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Plumbing The Depths: An Analysis of NQI WASH in Ghana, Uganda, and Zambia

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INTRODUCTION

Law, regulations, standards, and institutions are a critical part of the National Quality Infrastructure (NQI) needed to guarantee the quality, safety, and environmental soundness of Water, Sanitation, and Hygiene (WASH) goods, services, and processes. NQI WASH includes the laws and regulatory frameworks that create the need for WASH products and services, and the standards that create the need for and enable the availability of safe WASH products and services. A strong NQI WASH–specifically effective laws, institutions, and standards–will enable increased access to safe, reliable water and sanitation services and products.

Often the laws, regulations, and standards establishing NQI WASH are not known, do not exist, or are insufficient to accelerate access to safely managed water and sanitation services and products in line with the Sustainable Development Goals (SDGs) and WASH-sector goals. The purpose of this work is to accelerate access to water and sanitation services by improving NQI WASH, with a specific focus on the laws, institutions, and standards governing WASH within Ghana, Uganda, and Zambia. Through this research, WASH laws are analyzed and evaluated to determine whether they are sufficient to enable an effective NQI WASH. Ultimately, the research reveals several gaps within WASH laws and standards that weaken the NQI WASH for Ghana, Uganda, and Zambia. These gaps present key opportunities for strengthening NQI WASH, and the report offers suggestions for how WASH laws can be strengthened in order to bolster NQI WASH.

THE ROLE OF LAW IN ADVANCING NATIONAL QUALITY INFRASTRUCTURE

Finding #1: National laws in Ghana, Uganda, and Zambia do not create a commitment to achieving access to water and sanitation.

Countries establish commitments to WASH through the law. Using the law, governments–at the national and local levels–commit to increasing access to safe, reliable drinking water and sanitation by establishing specific rights, protections, rules, requirements, processes, authorities, and responsibilities that commit the government and other actors to take certain actions, refrain from certain actions, or modify their actions or activities according to certain rules and limitations. By creating a commitment to achieve universal access to safely managed drinking water and sanitation services, the law creates a need for WASH products and services, and a need for those products and services to be safe. A law establishing rights to water and sanitation creates a need for WASH products and services because those products and services are needed to deliver drinking water and sanitation services to each and every person. By requiring water and sanitation services to meet certain safety standards, the law creates a commitment to ensuring that those WASH products and services are not only available but are safe for public health and the environment. NQI WASH is at its strongest when the law demands action to achieve universal access to drinking water and sanitation goods, services, and processes that protect public health and the environment.

Not all laws are created equally. There are certain provisions that must be present within any law in order to create an actionable, measurable commitment to achieving universal access to drinking water and sanitation, thereby ensuring a strong NQI WASH. For a law to create a commitment to achieving access to water and sanitation, the law must: (1) recognize the human rights to water and sanitation, (2) control and limit the release of pollution, (3) manage the quality of drinking water and sanitation services to protect public health and the environment, (4) manage the use and quality of water resources, and (5)

ensure accountability and transparency.[1] Each of these factors play a key role in ensuring that safe, effective water and sanitation services are delivered to every household.

Recognizing the human rights to water and sanitation is at the heart of a strong NQI WASH. By creating *actionable, tangible* rights to water and sanitation, the government obligates itself to ensure that each and every household actually receives water and sanitation. For example, in the law the government should create a right to drinking water, and then define what it means for a person to have a right to drinking water, such as receiving 50 liters per person per day. The more definition that can be provided, the clearer it is what is owed to whom and by whom. This means that it is more likely that a person will not only actually have the right, but also experience and enjoy that right. Having a right to water and a right to sanitation empowers people and creates an accountability mechanism for ensuring that having a right translates into real service delivery.

Limiting pollution and managing water resources ensures that there are actual services to deliver to households. Limiting pollution into water resources not only protects water resources, the environment, and therefore people's health when interacting with the environment, but also makes it easier, and more affordable, to provide safe drinking water. The less contamination that is released into the environment, the less that has to be removed from drinking water. Furthermore, by setting limits on how much pollution can be released as a result of certain activities, it creates an impetus for developing technologies that remove pollution from wastewaters created by domestic, commercial, and industrial processes. Because certain limits must be met, technologies that will allow wastewater producers to meet those limits must be developed. The more restrictive the limits, the more advanced the technology has to be, which means the better the technology will be at ensuring that the contamination is not released. The law creates the need for technologies and infrastructure, and by setting the levels of pollution allowed, also establishes how effective the technologies need to be at removing pollution in order to protect public health and the environment. The law serves to both spur innovation in service delivery approaches as well as ensure that service delivery protects public health and the environment, environmental contamination is limited, and water resources are effectively managed to guarantee that sufficient water is available to be treated and delivered as drinking water.

Creating rights and establishing rules must be complemented by tools of transparency and accountability. Developing rules establishes the baseline for what is and is not allowed. However, these rules will not change behavior if they are not applied and if it is not required that they be followed. Therefore, it is important that the law creates processes for collecting and reporting information about the activities of different actors, and consequences when rules are not followed. Together, information and action ensure that the rules and rights established within the law, regulations, and standards convert into something meaningful for communities.

In the analysis that follows, each component of WASH law is analyzed and evaluated for Ghana, Uganda, and Zambia.

1. Current national laws do not create human rights to water or sanitation.

In Ghana, Uganda, and Zambia, existing laws do not commit national or local governments to achieving the human rights to water and sanitation which undermines NQI WASH. Neither the Constitution nor any other law in these three countries state that the people have a right to water or a right to sanitation. This means that there is no obligation on national or local governments to ensure that people have access to

[1] Center for Water Security and Cooperation, *Our Methodology*, available at law.thecwsc.org/our-methodology/.

water and sanitation. This also means that the people have no right to expect or request water and sanitation services from the government. Without rights to water and sanitation, there is no obligation to take steps to ensure water and sanitation services are delivered to households.

Sometimes objectives or other statements within laws or policies suggest there are rights to water and sanitation. However, these do not create enforceable rights to water and sanitation, and provide no protections to people. For example, in Ghana, the National Water Policy establishes as a key principle of the policy that all people have a fundamental right to safe and adequate water to meet basic human needs.[2] In the Forward to the National Drinking Water Quality Management Framework, the Ministry of Water Resources, Works, and Housing states that it recognizes "access to safe drinking water as a basic human right and essential to protect public health."[3] However, policy documents do not create rights and their provisions are not enforceable. Therefore, no minister in Ghana is obligated to take steps to realize the rights to water and sanitation even if they acknowledge such rights. In Uganda, within the objectives of the Constitution, the State is mandated to ensure that "all Ugandans enjoy rights and opportunities and access to education, health services, clean and safe water, work, decent shelter, adequate clothing, food security and pension and retirement benefits."[4] Similarly to policy documents, stating that an objective of the law is to ensure access to clean and safe water is not the same as establishing a right to drinking water. Therefore, these policies and statements of objectives do not create an obligation on the government to take steps to ensure access to water and sanitation.

Uganda and Zambia have adopted laws that provide limited support to increasing access to drinking water. Under the Water Act, water authorities in Uganda have the option to provide water services to any person, but if they do provide services to a person they are required to comply with all regulations or the terms of the performance contract.[5] The same water authority can also take steps to protect drinking water, but is not required to. For example, they *can* create protected zones near waterbodies, boreholes, and drinking water works, as well as prohibit certain activities within those zones.[6] In Zambia, the law seems to provide a strong driver to get people connected to services, but undercuts the requirement with a vague and overpowering caveat. Local authorities under the Water Supply and Sanitation Act, are required to provide water supply and sanitation services to any area within its jurisdiction, except where services are already being provided or where they are "unable, for whatever reason."[7] No restrictions are placed on what "unable" includes or does not include, which means the exception easily swallows any requirement. Ultimately, neither Ghana, Uganda, or Zambia have recognized a right to water or a right to sanitation.

2. National laws in Ghana, Uganda, and Zambia prohibit pollution beyond certain limits, but do not create a clear and effective framework for managing pollution control.

National laws in Ghana, Uganda, and Zambia do not create an effective framework for managing pollution control. To create an effective framework for limiting pollution, there are certain provisions that should be present within the law. These provisions include: 1. a prohibition on the release of pollution, 2. a requirement to apply for a permit before releasing pollution into the environment, 3. a requirement to develop effluent limitations for dischargers, and 4. a requirement to develop water quality standards.

[2] Ghana, National Water Policy, Section 1.2.1.
[3] Ghana, National Drinking Water Quality Management Framework, Forward.
[4] Uganda, Constitution, Objective XIV.
[5] Uganda, Water Act, Article 49.
[6] Uganda, Water Act, Article 72.
[7] Zambia, Water Supply and Sanitation Act, Article 10(2).

Such a clearly established framework for pollution control does not exist in either Ghana, Uganda, or Zambia.

The foundation of any good law is a prohibition on pollution. The only way to limit the release of pollution into the environment is to prohibit the release of pollution. Typically, there is not a broad prohibition on pollution, but rather a prohibition unless the discharged wastewater meets certain standards. Second, the law should create an accountability mechanism by requiring any entity that is discharging pollution to apply for and receive a permit. It is through this permit requirement that the regulator can learn about the activity, review the proposed activity, and ensure sufficient measures are in place to protect the environment, and monitor compliance with regulations and permit requirements as the activity takes place. Third, the law should require the development of effluent limitations and water quality standards. Effluent limitations limit the amount of pollution that can be released into the environment. Water quality standards ensure that the condition of waterbodies is sufficient to support the purposes for which the waterbody is used, such as recreation, drinking water source, or fishing. Water quality standards are typically complemented by an anti-degradation policy that protects existing uses and the level of water quality to protect those uses. Together, these efforts create a strong framework for managing pollution control.

A. Prohibition on pollution

In Ghana, Uganda, and Zambia, the law allows pollution, but prohibits pollution beyond the limits or requirements set forth in the law. For example, in Ghana, the Water Resources Commission Act (WRCA) states that it is a punishable offense to interfere with or alter the flow of water resources or to pollute water resources beyond the levels prescribed by the Environmental Protection Agency, except as in accordance with the WRCA or with the approval of the Environmental Protection Agency.[8] Similarly in Zambia, the Environmental Management Act specifically prohibits any person from discharging any pollutant into the aquatic environment in contravention of water pollution control standards established by the Zambia Environmental Management Agency (ZEMA).[9] However, the Act also allows a person to apply for a license to use water resources to dilute effluent.[10] In Uganda, the Water Act prohibits any person from allowing waste to come into contact with any water other than has been prescribed by law.[11] Therefore, broadly pollution is allowed but is only allowed within the limits set forth within the law.

Ideally, the law would first establish a broad, unequivocal prohibition against water pollution. Such a prohibition would encourage reduction in and ultimate elimination of pollution production in the first instance. Given that a complete prohibition on pollution would likely not be feasible to enforce today, the law could provide progressive compliance timelines that would encourage innovation in pollution control and changes to processes–particularly agricultural, commercial, and industrial processes–to reduce the use of and production of harmful contaminants. Such an approach would compel greater action for reducing not only the release of pollution, but the production of pollution.

B. Requirement to apply for a discharge permit

Permits seem to only be required in Zambia, and in a limited way in Uganda. In Zambia, a permit is required to discharge pollutants. The Environmental Management Act prohibits the discharge of a pollutant into

[8] Ghana, Water Resources Commission Act, Article 24.
[9] Zambia, Environmental Management Act, Article 46.
[10] Zambia, Water Resources Management Act, Article 46.
[11] Uganda, Water Act, Article 6(c).

the environment without a license if that discharge causes or is likely to cause an adverse effect.[12] 'Adverse effect' is defined broadly and incorporates any harmful or detrimental effect that impairs or could impair human health or the ability of communities to provide for their health, safety, cultural and economic well-being.[13] The Act also penalizes the discharge of pollution without a permit, which seems to suggest a broader expectation that if a person is discharging pollution they must obtain a permit.[14] Furthermore, the Act prohibits persons from starting any project that could have an effect on the environment without written approval by the Environmental Protection Agency.[15] Therefore, projects with environmental impacts–which includes impacts on water resources–require approval and a license.

In Uganda, a person discharging waste *can* apply to the Director of Water Development for a waste discharge permit.[16] While that provision does not require a permit, the law later states that a person who allows waste to come into contact with any water, waste to be discharged directly or indirectly into water, or water to be polluted without authorization–i.e. a permit–commits an offense, and if found liable, will be required to pay the cost of remedying the damage and reinstating the environment to its original state, amongst other actions.[17] Therefore, it seems that while the law does not explicitly require a permit to discharge pollution, permits are in fact required because if a person discharges waste and does not have a permit, they will have committed an offence and be liable for addressing the harm. There are three circumstances where a person is explicitly required to apply for a permit. A waste discharge permit is required in areas where the Minister has declared 1. that waste cannot be discharged, 2. that certain trades cannot discharge waste, or 3. that waste cannot be discharged from certain classes of premises.[18] However, a permit is only required if the Minister identifies such areas.

Ghanaian law does not seem to require a permit for discharging pollution into the environment. In Ghana, the Water Resources Commission has been given the authority to make regulations for issuing permits to discharge waste into water bodies.[19] However, the Commission is not required to issue permits, and based on how the law is written, those who are releasing pollution are not required to apply for a permit. The Environmental Protection Agency also has the authority to issue environmental permits and pollution abatement notices for controlling discharges, but is not required to issue permits.[20] There is also no enforcement measure within either law that sets forth a penalty for discharging pollution without a permit.

The national laws in Ghana, Uganda, and Zambia do not include clear permitting requirements for discharging pollutants or contaminants into the environment or water resources. Nor do the laws set forth sufficient guidance on what the permit application and review process require, leaving the permit process lacking transparency.

[12] Zambia, Environmental Management Act, Article 32.
[13] Zambia, Environmental Management Act, Article 2.
[14] Zambia, Environmental Management Act, Article 32(30.
[15] Zambia, Environmental Management Act, Article 29(1).
[16] Uganda, Water Act, Article 29(1).
[17] Uganda, Water Act, Article 31(1).
[18] Uganda, Water Act, Article 28(1).
[19] Ghana, Water Resources Commission Act, Article 35(1)(g).
[20] Ghana, Environmental Protection Agency Act, Article 2(f).

C. Requirement to adopt effluent limitations

In Ghana, Uganda, and Zambia, the laws do not require the adoption of effluent limitations. In Ghana, both the Water Resources Commission and the Environmental Protection Agency have been given the authority but are not required to issue regulations for "prescribing...acceptable levels of pollution."[21] Furthermore, the law does not provide any guidance on how these effluent limitations are to be developed. This type of guidance would relate to: how agencies decide which contaminants to regulate (e.g. the basis for determining whether or not to regulate a contaminant), the basis for calculating effluent limitations and what factors will be considered in setting the effluent limitations, and whether and how frequently existing effluent limitations are reviewed and revised, including how frequently new contaminants for regulation are considered. The law does require compliance with effluent limitations should they be adopted by EPA or the WRC.[22]

Similarly in Zambia, there is no requirement to develop effluent limitations. Instead, any person who discharges a pollutant into the environment is required to take "reasonable measures to ensure that the best practicable option…is adopted in relation to the discharge."[23] The Director-General of the Zambia Environmental Management Agency or any other person with the authority to authorize a discharge of a pollutant must make sure that the 'best practicable option' is adopted.[24] The law provides no guidance for how the Director-General or other person is to make sure that the 'best practicable option' is adopted, or on what the authorization process looks like. Furthermore, while the Director-General is supposed to make sure the best practicable option is adopted, the discharger only has to take reasonable steps to adopt the best practicable option, two contradictory roles because the discharger only has to take reasonable steps–or make a good faith effort–to adopt the best practicable option. From a process point of view, it is not clear from the law whether the 'best practicable option' is defined on a case-by-case basis, or for the industry or sub-industry as a whole. If it were defined on a case-by-case basis, this has the potential to create inconsistency across the industry and confusion about what the best practicable option is. Also, the focus seems to be more on the technology being adopted rather than what kind of pollution control can be achieved based on the capability of the best available technologies.

As in Ghana and Zambia, Ugandan law does not require that effluent limitations be adopted. The Minister of Public Health has the authority to establish effluent limitations, but is not required to.[25] The Minister also has the authority to devolve authority and responsibility for implementing and enforcing those rules to local authorities. Furthermore, the Minister for Water has the authority to prescribe codes of workmanship for water supply, sewerage, and waste treatment works, but is not required to.[26] Therefore, the Ministry has the right authority, but no requirement to act.

While the law often empowers the Ministries to act, they do not require the Ministries to adopt effluent limitations. Nor does the law provide any guidance for how those effluent limitations are to be crafted in order to ensure consistency from discharge-to-discharger.

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[21] Ghana, Water Resources Commission Act, Article 35(1)(h). Environmental Protection Agency Act, Article 2(h).
[22] Water Resources Commission Act, Article 24.
[23] Zambia, Environmental Management Act, Article 38(1).
[24] Zambia, Environmental Management Act, Article 38(2). The Director General is the chief executive officer of the Zambia Environmental Management Agency. Article 13.
[25] Uganda, Public Health Act, Article 70(b), (e).
[26] Uganda, Water Act, Article 70(1).

D. Requirement to adopt water quality standards

Only Zambian national law requires the adoption of water quality standards. The Water Resources Management Agency (WRMA) is required, in collaboration with the Environmental Management Agency (EMA), to recommend ambient water quality standards to the Zambia Bureau of Standards (ZABS) and "ensure that the standards are maintained."[27] While the law requires the development of water quality standards, certain dynamics are not detailed. First, while the WRMA and EMA are required to develop the standards, the Zambia Bureau of Standards do not seem to be required to adopt those standards. The WRMA and EMA make recommendations, but the law does not require the ZABS to review and adopt some set of standards for ambient water quality. Second, the law does not require compliance with those standards to be compulsory. Third, the law does not define what it means to have the WRMA and EMA "ensure that the standards are maintained."[28] Therefore, while there is a requirement to adopt water quality standards, it remains unclear how those become operational.

Ghana national law authorizes the Minister of the Environment to adopt regulations which set standards for environmental protection–which could include the adoption of water quality standards, but is not explicitly stated within the law–but does not require the adoption of environmental protection standards.[29] Similarly, there is no requirement in Ugandan national law to establish water quality standards. While the law does not require the adoption of water quality standards, the Public Health Act allows the Minister of Health to prohibit the growing of crops or irrigation of lands within the boundaries of a municipality or town where such activity is "unhealthful or unsanitary".[30] This prohibition is not the same as adopting a water quality standard, however, the effect, if such measures were adopted by the Minister, is to help protect water quality by limiting nonpoint source pollution, thereby helping to protect the water quality of nearby water resources.

3. Ghana, Uganda, and Zambia national laws create insufficient requirements for drinking water and non-sewered sanitation services.

Ghana, Uganda, and Zambian national laws do not create any requirement to adopt drinking water quality standards. Ghana has adopted a National Drinking Water Quality Management Framework and Sector Guidelines for drinking water supply in small towns, small communities, and rural communities.[31] However, while reflecting best practices, both documents are policies, do not require action, and are not enforceable.

While national law has little to say when it comes to drinking water, in some instances the law has more to say about non-sewered sanitation services. In Ghana, the law does not require the establishment of regulations to govern non-sewered, on-site sanitation. However, the Minister of Environment has broad authority to issue regulations, on the advice of the Board, for "standards and code of practice relating to the protection, development, and rehabilitation of the environment."[32] Therefore, the Minister of Environment has the authority to adopt standards for installing non-sewered sanitation because such standards would help protect the environment from untreated human waste that could contaminate

[27] Zambia, Water Resources Management Agency, Article 8(2)(n), 47(1).
[28] Id.
[29] Ghana, Environmental Protection Agency Act, Article 62(1)(a).
[30] Uganda, Public Health Act, Article 20.
[31] Ghana, National Drinking Water Quality Management Framework. See also Community Water and Sanitation Agency, Sector Guidelines.

[32] Environmental Protection Agency Act, Article 62(1)(a).

aquifers, water bodies, and the environment. Similarly in Zambia, there is no requirement to adopt regulations for non-sewered sanitation. However, there is a broad prohibition on starting any project that could have an effect on the environment without written approval by the Agency.[33] The term 'project' is not defined, and therefore, it is not clear whether this requirement to seek approval would apply to the construction of non-sewered sanitation systems on private property.

Uganda breaks the mold by requiring the adoption of codes of workmanship to govern private sewerage installations or plumbing.[34] A private sewerage installation includes a privately constructed latrine, septic tank, or other sewerage systems and all fittings connect to any of them.[35] And a code of workmanship includes all matters related to the design, construction, alteration, maintenance or repair of such works, including anything used in the works.[36]

4. Zambia and Uganda require permits to withdraw water resources, and only Zambia prioritizes domestic use above and against other water uses.

Two of the three countries require permits to withdraw water resources. In Zambia, the Water Resources Management Act requires a permit to withdraw water resources. Permits are required when water is used for the following purposes: environmental, municipal, agriculture, industrial, hydroelectric, mining, navigational, bulk water supply, and any other purposes as identified by the Board.[37] A permit is not required to use water from any surface water or groundwater resource for domestic or noncommercial purposes.[38] While it is important to reduce hardships in getting access to water for domestic purposes, registration and metering of withdrawals would help monitor water usage within a basin and protect water resources. In Uganda, the law prohibits any person from extracting water unless authorized.[39] Any person seeking to construct any works, or to withdraw and use water may apply to the Director of Water Development for a permit.[40] To be authorized to use water, a person must be issued a permit. In Ghana, while the law is not clearly written, the withdrawal or use of water without a permit is prohibited. The law prohibits the abstraction or use of water except as in accordance with the law, which includes applying to the Water Resources Commission for a water right.[41] Furthermore, the abstraction or use of water resources without authority–or permit–is a punishable offense.[42]

Prioritizing water for domestic purposes within the law is important for ensuring sufficient water resources are available to meet domestic and municipal needs.[43] Neither Uganda nor Ghana prioritize water use for domestic purposes. In Zambia, domestic use is prioritized. Subcatchment councils are required to develop subcatchment management plans. Within those plans, councils must ensure that domestic and noncommercial purposes are first within the order of priority water uses as well as ensure

[33] Zambia, Environmental Management Act, Article 29(1).
[34] Uganda, Water Act, Article 70(1).
[35] Uganda, Water Act, Article 2.
[36] Uganda, Water Act, Article 70(2).
[37] Zambia, Water Resources Management Act, Article 71(a).
[38] Zambia, Water Resources Management Act, Article 70.
[39] Uganda, Water Act, Article 8(2).
[40] Uganda, Water Act, Article 18.
[41] Ghana, Water Resources Commission Act, Article 13(1), 16(1)
[42] Ghana, Water Resources Commission Act, Article 34.
[43] Since water for domestic purposes–whether for drinking, cooking, or hygiene–should ideally be treated before use, this water comes from municipal providers. Therefore, water from municipal providers used for domestic purposes should also be protected and prioritized.

that "water reserves are set aside for priority purposes and environmental needs."[44] Therefore, domestic uses are prioritized. Interestingly, Ghana has a mechanism to protect water for domestic use during emergencies, but it does not create a requirement. When there is a threat of a "serious deficiency of water for essential domestic purposes" the Minister of Works and Housing is allowed to, but not required, to declare a water emergency.[45]

5. Each of the three countries has an opportunity to strengthen key provisions that would improve transparency and accountability.

