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COMMUNICATIONS STRATEGY FOR INTEGRATED WATER AND WASTEWATER MANAGEMENT (IWWM) IN BARBADOS

ALL IS WATER!

THE INTEGRATED WATER AND WASTEWATER MANAGEMENT COMMUNICATIONS CAMPAIGN

Prepared by:
PRMR Inc.

The *Communications Strategy for Integrated Water and Wastewater Management (IWWM) in Barbados* was spearheaded by the Environmental Protection Department, Ministry of Environement and National Beutification and financed by The Global Environment Facility (GEF) under the GEF CReW+ Project.

The GEF CReW+ is a partnership project funded by the Global Environment Facility (GEF) that is being co-implemented by the Inter-American Development Bank (IDB) and the United Nations Environment Programme (UNEP) in 18 countries of the Wider Caribbean Region (WCR).

This project builds upon its previous successful phase "The Caribbean Regional Fund for Wastewater Management (CReW)" project (2011-2017). CReW+ is being executed by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, the Organisation of the American States (OAS) and the Secretariat of the Cartagena Convention (CAR/RCU) on behalf of the IDB and UNEP respectively.

The 18 participating CReW+ countries (Barbados, Belize, Colombia, Costa Rica, Cuba, Dominican Republic, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Saint Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago) vary geographically from large, continental countries to small island states, with significantly different political, linguistic and cultural contexts.

About the GEF: The Global Environment Facility (GEF) has provided $22 million in grants and blended finance and mobilised nearly $120 billion in co-financing for more than 5,200 projects and programmes. The GEF is the largest trust fund focused on enabling developing countries to invest in nature and supports the implementation of international conventions on biodiversity, climate change, chemicals and deserti_cation. It brings together 184 governments, plus civil society, international organisations, the private sector and partners.

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BACKGROUND

The communications plan herein was created in response to a call for the development of a national communications strategy (and associated implementation plan) for integrated water and wastewater management in Barbados by the general secretary of the Organization of American States (OAS) in 2022.

The OAS's Water Program supports member states in their efforts to improve the management, conservation, and sustainable use of both surface and groundwater resources by promoting social and economic growth in these regions. Specific actions include the promotion of water governance; assistance in developing policies, laws, and regulations for integrated water resources management; capacity building in regional, national, and local institutions; and the support of the exchange of information through specialized networks in water resources.

To achieve its mission, the OAS has implemented projects such as CReW+, in which the objective is "to implement innovative technical small-scale solutions in the Wider Caribbean Region using an integrated water and wastewater management approach building on sustainable financing mechanisms piloted through the Caribbean Regional Fund for Wastewater Management." The GEF CReW+ project serves as a catalyst to implement the development of a holistic national communications strategy and associated implementation plan, a requirement of the National Water Reuse Policy, which aligns with Component 4 of GEF CReW+ within the broader national context of the Roof to Reefs Project.

The objectives of GEF CReW+ are also consistent with two approved national policies of the Government of Barbados - the 2020 Water Protection and Land Use Zoning Policy, the National Water Reuse Policy 2018, and the Water Reuse Act May 2023. The development of a national communications strategy (and associated implementation plan) for integrated water and wastewater management in Barbados called for a team with expert knowledge in water policy, project management, and, most of all, applied communications.

PRMR Inc., a public relations agency in Bridgetown, Barbados, with years of experience in applied communications, undertook the plan's development with the support of two experts in water resource management and policy.

INTEGRATED WATER RESOURCE MANAGEMENT

According to Biswas (2008), the most quoted definition of integrated water resource management (IWRM) was formulated by the Global Water Partnership (GWP, 2000), which started to champion integrated water resources management as a major component of its technical program shortly after its inception. The GWP defined IWRM as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." [1]

IWRM, therefore, involves considering the entire water cycle, including surface water, groundwater, and their interactions as well as the social, economic, and environmental aspects associated with water management. It aims to optimize the use and allocation of water resources by considering the needs of various sectors, such as domestic, agricultural, industrial, and environmental, and the long-term sustainability of water availability and quality. It recognizes that water resources are interconnected and finite and require coordinated and integrated planning, policy development, and decision-making. [2]

Key Principles of IWRM

1. *Integrated Approach:* IWRM emphasizes the interconnectedness of water resources, ecosystems, and human activities. It promotes the integration of water management across sectors and levels of governance to achieve sustainable outcomes.
2. *Stakeholder Participation:* Effective IWRM involves engaging all relevant stakeholders, including government agencies, communities, industries, nongovernmental organizations, and indigenous groups. It recognizes the importance of their knowledge, values, and perspectives in decision-making processes.
3. *Sustainability:* IWRM seeks to balance the social, economic, and environmental dimensions of water management to ensure the long-term sustainability of water resources. It aims to meet current water needs without compromising the ability of future generations to meet their own needs.
4. *Adaptive Management:* IWRM recognizes the dynamic nature of water resources and the need to adapt to changing conditions, including climate change, population growth, and environmental degradation. It promotes flexible and adaptive management approaches that can respond to uncertainties and evolving challenges.

