Al-Noor Journal of Digital Innovation in Financial and Administrative Studies, 2026(45-58)
DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

Journal of Digital Innovation in Financial and Administrative Studies

https://jdifas.alnoor.edu.iq/

Proposed Objectives for Water Accounting Lists Under the Government Finance Statistics Manual (GFSM)

Waadullah Maan Al-Maadidi [1] **Sinan Zuhair Mohamed Jameel** [2]

[1*2] **Administrative Technical College, Northern Technical University, College of Administration and Economics University of Mosul, Mosul, Iraq.**

Article information

Article history:
Received:24 /6/2026
Revised: 4/7/2026
Accepted: 5/7/2026

Keywords:
Water Resources Accounting; (GFSM);
Objectives of Water Accounting Statements

Correspondence:

Waadullah Maan
waadallah.maan@ntu.edu.iq

Abstract

The research aims to set proposed objectives for water accounting statements in the light of the Government Financial Statistics Manual (GFSM), based on the growing importance of water resources as a strategic natural resource and an influential economic and sovereign asset in the financial and environmental sustainability of the country. The research problem is that traditional government financial statements fail to provide adequate information on water stocks and flows, depletion costs, environmental spending, and future commitments related to the conservation and efficient management of water resources.

Hence, the research gap is identified in the limited studies that dealt with the possibility of employing the Government Financial Statistics Manual in building clear objectives for water accounting statements that link physical water data with government financial and economic impacts.

The research relied on deductive and inductive methods in presenting and analyzing the literature, studies and research related to water resources accounting and the government's financial statistics manual, as well as relying on secondary sources represented in books, reports, and professional and official publications.

The scientific addition to the research is to provide a theoretical perception of the objectives of water accounting lists under the GFSM, which contributes to expanding the scope of government accounting to include natural and water resources, and enhances the disclosure of water as a measurable and controllable sovereign asset.

The research concluded that setting goals for water accounting lists contributes to shifting the treatment of water from being a traditional natural resource to an economic and sovereign asset that requires measurement, disclosure and control, and that the integration of water resources within the GFSM framework provides an integrated information base that helps to assess financial and water sustainability, enhance transparency and institutional accountability, and support government decision-making. The research recommends the need to adopt a framework for water accounting lists within government financial reports or as supporting appendices to them, and to develop information systems Linking government spending on the water sector to actual results related to use efficiency, reducing waste and achieving water sustainability.

Al-Noor Journal of Digital Innovation in Financial and Administrative Studies, 2026(45-58)
DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

1.1 Introduction and Problem:

Water resources are strategic natural resources whose availability and sustainability are linked to the economic, social and environmental security of the country, especially in light of the increasing pressures resulting from population growth, climate change, and the expansion of agricultural, industrial and service activities. Since water represents a public resource that the state intervenes in regulating, financing and managing through spending on dams, distribution networks, drainage, treatment, and protection from pollution, there is an urgent need to develop water accounting statements that help measure these resources and disclose the costs of their management and its benefits and financial implications.

Although the GFSM is important in providing a structured framework for presenting government financial operations, in terms of revenues, expenditures, assets, liabilities and cash flows, its application in the field of water resources raises a research problem regarding the extent to which this guide can be used to construct clear objectives for water accounting statements. Traditional government financial statements may not adequately reflect the economic and financial value of water resources, and may not clearly reflect the costs of attrition, environmental spending, or Future commitments related to water conservation and sustainability.

The special feature of choosing the Government Financial Statistics Manual (GFSM) is highlighted by the fact that it represents one of the international frameworks adopted in the organization and preparation of public finance statistics, as well as its connection to the requirements of financial reform and government transparency. The Iraqi environment is also moving towards harmonizing its financial and statistical system with this manual, especially in light of the need to enhance the reliability of government financial statements and improve the state's ability to deal with international financial institutions, including the International Monetary Fund, in a way that supports financing and loan requirements during the next phase.

Hence, the research problem arises to answer the following question: "Is it possible to set targets for water accounting lists in light of the State Financial Statistics Manual (GFSM)?"

1.2 Research Objective:

The research aims to set goals for water accounting statements considering the Government Financial Statistics Manual.

1.3 Importance of the research:

The importance of the research is highlighted by the attempt to set goals for water accounting statements, particularly in terms of providing more relevant and transparent information that helps in measuring and disclosing water resources and supporting the decisions of the users of the financial statements.

1.4 Research Hypothesis:

Considering the identification of the research problem, its importance, and its objectives, the research started from the following hypothesis: **"Goals can be set for water accounting statements in the light of the GFSM Manual of State Financial Statistics."**

1.5 Research Methodology:

The research relied on deductive and inductive methods in analyzing the literature, studies and professional frameworks related to water resources accounting and the Government Finance Statistics Manual (GFSM). The deductive method was used to construct the conceptual framework and explain the relationship between water resources accounting and government financial statements, while the inductive method was used in the analysis of the previous literature to derive proposed objectives for water accounting statements.