A. Data collection and monitoring structure in place.

While Zambian law says the most about data in comparison to Ghana and Uganda, the majority of the 'asks' within the laws related to data collection are optional or infrequent. In Zambia, dischargers of contaminated wastewater are subject to minimal data collection and reporting requirements. Any person or facility discharging pollution is required to measure the 'levels of discharge' and report the results to ZEMA.[46] 'Levels of discharge' is not defined, and could relate to the volume of discharge and/or the composition of the discharge, or more. Further, it is unclear whether this is a one-time requirement or that the measurements must be taken periodically. In addition, the owner or operator of a sewerage system or any other undertaking likely to discharge contaminants–such as an agricultural scheme, industrial plant, or business–is required to submit to the Inspectorate "information relating to the quantity and quality of the pollutant or contaminant."[47] Similarly, this appears to be a one-time requirement rather than an ongoing requirement, which would enable continued monitoring and compliance. Additional reports on the quantity and quality of pollutants are only required upon request from the Inspectorate when the Inspectorate has reasonable grounds to believe that the owner is or is likely to cause a discharge of pollution into the environment, which limits the authority of the Inspectorate to request information.[48] Therefore, there is no ongoing responsibility to collect and report information.

The Water Resources Management Authority for Zambia is required to develop a "gender sensitive integrated national management, monitoring, and information system on water resources as may be prescribed by the Minister."[49] However, the law provides no additional context as to what information should be collected as part of this effort, from whom the data is to be collected, or how the information should be presented, including whether the information is to be made public. To build out the system, WRMA may require any person or authority to provide them information, documents, samples, or materials either one-time or regularly.[50] Ultimately, collecting that data and information is left to the discretion of the WRMA.

WRMA is also responsible for monitoring the quality of water resources.[51] If WRMA is concerned that certain activities may cause pollution, the Authority may require the person conducting the activities to install devices to monitor the quality and quantity of effluent, take reasonable measures to control or

[44] Zambia, Water Resources Management Act, Article 61(2)(e).
[45] Ghana, Water Resources Commission Act, Article 33.
[46] Zambia, Environmental Management Act, Article 35(2).
[47] Zambia, Environmental Management Act, Article 37(1).
[48] Zambia, Environmental Management Act, Article 37(2).
[49] Zambia, Water Resources Management Act, Article 38(1).
[50] Zambia, Water Resources Management Act, Article 38(4).
[51] Zambia, Water Resources Management Act, Article 47(2).

prevent pollution, construct or install waterworks to control or prevent pollution, or provide a report to the authority about their current and future activities.[52] A person who fails to comply with these requirements can be fined, imprisoned, or required to remediate the area or pay for any remediation conducted by the government.[53] While WRMA is empowered to act, the law does not include any trigger language–identify any specific circumstances–that would require WRMA to act.

In comparison, the data collection requirements set forth in Ghana and Uganda national laws are much weaker. The environmental and water laws in Ghana do not create requirements for collecting and publishing data on water resources, drinking water and sanitation service quality, or water use and discharge permits. In Uganda, the Director of Water Resources may request the collection of data and information, but is under no obligation to require such collection. For example, the Director of Water Resources can request information about the quality, characteristics, and use of water or waste.[54] The Director is required to maintain a register of all permits issued by the Ministry and any works or uses of water registered under the Water Act.[55] At the local level, local authorities are required to keep a map showing all existing public sewers and all public sewers under construction within its district or under its control, including identifying their purpose.[56] The silence within the law creates an opportunity to improve data collection and reporting requirements.

B. Implementation and enforcement mechanisms exist.

Because there are limited requirements to act and limited rules to follow set forth in the law, there are limited opportunities for enforcement. Enforcement is only available where there are rules or rights to enforce. Given that Ministries are often given the discretion under the law to determine if and when they need to act, and when they need to develop regulations or requirements that they would then need to enforce, any enforcement mechanisms depend on the Ministries choosing to act and choosing to develop regulations or requirements first. The enforcement mechanism–a rule and authority to act–is just one piece. Rules must be complemented by penalties or the ability to assess a penalty.

There are limited enforcement and penalty mechanisms present in the laws, some of which are discussed throughout the analysis above. For example, in Uganda, the Minister can imprison or fine any person who wastes water, misuses water, unreasonably uses water, or uses water for a purpose other than indicated in the permit.[57] What it means to misuse, waste, or unreasonably use water is not defined in the law, which means that the requirement may not be applied consistently. Any person who commits this offense can be imprisoned for no more than five years and/or fined no more than six million shillings, in addition to one million shillings per day that the offense continues. While the law sets a cap on the consequences, it may be high enough to disincentivize noncompliant behavior.

In Ghana, there are broader enforcement provisions. Any person who alters the flow of or pollutes water resources beyond the levels that may be prescribed by EPA–except in accordance with the requirements of the WRCA or with the approval of EPA–commits an offense and can be fined up to 500 penalty units and/or imprisoned for no more than two years.[58] In comparison to Uganda, the financial penalties for

[52] Zambia, Water Resources Management Act, Article 49(1).
[53] Zambia, Water Resources Management Act, Article 49(2), and (3).
[54] Uganda, Water Act, Article 12.
[55] Uganda, Water Act, Article 34.
[56] Uganda, Public Health Act, Article 77.
[57] Uganda, Water Act, Article 40.
[58] Ghana, Water Resources Commission Act, Article 24.

noncompliance are likely to be insufficient to disincentivize noncompliant behavior. Furthermore, the Water Resources Commission can fine or imprison a person for withdrawing or using water without the required "authority" or for constructing works without "authority."[59]

The Environmental Management Act and the Water Resources Commission Act for Zambia establish even more robust enforcement mechanisms. Under the EMA, any person who discharges pollution without a license can be fined no more than 700,000 penalty units and/or imprisoned for no more than seven years.[60] The polluter can also be required to clean up the polluted environment and eliminate the effects of the pollution at their expense.[61] If any third parties incur costs as a result of the pollution, the polluter may also be required to pay those costs.[62] The WRMA has a similar provision whereby any person who discharges pollution into a water resource can be fined no more than 100,000 penalty units and/or imprisoned for a period of no more than one year.[63] Similarly, the polluter can also be required to take remedial action, to reimburse the Authority for remedial action they have taken, and pay compensation for the damage caused.[64] Under the WRMA, the penalty for pollution is less than if the pollution is released into the environment! Broadly, the actual penalties themselves across the three countries are arbitrary, and limit the ability of the Ministry and court to penalize behavior that detrimentally–and potentially irreparably–damages the environment and water resources.

Finding #2: National laws in Ghana, Uganda, and Zambia do not encourage the development of WASH standards.

1. The Standards Bodies are not required to develop WASH standards.

While the Standards Bodies for Ghana, Uganda, and Zambia have many responsibilities, they are not required to adopt standards related to water and sanitation services. While this report focuses primarily on product standards, it is important to note that other standards related to system design, installation, and maintenance as well as those that establish personnel training and credentialling requirements are also important. The Ghana National Standards Authority Act of 1973, the Zambia Standards Act of 2017 and Zambia Compulsory Standard Act of 2017, and the Uganda National Bureau of Standards Act, each grant the standards bodies the authority to develop standards which are the foundation for national technical regulations, but do not require the standards bodies to develop WASH product standards specifically. Given the importance of the safety of drinking water and sanitation to public health, the environment, equity, and the economy, it is expected that Standards Acts require standards bodies to adopt WASH product standards or regulations. To support this process, any Standards Act should identify specific categories of WASH standards that standards bodies must adopt to ensure that the national standards bodies develop the regulations necessary to ensure that drinking water and sanitation are safe and reliable.

2. WASH standards, when they have been adopted, are not compulsory.

Even where technical regulations for WASH products have been developed by the national standards bodies, it is not required that they be complied with unless mandated by the ministry which has jurisdiction. In Ghana, all of the WASH product standards that have been developed are voluntary, which

[59] Ghana, Water Resources Commission Act, Article 13.
[60] Zambia, Environmental Management Act, 32(3).
[61] Zambia, Environmental Management Act, Article 32(4).
[62] Zambia, Environmental Management Act, Article 32(5).
[63] Zambia, Water Resources Management Act, Article
[64] Zambia, Water Resources Management Act, Article 48.

means that while standards have been adopted, the standards do not have to be complied with. In both Uganda and Zambia, some standards are voluntary while others are compulsory. In Ghana, there is no authority to make a standard 'compulsory' or mandatory to follow, while the laws in both Uganda and Zambia for standards to be designated as compulsory.

In Uganda, the Council for the National Bureau of Standards can recommend that the standards be compulsory only if the Council believes that it is "not practicable to achieve the purposes of the standard specification otherwise than by means of making it compulsory."[65] The Act provides no additional guidance on what that language means, including what types of situations would make it impractical to achieve the purposes of the standard. Further, there is no requirement for the Council to make these determinations for each standard, and then provide a review and appeal process. Therefore, standards remain voluntary without any consideration for making them compulsory.

In Zambia, there is a Compulsory Standards Act which allows the Minister, after the recommendation of the Board, to declare an existing National Standard to be compulsory where "it is necessary or expedient to do so in respect of a commodity or service to promote public safety, health, consumer protection or environmental protection."[66] The Act does not require the Board to review all existing standards and make preliminary recommendations, nor is the Minister required to act if the Board does make a recommendation. It is also unclear whether or not the Board's decision on whether a standard should be made compulsory is made available to the public, so the public can know here the Board thinks a standard should be compulsory but the Minister has not acted. To date, Zambia only has adopted one compulsory WASH standard.

3. WASH standards are not comprehensive.

There are significant gaps in the existing portfolio of standards for Ghana, Uganda, and Zambia. This study reviewed three categories of WASH related product standards including plumbing fittings and fixtures, piping, and water treatment technologies. The Ghana Standards Authority has not adopted standards to govern sanitation technologies, including water closets (either Western or squat), sanitary systems, non-sewered systems, or latrines. On the drinking water side, the Ghana Standards Authority has not adopted standards to govern water filtration technologies, boreholes, or hand pumps. Limited standards have been developed regarding piping. Standards have not been adopted for several types of piping materials, including: cast iron, polypropylene, polyethylene, polybutylene, and poly vinyl chloride (PVC). Standards for these types of products are critical to protecting water quality as well as ensuring material safety and product performance or efficiency. Therefore, there is nothing to ensure, for example, that toilets can withstand a certain weight, or that lead or other toxins cannot leech off.

Similarly, in Zambia, neither the Zambia Bureau of Standards nor the Zambia Compulsory Standards Agency have adopted robust standards to govern sanitation technologies. No standards have been adopted for water closets, urinals, sanitary systems, or latrines. One standard has been adopted to govern a prefabricated integrated non-sewered sanitation treatment unit. On the drinking water side, limited standards have been adopted. No standards have been adopted to govern hand pumps or faucets. Limited standards have been developed for fittings, piping, water filtration technologies (including point-of-use technologies), and boreholes. For example, standards have been adopted for certain piping materials, including polypropylene, polyethylene, polybutylene, and poly vinyl chloride (PVC), but not for cast iron.

[65] Uganda, National Bureau of Standards Act, Article 18(2).
[66] Zambia, Compulsory Standards Act, Article 11(1).

Uganda has limited WASH standards. The Uganda National Bureau of Standards (UNBS) has not adopted robust standards to govern sanitation technologies, having only adopted standards for a washdown water closet pan, a urinal, a flushing cistern, a prefabricated integrated non-sewered sanitation treatment unit, and a prefabricated fecal sludge resource recovery unit. On the drinking water side, the UNBS has not adopted standards to govern boreholes. Limited standards have been developed regarding fittings, piping, water filtration technologies (including point-of-use technologies), and handpumps. For example, standards have been adopted for certain piping materials, including polyethylene and polypropylene, but not for cast iron, polybutylene, and poly vinyl chloride (PVC).

Therefore, the standards for Ghana, Uganda, and Zambia should be made more robust to reflect the need for drinking water and sanitation to meet certain health and environmental standards from the withdrawal of surface water to the delivery of safe, reliable drinking water, and all the way through to the treatment of sanitation whether on-site or centralized.

4. ***Addressing lead in drinking water could be an important catalyst for the development and adoption of standards for WASH products.***

In March 2023, the governments of Ghana and Uganda were founding members of a consortium of governments, manufacturers, and civil society partners at the United Nations (UN) 2023 Water Conference that launched a global commitment to achieve lead-free drinking water.[67]

This consortium recognized that there is an urgent need to reduce human exposure to lead in the environment, including lead in drinking water–a source of exposure that is wholly preventable. An invisible, odorless, and tasteless chemical contaminant present in water supply systems worldwide, lead is a toxin that irreversibly impacts neurological and cognitive development. Exposure in childhood or during pregnancy can cause lifelong harm, yet globally, 800 million—or roughly 1 in 3—children have elevated levels of lead in their blood. The primary source of lead in many drinking water systems is lead-containing pipes and parts that leach lead into the water. While there is growing awareness of the long-term dangers posed by lead in drinking water, new systems across the globe continue to be built with unsafe materials.

Founding members of the consortium presented "The Global Pledge to Protect Drinking Water from Lead," which aims to build momentum around local and global initiatives to progressively reduce lead exposure from drinking water and protect public health.

The pledge highlights actions to eliminate the use of lead-leaching parts in the construction of new drinking water systems and to improve the monitoring and remediation of existing systems that leach lead into drinking water. Founding members of the consortium included the governments of Ghana, South Africa and Uganda; the World Health Organization; World Vision; WaterAid; the Conrad N. Hilton Foundation; LIXIL; RTI International; the Rural Water Sanitation Network; the Skat Foundation; the University of Leeds; The Water Institute at UNC; the International Water Association; the International, Water, Sanitation and Hygiene Foundation (IWSH); the World Plumbing Council; and the International Association of Plumbing and Mechanical Officials (IAPMO).

[67] United Nations, A Global Commitment to Stop the Flow of Lead in Drinking Water, available at https://sdgs.un.org/partnerships/global-commitment-stop-flow-lead-drinking-water#:~:text=As%20part%20of%20our%20global,water%20lead%20free%20by%202040.

This consortium invites governments, the private sector, manufacturers, suppliers, development banks, financial institutions, and philanthropic organizations and individuals to support global efforts by joining the Lead Pledge at www.globalleadfreewater.org and by working collectively to protect drinking water through the following actions:

- Ensure that all new water systems are constructed with products and materials that meet international standards for lead-leaching, material safety, and performance.
- For existing water systems that may contain lead-leaching materials, develop and implement plans for periodic water lead monitoring and data sharing, including the communication of monitoring results.
- Investigate water systems reporting lead levels at 10 parts per billion (the WHO guideline value) or above to identify contamination sources and implement necessary interim or long-term remedial measures to reduce human exposure.
- Support communities to reduce or eliminate exposure to lead through education and action such as designating safe taps for drinking and cooking.

To implement these commitments, the consortium supports:

- Adoption of national policies and regulations based on international standards and testing/certification requirements for products and materials used in drinking water systems that address lead-leaching, material safety, and performance.
- Manufacturing of products and materials used in drinking water systems that meet international standards for lead-leaching, material safety, and performance.
- Affordable access to fittings, fixtures and filters that meet international standards for lead in drinking water.
- Development of low-cost technologies to enable widespread testing for lead in drinking water and materials to better understand the sources, impacts and mitigation/remediation of lead contamination in drinking water.
- Training and certification of professionals to oversee the design and construction of safe drinking water systems.
- National and local laboratory and monitoring capacity to assess and monitor lead in drinking water and materials to support the implementation of these commitments.
- High-quality research to better understand and identify sources, impacts and effective prevention and remediation methods and approaches to minimize harm from lead in drinking water.

5. The process for developing standards is not clearly defined and set forth in the law.

None of the Standards Acts identify the process by which standards are adopted, approved, and reviewed. The process by which standards are adopted, approved, and periodically reviewed should be detailed within the law. By detailing the process, the law helps to ensure that the process is fair, consistent, and transparent. The Standards Act for Zambia requires the Zambia Bureau of Standards to develop a standard for the process of setting, amending, and approving national standards.[68] However, the law does not provide any guidance for what should be included within the standard, or the types of processes or people that should be engaged. While the law requires the development of a standard for developing standards,

[68] Zambia, Standards Act, Article 16(3).

such a standard is not publicly available.[69] One of the benefits of having a transparent process is to ensure public engagement in the process, which cannot happen if the process is not known.

The Standards Acts for Ghana and Uganda similarly do not lay out a process by which standards are developed. Therefore, the law does not identify what steps must be taken to develop, adopt, or revise a law, and who is involved in that process, nor does the law require that the Board develop such a process through a standard or regulation, similar to Zambia. In both the case of Ghana and Uganda, limited information on the process is provided on the standards bodies' websites and there is no explanation for how that process was developed. In Ghana, the Ghana Standards Authority's process to develop standards is consensus-based.[70] A Technical Committee is formed with relevant stakeholders from different backgrounds. The Standards Directorate serves as a secretariat and project manager to these committees as they develop standards. For Uganda, much greater information is available about the process; however, no explanation of how it was established is provided. Similar to Ghana, the Uganda National Bureau of Standards uses technical committees to develop standards.[71] As of 2021, eighty-seven technical committees (TCs) have been formed. Technical committees are composed of a variety of interested stakeholders, including manufacturers, traders, consumers, regulators, civil society, and others. There are several WASH-related technical committees, such as a "Water and Sanitation" TC that focuses on standardizing the design and construction of water supply and wastewater systems, a "Mechanical Engineering" TC that develops standards for water well drilling, and a "Sanitary appliances and fittings" TC that develops standards for water closets, flashing cisterns, and other fittings. There are several steps to developing standards. The UNBS Secretariat can receive a request for a new standard from an individual, such as a manufacturer, an institution, a consumer, or civil society through the submission of a Preliminary Work Item (PWI) proposal. The Secretariat determines whether to prepare a formal New Work Item Proposal (NWIP) for approval by the UNBS management. Management approves this Proposal taking into consideration three factors: an assessment of market relevance, the cost effectiveness of developing a standard, and whether there is a need for the standard, such as when there is a new type of product or process that needs to be standardized or regulated. Once the proposal is approved, it must be designated a project status before the technical work begins by the Secretariat. During the preparatory stage, the Secretariat–or a working group–prepares a working draft. The working draft is reviewed and modified as necessary, and ultimately produced based on consensus and published for public comment for 30 days, if adopting an international standard, or 60 days if adopting a Zambian-developed standard. Once the notice and comment period is concluded, the National Standards Council (NSC) approves and declares the standard a Uganda Standard (US). While the process seems straight-forward, there are several areas where transparency will be important, including when the Secretariat decides not to turn a preliminary work item proposal into a new work item proposal, when the UNBS decides not to approve the Proposal, and what the comments are provide during the public comment period and whether and how they were taken into consideration during the revision process.

Ultimately, the law should require that a clear process be established in writing. Furthermore, it is important that where there are decisions made, that the reasoning for those decisions is made public and that there is an opportunity for a review or appeal of that decision. There is more that can be done to

[69] The standard mentioned in the Standards Act is neither available online nor listed in the Catalogue of Standards.
[70] Ghana Standards Authority, Standards, available at https://www.gsa.gov.gh/standards/.
[71] Uganda National Bureau of Standards, About Uganda Standards, available at https://unbs.go.ug//content.php?src=about-uganda-standards&pg=content.

inject greater transparency, public engagement, and accountability into the standard development process.

Finding #3: Zambia provides a good example of how countries can support workforce development.

The law in Zambia supports and enables the professionalization of the water and sanitation workforce. The Water Supply and Sanitation Act prohibits utilities and service providers from operating water and sanitation facilities without a license.[72] Licenses are valid for at least ten years.[73] The law could clarify and legitimize the licensing process by requiring the development of regulations to detail the qualifications required to receive different level licenses for different positions or itself provide greater guidance on what the licensing process looks like.

Licenses are also required for the construction of waterworks. The Water Resources Management Act prohibits persons from engaging in the business of constructing any water works without a license from the Water Resources Management Agency.[74] The Board may issue a license to a person involved in the construction of a water works or a borehole driller according to the rules and conditions determined by the Minister, should they prescribe the criteria for licensing a constructor or borehole driller and the qualifications for constructors and drillers who are authorized to design, construct, install, operate, or maintain any water works or drill any borehole, as they are authorized to do.[75]

It is also through the law that engineers and plumbers are regulated and licensed. The Engineering Institution of Zambia (EIZ) was re-established in 2010 by the Engineering Institution of Zambia Act of 2010 (Act No. 17 of 2010). The EIZ is responsible for regulating the engineering industry. The Constitution for the EIZ establishes different levels and categories of membership based on qualifications.[76] The Technical Education, Vocational and Entrepreneurship Training Act (No.13 of 1998), read together with TEVET (Amendment) Act No. 11 of 2005, established the Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) who is responsible for setting minimum standards and qualifications for different occupations and trades.[77] Operating as a plumber requires a license, and candidates to become a plumber must meet certain qualifications to obtain certain licenses as prescribed by TEVETA. For example, all plumbers must have completed at least Grade 9 of school. Candidates must complete academic training through a TEVETA accredited institute and on-the-job skills training through a company sponsorship. Once those trainings are complete, the candidate receives a TEVETA certificate, at which point the candidate must apply for a license from the Engineering Institution of Zambia and the Plumbers Association of Zambia (PAZA). According to TEVETA's latest guidelines, there are four levels of training that can be pursued by plumbers: Levels 1 to 4. Each level requires a different amount of training and level of education. There is also a program where plumbers with experience, but no formal training, can participate in Recognition of Prior Learning (RPL) trainings that allow them to receive the necessary certifications to be a licensed plumber. To date, there are 280 registered members of PAZA with TEVETA certificates and licenses from PAZA. PAZA is currently working with the Zambia Qualifications Authority

[72] Water Supply and Sanitation Act, Article 11(1). Service providers are defined as any person who provides water supply or sanitation services, and a utility is a water supply and sanitation utility established by a local authority. WSSA, Article 2.
[73] Water Supply and Sanitation Act, Article 13(2).
[74] Water Resources Management Act, Article 88(1).
[75] Water Resources Management Act, Article 88(2), 88(3).
[76] Engineering Institution of Zambia, available at https://www.eiz.org.zm/Home/About.
[77] TEVETA, available at https://www.teveta.org.zm/about/.

(ZAQA)–established by the Zambia Qualifications Authority Act No. 13 of 2011–to develop National Occupational Standards for plumbers.

The reach of PAZA goes further than just licensing. Within PAZA there is an Inspectorate responsible for overseeing licensed plumbers. The Inspectorate receives reports from companies who have used PAZA-licensed plumbers to complete work, which creates an oversight function and opportunity to review the work of the plumbers. Furthermore, when infrastructure is constructed, those completing the construction are required to use licensed plumbers. As part of the process to bid on a project, PAZA is required to identify and recruit plumbers with the skills to complete the plumbing work required. While PAZA does provide a list of qualified plumbers, licensed plumbers are not always used, especially for WASH facilities in schools, in governmental infrastructure, and in rural areas. While there are opportunities to strengthen and clarify the model in Zambia, it presents an example of how other countries could professionalize their WASH workforce.

NEXT STEPS AND RECOMMENDATIONS

The gaps and shortcomings within existing laws present unique opportunities to strengthen National Quality Infrastructure in Ghana, Uganda, and Zambia. Below we provide several examples of the steps that could be taken to strengthen NQI and why these steps are important.