[1]. Asit K. Biswas. "Integrated Water Resources Management: Is It Working?" International Journal of Water Resources Development 24, no. 1 (2008): 5–22.

[2]. Saravanan Subramanian, Geoffrey T. McDonald, and Peter Paul Mollinga. "Critical Review of Integrated Water Resources Management: Moving Beyond Polarized Discourse." Natural Resources Forum 33, no. 1 (February 2009): 76–86).

5. *Water Governance:* IWRM emphasizes effective governance structures and mechanisms that promote transparency, accountability, and coordination among different stakeholders and institutions involved in water management. It encourages the development of policies, regulations, and institutional frameworks that support integrated decision-making and collaboration.
6. *Data and Information Management:* IWRM relies on accurate and timely data collection, monitoring, and analysis to inform decision-making processes. It emphasizes the importance of data sharing, information dissemination, and knowledge exchange to support evidence-based water management.
7. *Ecosystem Protection:* IWRM recognizes the intrinsic value of ecosystems and their role in supporting water resources. It promotes the conservation and sustainable use of water-related ecosystems, such as wetlands, rivers, and aquifers, to maintain their ecological functions and services.

BARBADOS WATER REUSE POLICY & WATER REUSE ACT

The use of reclaimed water from wastewater treatment plants has become increasingly important in sustainable water management practices. The National Water Reuse Policy 2018, developed by the Government of Barbados, was a crucial step towards ensuring the treatment of all wastewater discharges in the country. The Physical Development Plan and the Water Protection and Land Use Zoning Policy support this policy. To further support this policy, focus has been placed on increasing awareness and understanding of IWWM and its significance among the population.

One recommendation of the Policy was to establish a Water Reuse Act and accompanying regulations. Therefore, the Water Reuse Act 2023 provides an overview of the various uses of reclaimed water, regulatory requirements, the issuance of warnings, the revocation and suspension of licenses, and the amendment of permits in the context of wastewater treatment. These legislative requirements aim to ensure the safe and responsible use of reclaimed water, promoting environmental conservation and public health. Specific information from the Act will be used in the messaging.

Uses of Reclaimed Water

Reclaimed water derived from wastewater treatment plants can serve diverse purposes across different sectors, finding application in domestic, commercial, agricultural, industrial, and public settings. For domestic use, reclaimed water is suitable for flushing water closets, maintaining household gardens, and cleaning outdoor surfaces. Commercially, it can be used for cleaning outdoor areas, flushing water closets, and irrigating ornamental plants or trees. In the agricultural sector, reclaimed water is valuable for the irrigation of edible crops, ornamental plants, and trees, as well as for cleaning outdoor surfaces and animal holding areas. Industries can employ this water for equipment cooling, flushing water closets, and irrigating green spaces in industrial zones. Moreover, reclaimed water can contribute to public purposes such as watering plants or trees in public areas, recharging groundwater, and filling surface ponds or lakes.

Water Reuse Committee

A Water Reuse Committee will assist with the administration of the Act. This Committee is responsible for making recommendations to the Minister of Health on applications for wastewater treatment permits; determining the suitability of premises for wastewater treatment plants to produce reclaimed water; monitoring that each permit holder is compliant with the Act; investigating complaints against permit holders; and recommending suspension or revocation of permits where appropriate.

[3] *Barbados Water Reuse Act 2023*

Purchase and Registration

To ensure the safe and regulated usage of reclaimed water, individuals must procure it from a licensed wastewater treatment permit holder. Sellers of reclaimed water are required to maintain a comprehensive register of purchasers. This register should include essential information such as the name, address, and contact details of the buyer along with the intended use and volume of reclaimed water purchased. Additionally, the register must record the date of purchase and any other information as mandated by the relevant regulatory authorities. Inspectors may access and make copies of this register to enforce compliance with regulations.

Wastewater Register

To facilitate effective monitoring and management, the Minister of Health maintains a "Wastewater Register" containing crucial details regarding individuals granted wastewater treatment permits. It includes information such as the permit holder's name, address, and contact number as well as the permit number, issuance and expiration dates, and pertinent company details. It also specifies any periods of permit suspension or revocation. The Minister is responsible for publishing an annual list of permit holders and their registered business addresses in the Official Gazette, promoting transparency and accountability.

Warning Letters

When inspections reveal areas of concern previously brought to a permit holder's attention, the Minister, on recommendation of the Committee, has the authority to issue written warnings. These letters communicate the specific areas of concern, outline previous requests for rectification, and clearly state the necessary steps and specific time frame for compliance. The letters also indicate the number of previous requests sent to the permit holder and the potential consequences of noncompliance, such as suspension or cancellation of the permit. Permit holders who promptly address the identified concerns can request re-inspection subject to an additional fee.

Revocation and Suspension of Licenses

In cases of noncompliance with regulations, conviction of offenses, threats to health or safety, unauthorized alterations, or refusal to permit inspections, the Minister, on recommendation of the Committee, holds the power to suspend or revoke a wastewater treatment permit. Prior to taking such action, the minister must issue a written notice to the permit holder stating the reason for suspension or revocation. The permit holder is given an opportunity to present reasons why the permit should not be suspended or revoked. Failure to provide a suitable explanation within the stipulated time period may result in the revocation or suspension of the permit. The Minister is then responsible for publishing the details of the suspension or revocation in the Official Gazette. Violations of the prohibition during suspension or revocation can lead to legal consequences, including fines or imprisonment.