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

Thus, the research is limited to the theoretical and analytical aspect with the aim of formulating a proposal for water resources accounting objectives under the GFSM manual.

1.6 Water Resources Accounting

Water resources accounting is one of the modern accounting topics that has gained increasing importance because of the escalating environmental and economic pressures and the worsening of water scarcity crises. Water is no longer treated as a natural resource available only but has become a limited strategic resource that requires measurement, control and disclosure. Traditional accounting thought has shown a lack of expression of the value of water, its flows and the effects of its use, which has led to the emergence of the need for a specialized framework concerned with measuring water stocks and flows and linking them to economic, environmental and institutional dimensions (FAO, 2018, 3).

The concept of water resources accounting has evolved significantly, starting with a focus on the physical measurement of water by determining stocks and flows, and then evolving to include linking water to economic and social activities. Molden's work has contributed to this development by focusing on distinguishing between stocks and flows and linking water consumption to productivity, helping to assess water use at the basin and sectoral levels. (Molden, 1997, 1)

Subsequent literature has also emphasized the need to distinguish between water withdrawals and actual consumption, as confusing them can lead to misleading results in assessing water management efficiency (Perry, 2011, 1844) (Perry, 2012, 218)

The introduction of the economic dimension has led to the expansion of the concept of water resources accounting, in particular through the Water Economic Environmental Accounting System, which linked water accounts to national accounts, and water stock and flow data systems within tables linked to economic activities and institutional sectors (United Nations/SEEA-Water, 2007, 4). (FAO, 2018, 5)

Water resources accounting can be defined as an integrated analytical accounting framework that aims to measure, organize and process information related to water stocks and flows spatially and temporally, and link it to economic, environmental and institutional dimensions, in order to help determine the actual consumption and productivity achieved from the water resource, and to support sustainable management decisions (Momblanch et al., 2018, 23) (FAO, 2018, 3) (Mahmud et al., 2022, 4)

The objectives of water resources accounting are to support water planning and budgeting by providing information on the balance between supply and demand, promoting transparency and accountability on water allocation and use, improving allocation efficiency and productivity by measuring the return achieved per unit of water used, as well as providing a database that helps formulate price policies, cost recovery, and protect the resource from depletion and degradation (Momblanch et al., 2018, 25) (Molden, 1997, 7-13) (Vardon et al., 2025, 2) (Vink, 2014, 112)

Its importance is highlighted in providing accurate information about the water reality, enabling the competent authorities to make rational decisions, and distinguishing between water withdrawal and actual consumption, as failure to distinguish between the two may lead to misleading estimates of water deficit (Molden, 1997, 8) (Perry, 2011, 1845).

It also contributes to supporting water governance, reducing conflicts between users, and strengthening the relationship between water and economic development by demonstrating the efficiency of converting water into economic and social outputs

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

(Momblanch et al., 2018, 25) (FAO, 2018, 8) (Vink, 2014, 113) (Badawi, 2024, 12)

Water resources accounting relies on two basic methods of measurement. The first is the hydrological approach or physical measurement, which focuses on the inventory of balances and flows in units of volume such as cubic meters, and is concerned with the measurement of water inputs and outputs, with the need to distinguish between the water actually drawn and consumed (Perry, 2011, 1846), and the second is the economic approach or critical evaluation, which aims to translate physical data into financial values that allow the integration of water within economic and accounting analysis, and the measurement of the economic productivity of water and the costs of water Deterioration of their quality (United Nations, 2012, 28) (Momblanch et al., 2018, 5) Thus, water resources accounting is based on double measurement, i.e. a combination of quantitative and monetary measurement, providing a more comprehensive picture of the water resource, its value and the effects of its use.

1.7 Government Finance Statistics Guide

The Government Finance Statistics Manual (GFSM) is a international accounting and statistical framework that aims to organize government financial statements and provide a comprehensive picture of a country's performance and financial position. Not only is it a tool for classifying revenues and expenditures, but it also represents a shift in government financial thinking from focusing on recording monetary transactions to managing public wealth & measuring changes in a country's net worth (IMF, 2014, 1).

The guide is based on providing a unified financial language that allows for comparison between countries, regardless of their different legal and political systems. It also aims to support macrofinancial analysis by presenting government processes, assets, liabilities, and economic flows in a coherent manner, making it a sovereign tool for managing public resources and assessing financial sustainability (Parry, 2011, 12 (IMF, 2014, 5).

The guide is based on accrual and balance sheets, which enable it to present a broader picture of the government's financial position, including non-financial assets and natural resources that can fall under the scope of government analysis. This shift is important because it goes beyond narrow critical thinking and helps to recognize assets and liabilities more comprehensively and reliably (Diamond, 2002, 10) (Cavanagh et al., 2002).