Recommendation #1: Existing laws should be amended to establish human rights to water and sanitation.

National laws should be revised to recognize the human rights to water and sanitation. Establishing meaningful human rights to water and sanitation is the cornerstone of any government's commitment to achieving universal access to water and sanitation. Establishing justiciable human rights to water and sanitation is a commitment to ensuring access to water and sanitation for two reasons. First, establishing actionable human rights commits the government to taking the necessary steps to ensure each and every household has sufficient access to water and sanitation. It places the mandate for achieving the human rights clearly with the government. This supports NQI WASH by creating a clear expectation that the government is responsible for achieving universal access to safe drinking water and sanitation, which means they will need WASH products in order to be able to deliver that access. Second, creating justiciable human rights means that people can hold the government accountable for any shortcomings or failures in achieving those rights. Therefore, there is an accountability mechanism that helps ensure that the government acts on its mandate.

In order to activate their commitment to SDG6, Ghana, Uganda, and Zambia should amend their Constitutions and water laws to establish the human rights to water and sanitation. The law should designate the national government as responsible for achieving these rights and detail what steps the national government must take in order to realize these rights. The law should also require the Minister of Water to adopt a regulation that details how achievement of the access to water and sanitation that is protective of human health and the environment is to be measured. It is only by having a clear metric that countries can know what steps need to be taken and ultimately determine whether the goal of universal access has been, and continues to be, achieved. This clarity on how success can be achieved will support and enable NQI by requiring a diversification of WASH products and by requiring that those products meet certain safety specifications. Simply delivering WASH infrastructure and technologies will not be enough; WASH infrastructure and technologies will have to deliver safe, reliable services.

Recommendation #2: National laws should be revised to require the development of drinking water quality and sanitation standards.

National laws should be amended to require the development of water quality and sanitation standards. The law should require the Ministers of Water to develop drinking water quality standards. Drinking water quality standards are the basis for ensuring that drinking water is safe and clean. Drinking water quality standards set forth how much of a contaminant can be present in the water and it still be safe to drink. In order to ensure that the drinking water received by households is safe to drink, the law must require that drinking water quality standards are developed. In addition to requiring drinking water quality standards, the law must set forth how those drinking water quality standards are to be developed as well as the frequency of periodic reviews of existing standards and the list of contaminants not being regulated for reconsideration to be regulated. For example, the law could state that the maximum amount of a pollutant that can be found in drinking water should be set at a level at which there is no known or anticipated adverse effects on the health of persons, with a margin of safety, taking cost into consideration, requiring the two levels to be identified. The law should also require the standard to be reviewed every three (3) years to ensure that when there have been new technologies developed or once newer technologies become more readily available, thereby bringing down their cost, the standards are reevaluated, and the maximum contaminant level is adapted to reflect those changes. Drinking water quality standards support NQI WASH. By requiring that drinking water meet a certain potability standard, the law creates a need for technologies and services that can meet that standard. For example, if it is required that drinking water has no more than a designated amount of nitrate in the drinking water, then technology will be needed to meet that limit. Therefore, requiring the adoption of regulations and standards creates the need for technologies and services that allow for those regulations and standards to be met, and for drinking water to be safer.

Managing the capture, containment, treatment, and release of domestic wastewater protects public health and the environment. National laws should require all centralized wastewater treatment plants meet at least secondary treatment requirements as well as require the development of treatment standards for non-sewered sanitation. Non-sewered sanitation is an important infrastructure option when working to guarantee universal access to sanitation, especially in lower-income and hard-to-reach communities. National law should support and facilitate the adoption of non-sewered sanitation in order to ensure more rapid and more equitable access to safe sanitation. National law should expressly recognize non-sewered sanitation as an approach to wastewater management, and require the development of regulations to govern their design, construction, placement, operation, and maintenance. These regulations, or standards, would ensure the protection of public health and the environment, as well as encourage the creation of a marketplace for safe non-sewered sanitation and effective installation by trained, licensed professionals. By identifying the safety standards that must be met by non-sewered sanitation, the products available for sale in the marketplace are more likely to be safe and effective at protecting public health and the environment. By explicitly allowing for non-sewered sanitation and creating regulations or standards, the government signals that this type of technology is valued, thereby building a need for such products that ultimately helps support a vibrant marketplace in non-sewered sanitation technologies and infrastructure. Furthermore, by requiring installations to be conducted by licensed professionals, and for their work to be inspected after installation and periodically to ensure proper operation and maintenance, the law ensures that these technologies are used appropriately and installed safely.

Recommendation #3: National laws should require the adoption of water quality standards for source waters.

Water quality standards are essential for ensuring that water resources are available for use, especially to fulfill drinking water and other domestic purposes. Water resources–either surface water or groundwater–that are heavily contaminated may not be usable for their intended or desired use. For example, if rivers or other waterbodies are contaminated, those waterbodies may not be able to be used as a source for drinking water or for other activities where humans have contact with the water, such as fishing or recreational activities. Furthermore, the more contaminated water resources are, the more it costs to treat and provide as safe, potable drinking water. For example, nonexistent or ineffective wastewater treatment can contaminate water resources and introduce contaminants harmful to human health, such as fecal coliform from untreated fecal waste. Water quality standards help ensure that water resources are available to be used for their intended purpose by necessitating sufficient treatment of wastewaters. NQI WASH is encouraged by requiring that water resources meet a certain standard of quality because technologies and processes will be needed in order to meet that standard of quality. Without these technologies, wastewaters produced cannot be treated of contaminants and safely discharged into water resources. Therefore, a requirement to develop and implement water quality standards would support the advancement of NQI WASH.

The law is responsible for setting forth the framework by which water quality standards are to be set. Water quality standards require identifying the intended use of the water resources, setting water quality criteria that support that use, determining whether those criteria have been met or not, and taking preventative and restorative action depending on whether those criteria have been met. Without these standards, it is difficult to ensure that water resources are effectively protected to meet the needs of the community and the environment. Therefore, national law should require the adoption of water quality standards and better support NQI WASH by ensuring that activities that produce wastewater adopt processes that reduce or eliminate the release of contaminated wastewaters.

Recommendation #4: Data and information collection and reporting must be strengthened to increase transparency, ensure accountability, and enable greater public engagement.

Data and information are important for implementing the law, building trust with the community, creating opportunities for public engagement, enabling accountability, and improving environmental quality and service provision. Data and information are used to determine whether or not actors are in compliance with the law, and whether or not the law is having the desired and intended impact. Data also allows for threats to WASH and water resources to be identified and acted on. For example, there is no way to know whether wastewater treatment is occurring or if effluent limitations are sufficient to protect water uses without monitoring and reporting requirements. Further, data and information need to not only be collected but also made available to the public in an accessible format. The public plays a critical role in holding governmental and nongovernmental actors accountable and for improving the law through public notice and comment periods. Therefore, the law should create strong data and information collection mechanisms in order to ensure that the government and the public have the data they need to make decisions, track changes over time (that may necessitate changes in the approach taken), and enforce the law.

Recommendation #5: Standards Acts should require the development of certain standards.

As written, the Standards Acts for Ghana, Uganda, and Zambia do not *require* the standards bodies to develop any standards. The Acts give the standards bodies the authority to develop standards, but do not identify any standards that *must* be developed. Because of the importance of WASH standards to protecting public health and safety and the environment, Standards Acts should require standards bodies to adopt WASH standards. These Acts should also provide guidance on the categories of WASH standards that the standards bodies are required to adopt so that the products and services related to WASH are properly overseen. Therefore, existing standards acts should be amended to require standards bodies to adopt WASH standards.

Recommendation #6: The process for developing and adopting standards should be set out in the law, or in regulation, and be publicly available.

The process by which standards are developed can influence the content of the standard and the role and depth of civil society engagement. The Standards Acts for Ghana, Uganda, and Zambia do not describe or set guidelines for what steps and processes the standard development process should include. At a minimum, the Standards Acts should set guidelines for the process and require the process to be detailed in a regulation developed by the Standards Body, subject to public consultation. At most, the Acts could define the steps of the process, who should be involved, and any rules governing the process. In both circumstances, the process would be defined in writing, be made publicly available, and require the participation of civil society and the public.

Recommendation #7: WASH standards should be compulsory.

Across Ghana, Uganda, and Zambia, the majority of WASH standards that have been developed are voluntary instead of compulsory. WASH standards should be compulsory. WASH standards protect public health and safety. For example, if off-grid, on-site, non-sewered sanitation infrastructure is improperly built, environmental quality, public health and public safety can be put at risk. Should on-site sanitation not properly capture and contain human waste, human waste could leak into the soil, the environment, and the aquifer. This kind of leakage would expose humans to untreated fecal waste in the groundwater and in the environment, threatening their public health. Furthermore, this leak could contaminate the entire aquifer, meaning that an aquifer that did not require treatment before use would now require treatment, potentially making that source of water unavailable until such infrastructure can be built. Additionally, while lead in drinking water is a well-known risk, new systems around the world continue to be built with components that leach toxic levels of lead because there are no national technical regulations to prevent unsafe components from being used or sold in many countries. There are significant consequences when WASH standards are not mandatory. Therefore, comprehensive WASH product standards should be adopted and compliance should be compulsory.

Recommendation #8: The portfolio of WASH standards for Ghana, Uganda, and Zambia should be expanded to comprehensively standardize WASH products and services.

WASH standards are essential to ensuring that WASH products and services are safe and reliable. However, there are significant gaps in the current portfolio of WASH standards for Ghana, Uganda, and Zambia. The Ghana Standards Authority has not adopted standards to govern sanitation technologies, including water closets (either Western or squat), sanitary systems, non-sewered systems, or latrines. On the drinking water side, the Ghana Standards Authority has not adopted standards to govern water filtration technologies, boreholes, or hand pumps. Limited standards have been developed regarding

piping. Standards have not been adopted for several types of piping materials, including: cast iron, polypropylene, polyethylene, polybutylene, and poly vinyl chloride (PVC). The Uganda National Bureau of Standards (UNBS) has not adopted robust standards to govern sanitation technologies, having only adopted standards for a washdown water closet pan, a urinal, a flushing cistern, a prefabricated integrated non-sewered sanitation treatment unit, and a prefabricated fecal sludge resource recovery unit. On the drinking water side, the UNBS has not adopted standards to govern point of use technologies or boreholes. Limited standards have been developed regarding fittings, piping, water filtration technologies, and handpumps. For example, standards have been adopted for certain piping materials, including polyethylene and polypropylene, but not for cast iron, polybutylene, and poly vinyl chloride (PVC). In Zambia, neither the Zambia Bureau of Standards nor the Compulsory Standards Agency have adopted robust standards to govern sanitation technologies. No standards have been adopted for water closets, urinals, sanitary systems, or latrines. One standard has been adopted to govern a prefabricated integrated non-sewered sanitation treatment unit. On the drinking water side, limited standards have been adopted. No standards have been adopted to govern point-of-use technologies, hand pumps, or faucets. Limited standards have been developed for fittings, piping, water filtration technologies, and boreholes. For example, standards have been adopted for certain piping materials, including polypropylene, polyethylene, polybutylene, and poly vinyl chloride (PVC), but not for cast iron.

As a starting point, instead of adopting individual product standards, the standards bodies for Ghana, Uganda, and Zambia could adopt standards that govern the performance of materials and material safety, such as NSF/ANSI 61. NSF/ANSI 61 covers specific materials or products that come into contact with drinking water or drinking water treatment chemicals, and "establishes minimum health-effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components and materials used in drinking water systems."[78] This standard was most recently updated and strengthened in 2020. Adopting standards that govern the performance of component materials is not as effective as adopting individual products standards but provides an initial approach to protecting public health.

[78] NSF/ANSI 61 available at https://www.nsf.org/knowledge-library/nsf-ansi-standard-61-drinking-water-system-components-health-effects.

ANNEX I: COUNTRY-LEVEL LEGAL BENCHMARKS

For each country, the Center for Water Security and Cooperation (CWSC) applied a modification of its proprietary methodology developed to determine whether existing laws advance water security. The original methodology, used to examine laws across ten (10) nexuses, is a comprehensive examination of whether the sufficient rules, rights, protections, prohibitions, processes, and institutions are in place to achieve water security.[79] The modified methodology used here identifies what the CWSC expects to find in a country's law in order to realize the human rights to water and sanitation. The methodology identifies 16 different types of provisions it expects to find in a law that creates the enabling environment to achieve access to water and sanitation. For each provision, the CWSC determines whether or not the existing law is sufficient, concluding: (1) Yes, (2) Partially, or (3) No. The CWSC also includes a detailed analysis of how that conclusion was reached.[80]

Table Color Code: Yes (Y)=Green, Partially (Part)=Orange, No (N)=Red

GHANA

Examining whether national law creates commitments to achieving access to water and sanitation.

Several laws were reviewed in order to assess whether national-level laws create a commitment to increasing access to drinking water and sanitation, including the: (a) Constitution, (b) Water Resources Commission Act, 1996 (WRCA), (c) Community Water and Sanitation Agency Act, 1998 (CWSAA), (d) Environmental Protection Agency Act, 1994 (EPAA), (e) Public Health Act, 2012 (PHA), (f) Public Utilities Regulatory Commission Act, 1997, (PURCA), (g) Public Utilities Regulatory Commission (Consumer Service) Regulations, 2020, and (h) Local Governance Act, 2016 (LGA). We also reviewed other documents that represent policy positions, but are not enforceable, including the National Water Policy (2007), and National Drinking Water Quality Management Framework for Ghana (June 2015).

	Y	Part.	N
Creates a (human) right to water The law does not establish a human right to water. Two national policies suggest there is a human right to water. The National Water Policy establishes as a key principle of the policy that all people without discrimination have a fundamental right to safe and adequate water to meet basic human needs. Section 1.2.1 (page 19). In the Forward to the National Drinking Water Quality Management Framework for Ghana, the Ministry of Water Resources, Works and Housing (MWRWH) states that it recognizes "access to safe drinking water as a basic human right and essential to protect public health". However, as policies, these documents do not create enforceable, justiciable rights. Therefore, they do not create obligations on the government to increase access to drinking water and are			X

[79] The Center for Water Security and Cooperation's RENEWAL Platform is available at law.thecwsc.org.
[80] The methodology used–which includes the indicators included in the chart and the color code–are the proprietary methodology of the Center for Water Security and Cooperation and must be cited accordingly in any publication.

not enforceable as against the government by the people. Consequently, the government has not made a clear commitment to achieving universal access to water.			
Creates a (human) right to sanitation The law does not establish a human right to sanitation. Therefore, the government is under no obligation to achieve universal access to sanitation. Consequently, the government has not made a clear commitment to achieving universal access to sanitation.			X
Prohibits the release of pollution or contamination The law does not broadly prohibit the release of pollutants or contaminants. However, the law does prohibit pollution beyond the limits prescribed by law. The Water Resources Commission Act (WRCA) makes it a punishable offense to interfere with or alter the flow of water resources or to pollute water resources beyond the levels prescribed by the Environmental Protection Agency, except as in accordance with the WRCA or with the approval of the EPA. WRCA, Article 24. Therefore, pollution is allowed, but the quality of wastewater released must be within the limits set by the EPA. A person in violation of this provision can be fined no more than 500 penalty units and/or be imprisoned for no more than two years. WRCA, Article 24. Setting limits on the amount of pollution that can be found in wastewater drives the need for wastewater and sanitation technologies because those technologies are needed by those creating wastewaters so that they can comply with established regulations and standards. Further, limiting the volume of wastewater that can be discharged also helps to ensure wastewaters are properly treated and do not contaminate the surface waters used to produce drinking water.		X	
Requires permits for the release of pollutants into the environment The law does not explicitly require a permit to release or discharge waste or pollution into the environment. Under the WRCA, the Water Resources Commission is given the authority, but not required to, make regulations for "the granting of permits to discharge waste into water bodies." WRCA, Article 35(1)(g). Under the EPAA, one of the functions of the EPA is to "issue environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or any other source of pollutants and of substances which are hazardous or potentially dangerous to the quality of the environment or a segment of the environment". EPAA, Article 2(f). Under the law, it is not clear when permits *must* be issued in order for the activity to be in compliance with the law. For example, there is no explicit requirement that a permit must be granted before certain activities begin or certain pollutive outcomes are possible. The law does state that a permit		X	

cannot be issued until the person completes an environmental impact assessment, where they have received a notice from the Board stating that it is in the Board's opinion that an undertaking has or is likely to have an adverse effect on the environment. EPAA, Article 12. Therefore, even the requirement to complete an EIA is not a standard requirement and could be requested after an activity has already started.			
Requires the establishment of effluent limitations for wastewater treatment plants and other dischargers (incl. workmanship or construction regulations) The law does not require the establishment of effluent limitations for dischargers. Under the WRCA, the Water Resources Commission is given the authority, but not required to, make regulations for "prescribing the acceptable levels of pollution." WRCA, Article 35(1)(h). Under the EPAA, one of the functions of the EPA is to "prescribe standards and guidelines relating to the pollution of air, water, land and any other forms of environmental pollution including the discharge of waste and the control of toxic substances". EPAA, Article 2(h). However, similar to the WRCA, the EPAA does not require the EPA to set effluent limits. The law does not state how the agency will decide which contaminants to create effluent limits for, which means there is no standard, periodic process for evaluating existing pollutants and determining whether or not they need to be regulated based on their impact on human health and presence in water resources or drinking water. The law also does not establish how the effluent limits will be calculated or what factors will be considered in determining the effluent limits. The law undermines any commitment to achieving access to water and sanitation by not committing to pollution control and not requiring the responsible governmental bodies to establish effluent limitations.			X
Requires the establishment of regulations and standards for non-sewered sanitation, on-site, off-grid (NSS) The law does not require the establishment of regulations governing non-sewered, on-site sanitation. Under the EPAA, the Minister is authorized to, but not required to, issue regulations, on the advice of the Board, for "standards and code of practice relating to the protection, development and rehabilitation of the environment." EPAA, Article 62(1)(a). This is a broad authorization to develop standards that protect the environment from pollution and does not specifically require standards for non-sewered sanitation. The failure of the law to require the establishment of regulations and/or standards to govern the construction, operation, and maintenance of non-sewered sanitation illustrates a lack of commitment to achieving universal access to sanitation and water. Non-sewered sanitation is often the most affordable and therefore accessible form of sanitation for communities. Requiring the adoption of regulations for non-sewered sanitation ensures that non-sewered sanitation technologies sufficiently protect public health and the environment, thereby creating a safe and reliable			X

marketplace.			
Requires the development of drinking water quality standards The law does not require the development of drinking water quality standards. Drinking water that creates health problems is not drinking water. The only way to ensure that drinking water is safe to drink is to set drinking water quality standards that must be met by anyone providing drinking water to one or more households. Furthermore, the requirement to establish drinking water quality standards supports the creation of a marketplace of drinking water related products because they support the provision of drinking water in compliance with those regulations. The failure to require standards undermines any guarantee that drinking water is safe and clean to drink, and misses an opportunity to encourage a marketplace of drinking water treatment technologies. There is a National Drinking Water Quality Management Framework that reflects best practices for supplying safely managed drinking water, and was not intended to be applied as standards. However, this document is not enforceable. The Community Water and Sanitation Agency also has developed Sector Guidelines for drinking water supply in small towns, small communities, and rural communities.[81] These also are not enforceable.			X
Requires the establishment of water quality standards The law does not require the establishment of water quality standards to govern the quality of surface waterbodies. As stated earlier, under the EPAA, the Minister *may* adopt regulations to set standards for the protection of the environment, which could include the adoption of water quality standards since one purpose of water quality standards is to protect the environment. EPAA, Article 62(1)(a). However, such water quality standards are not required to be adopted by a governmental body. By not requiring the adoption of water quality standards, the government falls short of committing to providing universal access to water and sanitation. Water quality standards limit the release of effluent into water bodies to ensure that they can be used to meet demands, which is essential to ensuring that waterbodies stay clean enough to be a source for drinking water. One of the challenges identified by stakeholders is that unsafe chemicals are getting into water resources. This could be reduced and prevented by setting both effluent limitations and water quality standards.			X
Requires consideration of income-level (or the income-level of the customer base) when developing rates for drinking water and sanitation service provision, terminating water services for nonpayment, developing projects that provide			X

[81] These resources are available on the website for the Community Water and Sanitation Agency, available here https://lgs.gov.gh/community-water-and-sanitation-agencys-operational-documents-and-guidelines/.

services, and distributing funding for water and sanitation services The law does not require the consideration of income-level in developing rates for drinking water and sanitation services, terminating services for nonpayment, developing projects to supply services, and distributing funding for water and sanitation services. The Public Utility Regulatory Commission (PURC) Act Regulations recognize situations where a customer may not be able to pay. Where a consumer demonstrates an inability to pay a bill and is (I) sixty-five or older, disabled, and lives alone, (2) has a medical condition that will be made worse by the lack of service, or (3) resides at a senior living facility, a public utility is required to offer them a payment plan. PURC Regulations, Article 40. These groups of people are more likely to experience challenges in paying their water bills. Therefore, by requiring payment plans to be offered at least helps reduce the likelihood that they will be subject to water shutoffs. However, this offer does not extend broadly to consumers who are low-income and do not have the ability to pay, thereby excluding a large group of vulnerable people. Therefore, the protections offered are insufficient to adequately represent a commitment to ensuring that all households receive and remain connected to water services, despite ability to pay.			
Requires the collection and publication of data on water resources, drinking water, and sanitation The law does not require the collection and publication of data or information on water resources, drinking water, and sanitation. This includes that there is no general requirement in the law for dischargers of pollution to monitor and report on their discharges to either a government agency or to the public. The collection and publication of data and information is essential to identifying and acting on challenges and shortcomings. Data and information that is publicly available is also essential to ensuring that the public can hold governmental and nongovernmental actors accountable to complying with the requirements and limitations set forth in the law. Therefore, by not requiring the collection and publication of data and information, the law undermines its commitment to access to water by undermining transparency, accountability, and active monitoring of progress or setbacks.			X
Prohibits water withdrawal without a permit The law likely prohibits the abstraction or use of water without a permit; however, the language is confusing. WRCA, Article 13(1). The title of the provision states: "Prohibition of use of water without authority." The provision itself prohibits the abstraction or use of water except as in accordance with the provisions of the Act. Article 13(1). Later, the law *allows* but does not require a person to apply to the Water Resources Commission for a water right. WRCA, Article 16(1). The provision states: "A person may apply to the Commission in writing for the grant of water	X		

right." WRCA, Article 16(1). After a review process, and once the Board is "satisfied that the water right shall be granted," the Board issues the water right. WRCA, Article 16(6). The law does not define how the Board will determine that it is satisfied that the water right should be granted. The issuance of the water right is then subject to ratification by Parliament. WRCA, Article 16(8). The process for ratification by Parliament is not detailed within the law. The language for applying for a water right seems to be permissive. This means that it allows a person to apply for a right, but does not seem to require a person to apply for a right. Furthermore, the term "authority" in Article 13 is not defined. It is not clear that the "authority" in Article 13 is the same as the "water right" in Article 16, and therefore that securing the water right is the authority needed to continue with the water withdrawal. However, it is likely that these provisions are read together and that a water right is the "authority" expected to be secured in order to abstract and use water. Also, Article 34 of the WRCA penalizes the abstraction or use of water resources without the "authority" required in Article 13. Therefore, if read together, it is likely that the law requires a person to secure a "water right" before abstracting or using water. The Commission may suspend or amend the right to abstract or use water under certain circumstances. Where the water resource is depleted or is likely to be depleted by the exercise of the water right, the Commission can suspend or amend the water right. WRCA, Article 19. The Commission can also cancel a permit where the water resources are determined necessary for a public purpose; however, it is required that reasonable compensation be paid to the water right holder. Article 20, 21. The Commission may also cancel a permit when the conditions of the permit are breached. Article 22. Having these authorities is important for the Commission to be able to ensure that sufficient water is available to meet drinking water needs, and to readjust water rights if the water resources are depleted.			
Prioritizes water use for domestic purposes No, the law does not prioritize water use for domestic purposes. For the law to create a commitment to ensuring access to drinking water, the law must prioritize water for domestic purposes at all times, but especially where there is water scarcity or a drought. A person may abstract and use water for domestic purposes as long as they have lawful access to the water resources. WRCA, Article 14. That same person cannot construct infrastructure to abstract water. *Id*. It is important to note that the law does not require the government to ensure there are public access points for everyone. Consequently, not everyone may be able to get access to water resources to fulfill their domestic needs. Even in the event of an emergency, domestic use is not prioritized. Where there exists or there is a threat of a "serious deficiency of water for essential domestic purposes," the Minister *may* declare a water emergency. WRCA, Article 33. The			X