Amendment of Permits

In certain situations, the Minister may need to amend a wastewater treatment permit. Amendments may be necessary due to changes in business or personal information, such as alterations in the address, company name, or registered business name. Additionally, the terms and conditions of the permit may require modification. The Minister has the authority to request relevant information or documents to confirm the proposed changes. However, before amending a permit, the Minister must provide the permit holder with written notice explaining the intended action and providing an opportunity to make representations regarding the proposed amendments.

Display of Permits

To enhance transparency and ease of inspection, permit holders are encouraged to display a copy of their wastewater treatment permit at their business premises. If the permit is not displayed, it should be readily available for inspection upon request. Furthermore, the Minister is responsible for publishing an annual list of permit holders in the Official Gazette by the designated date, ensuring public access to information regarding wastewater treatment permits.

NATIONAL BUILDING CODE

BNS CP 16: Part 1, National Building Code Part 1 Plumbing and BNS 256: 2011 Identification of the content of pipelines, piping duct and conduits specification present a comprehensive set of standards designed to safeguard and differential potable (drinkable) and non-potable (non-drinkable) water systems. These standards are focused on minimizing risks of contamination and ensuring the safety and reliability of the water supply and are therefore important in the promotion of safe reclaimed water usage.

2020 WATER PROTECTION AND LAND USE ZONING POLICY

For the past half-century, Barbados has attempted to control groundwater quality (the source of our drinking water) by dividing the island into five zones, heavily restricting activity in Zone 1 around the public supply wells (PSW) with fewer restrictions in zones further away from the PSWs and hence closer to the coast. This narrowly focused approach:

- failed to provide any protection to coastal waters from land-based sources of marine pollution;
- relied solely on a predicted minimum travel time to control biological contamination of the groundwater close to the PSWs in geology that is heterogenous and likely to have unpredictable conduit flow; and
- was ineffective in controlling chemical contamination of the groundwater.

The new Water Protection and Land Use Zoning Policy adopts an integrated approach to water resource management because the whole of Barbados can be regarded as a coastal zone with direct hydraulic connectivity between the freshwater aquifers and the near shore, implying that any water and associated contaminants that soak into the ground eventually reach the sea. [4]

This new policy direction for water protection and land use emphasizes the importance of protecting both drinking water quality and the coastal zone, recognizing that surface runoff and groundwater eventually reaches the coast, carrying potential contaminants. The following are the key elements of the policy:

- Maximizing economic value: The policy aims to maximize the economic value of land and water resources while ensuring that access to freshwater is not a constraint to national development.
- Prevention over cure: The focus is on preventing pollution from entering groundwater by imposing restrictions on population encroachment in vulnerable areas and hazardous chemical usage, rather than relying solely on treatment plants after pollution has taken place.
- Integrated and synergistic approaches: The policy seeks to address all major sources of water pollution (agricultural, industrial, domestic) using appropriate means, including legal, institutional, technical, economic, and social measures.
- Polluter pays principle: Legal and economic instruments should be used to hold polluters responsible for the costs of treatment/remediation, but some costs should be borne nationally because of the benefits of the supply source environment and its ecosystems.
- Informed decision-making: Policymakers should be provided with the best available data on freshwater and coastal water quality, stormwater and wastewater flow, enforcement and compliance, and economics.

[4] *Green Paper on the 2020 Water Protection and Land Use Zoning Policy*

- Avoiding conflicts of interest: Regulatory and operational responsibilities should be separated, and collaboration and partnerships among agencies should be promoted for sustainable water management.
- Water fitness for purpose: Water uses should be categorized, and appropriate water quality standards should be created or legislated for each category of end use.

Scientific/Technical Guidance

- Treating the whole of Barbados as a coastal zone: Persistent contaminants released on land or into the ground are likely to reach the coast, so all waters (fresh, brackish, saline) should be protected.
- Using travel time for groundwater protection: Predictable travel times are effective against biological pathogens but ineffective against persistent chemicals.
- Increased abstraction rates and nitrogen contamination: Abstraction rates impact travel time, and nitrogen from agriculture and sewage is a primary concern for groundwater and coastal waters.
- Wastewater treatment challenges: Conventional sewage treatment does not sufficiently remove nitrogen and complex persistent organic chemicals. There should be further research to identify low-cost wastewater treatment solutions.
- Encroachment and housing density: Existing encroachment in Zone 1 areas should not be expanded, and new developments may require mandatory sewerage systems beyond a certain threshold density.

Summary

The policy envisions an integrated knowledge-based system that ensures a safe, affordable, and abundant potable water supply while protecting marine resources and ecosystems. The aim is to protect public supply wells and coastal waters through legislative, technical, economic, and social interventions. The policy objectives include preventing water contamination, using cost-effective treatment technologies, and providing policymakers with sufficient information for evidence-based decision-making.