The objectives of the Government Finance Statistics Manual are to assess the fiscal position and public liquidity, measure the country's ability to meet its current and future obligations, enhance transparency in the management of debt and financial resources, and support decision-making and fiscal policy-making based on reliable data (Ahmed & Mustafa, 2018, 396) (IMF, 2014, 1) (Al-Awwad & Al-Mutairi, 2020, 19).

It also aims to strengthen the control of public funds and protect assets from misuse and waste, as well as to achieve integration between the public budget, final accounts, and asset and liability management (Al-Shafi et al., 2020, 4) (Ardini, 2015, 48).

The guide is widely used, as it is used to analyze financial operations and the financial position of the government, and to measure financial sustainability by monitoring changes in net wealth and public liquidity (IMF, 2014, 3), and to produce macrofinancial performance indicators, such as net balance of operations, and to support regulatory bodies when examining expenditures, borrowing, and government liabilities (Omar, 2016, 60) (Al-Khazali and Al-Moussawi, 2019, 4). The manual also achieves consistency with national accounts systems, making it an important tool for linking public finances to the macroeconomy

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

and enhancing transparency and accountability to the public and international institutions (Ardini, 2015, 50) (Al-Salhabi & Al-Hussein, 2020, 19).

The scope of the guide's coverage includes the public sector with its various units, foremost of which is the public government sector, which includes the central government, local governments, and state or territorial governments according to the administrative system of the state. It also includes financial and non-financial public companies under government control (GFS, 2001, 6) (Wickens, 2008, 16) (GFS, 2014, 30) The manual focuses on the institutional unit as the basis for data collection, which is the unit capable of owning assets, undertaking liabilities, engaging in economic activity and entering into transactions with other units (Wickens, 2006, 20-21).

The outputs of the Government Finance Statistics Manual benefit a wide range of users, such as ministries of finance and planning, legislative bodies, supervisory bodies, government accountants, and directors of public units, as well as researchers, the public, and international organizations. The importance of the manual lies in the fact that it provides reliable and standardized financial information that helps to evaluate government performance, improve the quality of financial reporting, and promote sovereign accountability (Jumaa et al., 2025, 1139 (IMF, 2014, 3) (Al-Khazali and Al-Moussawi, 2019, 5).

The GFSM is thus an essential framework for the development of modern government accounting and its linkage to the efficient and transparent management of public resources.

1.8 Proposed Objectives for Water Resources Accounting Lists considering the Government Financial Statistics Manual

Considering the growing environmental challenges, climate change, and the increasing geopolitical complexities surrounding the management of water resources, it is no longer acceptable, from an accounting and economic perspective, to treat water resources as mere "free environmental goods" outside the scope of state financial and accounting measurement. Water resources should instead be viewed as scarce, strategic, and depletable sovereign economic assets that have a direct impact on the overall financial, economic, and environmental sustainability of the state. This view is particularly important because water is not only a natural resource necessary for life, but also a fundamental input for agriculture, industry, energy production, food security, public health, and social stability. Therefore, water represents an essential component of national security and should be included within the broader framework of sovereign wealth management and public financial sustainability (United Nations, 2012, 11).

The increasing scarcity of water and the continuous rise in demand require a fundamental transformation in the way the state manages this strategic resource. Traditional water management has often been limited to physical and hydrological dimensions, such as measuring rainfall, river flows, storage levels, groundwater reserves, and withdrawals. Although such measurements are necessary, they are not sufficient for evaluating the economic and financial consequences of water use. Hydrological information alone cannot determine the economic return generated by each unit of water consumed, identify sectors that deplete water without producing sufficient value, or estimate the future fiscal burdens resulting from water scarcity, pollution, or depletion.

Accordingly, the state must move from the narrow framework of "physical hydrological management" toward a broader framework of "accounting and economic management" of water resources. This transition requires the adoption of advanced

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

financial and accounting systems capable of providing reliable quantitative and financial information. Such systems can evaluate government performance, reduce waste in public resources, and strengthen control and accountability within government units in line with international requirements, particularly the Government Finance Statistics Manual (GFSM), which Iraq is required to implement (Al-Khazali & Al-Moussawi, 2019, 2).

The integration of water resources accounting into the structure of the Government Finance Statistics Manual is therefore an urgent necessity. The GFSM is not merely a statistical guide for classifying financial data; rather, it represents a comprehensive economic, statistical, and accounting framework designed to assess the impact of government policies and determine their long-term sustainability (IMF, 2014, 1). This makes it a suitable basis for developing water accounting statements that connect the physical reality of water resources with the financial position of the state, the sustainability of public policies, and the accountability of public institutions.