Minister may then allow a person who has water resources beyond what is necessary to meet their domestic purposes to supply water from the excess quantity to the water emergency area or to other people. *Id.* However, the law does not prioritize water use for domestic purposes, or offer any unique protections for domestic use in the event of an emergency.			
Penalizes non-compliance with effluent limitations The law does not require the development of effluent limitations; therefore, there is no specific penalty for noncompliance with effluent limitations. However, the law does state that a person–except in accordance with the requirements of the WRCA or with the approval of the EPA–who interferes with or alters the flow of or pollutes a water resource beyond the levels EPA *may* prescribe has committed an offense and is liable for a fine of no more than 500 penalty units and/or a prison term of no more than two years. WRCA, Article 24. Therefore, it seems like for the most part, if a person exceeds effluent levels established by EPA, they have violated the law. However, it seems like there could be a circumstance where EPA approves the discharge of wastewater that does not meet the limits it prescribes (e.g. "except…with the approval of the EPA"). Therefore, the law may provide an exception where certain people can be approved to exceed the "levels" (assuming the "levels" are pollution levels or effluent limitations). Enforcing effluent limitations is essential to protecting the water quality of the water resources used as source water for drinking water. Without enforcement, there can be no commitment. Therefore, the enforcement provision should provide no exceptions and greater consequences for noncompliance.		X	
Penalizes non-compliance with drinking water quality standards The law does not require the development of drinking water quality standards; therefore, there is no associated penalty for noncompliance.			X
Penalizes non-compliance with water use provisions The Commission may issue an enforcement notice when the Commission believes that the use of water resources is threatening the environment or public health. WRCA, Article 15. Within the enforcement notice, the Commission may identify the steps that must be taken and the time within which those steps must be taken. However, this enforcement authority is not linked to any specific provisions within the Act. Furthermore, it is a permissive authority. Therefore, the Commission can act, but is not required to act. Alternatively, the law could have identified circumstances where the Commission *must* issue an enforcement notice in order to decrease the subjectiveness of the application of the mechanism. A person can be imprisoned or fined for the following infractions, including: (1) diverting, storing, abstracting or using water resources without "authority" as	X		

required in Article 13, (2) constructing or maintaining works for the use of water resources without "authority" as required in Article 13, (3) failing to allow the Commission to inspect works as required in Article 29, and (4) failing to comply with directives given by the Minister under Article 33 when there is a water emergency. WRCA, Article 34. Therefore, based on an earlier presented analysis, it is likely that a person withdrawing water without a water right (i.e. authority) is in violation of the law. It is important that the law penalizes the abstraction or use of water resources not in compliance with the requirements of the law in order to ensure that the requirements of the law are being met.			
Establishes a clear mandate within an institution for overseeing water and sanitation service provision, and for enforcing rules As of 2017, there is now a ministry dedicated to drinking water, sanitation, and water resources called the Ministry of Sanitation and Water Resources. Three agencies fall under the Ministry of Sanitation and Water Resources: the Water Resources Commission (WRC), the Community Water and Sanitation Agency (CWSA), and the Ghana Water Company Limited (GWCL). The Ghana Water Company oversees urban water provision. The CWSA oversees rural water provision. The CWSA is in the process of becoming a limited liability company (LLC) like the Ghana Water Company. There are also discussions to create a national sanitation authority. The Ministry of Education oversees the provision of WASH services in schools. The WRCA, CWSA, and GWCL each play a role in overseeing water resources and the provision of drinking water and sanitation services. The Water Resources Commission (WRC) regulates and manages the use of water resources. WRCA, Article 2. The WRC is required to propose plans for the use of water resources, to grant water rights, to collect data on water resources, and to advise pollution control agencies. WRCA, Article 2.2. Furthermore, the WRC has the authority, but is not required by law to make regulations to regulate the use of water, to protect watersheds, to issue permits to discharge waste into waterbodies, and to prescribe "acceptable levels of pollution." WRCA, Article 35. The Board of the Water Resources Commission is made up of stakeholders from a variety of institutions related to water resources management, pollution control and WASH, including organizations that produce potable water. WRCA, Article 3. The purpose of the Community Water and Sanitation Agency (CWSA) is to facilitate the provision of water and sanitation services to rural communities and small towns. CWSAA, Article 2. The CWSA is required to perform several functions, including providing support to District Assemblies, encouraging private sector participation, providing technical assistance to District Assemblies, assisting, and coordinating with NGOs, prescribing standards and guidelines for water supply and sanitation service provision and supporting District Assemblies to ensure compliance, and charging reasonable fees for the services provided. CWSAA, Article 2. Furthermore, the Minister, on the advice of the Board, may make		X	

regulations on "detailed technical standards and acceptable code[s] of practice to be adhered to by any operator in the rural water and sanitation sector." CWSAA, Article 18. The Board may also issue guidelines on "the operation and maintenance of any system or appliance for rural water supply and the day-to-day management of the system or appliance." CWSAA, Article 18.

The Ghana Water and Sewerage Corporation (GWSC) was established by an act of Parliament in 1965.[82] In 1993, the responsibility for sanitation and water supply in small towns was moved from the GWSC to the District Assemblies. On July 1, 1999, the GWSC was converted into a 100% state owned limited liability company called Ghana Water Company Limited (GWCL), pursuant to the Statutory Corporations (Conversion to Companies) Act 461 of 1993 as amended by LI 1648. Ghana Water Company Ltd. is now solely focused on urban water supply. Ghana Water Company Ltd. is regulated by the Public Utilities Regulatory Commission (PURC). The functions of the PURC include: providing guidelines on rates chargeable for services, reviewing and approving the rates charged by regulated utilities, protecting the interests of consumers and utility service providers, monitoring the standards of performance for the provision of services, conducting investigations into the standards of quality of services provided to consumers, collecting and compiling data on public utilities the PURC considers necessary for the performance of its functions, amongst others. PURCA, Article 3. Utilities regulated by the PURC are required to make a reasonable effort to "provide to the public a service that is safe, adequate, efficient, reasonable, and non-discriminatory." PURCA, Article 11. The PURC is required to develop guidelines on the levels of rates that may be charged by the public utilities for the services provided, and the rates charged by regulated utilities must be in accordance with those guidelines. PURCA, Article 16. The PURC is required to approve all rates applied by regulated utilities. PURCA, Article 18. The Act also authorizes the PURC to create customer service committees. PURCA, Article 31. The functions of the customer service committees include educating consumers on their rights and responsibilities, consulting with public utilities on matters that interest consumers, receiving and transmitting complaints to the Commission, and making recommendations to the Commission on how to improve service delivery. PURCA Regulations, Article 18.

Beyond those institutions, there are three additional governmental bodies at the national level involved with water and governance. First, within the Ministry of Environment, Science, Technology and Innovation there is the Environmental Protection Agency (EPA), an agency. The functions of the EPA include advising the Minister on the formulation of environmental policies; controlling and preventing the discharge of waste into the environment independently or in collaboration with others; issuing environmental permits and pollution abatement notices in order to control the volume, types, constituents and effects of waste discharges; prescribing standards and guidelines relating to the pollution of air, water, land

[82] History of Ghana Water Company Limited, available at https://www.gwcl.com.gh/company-profile/.

and discharge of waste; and imposing and collecting environmental protection levies. EPAA, Article 2. The Minister may, on the advice of the Board, by legislative instrument develop regulations for standards and codes of practice related to the protection, development, and rehabilitation of the environment; the types of activities where an EIA or environmental management plan is required; matters for which permits are required; and the type, quantity, conditions, or concentration of substances that may be released into the environment. EPAA, Article 62. Second, there is the Ministry of Health. The Minister of Health may by legislative instrument provide for public health matters with respect to environmental sanitation, waste management, pollution, and water. PHA, Article 173. Third, the Ministry of Local Government, Decentralization and Rural Development oversees local governance. At a political level, Ghana is divided into 16 regions and 216 districts. There are three types of districts: Ordinary Districts with a population of at least 75,000 people, Municipal Districts with a population of at least 95,000 people, and Metropolitan Districts with a population of at least 250,000 people. Districts are governed by Metropolitan, Municipal and District Assemblies (MMDAs or District Assemblies). MMDAs are established by the Ministry of Local Government. District Works Departments within the District Assemblies have been established, replacing District Water and Sanitation Teams (DWSTs). Within the Works Departments there is a Water Unit and an Environmental Health Unit. These units are essential to the implementation and enforcement of the law, yet often lack the budgetary resources to conduct monitoring and ensure compliance. At an even more local level than the MMDAs, there are Area Councils and Electoral Areas. Area Councils support the District Assemblies, but are largely not well resourced financially. The National Water Policy states as a governmental objective strengthening the District Assemblies to take a central role in supporting community management of water and sanitation facilities and in maintaining the integrity of aquatic ecosystems. Section 2.2.2 (page 23). Under the Local Governments Act, District Planning Authorities are allowed to issue building bylaws and are required to provide for drainage and sanitation. LGA, Article 104. Building bylaws would speak to the provision and quality of WASH infrastructure that would be required to be provided.			

Examining whether national law supports the adoption and application of WASH standards.

The Standards Authority Act of 1973 (N.R.C.D. 173) (SAA) was reviewed to determine the level of support provided at the national level for adopting and applying WASH standards. Below we examine: 1. the mandate of the Standards Body and the scope of authorities and responsibilities issued to them, 2. the process by which standards are developed and approved, and 3. the enforcement authority of the Standards Body and enforcement tools.

Standards body mandate, and scope of authorities and responsibilities	The Ghana Standards Authority (GSA) has four purposes. Those purposes include: establishing and promulgating standards to ensure high quality products are produced for use within Ghana and for export, promoting industrial and commercial standardization, promoting industrial efficiency and development, and prompting standards to protect public and industrial welfare, health, and safety. SAA, Article 2. The Standards Authority has several responsibilities, including: (1) to develop standard specifications; (2) to inspect and test goods, processes, and practices; (3) to prohibit the sale or production of goods "in the national interest"; (4) to register and regulate standard marks; (5) to endorse international specifications suitable for use in Ghana; and (6) to perform functions which the Board decides are necessary to further the specific responsibilities identified. SAA, Article 3. The Board is the governing body of the Ghana Standards Authority. SAA, Article 4. The Board may appoint committees to advise the Board. SAA, Article 10. The Board may also prescribe rules. SAA, Article 9. The rules may: (1) prescribe the manner by which specifications[83] can be declared standard specifications[84]; (2) regulate the promulgation of standard specifications; (3) allow for modification or revocation of standard specifications and regulate the procedure; (4) govern the manufacturing of goods, the packaging, labeling, advertising and selling of goods, and the size and specifications for packaging goods, (5) prescribe standards for the composition and purity of goods, (6) regulate the issuance of licenses to use standard marks and prescribe the terms and conditions on which the licenses can be issued, including regulating the renewal, suspension and revocation of the licenses, (7) prescribe the forms required, and (8) prescribe the sale price, amongst others. SAA, Article 9. The law provides the Board broad authority and discretion to determine the rules for what they do and how they do it. The Board also has the authority to declare a specification to be a standard specification. SAA, Article 11. The Board may later modify or revoke a standard specification with advice from a committee. SAA, Article 11. The Board is responsible for receiving applications and issuing licenses to

[83] Specification is defined as "a description of the goods, commodity, process of practice, by reference to its nature, quality, strength, purity, composition, quantity, dimensions, weight, grade, durability, origin, age, or any other characteristics or by reference to a mark or label on the goods, commodity, process or practice and a model-form of bye-laws, a glossary of terms, definitions, or symbols, and a recommended practice." SAA, Article 25.

[84] Standard specification is defined as "a specification which has been declared a standard specification under section 11." SAA, Article 25. It is not clear what makes a "standard" specification different from a specification.

	use standard marks[85], and can revoke licenses for good cause. SAA, Article 12(2), (11). Licenses to use standard marks may not be granted for a period beyond one year. SAA, Article 12(3). The Minister responsible for Industries has the authority to confirm or otherwise change the decision made by the Board to issue a license to use a standard mark. SAA, Article 12(13). The Ghana Standards Authority is a member of several regional and international standardization bodies including the Africa Electro-Technical Commission (AFSEC), Institute of Electrical and Electronics Engineers (IEEE), ASTM International, International Bureau of Weights and Measures (BIPM), African Organisation for Standardization (ARSO), International Code Council, CODEX Alimentarius Commission (CODEX), International Electrotechnical Commission (IEC), International Organisation for Legal Meteorology (OIML), and International Standards Organization (ISO).[86]
Process by which standards are developed and adopted	The process for developing standards is not prescribed by law. Nor does the law seem to require the Board to develop a process for developing and approving standards or marks. Further, the law does not identify any procedures or guidelines or rules that should be considered or incorporated into the process for developing standards. Therefore, it also does not require public engagement in developing and periodically reviewing those standards. Based on the website of the Ghana Standards Authority, the process to develop standards is consensus-based.[87] A Technical Committee is formed with relevant stakeholders from different backgrounds. The Standards Directorate serves as a secretariat and project manager to such committees as they develop standards.
Enforcement	Under the law, a person can be fined 500 penalty units or imprisoned for no more than two years if they use a mark or make a statement that signals the product complies with a standard specification when the product does not. SAA, Article 21. This penalty is likely too weak to incentivize compliance with the law.

UGANDA

[85] Standard mark is defined as "a mark licensed as a standard mark under section 12." SAA, Article 25.
[86] Ghana Standards Authority, "Our Affiliates," available at https://www.gsa.gov.gh/.
[87] Ghana Standards Authority, Standards, available at https://www.gsa.gov.gh/standards/.

Examining whether national law creates commitments to achieving access to water and sanitation.

Several laws were reviewed in order to assess whether national-level laws create a commitment to increasing access to drinking water and sanitation, including the: (a) Constitution, (b) The Water Act, (c) the Public Health Act 1935 (Cap. 281)[88], and the (d) Local Governments Act 1997 (LGA).

	Y	Part	N
Creates a (human) right to water The law does not establish a human right to water. Within the Objectives of the Constitution, the State is instructed to ensure that "all Ugandans enjoy rights and opportunities and access to education, health services, clean and safe water, work, decent shelter, adequate clothing, food security and pension and retirement benefits." Constitution, Objective XIV. Stating that an objective of the law is to ensure access to clean and safe water is not the same as establishing a right to water. While the Constitution does not recognize a right to water, the Constitution does establish a right to a clean and healthy environment, which would help to ensure that there are safe water resources available to serve as a drinking water supply. Constitution, Article 39. An authority has the discretion to provide services to any person. The Water Act, Article 49. When the authority does choose to provide services, the service provided must comply with all regulations or the terms of the performance contract. Water Act, Article 49. A landowner that cannot receive water services from an existing water supply works or connect to an existing sewerage system, may apply in writing to the appropriate authority for that system to be extended to their land. The Water Act, Article 72. However, these provisions provide no requirement to provide service and create no protections for residents. The law identifies actions authorities may take to protect drinking water and sanitation services. An authority *may* but is not required to create protected zones near waterbodies, boreholes, drinking water works, or sewer systems, and prohibit certain activities within those zones. Water Act, Article 81. A water authority *may* restrict the amount of water distributed to a person or terminate services if the water authority believes the reduction or termination is necessary to avoid future water shortages, or if any private water pipe or other water work is inadequate, not properly constructed, or does not comply with the regulations or code of workmanship. Water Act, Article 82. The person's services can also be terminated or restricted if the person wastes, misuses, or pollutes the water supplied to them by the water authority. Water Act, Article 82. However, none of this establishes a right to water, even if they do provide protections for the resources used to provide drinking water.			X

[88] The Public Health Act has been revised and is awaiting approval.

Creates a (human) right to sanitation The law does not establish a human right to sanitation. While access to sanitation is not guarantee, the law requires certain actions to be taken under certain conditions. For example, once an area is declared as a sewerage area, all buildings built or rebuilt must be connected to the sewerage authority's works. The Water Act, Article 64. Plans for new buildings or for additions to existing buildings must show that adequate latrines have been included. Public Health Act, Article 85. These requirements help to ensure greater access to sanitation, despite there being no broader right to sanitation. In the case of existing buildings and sanitation structures, the government can require building owners to fix insufficient sanitation or take other actions where the sanitation poses a threat to public health. Where the local authority finds that a cesspool or private sewer is defective, insufficient, "in such a condition as to be prejudicial to health," or a nuisance, the owner or occupier of the building will be required to make satisfactory provision for drainage. Public Health Act, Article 86. "Satisfactory provision for drainage" means that the "drainage systems and appliances of the building comply with the rules for the time being in force relating to them and that the drainage systems of the premises connect with available public sewers." Public Health Act, Article 86. If a local authority finds that a building is without sufficient latrines or that the existing latrines are "in such a state as to be prejudicial to health or a nuisance," the owner of the building is required to provide the building with latrines of a type approved by the authority. Public Health Act, Article 88. Water closets cannot be required if there is insufficient water supply or public sewer available. *Id*. However, where a building has available to it sufficient water supply and sewerage, water closets must replace earth closets and other latrines. Public Health Act, Article 87. Lastly, within the district of a local authority, an owner or occupier of any premises or the owner of a private sewer must be allowed to connect their drains or private sewer to the public sewer under certain circumstances. Public Health Act, Article 80.[89] These provisions, similar to those above, help to ensure greater access even if there is no right to sanitation.			X
Prohibits the release of pollution or contamination The law does prohibit pollution beyond the requirements prescribed by law. According to the Water Act, no person shall acquire or have a right to cause or allow waste to come into contact with any water other than as prescribed by the law. Water Act, Article 6(c). This does not create a broad prohibition on polluting water resources, but rather prohibits pollution that is not in compliance with what is allowed by law. Any person who allows waste to come into contact with water,	X		

[89] Definitions of latrine and drain can be found in Article 1. Additional definitions can be found at Article 75, including an explanation of when a sewer is not a drain.

discharges waste directly or indirectly into water, or pollutes water without authorization (i.e., a permit) commits an offense. Water Act, Article 31. Permit holders are explicitly prohibited from causing or allowing water to be damaged and are required to prevent damage to the source waters from which they withdraw water or discharge effluent. The Water Act, Article 20(a)-(b). Permit holders must also "take precautions to ensure that no activities on the land where water is used result in the accumulation of any substance which may render water less fit for the purpose for which it may be reasonably used." Article 20(c). Taking precautions to prevent is not the same as preventing activities from causing a change to the quality of nearby water resources. Therefore, it is unclear under the law what would be expected to fulfil the requirement to 'take precautions'. Furthermore, permit holders must observe the conditions set forth in regulations issued pursuant to this law as well as any conditions included within the permit granted. Article 20 (d)-(e). The Public Health Act prohibits persons from causing a nuisance. Article 54. According to the Act, a variety of situations are considered a nuisance, including any stream, watercourse, water tank, cistern, water closet, earth closet, privy, urinal, cesspool, soakaway pit, septic tank, cesspit, soil pipe, wastepipe, drain, sewer, slop tank that is "so foul or in such a state or so situation or constructed as to be offensive or likely to be injurious or dangerous to health." Public Health Act, Article 57. A local authority or a medical officer of health *may* serve notice on the creator of the nuisance and require them to stop the nuisance within a specific time period. Public Health Act, Article 59. Therefore, the local authority has the authority to act, but is not required to take action to prevent the nuisance. The local authority or medical officer may also require certain actions to be taken under certain circumstances. *Id*. A person is also specifically prohibited from putting something into a public sewer or into any drain or private sewer that would harm the public sewer. Public Health Act, Article 79. These provisions effectively serve as a strong prohibition against pollution.			
Requires permits for the release of pollutants into the environment People specifically governed by the declarations of the Minister cannot discharge waste except with a waste discharge permit. The Minister *may* in any area declare (1) waste that may not be discharged, (2) trades that may not discharge waste, or (3) classes of premises or specific premises from which waste may not be discharged into any water, either directly or indirectly, except as in accordance with the terms and conditions of a waste discharge permit. Water Act, Article 28(1). A person governed by those declarations–i.e., a person who produces, stores, or discharges any waste, engages in any trade that discharges waste, or owns or occupies a premise that discharges waste–is required to have a waste discharge permit and must discharge waste in compliance with the terms and conditions of the permit. Water Act, Article 28(2). "Waste" is defined as including		X	

sewage and "any other matter or thing…which if added to any water may cause pollution." Water Act, Article 2. Therefore, anyone who discharges any waste that fall within the parameters of the declarations is required to have a waste discharge permit. Otherwise, no prohibition exists, and no permit is required. Any person who wants to discharge waste *can* (but are not required to) apply to the Director for a waste discharge permit. Water Act, Article 29(1). The Director must consider every application and every objection submitted during the public notice and comment period. Water Act, Article 29(4). The Director "may grant the permit on such terms and conditions as he or she sees fit." Water Act, Article 29(4). The Water Policy Committee may prepare guidelines or conditions to govern waste discharge permits, and the Minister may use them as desired. Water Act, Article 29(5)-(6). The law does not require greater transparency around the types of terms and conditions the Director can attach to the permit.			
Requires the establishment of effluent limitations for wastewater treatment plants and other dischargers (incl. workmanship or construction regulations) There is no requirement within the law to establish effluent limitations for wastewater treatment plants or other dischargers. The Minister of Public Health has the authority but is not required to establish effluent limitations. The Minister *may* but is not required to establish rules to govern the construction of buildings and standards for the "purity of liquid which, after treatment in any purification works, may be discharged from the purification works as effluent." Public Health Act, Article 70(b), (e). In establishing those rules, the Minister may also devolve authority and responsibility for implementing and enforcing those rules to local authorities. *Id*. Within their authority to make rules related to the construction of buildings, the Minister may regulate, "sanitary conveniences in connection with buildings; (ii) the drainage of buildings, including the means for conveying soil, waste, storm and subsoil water from buildings and their curtilages; (iii) cesspools and other means for the reception or disposal of foul matter in connection with buildings; (iv) ash pits in connection with buildings; (v) wells, tanks and cisterns for the supply of water for human consumption in connection with buildings;... [and] private and public sewers, communications between drains and sewers and between sewers." Article 71(1)(b). A sewerage authority or regulations may prohibit the discharge of certain waste into a sewer. The sewerage authority may state that certain types of waste are trade waste and therefore cannot be discharged into a sewer except as in accordance with a trade waste agreement. Water Act, Article 68(1). Any person who produces or discharges trade waste cannot directly discharge the waste into a sewer except as is allowed for under the trade waste agreement. Article 68(2). A sewerage authority may enter into a trade waste agreement for the discharge of the waste into the sewer or for treatment by the sewerage authority. Article 69(1). Those agreements must require treatment of the waste before it is discharged into the sewer unless it can be shown that untreated waste would not		X	