Overall, the proposed policy aims to safeguard water resources, prevent pollution, and promote sustainable water management practices to ensure the long-term availability and quality of water for various sectors and the protection of coastal ecosystems.

COMMUNICATIONS NEEDS ASSESSMENT

The strategic communications plan was developed from desk research of documents provided by the Environmental Protection Department, including Barbados' Water Protection and Land Use Zoning Policy, the Water Reuse Policy, the Water Reuse Act and the findings of a communication needs assessment conducted by **PRMR Inc.** The objective of the assessment was to identify the knowledge, attitudes, and practices (KAP) of persons and resulting information gaps regarding wastewater to inform communication strategies. The assessment included a KAP survey and a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis among key stakeholders, and a KAP survey of the public.

SYNOPSIS OF KEY STAKEHOLDERS' KAP FINDINGS

KNOWLEDGE AND AWARENESS

Respondents generally understand the importance of wastewater management and its impact on the environment and public health. Given the nature of these audience members, it was no surprise that their workplace is the primary source of information about wastewater management, which is one of the greatest differences between this group and the public.

ATTITUDES AND PERCEPTIONS

The majority of respondents believe wastewater management is important for households and that proper wastewater management is important for good health. There is also a strong belief that both the government and individuals share the responsibility of managing wastewater. The respondents are annoyed when wastewater is discharged directly into the environment.

PRACTICES

A significant percentage of respondents dispose of household wastewater through a suck well or septic tank, indicating limited reuse or treatment. Reuse of domestic wastewater is low, with the majority not reusing it at all. It was revealed that there is a need for awareness building, education, and new policies to encourage more householders to recycle water.

CONCERNS AND CHALLENGES

Respondents expressed concerns about the adequacy of wastewater management policies and access to services. Respondents mentioned diseases related to improper wastewater management, such as diarrhea, skin diseases, intestinal parasites, and dysentery, as significant concerns.

SYNOPSIS OF THE FINDINGS OF THE SWOT ANALYSIS

COMMUNICATION CAPABILITIES

STRENGTHS

Communication capabilities were frequently cited as a strength. Some organizations have public and community engagement practices in place, such as the Barbados Water Authority and Solid Waste Management Programme. Several organizations maintain websites that can be used for communication purposes.

WEAKNESSES

Communication capabilities were occasionally cited as a weakness. Many organizations acknowledged the need for improvement in their communication capabilities. The lack of permanent staff in areas such as social media hinders effective communication. Understaffing is a common issue across various organizations. Insufficient personnel negatively affects workload management and timely responses. Government-imposed policies and protocols were also thought to hinder operations.

OPPORTUNITIES

Communication capabilities were identified as an opportunity. Organizations have the potential to connect with key audiences and develop appropriate messaging. Some organizations have available technologies, such as websites, internal linkages, and apps, that could be utilized for communication purposes.

THREATS

Cultural attitudes threaten the project's success, particularly regarding the acceptance of using recycled water. A sustained campaign is recommended to build confidence in existing treatment plants and address the fear of wastewater-causing diseases. Government policies can create problems for the organizations and the project by disrupting activities and priorities. Finally, budgetary constraints were also identified as a threat. Limited financial resources affect each organization's ability to operate efficiently and may require adjustments to the work program.

COMMUNICATION NEEDS IDENTIFIED FOR KEY STAKEHOLDERS

Generally, the research findings suggest that communication capabilities can be improved by leveraging available technology, enhancing social media presence, and ensuring adequate staffing in communication roles. Internal communication processes also must be enhanced to facilitate timely decision-making and problem resolution. Development and implementation of a comprehensive communication strategy are required to address cultural attitudes and promote acceptance of recycled water. This strategy would help mitigate the impact of government policies by advocating for necessary changes and actively engaging with relevant stakeholders. Adequate funding also is needed to support communication initiatives and overcome budgetary constraints. Specific needs are outlined below.

EDUCATION AND AWARENESS

- Develop and implement educational campaigns to improve knowledge and understanding of the importance of wastewater management to the public and stakeholders.
- Emphasize the link between proper wastewater management and public health.
- Highlight the benefits and methods of wastewater reuse and recycling.

POLICY COMMUNICATION

- Improve communication about existing wastewater management policies and their implementation.
- Address concerns and provide regular updates on the progress of policy development and implementation.
- Ensure clear messaging about the roles and responsibilities of the government and individuals in wastewater management.

ACCESS TO SERVICES

- Provide information about available wastewater management services and infrastructure.
- Address concerns and improve access to services, particularly in communities where there is a lack of wastewater treatment infrastructure.
- Strengthen human resources in the area of communication.

BEHAVIORAL CHANGES

- Develop targeted communication campaigns to encourage behavioral changes, such as proper disposal, treatment, and wastewater reuse.
- Highlight the environmental and health benefits of responsible wastewater management.

COMMUNICATION NEEDS IDENTIFIED FOR KEY STAKEHOLDERS

COLLABORATION AND STAKEHOLDER ENGAGEMENT

- Foster collaboration among government agencies, stakeholders, and the public to work toward effective IWWM.
- Engage stakeholders through regular communication channels, including meetings, workshops, and online platforms.

