accounting designed for recording physical parameters of water balance could not ensure an adequate framework for taking strategic economic and environmental decisions; (ii) integration of hydrological, economic, and institutional data within analytical water accounts created an intellectual basis for effective management of water resources, enhanced analytical capacities of the accounting system and its relevance to sustainable development objectives.

The results confirm the demand for further development of theoretical understanding of the water accounting as a multi-tiered system combining scientific, economic, and managerial logic of analysis. The proposed specification of the concept of water accounts deepens their interpretation as a methodological framework for building analytical tools for sustainable development, and enhances the practical value of statistics in strategic decision-making on water management.

Although the term “hydrological accounting” has not been officially recognized in international statistical classifications, it can be used for designating the primary level of information detailing in the water management system. In practice, hydrological accounting shows a set of procedures for collection, verification, and summing up of data on natural stocks and movements of water, forming a physical background for building analytical water accounts. Hence, hydrological accounting constitutes the empirical dimension of the system, whereas water accounts represent its analytical dimension showing the links between physical, economic, and administrative parameters of water resource utilization.

The developed theoretical and methodological model for analytical water accounting is based on the phased integration of three information levels: physical, economic, and administrative. At the first level, hydrological data laying the empirical base of accounting are recorded and systematized. At the second level, these data are given economic interpretation by estimating the value, productivity, and efficiency of water resource utilization. At the third level, an analytical management module is built, enabling to proceed from statistical indicators to decisions on water safety, sustainable development, and institutional accountability. This model combines the scientific and socio-economic logic of water resource management, and lays the background for harmonization of national and international water accounting systems.

The authors were the first to formulate methodological principles underlying analytical water accounts for the transition from hydrological accounting to integrated management analysis. These principles include integrativity, analytical consistency, comparability, transparency, and interoperability. Their combination creates a structural framework for proceeding from descriptive physical measurements of water flows to analytical summarization of data for decision-making purposes.

The scientific novelty of the results is in formulating a theoretical and methodological model for analytical water accounting as a mechanism for the transition from descriptive hydrological observation to systemic economic-managerial analysis (managerial economics). The proposed approach develops the conception of integrated water management system wherein the water is interpreted as a natural and an economic asset, which lays the basis for enhancing the efficiency of water safety and sustainable development policies.

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