impact the health of people or the operations of the sewage treatment plant. Article 69(2). These pretreatment requirements are important to ensuring that sewerage systems can and continue to operate properly. The discharge of certain wastes and pollutants into a sewerage system could otherwise cause a system failure. The Public Health Act defines the term nuisance and provides a path to address identified nuisances. A nuisance includes, but is not limited to: (1) "any stream,...watercourse, sink, water tank, cistern, water closet, earth closet, privy, urinal, cesspool, soakaway pit, septic tank, cesspit, soilpipe, wastepipe, drain, sewer…so foul or in such a state or so situated or constructed as to be offensive or to be likely to be injurious or dangerous to health," (2) "any well or other source of water supply or any cistern or other receptacle for water, whether public or private, the water from which is used or is likely to be used by human beings for drinking or domestic purposes…which is in a condition liable to render any such water injurious or dangerous to health," (3) "any noxious matter, or wastewater, flowing or discharged from any premises, wherever situated, into any public street or into the gutter…or into any gulley, swamp or watercourse, irrigation channel or bed thereof not approve for the reception of discharge," (4) and "any collections of water, sewage, rubbish, refuse, ordure, or other fluid or solid substances which permit or facilitate the breeding…of…parasites," and (5) "any occupied dwelling for which such a proper, sufficient and wholesome water supply is not available within a reasonable distance as in the circumstances it is possible to obtain." Public Health Act, Article 57. The Minister responsible for water or natural resources may but is not required to prescribe codes of workmanship for "(a) works of water supply, sewerage, or waste treatment to be constructed under this Part of the Act; (b) private sewerage installations; (c) plumbing or drainage relating to water supply or sewerage to be executed on any land. Water Act, Article 70(1). An authority may require that the works mentioned above can only be completed by certain people or after certain steps are taken. For example, an authority can require that the works be executed by someone holding certain qualifications. Water Act, Article 70(3). Or the authority can require notice and approval of the work before the work begins. *Id*. However, none of these are requirements that must be fulfilled. The Director of Water Development may organize training sessions for plumbers, drainers, or other operators. Water Act, Article 71.			
Requires the establishment of regulations and standards for non-sewered sanitation (NSS) The Minister is required to adopt codes of workmanship to govern private sewerage installations or plumbing related to sewerage constructed on any land. Water Act, Article 70(1). A "private sewerage installation" is defined as a "privately constructed latrine, septic tank or other sewerage system and all fittings connected to any of them but does not include a building sewer." Article (2). A	X		

code of workmanship includes "matters concerning the design, construction, alteration, maintenance or repair of works, including the types of materials, fittings or appliances which may be used in works or any other thing connected thereto." Article 70(2). The law requires private sewerage installations to be constructed in accordance with any applicable code of workmanship prescribed under Article 70 of the Act. Water Act, Article 67. However, if the private sewerage installation was constructed legally before the Act was adopted, then it is presumed to have been constructed in compliance with the Act. Water Act, Article 67.			
Requires the development of drinking water quality standards The law does not require the development of drinking water quality standards.			X
Requires the establishment of water quality standards The law does not require the establishment of water quality standards. Under the Public Health Act, the Minister may prohibit the growing of a crop or the irrigation of lands within the boundaries of a municipality or town where such activity is "unhealthful or unsanitary." Public Health Act, Article 20. Such prohibitions would help to protect the water quality of waterbodies used as sources of drinking water. However, the Minister is not required to put in place these limitations.			X
Requires consideration of income-level (or the income-level of the customer base) when developing rates for drinking water and sanitation service provision, terminating services for nonpayment, developing projects that supply services, and distributing funding for water and sanitation services The law does not put into place requirements to consider income-level in providing services. However, the law does seem to give a water authority the flexibility to consider income-level in setting rates for services. Any authority can fix charges, fees, and penalties. An authority, through regulations and with the approval of the Minister, can establish charges, fees or depositions for services provided by the authority, as well as establish penalties when those charges and fees are not paid when due. Water Act, Article 94(1). The authority can also charge interest rates on outstanding amounts due to the authority. *Id*. A water authority has broad authority to determine how charges for water services will be determined. Water rates may "(a) be assessed on the quantity of water supplied as registered by a meter installed on the consumer's land by the water authority; (b) be assessed in some other manner approved by the Minister; or (c) be otherwise arrived at by agreement with the consumer." Water Act, Article 94(3). The water authority, with approval by the Minister, can establish charges to be		X	

paid per unit of water supplied and minimum charges to be paid for water supplied, as well as a rent fee for installing a meter. Lastly, the authority can determine the time within which charges and rent must be paid, including the terms and conditions of payment. Water Act, Article 94(3). All of these charges can be set for consumers generally or for classes of consumers. Water Act, Article 94(3). While the law does provide the authority flexibility in rate-setting, which means they could establish rates that consider ability to pay, the law does not establish broad protections for low-income households. The authority may disconnect services for nonpayment. When the charge for water or sewerage services remains unpaid thirty days after its due date, the water authority may restrict or disconnect services and demand the unpaid fee from the person. Water Act, Article 95. The law does not require the consideration of income level before disconnecting services to a low-income household for nonpayment.			
Requires the collection and publication of data on water resources, drinking water, and sanitation The Director of Water Resources may request the collection of data and information, but is not required to collect data. The Director may call for the "(a) the collection, collation and analysis of data concerning the occurrence, flow, characteristics, quality and use of any water or waste; (b) the systematic gauging and recording of rainfall and of the volume, flow and quality of other water or waste; (c) the construction, operation and removal of gauging, recording and monitoring stations and investigation and monitoring boreholes; (d) the sampling and analysis of any water or waste." Water Act, Article 12. Therefore, the Director has the authority to request data and information from providers, but is not required to collect this information with any frequency. The Director *is* required to keep a register of all permits granted and any works or uses of water registered as required under the Water Act. Water Act, Article 34. Local authorities are required to keep a map showing all existing public sewers and public sewers under construction within its district or under its control. Public Health Act, Article 77. The map is required to indicate the purpose of the sewer.		X	
Prohibits water withdrawal without a permit No person has a right to use water or construct or operate any works except as prescribed by the law. Water Act, Article 6. No person may extract water unless authorized. Water Act, Article 8(2). A person wishing to construct any works, or to take and use water may apply to the Director for a permit. Water Act, Article 18. The Director is authorized to include limited conditions in the permit. Water Act, Article 18(5). Therefore, a person who wants to use water with the appropriate authorizations must receive a permit.	X		

The Minister, in relation to any water source, may adopt certain rules and regulations about where water can be withdrawn and how water may be used. Water Act, Article 8(1)(a)-(b). The Minister also has special authorities to control water use when there is a shortage or a shortage is anticipated. Water Act, Article 8(1)(c). No additional guidance is provided by the law on when and how the Minister should exercise these authorities.			
Prioritizes water use for domestic purposes There is no specific prioritization of water use for domestic purposes. Domestic use is allowed without a permit. A resident on land where there is a natural source of water can use that water for domestic purposes; however, they cannot construct any works. Water Act, Article 7. While not clear, it seems that the use of water from resources on their land would not require a permit. The Director may cancel or amend an existing water permit when the Director believes it is necessary in order to make water available for a public purpose. Water Act, Article 26(1). The Minister can declare any purpose a public purpose by notice in the Gazette. Water Act, Article 26(2). This may apply to domestic water uses, but there is no requirement within the law to declare water use for domestic purposes a public purpose or to prioritize or protect domestic use in any way.			X
Penalizes non-compliance with effluent limitations There is no requirement to establish effluent limitations. Under the Public Health Act, if the Minister were to prescribe standards for the purity of effluent discharged after treatment and those standards were to be violated, Article 133 would likely apply. Article 133 states that where no penalty is prescribed for an offense, a person who contravenes a provision can be fined no more than 2,000 shillings, and up to sixty shillings per day if the offense is ongoing. Public Health Act, Article 133. Also under the Public Health Act, a local authority or medical officer of health may serve a notice on persons who create a nuisance. Public Health Act, Article 59. Where the person creating the nuisance fails to take action to eliminate the nuisance, the authority may file a complaint with the court, and the court can issue an order requiring certain steps to be taken by the person who has created the nuisance. Public Health Act, Article 60. Certain discharges of pollution could be characterized as a nuisance. Under the Water Act, a person who contravenes a provision for which no penalty is prescribed, a person can be imprisoned for no less than 3 months and no more than 10 years and/or be fined no less than 100,000 shillings and no more than 6 million shillings. Article 104. Therefore, if trade waste is discharged into a sanitation system in violation of the prescribed requirements, this enforcement		X	

provision would likely apply. The authority, upon notice, may require a person to take certain actions in the event that they contravene the Act, or a requirement issued by the authority. Water Act, Article 74. This could also serve as a basis to reduce and prevent pollution.			
Penalizes non-compliance with drinking water quality standards The law does not require the development of drinking water quality standards, and therefore does not set forth penalties for noncompliance with such standards.			X
Penalizes non-compliance with water use provisions The Water Act penalizes certain water usages. Any person who wastes water, misuses water, excessively consumes water without a reasonable cause, or takes or uses water for a purpose other than indicated in the water permit commits a punishable offense. Water Act, Article 39. Any person who commits this offense can be imprisoned for no more than five years and/or fined no more than six million shillings. Water act, Article 40. They can also be fined an additional one million shillings per day that the offense continues. Water Act, Article 40. The Water Act restricts the supply of water by persons within a water supply area to other persons, except if the water is being used or consumed on those premises or the water authority has approved the use. Article 97. Persons are also prohibited from taking water from the water authority's infrastructure except as is permitted under the Water Act. Article 98. Persons are further prohibited from taking water from a standpipe and using water from a standpipe, except for human and household consumption or other purposes allowed by the responsible authority. Article 98(2). The penalties for offenses for which specific penalties are not identified are set forth at Article 104. Water Act, Article 105.		X	
Establishes a clear mandate within an institution for overseeing water and sanitation service provision, and for enforcing rules There are several different institutions involved in the provision of water and sanitation services, or the management of water resources. The Minister has broad authority to issue regulations consistent with the Water Act in order to give effect to the purposes and provisions of the Act. Water Act, Article 107. The rights to investigate, control, protect and manage water in Uganda are exercised by the Minister and the Director of Water Development as is prescribed by the Act. Water Act, Article 5. The Minister has specific authorities as well. The Minister may place certain limitations on the use of water. For example, the Minister may identify the places from which water may be extracted,		X	

establish the time and manner in which water may be used, regulate water during shortages or anticipated shortages, or temporarily prohibit the use of water from certain areas on the basis of health reasons. Water Act, Article 8. The Minister may declare any area to be a water supply or sewerage area. Water Act, Article 45. The Minister must also appoint a person or public body to be a water authority or sewerage authority for the water supply and sewerage areas declared under Article 45. Water Act, Article 46. The Minister may require the Water Policy Committee to develop a water action plan that will protect, manage, and administer water. Water Act, Article 16. Once the plan is approved by the Cabinet, the Minister must issue the action plan which is binding on all persons and authorities. Article 17(1). The Minister may prescribe guidelines, on the advice of the Water Policy Committee, to be followed by the Director or public authority. Water Act, Article 35. To date, it does not appear that a water action plan has been issued. Broadly, the Water Policy Committee exists to offer advice to the Minister. Water Act, Article 10. The Director of Water Development has a wide range of authorities. The Director may require the collection and analysis of data relating to the use of water or waste, amongst other data points. Water Act, Article 12. The Director may require a class of persons or a person to take certain actions, such as keep and maintain records, install, and operate equipment, take samples, or provide information. Water Act, Article 13. The Director may require these actions by regulation or notice served to a person. *Id*. Anything required is done at the expense of the person to whom the notice is given, or the regulation applies. *Id*. The Director may organize training sessions for plumbers, drainers, or other operators, and award certificates. Water Act, Article 71. The Director has several authorities related to permits and overseeing the use of water. The Director may suspend or alter a water permit in an area that is or is likely to become "insufficient in quantity or quality for the needs of the persons using or seeking to use it from that source." Water Act, Article 22(1). The Director may also impose conditions on any permits that have varied or suspended under subsection 1. Water Act, Article 22(2). Where the permit does not specify a quantity of water to be taken, the Director can specify the quantity of water. Water Act, Article 23. The Director may also specify the duration of the permit where the duration has not been stated in the permit. Water Act, Article 24. The permit can also be canceled by the Director under certain conditions, including failing to comply with express and implied conditions within the permit, taking more water than allowed, using water for a purpose other than that for which the water should be used, and failing to have put the water to a beneficial use within the past two years. Water Act, Article 25. The Minister, Director and all other persons are required to "have regard to" the objectives of the Water Act, any international agreement to which Uganda is a party, the water action plan, any policy concerning the decentralization of administrative responsibilities, guidelines adopted by the Minister, and any			

delegation made by the Minister. Water Act, Article 43. It is unclear what it means to "have regard to" or what the repercussions would be if the Minister or Director did not have regard to these various requirements. Water and Sewerage authorities provide water supply services for domestic and other beneficial uses, manage water resources, private sewerage services as required, and implement directives issued by the Minister. Water Act. Article 47(1). An authority "shall endeavour" to provide its services according to the standards established by the Minister and in accordance with several principles. Article 47(2). The principles state that services should be provided in a manner most beneficial to the people of Uganda, that is efficient, economical, and socially and environmentally responsible, and is in consultation with appropriate public authorities and relevant community groups. Article 47(2). The authority shall adhere to relevant requirements set out in divisions 3-5 and 6 of the Act. Water Act, Article 47(3). Broadly, water and sewer authorities are allowed to build works. Water Act, Article 76. Water authorities have various authorities. A water authority has the authority to require an owner of land within the water supply area to connect to the authority's works. Water Act, Article 56. Water authorities may install meters to measure the amount of water it is supplying. Water Act, Article 57. However, the water authority is required to maintain a record of everywhere they install a meter. *Id*. Water authorities may prohibit, regulate, or restrict the consumption of water upon giving notice. Water Act, Article 61. Sewerage authorities also have several powers. Sewerage authorities may acquire, construct, operate or plan for the construction or operation of works to prove sewerage services or to dispose or treat any sewage or waste. Water Act, Article 62. Landowners with a private sewerage system can be asked by the sewerage authority to do certain things. Water Act, Article 67. A Water User Group may be established by individuals or households in order to collectively plan and manage the point source water supply system in their area. Water Act, Article 50. The Water User Group must operate through a Water and Sanitation Committee. *Id*. When there are multiple water user groups being served by a water supply system, the committees must form a water user association. *Id*. The National Government is responsible for land, water resources, and the environment. Local Governments Act, Second Schedule, Part I. District Councils are responsible for providing and maintaining water supplies in liaison with the Ministry responsible for natural resources. Local Governments Act, Second Schedule, Part Two. Urban Councils are responsible for water supplies outside the jurisdiction of the National Water and Sewerage Corporation. Local Governments Act, Second Schedule, Part Three. The District Council should devolve several functions to lower local government councils, including the making, altering, and maintenance of works and water courses; the enforcement of building standards,			

maintenance standards for buildings, and the proper methods for the disposal of waste and making, operation and maintenance of wells, dams, and other water supplies; the protection and maintenance of local water resources; and the maintenance of community infrastructure. Local Governments Act, Second Schedule, Part Four. Cities or municipal councils should devolve environmental care and protection and the provision of drinking water to divisions. Local Governments Act, Second Schedule, Part Five. Local authorities may construct and maintain a public sewer. Public Health Act, Article 76. They must also keep a map of all public sewers. Public Health Act, Article 77. It is the responsibility of the local authority to take all "lawful, necessary and reasonably practicable measures" to prevent pollution that endangers the health of any water supply which is used for drinking or domestic purposes and for purifying the supply when it has become polluted, including taking steps against the person causing the pollution of the supply. Public Health Act, Article 103. At a political level, there are several levels of local government, including: districts, cities, divisions, subcounties, municipalities, towns, parishes, and wards. Local government includes the local councils established for cities and towns, and lower local government includes the councils for a municipality, town, division or subcounty. LGA, Article 1. Local governments for a district rural area include district councils and subcounty councils. LGA, Article 3(2). Local governments for a city include city councils and city division councils. LGA, Article 3(3). Local governments for a municipality include a municipal council and municipal division councils. LGA, Article 3(4). And, the local government for a town includes a town council. LGA, Article 3(5). Urban Councils include city, municipal, division, and town councils. LGA, Article 1. Cities and districts are equivalent, and their respective councils exercise the same functions and powers. LGA, Article 4(a). Divisions and subcounties are equivalent, and their respective councils exercise the same functions and powers. LGA, Article 4(b). Wards, found within an urban council, are equivalent to a parish found within a district council. LGA, Article 1. On the rural side, Districts oversee counties, which oversee subcounties and towns, which oversee parishes and wards, which oversee villages. On the urban side, Cities oversee municipalities, which oversee divisions, which oversee wards.			

Examining whether national law supports the adoption and application of WASH standards.

The Uganda National Bureau of Standards Act 1983 (Cap. 327) was reviewed to determine the level of support provided at the national level for adopting and applying WASH standards. Below we examine: 1. the mandate of the Standards Body and the scope of authorities and responsibilities issued to them, 2. the process by which standards are developed and approved, and 3. the enforcement authority of the Standards Body and enforcement tools.

Standards body mandate, and scope of authorities and responsibilities	The Uganda National Bureau of Standards (UNBS) has several functions, including (1) formulating national standard specifications, (2) promoting standardization, (3) determining, reviewing, modifying, and amending standard specifications and codes of practice, (4) endorsing or adopting international specifications, (5) enforcing standards. UNBSA, Article 3. The Council, as the governing body of the Bureau, is responsible for managing the Bureau, formulating, and carrying out Bureau policies, and declaring standard specifications, certification marks, and codes of practice. UNBSA, Article 8. The Council may adopt bylaws–with the prior approval of the Minister–to govern the conduct of the Bureau. UNBSA, Article 42. The Council may also create committees. UNBSA, Article 4. The Minister may also adopt regulations–in consultation with the Council–that help to implement the law. UNBSA, Article 43. The National Standardization Strategy 2019/20 - 2021/22 is a framework to determine how to use the limited resources available for standardization to develop priority standards.[90] The Strategy ranks drinking water safety, poor sanitation services, and environmental degradation (i.e. non-economic priorities) first as very serious, urgent problems.[91] Inadequate standards and weak quality infrastructure, poor management of sewerage and wastewater (especially from industries), non-implementation of policies and laws, and climate change management are ranked third as serious problems with some media reports. Based on five criteria–economic efficiency, safeguard health and safety, preserve the environment, facilitate trade and industrial integration, and facilitate access to export markets–different stakeholders ranked priority sectors/subjects on a scale of 1 to 5, where 1 is the highest priority for standardization and 5 is the lowest.[92] The average priority given by the National Water and Sewerage Company (NWSC) for the subjects within the water supply and sewerage service fielders was three. The average priority given by the Uganda National Council for Science and Technology (UNCST) for law is 3.2.[93] The National Standardization Plan identifies several water-related priorities for Year 1, including developing specifications for steel pipes for water; specifications for the design, installation, testing and maintenance of water supply and drainage for buildings; code of practice for the design and installation of drainage fields for use in wastewater treatment; specifications for small wastewater treatment systems for up to 50 PT – Septic tanks assembled in situ from prefabricated kits, specifications for sanitary appliances–wash down water closets; specifications for pipes and fittings made from

[90] National Standardization Strategy, PDF page 10, available at https://unbs.go.ug/content.php?src=national-standardization-strategy&pg=content.
[91] Id at PDF page 30.
[92] Id at PDF page 15, 34-35.
[93] Id at PDF page 37.

	unplasticized Polyvinyl Chloride (PVC-U) for water supply [94] The UNBS oversees a Product Certification Scheme in accordance with the 1995 Certification Regulations.[95] Manufacturers apply for permits to use the Uganda Standards Certification Mark (the Quality Mark). Once they demonstrate that their product complies with the relevant Standards, they are granted a permit to use the Mark. The UNBS also oversees inspection and certification of a company's Management System in accordance with ISO Management System Standards.[96] The Uganda National Bureau of Standards is a member of several regional and international standardization bodies including the East African Community (EAC), Common Market for Eastern and Southern Africa (COMESA), African Organization for Standardization (ARSO) ,and International Organization for Standardization (ISO).[97]
Process by which standards are developed and adopted	The Council may declare a specification. A standard specification can be declared by the Council for any commodity, or for the manufacture, production, processing, treatment, or performance of any commodity. UNBSA, Article 15. The Council may also amend or revoke any declaration of a standard specification. The Council may also declare recommended practices–also known as codes of practice–for any process, installation, construction, testing, operation, or use of any article or device. UNBSA, Article 15. The Minister, on the recommendation of the Council and by notice in the Gazette, declares a standard specification, a compulsory standard specification, and a distinctive mark. UNBSA, Article 18. At least two months before making the recommendation to the Minister for a standard specification to be declared a compulsory standard, the Council must publish information about the standard specification in the Gazette. UNBSA, Article 19. The Council cannot recommend a standard be declared a compulsory standard unless the Council believes it is "not practicable to achieve the purposes of the standard specification otherwise than by means of making it compulsory. UNBSA, Article 18(2). No additional guidance is provided for what this means and how this is to be determined consistently. The Council also declares standards marks. With the approval of the Minister, the Council can declare a standards mark to be used for goods that conform with the standard specification. UNBSA, Article 16. Applications for a permit to use a mark are made to the Council. The

[94] Id at PDF page 43.
[95] UNBS, Product Certification, available at https://unbs.go.ug//content.php?src=product-certification&pg=content.
[96] UNBS, Systems Certification, available at https://unbs.go.ug//content.php?src=systems-certification&content.
[97] UNBS, Harmonization of Standards at Regional and International Level, available at https://unbs.go.ug//content.php?src=harmonization-of-standards-at-regional-and-interna&content.