INFORMATION DISSEMINATION

- Utilize government agencies as key information sources for wastewater-related information.
- Engage traditional and digital media to raise awareness and disseminate information on wastewater management.
- Develop informative materials, such as brochures, pamphlets, and online resources, to provide guidance on proper wastewater management practices.

MONITORING AND EVALUATION

- Establish mechanisms to monitor and evaluate the effectiveness of communication efforts.
- Collect feedback from stakeholders and the public to identify areas for improvement and measure behavioral changes.

COMMUNICATION NEEDS ASSESSMENT—GENERAL PUBLIC

The following communication needs assessment is based on the findings of the Knowledge, Attitude, and Practices (KAP) house-to-house survey conducted in February and March 2023. The survey aimed to assess residents' knowledge, attitudes, and practices regarding integrated water and wastewater management in Barbados. The assessment provided insights into the communication requirements for developing an effective IWWM. The following is a brief overview, followed by communication needs.

BASIC KNOWLEDGE OF WASTEWATER MANAGEMENT

Nearly half of the respondents were unsure about the existence of a wastewater management plan in Barbados. The majority of respondents did not know how wastewater is currently managed in Barbados. Younger respondents exhibited lower levels of knowledge compared to older age groups.

Sources of Information

Social media was identified as a significant source of information on wastewater management. The Barbados Water Authority was perceived as the leading entity responsible for wastewater management and regulation.

ATTITUDES TOWARD WASTEWATER MANAGEMENT IN BARBADOS

Respondents generally expressed positive attitudes toward wastewater management, highlighting its importance for households, health, and the environment. The majority agreed that wastewater management training is helpful for behavioral change in communities and that wastewater discharged directly into the environment is undesirable. There was a mix of agreement, neutrality, and disagreement regarding other attitudes related to satisfaction with current wastewater management, access to wastewater management services, and the use of reclaimed water.

Importance of National Water Reuse Policy

Respondents recognized the importance of a national water reuse policy because of rainfall variations and water scarcity.

PRACTICES ASSESSMENT

Respondents did not practice active wastewater reuse in their homes. Most respondents disposed of household wastewater through suck wells, sewer systems, or septic tanks. Only a few persons reported reusing wastewater for gardening purposes.

KEY TAKEAWAYS FOR COMMUNICATION STRATEGY

Barbadians exhibited encouraging levels of basic knowledge of wastewater management, indicating receptiveness to related concepts. Age was identified as a key factor in knowledge gaps, highlighting the need for communication strategies that target specific age groups.

Social media emerged as a prominent information source, but the potential for misinformation must be addressed. Leveraging the perceived leadership role of the Barbados Water Authority in wastewater management could be advantageous. Strong public opinion on the importance of wastewater management should be central to communication efforts. Attitudes expressed by respondents could guide the development of effective messaging.

RECOMMENDATIONS FOR A COMMUNICATIONS STRATEGY TARGETING THE GENERAL PUBLIC BASED ON THE FINDINGS

Targeted Messaging: Develop tailored communications materials and campaigns to address the specific knowledge gaps identified, particularly among younger age groups.

Social Media Engagement: Establish a strong presence on social media platforms to disseminate accurate information, address misconceptions, and effectively engage with the public.

Collaboration with Barbados Water Authority: Collaborate closely with the Barbados Water Authority to leverage its perceived leadership role in wastewater management and utilize it as a credible source of information.

Public Awareness Campaign: Design a comprehensive public awareness campaign to highlight the importance of wastewater management for all households, emphasizing its health and environmental benefits.

Behavior Change Communication: Develop messaging and initiatives that promote positive attitudes toward wastewater reuse by focusing on potential benefits and dispelling concerns or misconceptions.

Partnerships and Stakeholder Engagement: Collaborate with relevant government agencies, environmental organizations, and community leaders to amplify the reach of communication efforts and ensure a unified approach.

REVIEW OF COMMUNICATIONS BEST PRACTICES OF WATER PROJECTS IN OTHER JURISDICTIONS

Internet research on the best practices for communicating about integrated water and wastewater management (IWWM) across jurisdictions revealed projects in Europe, North America and Asia. Because information on communications for IWWM projects in Latin America and the Caribbean regions was not readily available, we took a three-pronged approach to produce the jurisdiction communications best practices report. First, we conducted a wide Internet search for information on the communications strategies of wastewater projects. Then we scoured scholarly journals for reports on the best approaches to communicate successfully about water and wastewater. Finally, to ensure we included regional projects, we closely read online blogs and stories for mentions of regional strategies. Information from all these sources has been included herein.

In their study, Bakar et al. (2021) noted that "Communications to promote resilience among consumers need to reach a wide audience, capture audiences' attention, build awareness and motivate water consumers to consume water sustainably." We are in agreement that this should be the approach to the final proposed and employed strategy. Bakar et al. (2021) also noted that despite the existence of a substantial body of work on improving water conservation campaigns, promoting more sustainable behaviors by water consumers is seldom successful. This makes creating messages and choosing media, which are primary to any campaign, even more critical when communicating about water.[5]

The following points from Bakar et al.'s (2021) study are generalizable to most water users and speak to communication barriers. They should therefore be considered when planning strategies for the national communications strategy for IWWM in Barbados.

