

Commentary

Release of the English Version of China's Standards for Drinking Water Quality: Bridging Evidence and Global Health Equity

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ABSTRACT

To eliminate language barriers to international water cooperation, the official English language version of China's *Standards for Drinking Water Quality (GB 5749-2022)* was released in December 2025. Compiled under national translation specifications, this authoritative edition ensures accurate communication of content. A comparative analysis with international standards demonstrates that *GB 5749-2022* balances global harmonization and localized adaptation in accordance with China's hydrogeological and public health conditions. The English version effectively eliminates technical ambiguities in transnational water projects and strengthens China's voice in global water governance. Nonetheless, challenges remain, including cross-lingual interpretations issues and gaps in the coverage of emerging contaminants such as per- and polyfluoroalkyl substances (PFAS). This article proposes optimizing interpretative documents, establishing dynamic updating mechanisms, constructing equitable cooperation platforms, and improving multi-dimensional evaluation systems. It aims to facilitate the global application of China's drinking water criteria, provide references for developing countries, and contribute to equitable global public health governance.

In recent years, China has actively engaged in extensive cooperation and exchanges with numerous countries and international organizations in the drinking water sector, where water quality serves as a core pillar of public health and technical collaboration (1–2). As the benchmark for national drinking water safety, authoritative foreign-language versions of China's drinking water standards have become essential for promoting the internationalization of China's water-related products, technologies, and scientific achievements. Furthermore, they serve as a critical

foundation for advancing the export of water services and facilitating international trade in the water sector. Consequently, the official foreign language translation and standardization of these national standards is a strategic imperative.

Adhering to the Standardization Administration of China (SAC) guidelines, the National Disease Control and Prevention Administration spearheaded the meticulous translation, expert review, and technical verification of the English version of the *Standards for Drinking Water Quality (GB 5749–2022)* (3). This effort strictly conformed to *Guidelines for Standardization—Part 10: General Rules for English Translation (GB/T 20000.10–2016)* (4) and *Part 11: Format and Presentation Requirements (GB/T 20000.11–2016)* (5). Following a rigorous approval process, the official English edition was formally promulgated on December 9, 2025, by the State Administration for Market Regulation and SAC (6). It is the first official English version of China's drinking water hygiene standards, marking a milestone in the internationalization of its public health standards.

Breaking Down Information Barriers:

From "Unreadable" to "Benchmarkable"

Complete and authoritative translation Earlier unofficial translations, characterized by fragmented excerpts and non-standard renditions, frequently exhibited omitted parameters, terminological inconsistencies, and inaccurate limit values. These deficiencies led to misinterpretations of China's water quality benchmarks, analytical methodologies, and oversight mechanisms (7), limiting global comprehension of its risk-based drinking water safety system.

In contrast, the official English version reproduces the full text of the national standard verbatim, covering all 55 reference indicators in Appendix A alongside detailed technical specifications and compliance criteria. With no content omission nor deviations from the original intent, it eliminates ambiguities and

transforms it to a transparent, globally benchmarkable technical instrument.

High international comparability with global mainstream standards The release of the English version enables direct global access to China's water quality limits and regulatory provisions, supporting direct benchmarking against the World Health Organization (WHO) *Guidelines for Drinking-water Quality*, the U.S. *National Primary Drinking Water Regulations*, the EU *Drinking Water Directive*, and Japan's *Drinking Water Quality Standards* (Table 1).

Comparative analysis indicates a high degree of congruence between *GB 5749-2022* and international benchmarks across most indicators, reflecting China's convergence with global paradigms in water safety governance (8). Furthermore, the standard incorporates region-specific parameters and limits reflecting China's distinct hydrogeochemical, epidemiologic, and socio-economic conditions. This demonstrates a science-based approach that reconciles international best practices with domestic public health priorities. Such a dual emphasis on harmonization and contextual adaptation reinforces the standard's scientific robustness and practical applicability.