	Council is responsible for granting the permit to use a mark subject to the conditions they think are necessary to impose. UNBSA, Article 17. Standard marks can only be used when a permit has been granted. UNBSA, Article 20.The permit is valid for 12 months. UNBSA, Article 17. The Council may withdraw, cancel, or suspend permits, or change the conditions included within the permit. UNBSA, Article 24. A person may appeal certain decisions made by the Council, such as the denial of a permit request or the inclusion of conditions on the permit. UNBSA, Article 25. Any commodity for which there is a compulsory standard specification must conform with the specification. UNBSA, Article 21. All persons are prohibited from importing, distributing, manufacturing, selling, or having within their possession or control any commodity that does not comply with the standard specification. UNBSA, Article 21. The same applies to the use of any mark. UNBA develops standards through technical committees (TCs).[98] As of 2021, eighty-seven technical committees have been formed. Technical committees are composed of a variety of stakeholders, including manufacturers, traders, consumers, regulators, civil society, and others. There are several relevant technical committees. First, there is a technical committee for "Water and Sanitation" that focuses on standardizing the "design and construction of water supply and wastewater systems, or maintenance techniques; and standardization of water for construction and agriculture." Second, there is a technical committee for "Mechanical Engineering" that develops standards for water well drilling. Third, there is a technical committee for "Sanitary appliances and fittings," which includes developing standards for water closets, flashing cisterns, amongst other fittings. Fourth, there is a technical committee for "Drinking water and soft drinks". Fifth, there is a technical committee for "Environment" who develops standards for water equity and effluents to water and soil. There are several steps to developing standards.[99] The UNBS Secretariat receives a request for a new standard from an individual, such as a manufacturer, an institution, a consumer, or a civil society. Such an individual must fill out and submit a Preliminary Work Item (PWI) proposal. The Secretariat determines whether to prepare a formal New Work Item Proposal (NWIP) for approval by the UNBS management or not. Management approves a proposal as a work item on two bases: an assessment of market relevance and the cost effectiveness of developing

[98] Uganda National Bureau of Standards, About Uganda Standards, available at https://unbs.go.ug//content.php?src=about-uganda-standards&pg=content.
[99] Uganda National Bureau of Standards, About Uganda Standards, available at https://unbs.go.ug//content.php?src=about-uganda-standards&pg=content.

	a standard. There also should be a need for the standard, such as when there is a new type of product or process that needs to be standardized or regulated. Once the proposal is approved, it must be designated project status before the technical work begins by the Secretariat. During the preparatory stage, the Secretariat prepares a working draft. An indigenous working draft can only be developed when there is no international or regional standard to be directly adopted. A working group can be formed to provide input to the technical committee, including drafting the standard. Once there is a working draft, a committee reviews the draft and modifies the draft as necessary. It is unclear whether the committee is the technical committee or a different committee. A draft Uganda Standard is produced based on consensus and published for public comment. A draft Uganda Standard is also pushed for national and international comment in accordance with the World Trade Organization-Technical Barrier to Trade requirements.[100] The draft must be made available for 60 days if it is an indigenous standard or 30 days for international standards. Once the notice and comment period is concluded, the National Standards Council (NSC) approves and declares the standard a Uganda Standard (US).
Enforcement	Several infractions or violations of the Standards Law are identified. A person has violated the law if they make a statement or representation which gives the impression that they hold a permit for the standards mark being used when they do not have a permit, that they hold a permit for the distinctive mark being used when they do not have a permit, or that the product complies with a standard specification or a compulsory standard specification when it does not. UNBSA, Article 26(1)(a)-(c). Additional offenses include comparing a product that does not comply with a standard specification with one that does comply, continuing to apply a mark after the permit has expired or been revoked, failing to comply with the conditions of a permit, and failing to provide information to an investigator as is required. UNBSA, Article 26. Both fines and imprisonment are authorized penalties for violations under Article 26. UNBSA, Article 27. The law also creates affirmative defenses to violations under certain circumstances. Article 31.

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[100] WTO Standards, available at https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm.

Examining whether national law creates commitments to achieving access to water and sanitation.

Several laws were reviewed in order to assess whether national-level laws create a commitment to increasing access to drinking water and sanitation, including the: (1) Constitution, (2) the Water Supply and Sanitation Act of 1997 (WSSA), (3) the Public Health Act of 2006 (PHA), (4) the Environmental Management Act of 2011 (EMA), and (5) the Water Resources Management Act of 2011(WRMA).

	Y	Part	N
Creates a (human) right to water Neither the Constitution nor the Water Supply and Sanitation Act establishes a human right to drinking water. The Water Supply and Sanitation Act does include other provisions which enable greater access. Local authorities are required to provide water supply and sanitation services to any area within its jurisdiction, except where a person is already providing such services for themselves, or a utility or service provider is already providing such services. Article 10(1). However, local authorities do not have to provide such services where they are "unable, for whatever reason". Article 10(2). This large, undefined caveat undercuts the initially broad requirement to provide water and sanitation services to anyone within its service area. Therefore, there is no requirement to provide services because any reason not to provide services could fall within the caveat "for whatever reason". The Water Resources Management Act recognizes as a principle of water resources management in Zambia that "water is a basic human need," and therefore domestic and noncommercial water uses must be prioritized first in the allocation of resources. WRMA, Article 6(b). Other principles of the law include that there shall be equitable access to water, that there shall be no private ownership of water and that the use of water will not be granted in perpetuity, that there shall be equity between genders in accessing water resources, and that the location of water resources on land shall not confer preferential rights to its use. WRMA, Article 6. However, these principles, while progressive, are intended to guide the development of the law, but are not enforceable provisions in and of themselves. Certain provisions help to ensure access to water resources is more widespread. The Water Resources Management Act states that a person cannot own water, and that water resources cannot be acquired as property. WRMA, Article 4. Declaring that water cannot be held as property gives the government more flexibility in managing water resources and their use. Further, it is required that the Water Resources Management Authority ensure that traditional practices are considered in managing water resources. Article 5(2). The Environmental Management Act recognizes a right to a clean, safe, and healthy environment. Article 4. This right likely includes encapsulates a right to			X

clean water resources. However, this right does not make any promise about drinking water or sanitation.			
Creates a (human) right to sanitation Neither the Constitution nor the Water Supply and Sanitation Act establishes a human right to sanitation. Sanitation service is defined broadly by the Water Supply and Sanitation Act. Sanitation service is defined as either the disposal, onsite or offsite of human excreta, or the collection of sewerage from residential, commercial, or industrial sources not including toxic waste or stormwater, or the treatment and disposal of wastewater in accordance with this Act and the standards established under the Standards Act, the Public Health Act, the Environmental Protection and Pollution Control Act (now the Environmental Management Act) or any other written law. Article 2. While the definition is incomplete–because it does not explicitly address each part of the sanitation value chain, from capture to containment to emptying to transport to treatment–it does recognize onsite and offsite disposal of human excreta. It is important that sanitation be defined broadly to ensure that all appropriate and safe technologies are allowed, incentivizing entrepreneurship in the development of alternative sanitation technologies. A more expansive definition of sanitation services acknowledges that certain communities–like rural and harder to reach communities–are harder to provide services to and therefore could be better served by less traditional ways of providing sanitation services.			X
Prohibits the release of pollution or contamination The law prohibits the discharge of pollutants without a license under certain circumstances. The law also prohibits the release of pollution beyond the requirements prescribed by law. The Environmental Management Act prohibits the discharge of a pollutant into the environment without a license *if* that discharge causes or is likely to cause an adverse effect. EMA, Article 32. An 'adverse effect' is defined as "any harmful or detrimental effect on the environment, whether actual or potential, that— (a) impairs, or may impair, human health; and (b) results in, or may result in, an impairment of the ability of people and communities to provide for their health, safety, cultural and economic wellbeing." EMA, Article 2. The Environmental Management Act states that an "adverse effect is deemed to have been caused by an act or omission if it is possible that the adverse effect could have resulted from the act or omission, if it was reasonably foreseeable that the effect could have resulted from the act or omission, and if there was no other plausible cause for the adverse effect." Article 127. Therefore, certain pollutants or certain volumes of pollution may be allowed as long as the discharge does not cause or is not likely to cause an adverse effect.	X		

The Environmental Management Act specifically prohibits any person from discharging any poisonous, toxic, obnoxious, or obstructing matter or other pollutant into the aquatic environment in contravention of the water pollution control standards established by ZEMA. EMA, Article 46. Therefore, the discharge of any pollutant into a water resource that exceeds the water pollution control limits set by ZEMA is prohibited. The law also does not state how the limits are to be defined and what factors have to be created. Lastly, any person who discharges a contaminant or pollutant in the environment unlawfully or that causes or is likely to cause an adverse effect is required to immediately notify the Agency, submit information about the quantity and quality of the discharge to the Agency, and take all practicable steps to "contain the discharge or emission and to prevent, mitigate or remedy the adverse effects resulting from the discharge or emission, including removing any deposit." EMA, Article 35. Furthermore, under the Environmental Management Act persons are prohibited from collecting, transporting, sorting, recovering, treating, storing, disposing of, or otherwise managing waste in a manner that results in an adverse effect or creates a significant risk. EMA, Article 54. Waste is defined as any liquid, solid, or gas that when discharged into the environment can cause an adverse effect. EMA, Article 2. Waste is defined again later in the Environmental Management Act–under Division 4 ("Waste Management") of Part IV ("Environmental Protection and Pollution Control")–as garbage, refuse, sludges, and other discarded substances from industrial and commercial operations as well as domestic and community activities, excluding wastewater as defined in the definition of effluent. EMA, Article 53. While sludge is not defined, it is likely that this provision applies to the release of the solid byproduct from wastewater treatment or sanitation management. The Public Health Act includes a broader prohibition on contamination. The Public Health Act prohibits persons from causing a nuisance or from allowing a nuisance or other condition liable to be injurious or dangerous to health to exist on the land or premises they own or occupy. PHA, Article 64. A nuisance includes, but is not limited to (1) any watercourse, water tank, cistern, water closet, earth closet, privy, urinal, cesspool, soak-away pit, septic tank, cesspit, soil-pit, waste-pipe, drain, or sewers so foul, or so offensive, or so injurious or dangerous to human health; (2) any well or other source of water supply the water from which is used or likely to be used for domestic purposes that is polluted or injurious to health; or (3) any noxious matter or wastewater discharged from any premises into a street or watercourse. PHA, Article 67. Nuisance is also defined broadly as "any act, omission, or thing which is, or may be offensive, dangerous to life, or injurious to health." PHA, Article 67(s). Therefore, there seem to be multiple ways to ensure that the release of pollutants does not cause harm to the environment and public health.			
Requires permits for the release of pollutants into the environment	X		

The Environmental Management Act prohibits the discharge of a contaminant or pollutant into the environment without a license if that discharge causes or is likely to cause an adverse effect. Article 32. The Agency can issue a license to discharge a pollutant or contaminant into the environment "in such manner and under such conditions as may be prescribed." Environmental Management Act, Article 33. The Minister is required, with the recommendation of the Agency, to identify "(a) the criteria and procedure for applying for an emission license and the grant, varying, renewal, transfer and revocation of an emission license; (b) the terms and conditions attaching to an application, grant, varying, refusal, renewal, transfer or revocation of an emission license; and (c) any other matters that are necessary or incidental to the effective regulation of emission licenses under this Act." Environmental Management Act, Article 34. Therefore, a wastewater treatment plan would be required to apply for a license before starting operations. This does not likely apply to on-site sanitation options because they do not discharge pollutants; however, it is not clear because the term discharge is not defined under the law. It is also unclear under the law whether this requirement applies to facilities that were in operation at the time the law was adopted because the law does not state whether operations existing at the time of the adoption of the law were required to get a permit. Similarly, a license is required to use water resources to dilute effluent. Persons are prohibited from using water resources to dilute effluent without a permit. WRMA, Article 46(1). All discharges of effluent must be done in compliance with the Environmental Management Act. WRMA, Article 46(2). More broadly, persons are prohibited from starting any project that could have an effect on the environment without written approval by the Agency. EMA, Article 29(1). Further, the project cannot be conducted except as in accordance with the conditions included in the approval. EMA, Article 29(1). A license for the project cannot be issued until approval is given by the Agency. Article 29(2). The Agency is prohibited from granting approval if "the implementation of the project would bring about adverse effects" or if "the mitigation measures may be inadequate to satisfactorily mitigate the adverse effects of the proposed project." EMA, Article 29(4). Any person who is intending to build any "undertaking that is likely to emit or discharge any pollutant or contaminant into the environment" must inform the agency of their intent during the "early planning stage". EMA, Article 36. The Agency, upon receipt of information about the project, may require the project initiator to conduct an environmental impact assessment in accordance with Article 29. *Id*. The law does not require an EIA in all circumstances and does not stipulate when the Agency must require an EIA to be conducted. Certain extensions or additions to existing facilities may also require an EIA to be conducted. *Id*. Under the Environmental Management Act, an owner or operator of a trade or industry who wants to discharge into an existing sewerage system must obtain			

written permission from the local authority operating or supervising the sewerage system. Article 47(1). The local authority can impose conditions under which the effluent will be accepted or prescribe methods of pretreatment prior to the sewerage system accepting the effluent. Article 47(2). These conditions must be included in the license. Any person who discharges effluent into a sewerage system in contravention of the conditions can be fined up to 500,000 penalty units and/or imprisoned for no more than five years. Article 47(4). While a discharger must consult with the local authority, the local authority is not required to include conditions in the permit. This means that conditions may not always be applied, and that similar industries may be subject to different conditions within different local authorities. Under the Water Resources Management Act, appropriate authorities are prohibited from issuing or granting any license, permit, or other authorization for doing any activity in any catchment or on or along water resources before consulting WRMA about whether the license will affect the resource quality or quantity of water in any water resource. Article 69(1). WRMA may impose conditions or stipulate requirements as they deem necessary to maintain or protect the resource quality or quantity in any water resource. Article 69(2). It is unclear how this interacts with the licenses that would be issued wastewater treatment plants. It is also unclear whether there is an ongoing examination of how activities are impacting water quality and the ability to meet ambient water quality standards. Broadly, a strategic environmental assessment must be conducted for any policy, program or plan that could have an adverse effect on environmental management or the sustainable management and use of natural resources. EMA, Article 23(1). A strategic environmental assessment report must be presented to the Agency for approval. *Id*.			
Requires the establishment of effluent limitations for wastewater treatment plants and other dischargers (incl. workmanship or construction regulations) The law does not require the establishment of effluent limits for wastewater treatment plants. The law does explain the standard dischargers are expected to achieve. Any person who discharges any pollutant or contaminant into the environment is required to take "reasonable measures to ensure that the best practicable option…is adopted in relation to the discharge." EMA, Article 38(1). The Director-General or any other person with the authority to authorize a discharge of a pollutant or contaminant, must make sure that the "best practicable option" is adopted. Article 38(2). The best practicable option is defined as "the best method for preventing or minimizing adverse effects on the environment, having regard, among other things, to: (a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; (b) the effect on the environment of that option when compared with other options; and (c) the current state of technical knowledge and the likelihood			X

that the option can be successfully applied." Article 38(3). It is unclear whether the "best practicable option" or "method" will be defined on a case-by-case basis or for the industry or sub-industry as a whole. Also, the best practicable option seems focused on the type of technology being used rather than the level of pollution control that can be achieved based on the application of the best practicable option. Therefore, it is possible that as applied it will be prescriptive of a specific technology rather than a standard that must be achieved regardless of the specific technology used.			
Requires the establishment of regulations and standards for non-sewered sanitation, on-site, off-grid (NSS) The law does not require the establishment of regulations or standards for non-sewered sanitation. However, there are other provisions in the law that may govern the construction and operation of non-sewered sanitation infrastructure. Persons are prohibited from starting any project that could have an effect on the environment without written approval by the Agency. Environmental Management Act, Article 29(1). A license for the project cannot be issued until approval is given by the Agency. Article 29(2). The term "project" is not defined; therefore, it is unclear whether this applies to the construction of non-sewered sanitation facilities. However, it is possible, and likely, that it would apply because non-sewered sanitation facilities could impact groundwater resources and the environment if they are not constructed properly, or are not properly maintained or used, or fail. ZEMA may also issue a waste management license to a person to allow the person to "(b) collect and dispose of waste from industrial, commercial, domestic or community activities; (c) transport waste to a disposal site; (d) own, construct or operate a waste disposal site or other facility for the permanent disposal or storage of waste; or (e) transit, trade in or export waste." Article 55(1). Because the definition of waste is broad it likely applies to the liquid and solid byproduct of non-sewered sanitation capture, collection, transport, and treatment technologies. Therefore, those involved in non-sewered sanitation activities may be expected to apply for a permit. However, there is no explicit designation within this requirement for non-sewered sanitation.			X
Requires the development of drinking water quality standards The law does not require the development of drinking water quality standards. The law also does not require that plumbing codes be drafted to regulate plumbing fixtures and fittings, piping, and water filtration systems.			X
Requires the establishment of water quality standards		X	

The law does require water quality standards to be established. WRMA is required, in collaboration with the Environmental Management Agency, to recommend ambient water quality standards to the Zambia Bureau of Standards and "ensure that the standards are maintained." WRMA, Article 8(2)(n), 47(1). While water quality standards must be created, there are certain dynamics that are not explained in the law. First, while WRMA and EMA are required to develop the standards, the Bureau of Standards does not seem to be required to adopt those standards or any water quality standards. Second, the law does not appear to require compliance with the standards or that the standards adopted be made compulsory. Nor is it clear on whom the standards would apply and how they would be operationalized. Third, while the law empowers WRMA and EMA to ensure the standards are maintained, the law does not define what it means to maintain the standards or how those agencies would be able to do that since they are not the agencies to adopt those standards. Lastly, the law does not provide any guidance on how the water quality standards are to be established, including on what basis the standards will be calculated. The law creates several opportunities for WRMA and other agencies to protect water resource quality. Broadly, WRMA is required to monitor the resource quality and control the pollution of any water resource. Article 47(2). The law prescribes a few specific ways agencies can monitor and control the release of pollution. For example, licenses cannot be issued without consideration of the impact on natural resources. Under WRMA, authorities are prohibited from issuing or granting any license, permit, or other authorization for conducting any activity in any catchment or on or along water resources before consulting WRMA about whether the activity authorized under the permit or license will affect the resource quality or quantity of water in any water resource. Water Resources Management Act, Article 69(1). Therefore, any new drinking water plant or wastewater treatment plant seeking a license would be required to consult with WRMA. It is unlikely that this applies to existing infrastructure. Another example includes the granting of authority to WRMA to impose conditions or requirements on proposed activities when they think the requirements are necessary to maintain or protect the water resource quality or quantity. Article 69(2). These conditions or requirements must be included on the license or permit issued. Article 69(3). Therefore, it seems that the impact of a discharge on water resource quality will be considered and integrated into a permit. How exactly that impact will be integrated and included on a permit is not clear. It is also not clear whether or how the determination that an activity will impact water resources impacts effluent limitations or is considered in light of ambient water quality standards. For example, it is not clear how the ambient water quality standards help to determine whether or not an activity will impact water resource quality, or how the standards are applied equitable to existing versus new discharges. Broadly, the Minister has authority to issue regulations that could protect water quality (and quantity). The Minister may issue regulations, with the			

recommendation of the Authority, to (a) limit or restrict the "purpose, manner or extent of the use of water", (b) "prescribe the outcome or effect which must be achieved by the installation and operation of any water works", (c) regulate the "design, construction, installation, operation, and maintenance of any water works", or (d) to regulate activity to protect a water resource. WRMA, Article 68(1). In developing these regulations, the Minister is required to take into the consideration the need to "(a) promote the social, economic, sustainable, equitable and reasonable use of water; (b) conserve and protect water resources or riparian habitat; (c) provide for adaptive measures for climate change; (d) prevent wastage of water; (e) facilitate the monitoring of the use of water and water resources; and (f) facilitate the imposition and recovery of charges." WRMA, Article 68(3). These types of regulations, which could include the adoption of water quality standards, could help improve and protect water quality.			
Requires consideration of income-level (or the income-level of the customer base) when developing rates for drinking water and sanitation service provision, terminating services for nonpayment, developing projects that supply services, and distributing funding for water and sanitation services There do not seem to be any requirements within the law that require the consideration of income level.			X
Requires the collection and publication of data on water resources, drinking water, and sanitation (monitoring and reporting) Several laws create requirements for collecting and publishing data and information on water resources and WASH. Under the Water Supply and Sanitation Act, NWASCO is required to appoint inspectors to monitor, inspect, and enforce the Water Supply and Sanitation Act. Water Supply and Sanitation Act, Article 33(1). Inspectors are required to ensure that "adequate arrangements for the provision of water supply or sanitation services are being provided in accordance with this Act." WSSA, Article 34(3). "Adequate arrangements" is not defined within the law. Inspectors are required to provide NWASCO with any reports or information requested by NWASCO pertaining to the inspection. WSSA, Article 35. There also does not seem to be a prescribed schedule for conducting inspections to ensure a regularity to such oversight. Therefore, it is not clear how the monitoring and inspection requirements will be applied consistently. Broadly, any person or facility discharging pollution is required to measure the levels of the discharge and submit the results to ZEMA. EMA, Article 35(2). Failure to do this can mean that the person is fined no more than 300,000 penalty units and/or imprisoned for no more than three years. Article 35(3). In the event of an unlawful discharge of a contaminant or pollutant, the person must immediately notify ZEMA, provide information to ZEMA about the quantity and quality of the discharge, and take all "practicable steps" to contain the discharge and prevent, mitigate, or remedy the adverse effects. Article 35(1). While important to ensure		X	

sufficient notification and response, this data collection is reactive to an emergency rather than proactive. The owner or operator of a sewerage system or any other undertaking likely to cause the discharge of a pollutant is required to submit to the inspector "information relating to the quantity and quality of the pollutant or contaminant". EMA, Article 37(1). The owner or operator is also required to submit information relating to the quantity and quality of the pollutant as required by the Inspectorate. Article 37(2). This means that there *may* be an ongoing responsibility to report information, but it is not clear whether systemic monitoring and reporting is required by all sewerage providers. Also, the inspectorate *may* but is not required to require an owner or operator to install metering devices, have samples taken and analyzed, and keep records. Article 37(3). No additional detail is provided on the type of information that must be collected and reported (e.g. the location of the discharge point, the volume of effluent being discharged). Furthermore, while the inspectorate has this authority, there are no circumstances under which they are required to exercise that authority. Therefore, the law does not require the systematic collection of data for all systems. Lastly, even if information must be collected and provided to the government, there is no clear requirement that such data and information must be made public. The Water Resources Management Authority is required to put into place a "gender sensitive integrated national management, monitoring, and information system on water resources as may be prescribed by the Minister." WRMA, Article 38(1). The Minister is required to set forth the procedures for collecting and managing data. WRMA, Article 38(2)The law does not provide any details about what types of information must be included within the system or how the system is to be 'gender sensitive'. The Board for the Water Resources Management Authority may require any person or authority within a reasonable time or on a regular schedule to provide the Board with specified information, documents, samples, or materials. WRMA, Article 38(4). This provision is important because it gives the Board the authority to request information from people. Furthermore, the Authority is required to publish guidelines to catchment councils, subcatchment councils, water user associations, appropriate authorities, and conservancy authorities on the maintenance of records and provision of information to the Authority as is required. WRMA, Article 38(5). The Authority is responsible for monitoring the quality of water resources and for controlling pollution into any waterbody. WRMA, Article 47(2). If the Water Resource Management Authority, in consultation with the Environmental Agency, is concerned that the activities of a person may lead to the pollution of a water resource, the Authority *may* but is not required to, by notice in writing, require the person to (a) install devices to test and monitor the quality and quantity of gasses, liquids or solids in any water, effluent or wastewater; (b) to test or monitor any water, effluent, or wastewater and submit the results to the Authority; (c) to take reasonable measures for controlling or preventing the pollution; (d) to			