- Most water consumers have low engagement with the water supply system, sewerage, and related environmental services.
- Water consumers are often either unaware of water-related threats or prioritize other environmental issues; thus, water-related issues are often considered less important.
- Many water consumers are ignorant of the issues and therefore do not consider the need to conserve water.
- Furthermore, the fact that the issue affects only selected areas means those who live in unaffected areas do not feel they should be concerned. These perceptions can often make such consumers potentially more vulnerable to water-related threats such as water scarcity.

A handbook produced by the Mena Project maintains that "a well-organized comprehensive communications program with stakeholders is essential for any modern water reuse project." [6]

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[5] *Abu Bakar, M. F., Wu, W., Proverbs, D., & Mavritsaki, E. (2021). Effective communication for water resilient communities: A conceptual framework. Water, 13(20), 2880.*

[6] *https://mena-water.com/*

Public involvement is critical and requires an effective communication channel. Several water reuse projects around the world have failed because of a lack of community confidence and trust in water reuse schemes in both developed and developing countries.

A review of multiple international water projects (including wastewater projects) revealed common trends regarding communications, including community and stakeholder engagement events, public consultations, and outreach efforts to bring about behavioral change in water reuse. These trends can prove useful with regard to the IWWM Communications Strategy and Implementation Plan for Barbados.

COMMUNICATION GOALS

The overarching goal of the plan is to increase the public's knowledge and awareness of the importance of wastewater management, its impact on public health and the environment, and the benefits of responsible practices to foster positive attitudes toward wastewater management and encourage households and individuals to adopt proper disposal, treatment, and reuse practices.

SPECIFIC OBJECTIVES

1. Increase the public's knowledge and awareness:
   - ***Objective 1:*** *Increase the percentage of respondents who are aware of the existence of a wastewater management plan in Barbados from 42% to 80% within one year.*
   - ***Objective 2:*** *Increase the percentage of respondents who have knowledge of the current wastewater management practices in Barbados from 30% to 60% within six months.*
2. Promote positive attitudes and behavioral change:
   - ***Objective 3:*** *Increase the percentage of respondents who agree with the importance of wastewater management training for behavioral change from 76% to 85% within one year.*
   - ***Objective 4:*** *Increase the percentage of households that practice active wastewater reuse from 21% to 40% within one year.*
3. Enhance stakeholder engagement:
   - ***Objective 5:*** *Conduct quarterly meetings and workshops with government agencies, environmental organizations, and community leaders to discuss integrated water and wastewater management progress and challenges.*
   - ***Objective 6:*** *Increase the number of active participants in online platforms for stakeholder engagement by 50% within one year.*
4. Improve policy communication:
   - ***Objective 7:*** *Develop and agree to a plan to regularly update stakeholders on the progress of wastewater management policies and legislation within one year.*
   - ***Objective 8:*** *Increase the understanding of the roles and responsibilities of the government and individuals in wastewater management by 30% within one year.*
5. Strengthen knowledge of access to services:
   - ***Objective 9:*** *Increase the awareness of available wastewater management services and infrastructure by 50% within one year.*
6. Disseminate information and promote best practices:
   - ***Objective 10:*** *Develop and distribute informative materials such as brochures, pamphlets, and online resources to provide guidance on proper wastewater management practices within six months.*
   - ***Objective 11:*** *Increase the reach and audience engagement on social media platforms by 50% within one year.*

TARGET AUDIENCES

It is important to identify and engage with target audiences to ensure a comprehensive and effective communication strategy that addresses each group's specific needs and concerns. The target audiences have been placed into two separate categories: primary and secondary audiences. Primary audiences are individuals, groups, or organizations with a direct and significant interest, influence, or involvement in the IWWM in Barbados. They are the key actors who are directly affected by, or can directly impact, the outcome's success. Secondary audiences are individuals, groups, or organizations with an indirect or less immediate interest or involvement. While they may not have a direct stake in the outcome, their perspectives, resources, or expertise can still contribute to the overall success and impact of the initiative.

It is important to note that the distinction between primary and secondary stakeholders is not made to lessen anyone's importance, but to create a priority grid of how the communications should be rolled out based on the audiences' level of influence, interest, and possible impact on the IWWM in Barbados.

PRIMARY AUDIENCES

1. ***Government Agencies:*** Government agencies that are responsible for water and wastewater management such as the Barbados Water Authority, the Environmental Protection Department, and the Planning and Development Department play vital roles in policy development, regulation, and infrastructure management. Collaboration with these agencies is necessary to ensure effective communication and implementation of policies. Interpersonal and direct communication would be key for this stakeholder group because their buy-in of the campaign is important for its success. These agencies would not only help make messages go viral, but they are also responsible for policies and services that impact the IWWM.
2. ***Environmental Organizations:*** Environmental organizations and non-governmental organizations (NGOs) that work in the field of water and environmental conservation are key stakeholders. Collaborating with these organizations can help amplify communication efforts, gain support, and leverage their expertise and resources. Similar to government agencies, interpersonal and direct communication would be important for this group.
3. ***Water and Wastewater Management Professionals:*** Professionals working in the field of water and wastewater management including engineers, technicians and plumbers, and scientists are important stakeholders. They can provide valuable insights, technical expertise, and support for implementing effective communication strategies. Although this group also acts as media consumers, events and meeting opportunities are needed to explain laws and policies as well as to gain feedback.