The importance of the GFSM in this context lies in its reliance on the accrual basis of accounting. Under this basis, economic flows are recorded when economic value is created, transformed, exchanged, transferred, or depleted, rather than only when cash is received or paid. This characteristic is highly relevant to water resources because the depletion or deterioration of water assets may occur even without immediate cash transactions. For example, excessive groundwater extraction, evaporation losses, pollution, or reductions in transboundary inflows may reduce the state's natural wealth

without being reflected directly in the cash budget. Therefore, the GFSM provides an accounting environment capable of recognizing real changes in the state's net wealth.

By applying the GFSM to water resources, water can be recognized as a sovereign asset that contributes to strengthening the government's financial and economic position. At the same time, the depletion or deterioration of water can be treated as a reduction in sovereign wealth or as a burden that threatens the sustainability of public service delivery. Based on this integration between financial accounting thought, the macroeconomic statistical framework of the GFSM, and contemporary trends environmental-economic accounting, the proposed objectives of water resources accounting statements can be formulated as follows.

First: Providing an Integrated Statistical and Macroeconomic Framework to Assess Financial and Water Sustainability

The first objective of the proposed water resources accounting statements is to provide an integrated statistical and macroeconomic framework that enables the state to assess both financial sustainability and water sustainability. This objective is derived from the basic philosophy of the Government Finance Statistics Manual, which was designed to provide a comprehensive statistical and economic framework that supports the assessment of government policies and determines their long-term viability (IMF, 2014, 1). When this philosophy is applied to water resources, the preparation of water accounting statements moves beyond the mere physical inventory of water quantities. It becomes an integrated accounting and financial model that translates hydrological balances and flows into a unified macroeconomic and financial language.

This objective is important because financial sustainability cannot be separated from water sustainability. A state cannot claim that it has achieved economic sustainability while its water assets are being depleted or degraded. Water is a basic input for several vital sectors, including agriculture, industry,

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

electricity generation, municipal services, and environmental protection. Therefore, any deterioration in the availability or quality of water will eventually affect public expenditure, food imports, infrastructure investment, health costs, social stability, and the state's ability to provide public services. Thus, integrating water accounts into the national accounting and financial structure provides a more realistic measure of dual sustainability, meaning the simultaneous sustainability of public finance and water resources (United Nations, 2012, 11).

The proposed water accounting statements should meet the information needs of several sovereign users. At the level of the legislative authority and senior policymakers, these statements provide a basis for evaluating whether agricultural or industrial expansion represents genuine development or merely an unjustified depletion of strategic water reserves. Public policies may appear successful when evaluated only in terms of production growth or short-term output. However, when the volume of water depleted is considered, the same policies may appear unsustainable. Therefore, water accounting statements can help legislators issue laws that reduce waste, restrict water-intensive activities, protect strategic reserves, and direct public investments toward activities that generate higher value with lower water depletion.

At the level of the Ministry of Finance, the proposed water accounting statements provide quantitative and financial indicators that link water abundance or scarcity to levels of public expenditure and government revenues. For instance, a decline in water availability or quality may impose future financial burdens on the state budget, such as the cost of building desalination plants, expanding water treatment facilities, importing food commodities, rehabilitating irrigation systems, or compensating communities affected by drought. In this sense, water accounting statements act as an early financial warning system. They enable the Ministry of Finance to anticipate potential liabilities and integrate them into medium- and long-term fiscal planning.

At the level of the Ministry of Planning, water accounting statements provide a dynamic database that enables planners to conduct stress tests for the national economy under water scarcity and climate change scenarios. This can be done through a macro-accounting equation based on the logic of the GFSM: opening balance + inflows − sectoral depletion = closing balance. The opening balance represents the total strategic water reserve controlled by the state at the beginning of the fiscal year, including quantities stored in dams and lakes, as well as extractable groundwater. The inflows represent positive additions to the water asset balance, such as rainfall, groundwater recharge, transboundary flows from the Tigris and Euphrates rivers, treated wastewater, and desalinated water. Sectoral depletion represents the reduction in the volume and value of water assets due to final consumption by agriculture, industry, municipal use, and other sectors.

The importance of this equation lies in its ability to connect water accounting with economic productivity. If the water accounting statements show that the agricultural sector depletes a large percentage of national water resources, this depletion should be compared with the sector's contribution to gross domestic product. This comparison reveals the economic productivity of water and helps decision-makers redirect investments from sectors with high depletion and low economic return toward sectors that produce higher value with less water consumption.

The researchers believe that framing water resources within this macro-accounting equation, based on the philosophy of the GFSM, represents both a cognitive and

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

practical transformation in the financial and economic management of the state. This transformation is especially significant in a country such as Iraq, which faces severe water scarcity pressures, climate risks, and geopolitical challenges related to transboundary rivers. Traditional government accounting systems, which are often based on cash flows and the movement of money, are unable to recognize the hidden depletion of natural assets. They may show that the government has spent money on irrigation, agriculture, or infrastructure, but they do not show whether such spending has preserved or depleted the water asset.