construction or install waterworks or devices for controlling or preventing pollution; or (e) to prepare and submit to the Authority a report providing information concerning the person's existing or proposed activities. WRMA, Article 49(1). A person who fails to comply with the requirement(s) imposed by the Water Resources Management Authority commits an offense and can be fined no more than 100,000 penalty units and/or imprisoned for no more than one year. WRMA, Article 49(2). The person may additionally be required to (a) remediate the area as prescribed by the court, (b) reimburse the Authority for remediation it performed, or (c) pay compensation for damage they caused. WRMA, Article 49(3). The Ministry responsible for water resources may on behalf of the government develop legal instruments, in cooperation with other riparian states and on the advice of the Authority, to use water, to monitor and control pollution and its effects in any shared water resources, to put in place adaptation measures to deal with climate change, and to control the long-range transport of pollution. WRMA, Article 56(1). Any agreement established under Article 56 can create an authority responsible for investigating, managing, monitoring, and protecting the water course. WRMA, Article 58. The Authority is required to establish and maintain a register of permits in force. WRMA, Article 87. Within the registry, the Authority must specify the details of the permits, their terms and conditions, and the results of the monitoring and enforcement actions taken by the Authority. WRMA, Article 87(1). Information within the registry is accessible by the public for a fee. WRMA, Article 87(2).			
Prohibits water withdrawal without a permit Under the Water Resources Management Act, permits are typically required to withdraw water resources. WRMA, Article 71. Permits are required when water is used for the following purposes: environmental, training and research, municipal, agricultural, industrial, hydroelectric, mining, navigational, bulk water supply, and any others as identified by the Board. WRMA, Article 71(a), Article 60. Not only are permits required, certain charges must be paid for the use of water. WRMA, Article 71. A permit is not required to use water from any water resource for domestic or noncommercial purposes (as long as the person has lawful access to the water resource) or for the development or use of groundwater for domestic and noncommercial purposes. Article 70. A permit is also required for other water resource-related activities such as: constructing waterworks; impounding, supplying, or distributing water from a waterworks or borehole to another person; dewatering a mine or quarry; draining a swamp or wetland; harvesting water by means of a dam; sinking or deepening a borehole in a water shortage area; or any activity in relation to a water resource as may be prescribed. WRMA, Article 71. A person is prohibited from allowing water to run to waste from any waterworks and from using water beyond the volume allowed under the permit. WRMA, Article 66(1). Furthermore, a subcatchment council *may*, but is not	X		

required to, ask a permit holder to install a meter to measure and record the volume of the water used and to submit records of the volume of water used as requested by the council. Article 67(1). Therefore, the law does require permits for non-domestic water use. The Water Resources Management Act has also put into place certain water use planning requirements. Water use broadly must "(a) maximise the social and economic benefits to the community; (b) be consistent with the principles specified under section six; and (c) avoid or minimise the adverse impact of that use on other users of water." WRMA, Article 60. Subcatchments council are responsible for drafting allocation plans that are included within the subcatchment management plans. WRMA, Article 61(1)(a). Those plans are then incorporated by the catchment council into the catchment management plans for approval by the Board. Article 61(1)(b). An allocation plan and catchment management plan must include the following information: "(a) water committed for the reserve; (b) the various categories of uses of water in that subcatchment and catchment; (c) the prioritisation of the various uses of water as specified under subsection (2); (d) requirements for water within the catchment to satisfy the needs of existing permit holders; (e) the effect of climate change or variability on the availability of water; (f) the adjustment to entitlements given for the use of water in case there is a reduction in the availability of water; and (g) water storage works existing or that are being, or are to be, constructed in the catchment." Article 61(3). Specific to groundwater, any person who wants to drill a borehole is required to notify the Authority, a catchment council, or a subcatchment council of the proposed construction before it begins. WRMA, Article 94. The Director General, a catchment council, or a subcatchment council may authorize the borehole drilling as well as prescribe certain terms and conditions. Article 95. The person drilling the borehole must keep a journal of the work being completed and send a completion report to the Authority and relevant catchment council or subcatchment council. WRMA, Article 99. Furthermore, a person who drills a borehole must notify the Authority of the location and details of the borehole upon its completion. WRMA, Article 100(1). The Authority is required to maintain a register of all boreholes. WRMA, Article 100(2). A catchment council may but is not required to request all existing borehole owners and operators to report the location and data related to the borehole. Article 101. Keeping good records is important for monitoring water use and permits.			
Prioritizes water use for domestic purposes When the subcatchment council develops a subcatchment management plan, the subcatchment council classifies water for different purposes. As part of that process, the subcatchment council must ensure that "water reserves are set aside for priority purposes and environmental needs" as well as ensure that domestic and noncommercial purposes are of first priority in the order of priority water	X		

uses. 61(2)(e). This means that domestic purposes are prioritized in the order of water uses included within a subcatchment management plan. Where a person seeks to use water from a customary area and the proposed use is likely to substantially affect the supply of water for domestic and noncommercial purposes to the occupants of that customary area, that person must obtain approval from the traditional authority in the area and put in place an alternative means for securing water for domestic purposes before applying for a permit from the Director-General. WRMA, Article 63. The law does allow water use even if such a use would endanger domestic water uses. However, the law at least requires that an alternative approach to getting water for domestic purposes be installed before applying for a permit. When either the Minister or President declare an emergency or national disaster because of a drought, the Authority may: "(a) suspend or amend any permit granted under this Act; (b) determine the amount of water that may be used by any person for any purpose; (c) define places from which and times at which water may be used; and (d) give any necessary and practicable orders or take any action suitable to ensure equitable allocation and use of water." WRMA, Article 146(1). While no greater detail is provided within the law, the basis for suspending or amending existing permits could be to ensure adequate water resources to fulfill domestic purposes. Where the President is concerned that there are insufficient water resources to fulfill domestic and noncommercial purposes, the President can direct a person with a water supply beyond their own domestic and noncommercial needs to provide the excess water to the area or person in need. WRMA, Article 146(2). Under the Water Supply and Sanitation Act, the utility or service provider is allowed to take certain steps where there is a reduction in the available water supply as a result of climatic conditions or natural disasters. During these times the utility or service provider may "(a) ration supplies; (b) restrict hours of supply; (c) terminate supplies to non-essential users and non-essential uses; (d) levy additional consumption charges for non-essential water consumption to reduce water use; or (e) otherwise modify their normal operating procedures." Article 26(1). The Act requires that any modification of normal operating procedures under subsection (e) prioritize safeguarding public health, and secondarily prioritize maintaining commercial and industrial activities. Article 26(2).			
Penalizes non-compliance with effluent limitations The Environmental Management Act penalizes the discharge of pollution without a permit. Any person who discharges pollution without a license has committed an offense and may be fined no more than 700,000 "penalty units" and/or imprisoned for no more than seven years. EMA, Article 32(3). The court may also require the person to clean up the polluted environment and eliminate the effects of the pollution to the satisfaction of ZEMA as well as pay the full cost of cleaning the environment and removing the pollution. EMA, Article 32(4). The polluter may	X		

also be required to pay any costs incurred by third parties as a result of the pollution created by the polluter. EMA, Article 32(5). Any person who fails to report an unlawful discharge or who does not report their discharge levels as required may be fined no more than 300,000 penalty units and/or imprisoned for no more than three years. EMA, Article 35. Additional offenses and penalties are included at Article 117-123. The Director-General also has the authority to act. Where the Director-General has reasonable grounds to believe that a person is or will be conducting an activity that may result in an adverse impact on the environment (which could include contamination of water resources), they can serve a prevention order. EMA, Article 103. The prevention order can require a person to prepare an emergency response plan, have certain equipment, or to take any measures that are necessary to address or prevent an emergency. The Director-General can also issue compliance orders on licenses where they have reasonable grounds to believe that there has been a noncompliance. EMA, Article 106. The Director General can also be requested by a member of the public to issue an order. EMA, Article 108. A person can also request that the Director General investigate an alleged contravention of the act. EMA, Article 109. Furthermore, a person can sue for damages for an act or omission that represents a contravention of this Act whether or not that person has suffered or will suffer any loss or harm from the act or omission. EMA, Article 110. It would be important to see how frequently these citizen mechanisms have been used and followed through on. The Water Resources Management Act also prohibits water pollution. A person is prohibited from using water to dilute effluent. WRMA, Article 46(1). Someone who uses water to dilute effluent commits an offense and is subject to the general penalty at Article 172. WRMA, Article 46(3). Broadly, if a person discharges directly or through drainage any matter, or water with such matter, into a water resource and causes pollution of the water resource, or discharges into a water resource directly or through drainage any effluent or wastewater that is the result of the use of water for any purpose, the person commits an offense. WRMA, Article 48(1). That person is liable to pay a fine of no more than one hundred thousand penalty units and/or imprisonment for a period of no more than one year. Article 48. If a person is convicted but shows that “due care and all reasonable steps” were taken to prevent the discharge, then the court must take that into consideration when prescribing a sentence. Article 48(2). That same person can be ordered to take remedial action, reimburse the Authority for remedial action they’ve taken, and pay compensation for the damage caused. Article 48(3). There are also provisions that allow for people to appeal decisions made by the government when they feel those decisions have been made in error. The Water Supply and Sanitation Act allows any person who feels aggrieved by a decision issued by the Council or the Minister to appeal to the High Court within 45 days of receiving the decision. Article 36. Under the Environmental Management Act, any person aggrieved by a decision made by ZEMA may apply to the Board for a			

review of that decision. Article 112. It is important to have appeal processes to ensure fairness in the application of the law.			
Penalizes non-compliance with drinking water quality standards There is no requirement to put in place drinking water quality standards; therefore, there are no penalties for noncompliance.			X
Penalizes non-compliance with water use provisions A person who uses water from any water resource without a permit commits an offense and is subject to the general penalty under Article 172. WRMA, Article 163. Contravention of this provision can result in a fine of no more than 500,000 penalty units and/or imprisonment for no more than 5 years. Article 172. Persons are prohibited from drilling a borehole in a water shortage area without a permit. Those who do commit an offense and can be fined no more than 200,000 penalty units and/or be imprisoned for a period of no more than two years. WRMA, Article 53. If a person abstracts more water than the maximum rate fixed for a water shortage area, the person commits an offense and is subject to a fine of no more than 200,000 penalty units and/or imprisonment of no more than two years. Article 54(1), (10). Where a person does not keep a journal of their progress drilling a borehole or send a completion report to the Authority, a person can be fined no more than 50,000 penalty units. WRMA, Article 99(1), (5). A person who fails to notify the Authority of the location and details of their boreholes that existed at the time the Act was adopted can be fined no more than 50,000 penalty units. WRMA, Article 101(2). A person who (1) starts construction on a dam before an engineer has prepared certain documentation and the dam owner has submitted certain information to the Authority, or (2) fails to provide any additional information on the request of the Authority before dam construction begins, a small dam owner is subject to a fine of no more than 200,000 penalty units and/or imprisonment of no more than two years and a large dam owner is subject to a fine of no more than 300,000 penalty units and/or imprisonment of no more than three years. WRMA, Article 110. There are a variety of other penalties that apply to violations related to dams.	X		
Establishes a clear mandate within an institution for overseeing water and sanitation service provision, and for enforcing rules Under different laws, several institutions related to water are created with various, but often similar authorities. The Constitution states that water resources management is the exclusive function of the national government. Constitution,		X	

Annex A. Environmental management, nature conservation, and pollution control are concurrent national and provincial functions. Constitution, Annex B. Local governments are exclusively responsible for pollution control, stormwater management systems and water and sanitation services limited to potable water supply systems and domestic wastewater and sewage disposal systems. Constitution, Annex C. Broadly, the Ministry is authorized to make regulations to better carry out the provisions of the Water Supply and Sanitation Act. Article 39(1). The Water Supply and Sanitation Act establishes the National Water Supply and Sanitation Council (NWASCO). WSSA, Article 3. Broadly, NWASCO is required "to do all such things as are necessary to regulate the provision of water supply and sanitation services." WSSA, Article 4(1). Several specific functions are also listed. These specific functions include: providing advice to the national government on water supply and sanitation issues; providing advice to local governments on commercially viable institutional models; licensing utilities and other service providers; developing sector guidelines; establishing and enforcing standards for water supply and sanitation services and the design and operation of facilities; advising utilities on how to address consumer complaints; disseminating information to customers; and carrying out other activities that allow the Council to better perform its functions. WSSA, Article 4(2). The Council may require a utility to deliver its services in compliance with the Act or submit information to the Council that will allow the Council to monitor the performance of the utility. WSSA, Article 5. NWASCO is required to create a Technical Advisory Committee. The TAC is responsible for providing advice on the development of standards, policies, guidelines, and regulations in addition to any other matters. WSSA, Article 6. NWASCO is responsible for overseeing the issuance and enforcement of licenses. NWASCO is also responsible for reviewing applications for licenses to provide water supply and sanitation services within sixty days of receiving the application. WSSA, Article 13. Where the Council "is satisfied" that a utility or service provider is contravening or likely to contravene any article of the Act or a directive issued by the Council, the Council is required to issue an enforcement notice. WSSA, Article 20(1). The Council is also required to publish a copy of the notice in the Gazette and public media, and send a copy to the local government. WSSA, Article 20(3). The Council is also authorized to suspend or cancel any license where the license holder contravenes the Act or the terms and conditions of the license or fails to comply with an enforcement notice. WSSA, Article 21(1). Local governments are required to provide water supply and sanitation services to all localities within its jurisdiction. WSSA, Article 10(1). They are not required to provide such services where a person is already providing those services to themselves, where a person or service provider is already providing those services, or the local government is "unable, for whatever reason". WSSA, Article 10(2). Local authorities may, but are not required to make by-laws to ensure that the provision of water supply and sanitation services are in accordance with the Water Supply and Sanitation Act. WSSA, Article 39(2). The local authority is also			

responsible for ensuring enforcement of the bylaws issued. Article 39(1). Under the Public Health Act, local authorities are required to "take all lawful, necessary and reasonably practicable measures...for preventing the occurrence...or for remedying or causing to be remedied, any nuisance or condition liable to be injurious or dangerous to health." Article 65. Such nuisances include: any well or other source of water supply for public or private use that is used or is likely to be used for drinking or domestic purposes and is polluted or is otherwise likely to be dangerous to human health; any wastewater flowing or discharged into a public street, gutter, watercourse, or irrigation channel; and any dwelling that is not provided with or cannot be provided with a sanitary accommodation. Article 67(1)(d-e). The Act says that the nuisance must be stopped, but does not speak to how the underlying issue should be resolved long term. For example, if domestic wastewater is flowing into the street, then it is likely coming from a faulty sanitation facility or the complete lack of a sanitation facility. Therefore, the flow will not stop long term if the source of the issue is not fixed. Utilities and service providers who have been issued a license are required to: "(a) construct and maintain water supply services lines and where necessary...sewer systems to the boundary of a consumer's property, (b) operate in accordance with the plans submitted under...section twelve; (c) comply with the general directives issued by the Council…; (d) keep a record of its water or sanitation services in a form specified by the Council and submit the record to the Council every year from the commencement of the license; and (e) comply with any other condition which the Council shall consider relevant for the proper operation of the utility or service provider." WSSA, Article 16. Where a license holder cannot provide services in compliance with the terms of the license, the holder must notify the Council and surrender the license. WSSA, Article 17(2). Utilities and service providers must construct and maintain facilities within its service area to the boundary of the customer's property. WSSA, Article 30(1). Owners of the property to which facilities have been constructed are required to connect within a period of time set by the utility or service provider. WSSA, Article 30(2). Under the Environmental Management Act of 2011, the Environmental Council was renamed the Zambia Environmental Management Agency (ZEMA). EMA, Article 7. ZEMA is broadly required to ensure the sustainable development of natural resources, the protection of the environment, and the prevention and control of pollution. EMA, Article 9(1). Specifically, ZEMA is expected to develop and enforce measures aimed at preventing and controlling pollution, to develop standards and guidelines related to the protection of water and the prevention and control of pollution; research environmental management and the impact of climate change on human beings and the environment; and publicize information on the environment. EMA, Article 9(2). The Minister may but is not required to develop regulations on the advice of ZEMA, after ZEMA has consulted appropriate authorities. EMA, Article 43(1). This means that the Minister can issue regulations but only when ZEMA has provided advice. Regulations can be issued to prevent and control activities that result in			

adverse effects on the environment; require a class of persons to monitor discharges and keep records; create systems of integrated pollution prevention and control; set forth procedural and substantive requirements for license issuances; establish requirements; set standards and guidelines for preventing and controlling discharges into the environment and for activities which cause discharge; require and establish standards in relation to the use of any technology, procedure, equipment, or other method used in an activity or process that may result in the discharge of a pollutant; monitor discharges into the environment and monitor ambient environmental quality in areas surrounding discharges; report information related to discharges; establish a system to control discharges of pollutants or contaminants; and pay fees relates to the discharge of pollutants or contaminants. EMA, Article 43. Several items on this list are similar and overlap in meaning. Further, there is no direction provided in the law for how these regulations should be developed. Additionally, the Minister may issue regulations to more effectively administer strategic environmental assessments and environmental impact assessments. EMA, Article 30(1). While the Minister is not required to act, ZEMA is required under the law to develop several regulations. With respect to water, ZEMA is required to take several actions, including establishing water quality and pollution control standards; determine conditions for the discharge of effluent into water resources; formulate rules for protecting certain areas that may need special protection such as drinking water sources and recreational areas; carry out investigations of actual or suspected water pollution; determine the analytical methods by which water quality and pollution control standards can be determined; encourage international cooperation in the control of water pollution; and collect and interpret data on water quality and hydrology which is relevant to issuing permits. EMA, Article 48. Many of these standards would apply to wastewater treatment plants and non-sewered sanitation facilities. While this does require ZEMA to take several actions related to pollution control, the law does not create an analytical framework within which ZEMA should set these standards. For example, the law allows ZEMA to determine how water quality and pollution control standards should be set and then to set those standards. The law does not provide any basis upon or method by which those standards should be created. ZEMA may issue a waste management license, upon application, to allow the person to reclaim, reuse, recover or recycle waste; collect and dispose of waste from domestic or community activities; transport waste to a disposal site; own, construct or operate a waste disposal site; and transit, trade in or export waste. EMA, Article 55. Based on the construction of this sentence, it is not clear whether a person must apply for a license before managing waste. It simply states that the ZEMA has the authority to grant waste management licenses and *may* do certain things. The Minister is required to develop criteria for licensing people involved in waste management; the procedure for applying for a license and for issuing modifications, renewals, transfers, or revocations; the terms and conditions attaching to an application, issuance, modification, refusal, renewal, transfer, or revocation; and any other such matters. EMA, Article 55. The Minister, on the			

advice of ZEMA, can exempt certain categories of persons or wastes from the requirements of Article 55. EMA, Article 55(5). The law does not provide any restrictions on exemptions. The Environmental Management Act requires that local authorities collect and dispose of, or arrange for, all household waste in accordance with the Act as well as ensure that waste is collected, transported, and disposed of in accordance with the Act. EMA, Article 56. Because waste is defined as sludge, it is likely that this applies to household fecal waste and onsite/non-sewered sanitation management, but not explicitly clear. Persons are also responsible for reducing their impact on the environment. The Environmental Management Act requires persons whose activities generate waste and potentially pollute the environment to adopt measures that minimize waste through treatment, reclamation, reuse, recovery, and recycling. EMA, Article 58. It is unclear how this applies to fecal waste or gray water produced at the household level. The Water Resources Management Act establishes the Water Resources Management Authority (WRMA or the Authority) and other subnational bodies to help oversee the management of water resources. The Board, appointed by the Minister, is responsible for governing the Authority. WRMA, Article 11. The Board is responsible for appointing a Director-General who is the CEO of the Authority. WRMA, Article 15. The broad function of the Water Resources Management Authority is "to promote and adopt a dynamic, gender-sensitive, integrated, interactive, participatory and multisectoral approach to water resources management and development that includes human, land, environmental and socioeconomic considerations, especially poverty reduction and the elimination of water borne diseases, including malaria." WRMA, Article 8(1). More specifically, the Authority is tasked with identifying and protecting potential sources of freshwater supply; conserving and protecting the environment; taking into consideration climate change; planning for and ensuring the sustainable and rational use of water resources; "provide access to water resources of acceptable quantity and quality for various purposes;" sets standards and guidelines; establish and maintain and information system; advise the Minister; serve the role of a catchment council when the Minister has not formed one; set ambient water quality standards; monitor water resource quality; approve catchment management plans and subcatchment management plans; and ensure that there is no charge for using water for domestic and non-commercial purposes. WRMA, Article 8. While Article 8 lists things the Authority must do, Article 9 lists additional authorities that the Authority has and may exercise but is not required to. Article 30 also identifies requirements of the Board, including but not limited to ensuring the conservation and protection of the environment; taking into account the standards, regulations and guidelines issued under EMA and the Standards Act; and ensuring the public's right to access places of leisure, recreation and natural beauty related to water resources. WRMA, Article 30. The Authority is required to recommend ambient water quality standards to the Zambia Bureau of Standards			

and ensure the standards are "maintained." WRMA, Article 47(1). The Authority is also required to monitor for water resource quality and control water pollution of any water resource. WRMA, Article 47(2). The Authority is required to develop a national water resources strategy and plan. WRMA, Article 31. The strategy and plan are Gazetted by the Minister. WRMA, Article 31. The Ministry, the Authority and any appropriate authority must "take into account, and give effect to, the national water resources strategy and plan" when exercising their power or performing a function given to them under the Act. WRMA, Article 31. Therefore, it seems like this policy document is legally enforceable. The Authority has a significant role in managing water use. The Authority is required, "where appropriate," to identify the environmental flow of any water resource. WRMA, Article 43. The Authority is also required to specify the Reserve, by Gazette, for all or part of a water resource. WRMA, Article 44. The Authority is further required to develop water conservation management practices to "minimize waste of water, encourage sustainable and efficient use of water, and improve the quality of water." WRMA, Article 45(1). Any water user is required to comply with the water conservation management practices developed by the Authority. WRMA, Article 45(2). The Authority is required to protect groundwater by "(a) encouraging the development of sustainable practices that do not degrade groundwater; (b) specifying measures that are necessary to mitigate saline intrusion into aquifers; (c) preventing the pollution of aquifers through the regulation of toxic substances that permeate the ground; (d) recommending to the Minister the declaration of water resource protection areas around groundwater, re-charge areas and abstraction sources; and (e) promoting measures to improve the safety and integrity of boreholes." WRMA, Article 93. In addition to the Authority, there are catchment councils. The Minister constitutes a catchment council on the recommendation of the Authority. WRMA, Article 17. A catchment council has a variety of required obligations including sharing with the Director-General the license and permit recommendations made by the subcatchments; regulating and supervising the use of water; investigating and addressing water use disputes; preparing catchment management plans; harmonizing local management plans and subcatchment plans with catchment management plans; preparing catchment reports and regularly reporting to the Authority; taking appropriate actions in emergency situations; promoting gender mainstreaming in decision-making processes; undertaking catchment protection and resource quality monitoring and evaluation; proposing catchment management strategies to the Authority; monitoring implementation of international and regional agreements at the catchment level; performing the functions of a subcatchment council where one does not exist; collecting water use charges; and ensuring compliance with the Act. WRMA, Article 18, 32 (preparing catchment management plans). Where a subcatchment council is formed by the Minister under Article 19, they have a variety of required obligations listed under Article 20. The Minister may also form a water users			

association for a catchment. WRMA, Article 24. Once constituted, the water user association shall undertake activities that protect the catchment; monitor water quality; ensure water resources conservation; collect data to submit to the subcatchment council; promote community participation in management; investigate and address water use disputes; and propose local water management plans to the subcatchment council. WRMA, Article 25. The Minister also has responsibilities. The Minister is required to ensure the Authority equitably and efficiently allocates water resources; ensure that the Authority provides access to water resources of acceptable quality and quantity; ensure that the Authority puts in place adaptive measures for climate change; and mobilize resources for the management of water resources in the public interest. WRMA, Article 26. The Minister is also required to designate the six (6) catchments of Zambia. WRMA, Article 28. In overseeing the management of catchments, the Minister is required to identify what must be included within a catchment management plan. WRMA, Article 33. The Minister–on the recommendation of the Authority and catchment council–may prescribe certain rules to govern the decisions made in developing the catchment management plan. WRMA, Article 61(5). This includes prescribing what factors must be considered when determining the respective priority of different water uses, the approach to allocating water between users who have competing needs for water, any limitations on the volume of water that can be extracted for any category of use, the methods for allocating water, and the processes and procedures for classifying and allocating water in a subcatchment and under any water users associations. WRMA, Article 61(5). The Authority–in consultation with the catchment council, subcatchment council or water user association–can be required by the Minister to investigate certain uses or allocations of water and report back to the Minister. WRMA, Article 65(1)(a). The Authority can also on its own prerogative investigate uses or allocations, in consultation with permit holders, licensees, traditional authorities, catchment councils, subcatchment councils or water user associations. WRMA, Article 65(1)(b). Where the Board finds it is necessary to issue, cancel, or amend a permit or license, or take any other actions it sees are necessary, it can. WRMA, Article 65(2). The Minister may–on the recommendation of the Authority–(1) make regulations to limit or restrict the purpose or manner of the use of water, (2) prescribe the outcome for installing or operating any waterworks, (3) regulate the design, construction, installation, operation and maintenance of any waterwork, (4) regulate the roles and responsibilities of officers within the Authority, water users associations, appropriate authorities and any department or agency of the government responsible for water resources management and environmental protection, and (5) regulate or prohibit any activity in order to protect a water resource or riparian habitat. Article 68(1). These regulations can differentiate between different purposes for the use of water, different water resources, and different geographical areas. WRMA, Article 68(2). They can also create offenses and penalties. WRMA, Article 68(2).			