4. ***Employees and Staff Members of Wastewater Management Organizations:*** Employees and staff members of wastewater management organizations, including government departments and private companies, are internal stakeholders. Their involvement and support in communication efforts are vital for effectively implementing and adopting sustainable practices. It is important to engage internal stakeholders before going externally with the message. Internal communication tactics such as newsletters, meetings, and email marketing would be key strategies to win over this group.
5. ***Public:*** The public is an important stakeholder because it plays a crucial role in wastewater management practices. It is essential to engage and educate the public about proper wastewater management, behavioral change, and the benefits of responsible practices. The public will be broken down by age groups: primary school, secondary school, young adults, middle-age, and over 60. Research revealed that younger persons consume their information online. However, radio and newspapers still play a vital role in communication for older adults.

SECONDARY AUDIENCES

1. ***Media Organizations:*** Traditional and digital media outlets including Nation, Barbados Today, and the Advocate newspapers; CBC television; radio stations such as VOB, 900, Love, 104.1, Slam, and Hot 95.3; and online platforms like Facebook, YouTube, Instagram, and LinkedIn are crucial for disseminating information to a broader audience. Collaborating with media organizations such as these can help raise awareness and reach a larger and more varied population.
2. ***Community Leaders:*** Barbados has a wide range of influential NGOs that are willing to engage with and support social causes. Engaging community leaders including local leaders, religious leaders, and influential community members could help disseminate information and encourage behavior change within their communities. This type of stakeholder would also require an interpersonal approach.
3. ***Tourism Industry:*** Barbados' primary industry is tourism. Its hotels are not only large water consumers, but they have high levels of wastewater and most of them are in coastal zones, checking all the boxes for IWWM. The tourism industry can be a major stakeholder because water resources and environmental conservation are important for attracting tourists. Engaging tourism organizations, hotels, and hospitality businesses can promote responsible water management practices within the industry.

4. ***Academia and Research Institutions:*** Universities, research institutions, and academic experts working in the field of water and wastewater management can provide valuable insights, research findings, and technical support for the communication strategy. Using these persons as subject matter experts would strengthen the message.
5. ***International Organizations and Donors:*** International organizations and donors that provide support and funding for water and wastewater management projects in the country are important stakeholders. Their involvement could also add weight to the campaign as unbiased outside voices and could provide anecdotal information on other countries' success that may be able to benefit the sustainability of the communication strategy.

SPECIFIC COMMUNICATION MESSAGES

These communication messages will be tailored to different target audiences and channels with respect to their knowledge, attitudes, and preferred communication platforms. The messages aim to educate, engage, and inspire behavioral change while emphasizing the importance of wastewater management and the shared responsibility of individuals and the government in ensuring a sustainable future.

1. **Knowledge and awareness:**
   - Proper treatment of wastewater is essential for safeguarding public health and protecting the environment.
   - Learn how proper wastewater practices directly impacts the quality of our water resources and the well-being of our communities. Click here for more information.
   - Did you know that any water and associated contaminants that soak into the ground eventually reach the sea? So be careful of how you dispose of chemicals.
   - Do you know that water recycles? There is a finite amount of water.
2. **Attitudes and behavioral change:**
   - Join us in building a healthier future by adopting responsible wastewater management practices.
   - Every household plays a vital role in protecting our water resources. Let's make a positive impact together.
   - Together, we can reduce pollution and ensure a sustainable water supply for generations to come.
   - Our beaches and our ocean are important to economy. The whole of Barbados should be regarded as a coastal zone.
3. **Stakeholder engagement:**
   - Collaborate with us to build effective integrated water and wastewater management solutions.
   - Your voice matters. Engage in meaningful discussions and contribute to shaping our wastewater management policies.
   - Join our online platform to connect with other stakeholders and stay informed about the latest developments in wastewater management.
   - Know your wastewater registration requirements.
4. **Policy communication:**
   - (A policy) - Stay updated on the progress of wastewater management policies and legislation that directly affect our communities.
   - We are committed to transparent policy communication to ensure accountability and positive change.

SPECIFIC COMMUNICATION MESSAGES - CONT'D

1. **Access to services:**
   - (Feature a Facility) - Discover the available wastewater management services and infrastructure in your community.
   - Improving access to wastewater treatment facilities is crucial for a healthier environment and improved public health.
2. **Dissemination of information and best practices:**
   - Explore our informative online resources to learn about proper wastewater management practices for your home.
   - Get expert guidance on how to dispose, treat, and reuse wastewater responsibly.
   - Together, we can make a difference. Share our resources to spread awareness and promote best practices in wastewater management.

SOLUTION OVERVIEW FOR THE STRATEGIC COMMUNICATIONS PLAN

All is water!