Accordingly, adopting this objective moves accounting from being merely a tool of recordkeeping to becoming a sovereign tool for early warning and macroeconomic planning. The proposed water accounting statements would require the decision-maker to stop viewing water as a free commodity and to link every unit of depleted water to a measurable economic return. This is particularly important in the agricultural sector, which often consumes the largest share of water. Furthermore, accurate accounting measurement of water balances, flows, and depletion would provide the Iraqi negotiator with strong quantitative and economic evidence when dealing with upstream countries. Instead of relying only on political claims or general diplomatic language, Iraq would be able to present documented water accounting statements that show the economic and sovereign losses caused by reductions in transboundary water flows.

Second: Providing Accounting Information to Assess Supervisory Responsibility and Institutional Accountability Toward Sovereign Water Assets

The second objective of the proposed water resources accounting statements is to provide accounting information that enables the assessment of supervisory responsibility and institutional accountability toward sovereign water assets. The concept of supervisory responsibility is one of the core pillars of accounting conceptual frameworks. When this concept is applied at the level of the state, it acquires a sovereign dimension. The state and its institutions do not own water resources in an absolute sense that allows unlimited disposal. Rather, the state acts as a supervisory agent entrusted with managing, protecting, and preserving this wealth on behalf of society and future generations.

This objective arises from the need to close the accountability gap that exists in traditional government accounting systems. The current government accounting system may show how much money has been spent by the Ministry of Water Resources, the Ministry of Agriculture, or municipal authorities. However, it cannot adequately show whether these expenditures preserved the water asset, improved its quality, reduced losses, or contributed to depletion and deterioration. Therefore, water accounting statements aim to translate hydrological and institutional performance into accounting and financial indicators that can be used for accountability.

The first dimension of this objective is the disclosure of internal operational efficiency. The proposed water statements should not be limited to a quantitative description of water movement. They should provide a comprehensive evaluation tool that measures the effectiveness of government units in protecting and using sovereign water resources. Specifically, the category of outflows and expenditures should be transformed from a purely monetary category into a hydro-accounting category capable of analyzing the structure of public water consumption and identifying its causes.

This operational transparency can be achieved by separating two types of water outflows. The first type is productive depletion, which refers to water resources consumed in operational activities that

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

generate tangible economic outputs or social benefits, such as agricultural production, industrial processes, electricity generation, and urban municipal supply. The second type is water losses and waste, which refers to quantities of water that leave the economic control of the state without generating any developmental return or added value. These losses may include excessive evaporation from open and unlined irrigation canals, worn-out transmission and distribution networks, poor maintenance, weak monitoring, illegal withdrawals, or encroachments on riverbeds. By separately disclosing these losses, the water accounting system can reveal hidden waste and identify weaknesses in water management.

This distinction creates a qualitative shift in the philosophy of sovereign control. It provides supreme supervisory bodies with an objective measurement tool to evaluate the effectiveness of government control procedures. It also supports efforts to reduce waste, prevent unjustified depletion, and protect national wealth. In this sense, water accounting statements contribute to enhancing control and accountability in government units, consistent with the need to reduce waste in money and public resources (Al-Khazali & Al-Moussawi, 2019, 2).

The second dimension of this objective is the accounting segregation of responsibilities through the application of the GFSM concept of other economic flows. For accountability to be fair and objective, government management should not be held responsible for events outside its control. Therefore, changes in water stocks resulting from government operations should be separated from changes resulting from external or natural events, such as droughts, climate change, or actions by upstream countries. This separation allows parliament and supervisory bodies to distinguish between internal administrative failure and external shocks.

The third dimension is accountability for environmental and legal obligations. The state's responsibility toward water resources is not limited to protecting the reservoir. It also includes meeting mandatory water claims, such as environmental flows needed for the recovery of marshes, water quotas allocated to governorates, and obligations related to public health and environmental protection. If the proposed water statements show that these obligations are not covered, this becomes an accounting indicator of failure in performing supervisory responsibility. Such failure may threaten social stability and weaken the principles of good water governance.

Good water governance includes transparency, accountability, efficiency, justice, and the rule of law. Transparency requires clear disclosure of information related to water resources. Accountability requires holding water management entities responsible for their decisions and performance. Water accounting under the GFSM strengthens accountability by providing quantitative and financial measures that separate internal administrative failure from external factors. Efficiency requires the allocation of water to uses that generate higher economic and social returns. Justice requires fair distribution of water among sectors, governorates, and generations. The rule of law requires strict enforcement of legal frameworks that protect water resources from violations, such as random wells or industrial pollution (Vink, 2014).