The Standards Act establishes the Zambia Bureau of Standards. Article 3. The Bureau is responsible for, amongst others, administering and maintaining standards, ensuring conformity with standards, providing a voluntary certification mark for the assurance of product conformity with standards, and providing information services to the public on standards. Standards Act, Article 5. Several authorities and responsibilities have been granted across different Acts and different agencies. Many of these authorities and responsibilities overlap. And, while institutions are created and given authorities, there are many instances in which those authorities can be voluntarily exercised. Furthermore, while the authority is given, the laws often provide no or limited guidance on how to exercise those authorities or meet their responsibilities.			

Examining whether national law supports the adoption and application of WASH standards.

The Standards Act of 2017 and the Compulsory Standards Act of 2017 were reviewed to determine the level of support provided at the national level for adopting and applying WASH standards. Below we examine: 1. the mandate of the Standards Body and the scope of authorities and responsibilities issued to them, 2. the process by which standards are developed and approved, and 3. the enforcement authority of the Standards Body and enforcement tools.

Standards body mandate	The **Zambia Bureau of Standards** was established under the repealed Standards Act of 1994, and was continued as an institution under the revised Standards Act of 2017. SA, Article 3. The functions of the Bureau include to develop, maintain, and withdraw Zambia National Standards; ensure conformity with standards; provide information to consumers where products do not conform with the standards; amongst others. SA, Article 5(1). The functions of the Board overseeing the Zambia Bureau of Standards include overseeing the implementation of the policy and functions of the Bureau, reviewing, and approving the policy and strategic plans of the Bureau, approving the annual budget, approving the methodology for the development and approval of Zambian National Standards, and monitoring and evaluating the performance of the Bureau against budgets and plans. SA, Article 7(2). The Board of the Zambia Bureau of Standards serves as the governing body of the Bureau. SA, Article 6. The Board is composed of: (a) a representative of the Ministry responsible for industry; (b) a representative of the Attorney General; (c) two persons representing manufacturers and chambers of commerce respectively; and (d) three persons with experience and knowledge in matters relevant to this Act. SA, Article 6(1). The Minister selects the Chair of the Board from the Board members who are not public officers. SA, Article 6(2). The Board is responsible for appointing the Executive Director of the Bureau. SA,

	Article 11. The Board may create committees to assist the Board in performing its functions. SA, Article 9 16(2)(a). The **Zambia Compulsory Standards Agency** is established under the Zambia Compulsory Standards Act of 2017. CSA, Article 1. The functions of the Compulsory Standards Agency include developing, maintaining and ensuring compliance with compulsory standards, conducting market surveillance, and educating the public on compulsory standards. CSA, Article 5(1). The functions of the Board of the Compulsory Standards Agency include overseeing the implementation of the policy and functions of the Agency, reviewing, and approving the policy and strategic plans of the Agency, approving the annual budget, approving the methodology for developing and approving compulsory Zambia National Standards, and monitoring and evaluating the performance of the Agency, amongst others. CSA, Article 7(2). The Board serves as the governing body of the Agency. CSA, Article 7. The Board is composed of: (a) a representative from the Ministry responsible for the industry, (b) a representative of the Attorney- General; and (c) five persons with experience and knowledge in matters relevant to this Act. CSA, Article 6(1). The Minister is required to ensure that 50% of each gender is represented on the Board, and that there is equitable representation of youth and persons with disabilities. CSA, Article 6(2). The Board appoints the Executive Director of the Agency. CSA, Article 8(1). The Board may also form committees to assist in performing its functions. CSA, First Schedule, Article 3(1). The Minister is required to appoint the Chair of the Board from members of the Board who are not public officers. CSA, Article 6(3). The Agency is required to establish an Inspectorate. CSA, Article 17(1). The Executive Director is responsible for appointing inspectors. CSA, Article 17(2).
Scope of authorities and responsibilities	Under the **Standards Act**, The Bureau is required to establish and maintain a system to develop and publish Zambian National Standards that conform with international norms and best practices. SA, Article 16(1). The Board is responsible for approving Zambian National Standards, which must comply with any international or regional trade agreements to which Zambia is a party. SA, Article 16(4). The Bureau must publish any Zambian National Standard in the Gazette. SA, Article 18(1). The Bureau also has the authority to develop and publish normative and informative documents that do not have the force of being a Zambian National Standard. SA, Article 17(1). Beyond setting standards, the Bureau has other authorities. With the approval of the Board, the Bureau may establish, maintain, and provide inspection services to the public and private sectors. SA, Article 22(1). The

	Board can also approve the Bureau to establish and maintain testing laboratories. SA, Article 23(1). The Board may convene an ad hoc Standards Consultative Forum when the need arises. SA, Article 12(1). The Forum shall "consider matters that promote consumer protection, industrial efficiency and development through standardisation," make recommendations to the Board, and recommend areas for legal reform taking into consideration international best practices. Article 12(2). The Minister also has authorities and responsibilities under the Standards Act. Following the recommendation of the Board, the Minister may, using a statutory instrument, establish product certification schemes to be administered by the Bureau and declare a mark to be a certification for the purposes of certifying that the product conforms with a declared standard. SA, Article 24(1). The Minister may also establish a system certification scheme that is administered by the Bureau and declare a mark to be a certification for the purposes of certifying that the product conforms with a declared standard. SA, Article 25(1). Under the **Compulsory Standards Act**, the Minister may, on the recommendation of the Board, "where it is necessary or expedient to do so in respect of a commodity or service to promote public safety, health, consumer protection or environmental protection," declare a Zambian National Standard or a part of such a standard as compulsory, publish a specification or code of practice with respect to an export commodity, declare any specification or code of practice related to an export commodity as a compulsory standard or withdraw a standard. CSA, Article 11(1). The Minister may, on the recommendation of the Board, declare a mark described in a compulsory standard to be a distinctive mark to be used to mark specified commodities. CSA, Article 12(1). The Minister also has the authority to adopt an emergency compulsory standard when there is a direct and immediate threat to the environment or human or animal life or health. CSA, Article 14(1). The declaration of an emergency compulsory standard cannot exceed one year. CSA, Article 14(3). The Board may convene an ad hoc Consultative Forum when the need arises. CSA, Article 10(1). The Consultative Forum considers matters related to compulsory standards, offers recommendations to the Board, and suggests areas for legal reform. CSA, Article 10(2).
Process by which standards are developed and adopted	Under the Standards Act, the Bureau is required to develop and maintain a standard that sets forth the process for setting, amending, and approving a Zambian National Standard. SA, Article 16(3).
Enforcement	Under the Standards Act, all persons are prohibited from declaring that their product conforms with a Zambian National Standard unless it is true. SA, Article 21(1). Persons are also prohibited from applying a certification

	mark to a product that does not comply with the standard, except if it has written authority from the Bureau. SA, Article 24(3). Under the Compulsory Standards Act, a supplier planning to introduce a product or service into the Zambian market that is governed by a compulsory standard is required to apply to the Agency for certification of the product or standard. CSA, Article 13(1). All persons are prohibited from importing, manufacturing, selling, marketing, advertising, offering for hire or supplying a product or service that is subject to a compulsory standard but does not comply with the compulsory standard, does not have the required distinctive mark, or is not certified as required under Article 13. CSA, Article 15(1). Service providers and manufacturers are prohibited from providing products or services that contravene a compulsory standard. CSA, Article 16(1). Under the Compulsory Standards Act, when the Executive Director of the Bureau suspects that a product or a batch of a product does not comply with a compulsory standard or has not been manufactured in line with the compulsory standard, the Executive Director may require the person in possession or control of the commodity to keep the product within their control until it is modified in line with the standard. Article 16(2). If the Agency determines that the product does not comply with the standard, the ED can require the importer to return the product to where it came from, can require the product be confiscated or destroyed, or can require the product to be dealt with in a manner prescribed by the ED. CSA, Article 16(4). If the Executive Director suspects that a service does not comply with the standard, the Executive Director can, in writing, require the person providing the service to stop until it complies with the standard. CSA, Article 16(3). If the Agency determines that the service does not comply, the ED can require the service provider to stop providing the service until the service provider complies with the standard. CSA, Article 16(5). Contraventions of these requirements come with a penalty of no more than 300,000 penalty units and/or a prison term of no more than three years. CSA, Article 16(6). Additional penalties and offenses are included within Part V of the Act (Articles 21-28).

ANNEX II: COUNTRY LEVEL STANDARDS ANALYSIS

CWSC and IAPMO reviewed the standards catalogues for each Standards Body located in Ghana, Uganda, and Zambia to identify standards that have been adopted related to (1) plumbing fittings and fixtures, (2) piping, and (3) water quality and water treatment technologies.

Ghana Technical Regulations: Plumbing Fittings and Fixtures

No technical regulations for plumbing fittings and fixtures have been adopted.

Ghana Technical Regulations: Piping

National regulation reference number	National regulation title	Year adopted	Status
GS 831	Plastics - Pipes and Fittings made of Modified Unplasticized Polyvinyl Chloride (PVC-M) for Water Supply	2018	Voluntary
GS ASME B16.1	Gray Iron Pipe Flanges and Flanged Fittings	2017	Voluntary
GS ASME B16.9	Factory Made Wrought Buttwelding Fittings	2017	Voluntary
GS ASME B16.11	Forged Fittings, Socket-Welding and Threaded	2017	Voluntary
GS ASME B16.24	Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves	2017	Voluntary
GS ASME B16.42	Ductile Iron Pipe Flanges and Flanged Fittings	2017	Voluntary
GS ISO 49	Malleable Cast Iron Fittings Threaded	1994	Voluntary
GS ISO 580	Plastics Piping and Ducting Systems	2006	Voluntary
GS ISO 727-1	Fittings made from Unplasticized Poly(Vinyl Chloride) (PVC-U)	2006	Voluntary
GS ISO 727-2	Fittings made from Unplasticized Poly(vinyl Chloride) (PVC-U)	2006	Voluntary
GS ISO 1167-1	Thermoplastics Pipes, Fittings and Assemblies for the Conveyance of Fluids	2006	Voluntary
GS ISO 1167-2	Thermoplastics Pipes, Fittings and Assemblies for the Conveyance of Fluids	2006	Voluntary
GS ISO 1452-3	Plastics Piping Systems for Water Supply and for buried and Above- Ground Drainage and Sewerage under Pressure	2015	Voluntary
GS ISO 2531	Ductile Iron Pipes, Fittings, Accessories and Their Joints for Water or Gas Applications	2017	Voluntary
GS ISO 3419	Non-alloy and Alloy Steel Butt-welding Fittings	2006	Voluntary
GS ISO 3545-3	Steel Tubes and Fittings - Symbols for use in Specifications	2006	Voluntary
GS ISO 4132	Unplasticized Polyvinyl Chloride (PVC) and Metal Adaptor Fittings for Pipes under Pressure	2006	Voluntary
GS ISO 4144	Pipework - Stainless Steel Fittings Threaded	2006	Voluntary
GS ISO 4145	Non-alloy Steel Fittings Threaded to IS0 7/1	2006	Voluntary

GS ISO 5251	Stainless Steel Butt-welding Fittings	2006	Voluntary
GS ISO 5256	Steel Pipes and Fittings for Buried or Submerged Pipelines -External and Internal Coating by Bitumen or Coal Tar derived Materials	2006	Voluntary
GS ISO 6761	Steel Tubes - Preparation of Ends of Tubes and Fittings for Welding	2006	Voluntary
GS ISO 9808	Solar Water Heaters - Elastomeric Materials for Absorbers, Connecting Pipes and Fittings - Method of Assessment	2007	Voluntary
GS ASME B36	Welded and Seamless Wrought Steel Pipe	2017	Voluntary
GS ISO 7-2	Pipe Threads where Pressure-Tight Joints are made on the Threads	2006	Voluntary
GS ISO 580	Plastics Piping and Ducting Systems - Injection-moulded Thermoplastics Fittings	2006	Voluntary
GS ISO 1452-1, 1452-2, 1452-4, 1452-5	Plastics Piping Systems for Water Supply and for buried and Above- Ground Drainage and Sewerage under Pressure - Unplasticized Poly (Vinyl Chloride) (PVC-U)	2009	Voluntary
GS ISO 7268	Pipe Components - Definition of Nominal Pressure	2006	Voluntary
GS ISO 9080	Plastics Piping and Ducting Systems - Determination of the Long-Term Hydrostatic Strength of Thermoplastic Materials in Pine form by Extrapolation	2014	Voluntary

Ghana Technical Regulations: Water Quality & Water Treatment Technologies

National regulation reference number	National regulation title	Year adopted	Status
GS 786	Code of Hygienic Practices for the Collection, Processing and Marketing of Potable Water	2017	Voluntary
GS 175	Water Quality- Specification for Drinking Water	2017	Voluntary

Uganda Technical Regulations: Plumbing Fittings and Fixtures

National regulation reference number	National regulation title	Year adopted	Status
US EAS 1017-2	Sanitary appliances (vitreous china): wash down water closet pan	2021	Compulsory
US EAS 1017-5	Sanitary appliances (vitreous china): urinal	2021	Compulsory
US EAS 1017-6	Sanitary appliances (vitreous china): flushing cistern	2021	Compulsory

US 403	Standard specification for deep well CBMS hand pump (model U3)	1995	Compulsory
US 404	Standard specification for Extra deepwell CBMS handpumps	1995	Compulsory
US 405	Standard specification for shallow well handpumps (model U2/U3)	1995	Compulsory
US 406	Standard specification for deep well hand pump (model U2)	1996	Compulsory
US ISO 30500	Non-sewered sanitation systems — Prefabricated integrated treatment units	2018	Compulsory
US ISO 31800	Faecal sludge treatment units — Energy independent, prefabricated, community-scale, resource recovery units	2020	Voluntary

Uganda Technical Regulations: Piping

National regulation reference number	National regulation title	Year adopted	Status
US EAS 426-1	Concrete pipes and ancillary concrete products	2006	Voluntary
US EAS 426-4	Concrete pipes and ancillary concrete products	2006	Voluntary
US EAS 426-5	Precast concrete pipes and ancillary concrete products	2006	Voluntary
US EAS 426-6	Precast concrete pipes, fittings, and ancillary products	2006	Voluntary
US ISO 1452-3	Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure	2009	Compulsory
US ISO 4064-1, 4064-2, 4064-3, 4064-4, 4064-5	Water meters for cold potable water and hot water installation	2014	Voluntary
US ISO 4427-3	Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE)	2019	Compulsory
US ISO 15874-3	Plastics piping systems for hot and cold water installations — Polypropylene (PP)	2013	Voluntary
US 927	Polyethylene/aluminium/ polyethylene (PE-AL-PE) and polyethyleneRT/aluminium/ polyethylene-RT (PERT-AL-PERT) composite pressure pipes	2011	Compulsory
US ISO 1452-1, 1452-2, 1452-5	Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure	2009	Compulsory
US ISO 4427-1, 4427-2, 4427-5	Plastics piping systems for water supply and for drainage and sewerage under pressure — Polyethylene (PE)	2019	Compulsory

US ISO 15874-1, 15874-2, 15874-5	Plastics piping systems for hot and cold water installations — Polypropylene (PP)	2013	Voluntary
US ISO/TS 15874-7	Plastics piping systems for hot and cold water installations — Polypropylene (PP)	2018	Voluntary
US ISO/TS 15875-7	Plastics piping systems for hot and cold water installations — Cross-linked polyethylene (PE-X)	2018	Voluntary
US ISO/TS 22391-7	Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT)	2018	Voluntary

Uganda Technical Regulations: Water Quality & Water Treatment Technologies

National regulation reference number	National regulation title	Year adopted	Status
US ISO 6461-2	Water quality — Detection and enumeration of the spores of sulfite-reducing anaerobes (clostridia) — Part 2: Method by membrane filtration	1986	Voluntary
US ISO 7899-2	Water quality — Detection and enumeration of intestinal enterococci — Part 2: Membrane filtration method	2000	Voluntary
US ISO 10530	Water quality — Determination of dissolved sulfide — Photometric method using methylene blue	1992	Voluntary
US ISO 16266	Water quality — Detection and enumeration of Pseudomonas aeruginosa — Part 2: Membrane filtration method	2006	Voluntary
US 925	Chemicals used for treatment of water intended for human use — Sodium hypochlorite — Specification	2021	Compulsory
US 926	Chemicals used for treatment of water intended for human use — Polyamines — Specification	2021	Compulsory
US ISO 10634	Water quality — Guidance for the preparation and treatment of poorly water-soluble organic compounds for the subsequent evaluation of their biodegradability in an aqueous medium	2018	Voluntary
US ISO 24516-1	Guidelines for the management of assets of water supply and wastewater systems	2016	Voluntary
US EAS 12	Potable water — Specification This Uganda Standard specifies requirements and methods of sampling and test for potable water	2014	Voluntary
US ISO 7875-1	Water quality — Determination of surfactants	1996	Voluntary
US ISO 7887	Examination and determination of colour	2011	Voluntary
US ISO 9696	Water quality — Gross alpha activity	2017	Voluntary

US ISO 10566	Determination of aluminium — Spectrometric method using pyrocatechol violet	1994	Voluntary
US ISO 20426	Guidelines for health risk assessment and management for non-potable water reuse	2018	Voluntary

Zambia Technical Regulations: Plumbing Fittings and Fixtures

National regulation reference number	National regulation title	Year adopted	Status
ZS ISO 3055	Kitchen equipment:- Coordinating sizes	1985	Voluntary
ZS ISO 30500	Non-sewered sanitation systems – Prefabricated integrated treatment units	2018	Voluntary
ZS EN 1254	Copper and copper alloys. Plumbing fittings.		Voluntary

Zambia Technical Regulations: Piping

National regulation reference number	National regulation title	Year adopted	Status
ZS ISO 15874-3	Plastic piping systems for hot and cold water installations – polypropylene (PP)	2013	Voluntary
ZS ISO 15875-3	Plastic piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X)	2003	Voluntary
ZS ISO 15877-3	Plastic piping systems for hot and cold water installations – Chlorinated poly (vinyl chloride) (PVC-C)	2009	Voluntary
ZS ISO 21003-3	Multilayer piping systems for hot and cold water installations inside buildings	2008	Voluntary
ZS ISO 22391-3	Plastic piping systems for hot and cold water installations – polyethylene of raised temperature resistance (PE-RT)	2009	Voluntary
ZS ISO 10508	Plastic piping systems for hot and cold water installations – Guidance for classification and design	2006	Voluntary
ZS ISO 15874-1	Plastic piping systems for hot and cold water installations – polypropylene (PP)	2013	Voluntary
ZS ISO 15874-2	Plastic piping systems for hot and cold water installations – polypropylene (PP)	2013	Voluntary
ZS ISO 15874-5	Plastic piping systems for hot and cold water installations – polypropylene (PP)	2013	Voluntary
ZS ISO/TS 15874-7	Plastic piping systems for hot and cold water installations – polypropylene (PP)	2018	Voluntary
ZS ISO 15875-1	Plastic piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X)	2013	Voluntary

ZS ISO 15875-2	Plastic piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X)	2003	Voluntary
ZS ISO 15875-5	Plastic piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X)	2003	Voluntary
ZS ISO 15876-1	Plastic piping systems for hot and cold water installations – Polybutylene (PB)	2017	Voluntary
ZS ISO 15876-2	Plastic piping systems for hot and cold water installations – Polybutylene (PB)	2017	Voluntary
ZS ISO 15876-5	Plastic piping systems for hot and cold water installations – Polybutylene (PB)	2017	Voluntary
ZS ISO/TS 15876-7	Plastic piping systems for hot and cold water installations – Polybutylene (PB)	2018	Voluntary
ZS ISO 15877-1	Plastic piping systems for hot and cold water installations – Chlorinated poly (vinyl chloride) (PVC-C)	2009	Voluntary
ZS ISO 15877-2	Pipes Plastic piping systems for hot and cold water installations – Chlorinated poly (vinyl chloride) (PVC-C)	2009	Voluntary
ZS ISO 15877-5	Plastic piping systems for hot and cold water installations – Chlorinated poly (vinyl chloride) (PVC-C)	2009	Voluntary
ZS ISO/TS 15877-7	Plastic piping systems for hot and cold water installations – Chlorinated poly (vinyl chloride) (PVC-C)	2018	Voluntary
ZS EN 1057	Copper and copper alloys-seamless, round copper tubes		Voluntary

Zambia Technical Regulations: Water Quality & Water Treatment Technologies

National regulation reference number	National regulation title	Year adopted	Status
ZS 748; Part 1	Chemicals Used for Treatment of Water Intended for Human Consumption	2012	Voluntary
ZS 748; Part 2	Chemicals used for Treatment of Water Intended for Human Consumption	2012	Voluntary
ZS 748; Part 3	Chemicals used for Treatment of Water Intended for Human Consumption	2012	Voluntary
ZS 748; Part 4	Chemicals used for Treatment of Water Intended for Human Consumption	2012	Voluntary
ZS 1136	Sodium Hypochlorite Solutions	2018	Voluntary
ZS ISO 11923	Water quality — Determination of suspended solids by filtration through glass-fibre filters	1997	Voluntary
ZS 312; Part 7	Water Quality – Test methods	2006	Voluntary

ZS ASTM D4188	Practice for Performing Pressure In-Line Coagulation-Flocculation-Filtration Test in Water		Voluntary