Strategic Value for Cross-Border Cooperation and Health Diplomacy

Addressing the "Contractual Ambiguity" pain point in cross-border engineering projects Relevant policies underscore that the absence of authoritative English regulatory documents drive normative discrepancies in international water safety planning and implementation (13). In Belt and Road partner regions, particularly Southeast Asia and Africa, water supply projects undertaken by Chinese enterprises are situated within complex epidemiological and climatic contexts. Historically, fragmented standards have created contractual ambiguities and technical barriers in overseas engineering practices (14).

As the sole authoritative text available for formal citation, the English version of *GB 5749-2022* provides unified, unambiguous technical criteria for international water supply projects. It directly addresses the "contractual ambiguity" pain point, lowers technical negotiation costs, accelerates project delivery, and mitigates compliance risks across the full lifecycle from design to operation and maintenance.

Serving as a "rule carrier" of health diplomacy The standard transcends routine technical documentation; it constitutes critical soft infrastructure for China's participation in global health governance and international development cooperation. As a global public good featuring both scientific rigor and contextual adaptability, the English version translates policy commitments into actionable tools. It can be disseminated via multilateral and bilateral mechanisms including the Lancang-Mekong Cooperation Mechanism (15), the China - Association of Southeast Asian Nations (ASEAN) Public Health Cooperation Initiative (16), and the Forum on China-Africa Cooperation water supply programs (17), offering a replicable "Chinese approach" for partner countries revising their national drinking water regulations.

It further supports the overseas transfer and localization of China's proven expertise in water pollution control, centralized rural water-supply management, and water quality monitoring network, advancing technology transfer and institutional capacity building in recipient countries. This marks a strategic upgrade in China's foreign cooperation, from exporting infrastructure and products to exporting normative standards and governance philosophy (18), strengthening its influence in global health governance.

Challenges in Implementation and Interpretation

Terminology differences and context-dependent interpretation barriers The precise interpretation of

TABLE 1. Comparative analysis of *GB 5749-2022* and major international drinking water standards (Unit: number of parameters).

Comparison category	WHO (9)	USA (10)	EU (11)	Japan (12)
Identical limit values	41	17	19	23
Stricter limits in <i>GB 5749-2022</i>	15	26	2	6
Less stringent limits in <i>GB 5749-2022</i>	1	16	11	20
Indicators not listed or non-comparable	40	38	65	48

Note: Number of parameters in each category when *GB 5749-2022* is benchmarked against the corresponding international standard. "Non-comparable" refers to parameters whose divergent definitions, units, or testing methods prevent direct comparison.

Abbreviation: GB=guobiao (Chinese national standard); WHO=world health organization; USA=United States of America; EU=European Union.

specialized terminology constitutes a central challenge to the standard's global dissemination. Concepts specific to China's regulatory framework, such as "regular indicators" and "expanded indicators," diverge substantively from international classification systems. These include the U.S. distinction between primary and secondary drinking water regulations (10). Japan's approach features a tripartite categorization comprising water quality standard items, targeted management items, and items under consideration (12). Although the translation strictly adheres to *GB/T 20000.10–2016* to ensure semantic fidelity (4), such structural disparities cannot be reconciled through lexical equivalence alone.

The current absence of support for bilingual interpretation guidelines and application manuals creates a risk of misinterpretation among international users unfamiliar with China's regulatory context. Clarifications on indicator classification logic, monitoring frequencies, and application scenarios are needed to bridge the gap between translation and implementation.

Insufficient regulation of emerging contaminants restricts global adaptability Regulatory gap persists regarding fast-evolving emerging contaminants. The 97 indicators included in *GB 5749–2022* do not cover substances of growing global concern, including PFAS, microplastics, cyanobacterial toxins, and novel organic pesticides. For example, the U.S. Environmental Protection Agency (U.S. EPA) sets a stringent limit of 4.0 ng/L for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) given their carcinogenicity and developmental toxicity (19); the latest WHO guidelines also introduce limits for cylindrospermopsin and saxitoxin (9). The exclusion of these contaminants creates notable divergence from

international best practices.