The inclusion of water resources within the GFSM represents the practical application of these governance principles. It transforms governance from general theoretical principles into measurable accounting practices that are subject to parliamentary and financial oversight. In the Iraqi environment, this is highly important because water resources management suffers from institutional fragmentation.

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

Responsibilities are distributed among several entities, including the Ministry of Water Resources, the Ministry of Agriculture, the Ministry of Construction, Housing and Municipalities, and local governments in the governorates. This fragmentation may lead to institutional evasion when drought crises worsen, pollution increases, or water waste is detected. Therefore, adherence to the GFSM and the preparation of water accounting statements would help unify dispersed entities within an integrated government reporting framework.

Third: Accounting Measurement of Net National Water Wealth and Evaluation of the State's Water Position

The third objective of the proposed water resources accounting statements is to measure net national water wealth and evaluate the true water position of the state. Providing accurate and reliable information about the sovereign financial position of the state is one of the main objectives of the Government Finance Statistics Manual. When this objective is applied to natural resources, it requires a shift from purely hydrological measurement to accrual-based accounting and financial measurement. This shift aims to quantify net national water wealth and present a true picture of the country's water position (IMF, 2014, 67).

Traditional hydrological reporting is useful but analytically insufficient. It often focuses on total water reserves available in dams, lakes, and aquifers. Although these figures are necessary, they may create a misleading impression of water abundance. Total water reserves do not necessarily represent water that is fully available for economic use, because part of these reserves may be restricted by legal, environmental, social, or strategic obligations. Therefore, relying only on total water availability may lead to incorrect economic decisions and unsustainable development plans.

To address this information distortion, the proposed water statements should adopt the balance sheet approach. This approach requires matching sovereign water assets with water claims and obligations in order to determine the true water position of the state. Sovereign water assets include the total natural water reserves under state control, such as surface water stored in dams and lakes, groundwater that can be extracted sustainably, and other water resources controlled by the state. Water claims and liabilities include mandatory environmental flows, governorate water quotas, international obligations, strategic reserves, and other constraints that reduce the amount of water freely available for economic allocation. Net water value is then calculated by subtracting total water claims and liabilities from total water assets.

The measurement of net water wealth gives planning and financial authorities a stronger ability to anticipate the state's capacity to meet future development and social commitments. It also prevents over-allocation, which occurs when development plans are based on total available water without deducting environmental obligations, emergency reserves, and strategic needs. This approach is particularly important for Iraq, where water management may rely on total reservoir figures as if they represent free water available for agricultural or industrial use. Such treatment can lead to excessive expansion in water-intensive crops or projects that exceed the safe carrying capacity of the resource, causing drought crises, groundwater depletion, and environmental degradation, including the drying of the marshes.

The adoption of a water position statement on an accrual basis would create a qualitative change in sovereign decision-making. Decision-makers would be required to deduct mandatory environmental obligations, climate emergency allocations, and strategic reserves from total stored water before determining the

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

quantity available for economic allocation. By converting environmental obligations and strategic reserves into book liabilities, legislators and the Federal Board of Supreme Audit would have a scientific and legal tool to prevent unconsidered sectoral expansion at the expense of national sustainability and the rights of future generations.

Fourth: Providing Accounting Information to Assess Water Productivity and the Efficiency of Economic Allocation Among Sectors

The fourth objective of the proposed water resources accounting statements is to provide accounting information that enables the assessment of water productivity and the efficiency of economic allocation among sectors. Traditional financial and economic planning often allocates financial resources to sectors without considering the alternative cost of depleted water resources. For example, the government may support agriculture based on production outputs while ignoring the large volume of water depleted by this sector.

To overcome this gap, water accounting statements should shift from measuring total water withdrawals to measuring water productivity and allocation efficiency. Sectoral performance should not be evaluated only according to financial spending or production volume, but also according to the economic return generated by each unit of water depleted. This is consistent with the idea of measuring the economic productivity of water and evaluating the return of a water drop (Molden, 1997, 2).

This objective requires sectoral accounting tracking of water depletion. The proposed water statements should classify water use according to economic sectors and government functions. This classification allows the state to determine how much water is actually consumed by agriculture, industry, electricity generation, municipal use, and other activities. It should also distinguish between non-consumptive use and net depletion. Non-consumptive use refers to water withdrawn and used in operational activities but later returned to the hydrological system, such as treated wastewater or water used to cool power plants. Net depletion refers to water permanently removed from the hydrological and economic system through evaporation, plant transpiration, or incorporation into products.

The accounting measurement of the economic return of a water drop is achieved by linking sectoral water depletion with national accounts and gross domestic product. By dividing the economic value generated by a sector by the volume of water depleted in that sector, accounting indicators can be produced to show the economic return per unit of water consumed. These indicators help determine whether a sector is using water efficiently or consuming large quantities while generating limited economic value (Molden, 1997, 2). In Iraq, this objective is particularly important because the agricultural sector consumes the largest share of water resources while its contribution to GDP is relatively limited compared with the volume of water depleted. Activating this objective within the GFSM framework would expose the economic and environmental cost of agricultural and industrial policies and encourage the transition toward modern irrigation techniques and more efficient crop structures.