During the compilation of *GB 5749–2022*, the drafting committee reviewed relevant international research but opted not to include these indicators, citing the limited detection capacity of domestic institutions and the high upgrade costs for water treatment facilities (20). While this prudent approach ensures short-term feasibility, it weakens the standard's alignment with the frontier of global regulatory science. A dynamic annual review mechanism should be established. As toxicological evidence and detection technologies advance, emerging contaminants should be added and existing limits revised.

Call for Global Participation: Building a Community of Water Security

Establish equal international standard cooperation mechanisms

This article advocates the global adoption of the English version of *GB 5749–2022* as an authoritative reference, addressing the need for enhanced transboundary water cooperation underscored by UN-Water and other multilateral frameworks (21). However, securing genuine global recognition necessitates more than unilateral promulgation; it hinges upon the establishment of equitable, open, and mutually beneficial dialogue mechanisms.

China will take a proactive role in leading deeper engagement with the International Organization for Standardization (ISO), WHO, and regional standard-setting bodies, establishing regular mechanisms for standard mutual recognition and technical consultation to replace one-way "export" with reciprocal exchange (Table 2). Parallel efforts will focus on joint verification pilots in Belt and Road partner countries. These pilots will explore implementation

TABLE 2. Standard internationalization roadmap.

Phase	Core Action	Key Tools / Mechanisms	Expected Outcome
Phase 1: mechanism establishment	High-level engagement with ISO, WHO, and regional bodies.	Memorandum of understanding, joint working groups, dialogue platforms.	A formal platform for standard mutual recognition.
Phase 2: technical adaptation	Joint verification pilots in Belt and Road partner countries.	Water quality baseline surveys, technological adaptability assessments.	Localized implementation plans tailored to specific regional needs ("one country, one policy") (22).
Phase 3: efficacy assessment	Establishing a transnational health impact monitoring system.	Epidemiological data analysis, water treatment efficacy evaluation.	Evidence-based reports demonstrating tangible public health improvements.
Phase 4: global adoption	Integration into regional/global technical guidelines.	Academic promotion, multilateral development banks procurement integration, policy briefs.	Transition from a "national document" to a "globally adopted public good."

Abbreviation: ISO=international organization for standardization; WHO=world health organization.

pathways tailored to local water quality, epidemiological profiles, and treatment capacities. Ultimately, the standard will be transformed into a global public good for drinking water safety.

Optimizing the multi-dimensional global impact evaluation system Evaluation of the English version's global influence must be evidence- and outcome-based. Reliance on bibliometric indicators (e.g., downloads, citation counts) only captures superficial academic attention and fails to reflect the standard's practical value in global public health governance. A multi-dimensional, quantifiable framework integrating academic recognition, practical applicability, and public health benefits is urgently needed (23).

Core indicators should track the standard's real-world performance. First, they should measure adoption and citation by international organizations and partner countries. Second, they should assess its technical contribution to cross-border water projects. Third, they should monitor reductions in waterborne disease incidence. Fourth, they should evaluate improvements in water treatment efficiency and water quality compliance rates. Finally, they should gauge international stakeholder awareness and acceptance of China's drinking water standards. This outcome-oriented system shifts focus from dissemination scale to governance efficacy and from academic impact to tangible public health gains (24). Continuous empirical assessment can enhance the global credibility and leadership of China's drinking water standards, supporting Chinese contributions to global water security governance.

CONCLUSION

The release of the English version of *GB 5749–2022* represents a paradigm shift in leveraging technical standards to advance global health equity. This development has prompted the strategic prioritization of English translations for other critical Chinese public health standards with international implications. Priority should be assigned to those governing food safety and quarantine protocols. These areas play a crucial role in international trade, travel, and collaborative health security. By presenting its science-based regulatory framework in a globally accessible language, China not only provides a replicable model for global water governance, particularly for developing countries, but also underscores that the ultimate value of these standards lies not merely in textual accuracy but in delivering tangible improvements in drinking

water safety worldwide. Therefore, this release is not the end of China's standard internationalization but an invitation for global collaboration. By adopting science-based and equitable approaches, countries can work together to achieve safe drinking water for all and strengthen global health governance.

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