Fifth: Accurate Accounting Separation Between Internal Operational Performance and External and Climatic Effects

The fifth objective of the proposed water resources accounting statements is to provide an accounting framework that separates internal operational performance from external and climatic effects. Contemporary accounting theory relies on the principle of controllability, which means that management should not be held accountable for losses caused by events outside its control.

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

Applied to water resources, this requires distinguishing between human and operational consumption, which is under government control, and natural, climatic, and geopolitical factors, which are outside direct government control.

Traditional hydrological and accounting reports often show only the final net decline in water stocks. This may create confusion because the causes of decline may overlap. A decline in water reserves may appear to indicate failure in government policy, while the real cause may be severe drought, abnormal evaporation, or reduced inflows from upstream countries. Therefore, water accounting statements should separate operational flows from other economic flows. Operational flows include withdrawals and depletion resulting from government-controlled activities, such as agriculture, industry, electricity generation, and municipal use. These figures are used to evaluate the efficiency of water policies and resource allocation.

Other economic flows include changes in water assets that do not result from ordinary operational transactions. These include climatic impacts, such as abnormal evaporation, severe drought, and reduced rainfall, as well as geopolitical impacts, such as reductions in transboundary inflows caused by upstream dams or river diversions. This accounting separation allows a fair assessment of local executive agencies and transforms climatic and political shocks into documented economic losses recognized in the consolidated financial statements of the state.
This objective is particularly significant for Iraq because the country is located downstream and is affected by the water policies of upstream countries. Applying the GFSM concept of other economic flows would allow Iraq to translate damages resulting from reduced inflows, river diversions, dam construction, drought, and marshland evaporation into measurable losses in sovereign net wealth. This would strengthen Iraq's negotiating position and provide a documented economic basis for claiming fair water arrangements.

In conclusion, the proposed objectives of water resources accounting statements considering the Government Finance Statistics Manual show that water accounting can play a central role in developing government financial reporting. It can clarify the nature of water resources as sovereign economic assets, provide an integrated framework for measuring water balances and flows, enhance disclosure and transparency, support institutional accountability, measure net national water wealth, evaluate water productivity, and distinguish between internal operational performance and external climatic or geopolitical shocks. The theoretical analysis also shows that the GFSM provides a suitable basis for building water accounting statements because it relies on accrual accounting, recognizes assets and liabilities, records other economic flows, and supports the assessment of fiscal sustainability. Accordingly, the proposed framework supports the research hypothesis and highlights the importance of integrating water resources into sovereign financial reporting systems, especially in countries suffering from water scarcity, environmental pressures, and geopolitical challenges such as Iraq.

1.9 Conclusions

1. Setting targets for water accounting lists in the light of the Government Financial Statistics Manual (GFSM) contributes to the transformation of water from being a traditional natural resource to an economic and sovereign asset that requires measurement, disclosure and control.
2. Water accounting statements can provide an integrated information framework that links water balances and flows on the one hand, and the financial and economic impacts of the government on the other, to

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

support the assessment of the financial and water sustainability of the country.

3. The measurement of the net national water wealth is an important tool for assessing the water position of the country, as it shows the impact of use, depletion and deterioration on the country's ability to meet its future development and environmental commitments.
4. The objectives of water accounting lists can support government decision-making, by providing appropriate information that helps rationalize public spending, improve water allocation between sectors, and support policies aimed at achieving water security and sustainability.

1.10 Recommendations

1. The need to develop government information systems related to water, so that they provide accurate data on water balances, flows, consumption, and depletion, in a way that supports financial and water planning and rational decision-making.
2. The need to enhance disclosure, transparency and accountability in water resources management by linking government spending on the water sector to actual results related to use efficiency, reducing waste, and achieving water sustainability.

1.11 References

1. Ahmed, Safaa Mohammed, Mustafa, Roa Kamel, 2018, The Impact of Using the Government Finance Statistics Manual (GFSM) on the Federal General Budget in the Republic of Iraq, Journal of Economic and Administrative Sciences, Vol. 24, No. 104.
2. Al-Khazali, Alaa Shamsallah, Al-Moussawi, Dunia Mohsen Khalaf, 2019, Government Financial Statistics System (GFS) and its Role in Developing the Government Accounting System and Enhancing the Effectiveness of Control in Centrally Funded Units, Journal of Administration and Economics, Al-Mustasiriyah University, Vol. 42, No. 118.
3. Al-Mutairi, Huda Ahmed Ali, Al-Awwad, Asaad Muhammad Ali, 2020, Employing the Government Accounting System Using the Government Financial Statistics System in Municipal Institutions, An Applied Study in the Municipality of Karbala and the Municipalities of the Districts and Suburbs, Iraqi Journal of Administrative Sciences, Vol. 15, No. 61.
4. Al-Salhabi, Mona Hamdna Allah Ahmed, Al-Hussein, Mohamed Awad Al-Karim, The Impact of the Application of the Government Financial Statistics System on the Quality of Financial Reports in Federal Government Institutions, Sudan Academic Journal for Research and Science, Vol. 8, No. 19.
5. Al-Shafi, Khidr Al-Tayeb Al-Amin, Al-Zain, Omar Al-Zain, Al-Bashir, Mazen Abdullah Ibrahim, 2020, The Impact of the Application of the Government Financial Statistics System (G.F.S.) on the Performance of Internal Audit (Case Study of the Ministry of Finance, Economy and Manpower - White Nile State for the Year 1441 A.H.-2019), International Journal of Economics and Business, Volume 8, Issue 1.
6. Ardini, Taha Ahmed Hassan, 2015, Features of a Conceptual Framework for Government Accountability in the Iraqi Environment in Accordance with (CF-IPSASB) and (GFSM), Ph.D. Thesis, Faculty of Administration and Economics, University of Mosul, Iraq.
7. Badawi, Afaf El-Sayed, 2024, A Proposed Framework for a Water Accounting Information System to Support the Sustainable Use of Water Resources in Egypt, Scientific Journal of the Faculties of Commerce Sector, Al-Azhar University, Issue 32.

DOI: https://doi.org/10.69513/jdifas.v2.i2.a4
ISSN: 3080-1907

8. Cavanagh, Joseph, Suzanne Flynn, and Delphine Moretti. 2016. Implementing Accrual Accounting in the Public Sector. Technical Notes and Manuals 16/06. Washington, DC: International Monetary Fund.
9. Diamond, Jack. 2002. Performance Budgeting—Is Accrual Accounting Required? IMF Working Paper WP/02/240. Washington, DC: International Monetary Fund.
10. Food and Agriculture Organization of the United Nations, and World Water Council. 2018. Water Accounting for Water Governance and Sustainable Development. White Paper. Rome and Marseille: FAO and World Water Council.
11. International Monetary Fund, 2014, Government Finance Statistics Handbook 2014, IMF Department of Statistics, Washington, USA.
12. Jumaa, Tayseer Mohamed, Abdul-Reza, Dergham Ahmed, and Jassam, Younis Ahmed, 2025, Evaluation of the Procedures for Preparing and Implementing the State General Budget under the Government Financial Statistics System, Journal of Business Economics for Applied Research, Volume 7, Issue 2.
13. Mahmud, A., N. Susilowati, A. Susanti, and P. N. Sari. 2022. "Does Water Accounting Support Sustainable Water Management? A Review." IOP Conference Series: Earth and Environmental Science, no. 1.
14. Molden, David, and R. Sakthivadivel. 1999. "Water Accounting to Assess Use and Productivity of Water." International Journal of Water Resources Development 15, no. 1–2.
15. Molden, David. 1997. Accounting for Water Use and Productivity. SWIM Paper 1. Colombo, Sri Lanka: International Irrigation Management Institute. ix + 16 pp. https://hdl.handle.net/10568/36522.
16. Momblanch, Andrea, María Pedro-Monzonís, Abel Solera, and Joaquín Andreu. 2018. "Water Accounting for Integrated Water Resources Management: Experiences and Recommendations." Advances in Chemical Pollution, Environmental Management and Protection 3.
17. Omar, Othman Mohamed Abkar, 2016, The Reality of Preparing the General Budget of the Government of Sudan according to Government Financial Statistics, Ph.D. Thesis, Sudan University of Science and Technology, Khartoum.
18. Perry, Chris. 2011. "Accounting for Water Use: Terminology and Implications for Saving Water and Increasing Production." Agricultural Water Management 98, no. 12.
19. Perry, Chris. 2012. "Accounting for Water: Stocks, Flows, and Values." In Inclusive Wealth Report 2012: Measuring Progress toward Sustainability, 215–230. Cambridge: Cambridge University Press.
20. Vardon, Michael J., Thi Ha Lien Le, Ricardo Martinez-Lagunes, Ogopotse Batlokwa Pule, Sjoerd Schenau, Steve May, and R. Quentin Grafton. 2025. "Accounting for Water: A Global Review and Indicators of Best Practice for Improved Water Governance." Ecological Economics.
21. Vink, Sue. 2014. "Water Accounting: International Approaches to Policy and Decision-Making." Australasian Journal of Environmental Management 21, no. 2.
22. Wickens, Tobias, 2008, Non-Financial Sector Statistics – Consolidation Process, International Monetary Fund.