The Integrated Water and Wastewater Management (IWWM) strategic communications plan aims to build a greater understanding of water through a comprehensive public awareness campaign. Such an endeavor emphasizes the importance of wastewater management for key stakeholders and the public grounded in Barbados' water protection and land use policies to promote health and environmental benefits. Various communication channels (e.g., radio, television, newspaper, social media, events) will help to reach a vast and varied audience to build trust in the efficacy of the island's water and wastewater management.

The idea that water recycles will be the anchoring message. Persons should not just look at reclaimed water as waste, but instead as water that is going through one of its cycles. Water should be promoted as having different characteristics. Each characteristic is symbolic of water at one of its stages, reclaimed, grey or blackwater, with each being exploited in the promotion. The promotion will also play on the emotional appeal for people to be smart, which works for Barbados' highly educated population. There is to be a family of 'Waterman's' delivering the messages with the main character, *Smart Waterman*, encouraging people to be smart and learn about the use of treated and grey water. There are two approaches being suggested: a factual, informational approach for primary stakeholders in the industry, and a fun, storytelling approach for younger audiences.

THE ROLE OF THE MEDIA

The major media houses in Barbados will be approached about strategic partnerships for dedicated coverage and commentary on integrated water and wastewater management. The media plays a crucial role in integrated water and wastewater campaigns by raising awareness, educating the public, and mobilizing support for sustainable water management practices. The Nation newspaper, for example, has its Green Nation promotion, which is a synergistic fit. Some influential columnists are already commenting on water, albeit negatively (see Appendix 3), but they need the correct information to change their position from activist to advocate. The media is therefore important for disseminating accurate information, building public awareness and education, finding and training advocates, engaging the community, amplifying the voices of water experts, and helping influence policy decisions.

The agencies involved in water and land development in Barbados should also play a critical role. Executives are to be trained in media engagement (speaking and writing) and promoted as thought leaders in the area. There are several myths about water, and using experts will be important to addressing and debunking them.

THE FOLLOWING PROVIDES AN OVERVIEW OF THE KEY COMPONENTS OF THE SOLUTION:

1. ***Targeted mass media messaging:*** Messages should address each specific knowledge gap among different age groups. Informative and engaging content that highlights the importance of wastewater management, its impact on public health and the environment, and the benefits of responsible practices are to be created to be approved by the EPD.

2. ***Social media and other strategies involving cellphone technology:*** A strong presence on social media platforms should be generated to disseminate accurate information, address misconceptions, and engage with the public effectively. A sample of a social media banner is attached. There should be regular posting of relevant content, responding to inquiries and comments, and leveraging partnerships with other agencies and NGOs to reach a wider audience. Collaboration with cellular providers to send water tips to phones is another potentially effective tactic.

3. ***Collaboration with the Barbados Water Authority and other partners:*** There should be collaboration with the Barbados Water Authority to leverage its leadership role in water management and utilize it as a credible source of information. This partnership can involve joint communication campaigns, sharing resources and expertise, and coordinating efforts to ensure consistent messaging and outreach.

4. ***Behavioral change communication:*** Messaging and initiatives that promote positive attitudes toward wastewater reuse and dispel concerns or misconceptions would be utilized. The campaign would use the emotional appeal of people to be smart to generate positive action.

5. ***Partnerships and stakeholder engagement:*** There is to be collaboration with relevant government agencies, environmental organizations, community leaders (including parish ambassadors, church groups, youth groups, and sports groups), and tourism stakeholders to amplify the reach of communication efforts.

6. ***Information dissemination:*** Government agencies should function as key information sources for wastewater-related information and engage traditional and digital media to raise awareness and disseminate information on wastewater management.

7. ***Events and recognition of World Water Day and other days associated with water.***

TACTICS

Several tactics have been suggested to accomplish the campaign's objectives. The implementation plan is specific to the consultancy brief, and the times suggested are specific to Task 2, Activity 4: "Conduct educational and public sensitization activities using messages created during Tasks 1, 2, and 3 and placed on a variety of multimedia platforms (e.g., radio, print, television, and social media) to reach the relevant stakeholder groups and test the efficacy of the messages. The budget for this activity is fixed in the contract for services with the OAS.

Objective	**Tactic**
Increase public knowledge and awareness.	Develop a dedicated website or online portal that serves as a central hub for information, resources, and updates on wastewater management initiatives.
	Create a jingle about the different forms of water and that it recycles; writing, music creation, talent.
	Engage traditional media such as press releases, newspapers for feature articles, interviews, and stories related to wastewater management; engage editors and news columnists; and utilize media partnerships.
	Create a radio campaign for a radio talk show about water that gives a water tip of the day; engage editors and talk show hosts; and utilize media partnerships.
	Create television ads; make *Mornin' Barbados* and *People's Business* appearances; and collaborate with the Barbados Water Authority's Water Wednesdays program.
	Make three water videos: *"Safe and Responsible Use of Reclaimed Water*," "*Know Your Land Zones*," and "*Water in its Various Forms.*"
	Engage with social media to establish and maintain active social media accounts on platforms such as Facebook, Instagram, Twitter, YouTube, and LinkedIn and regularly share informative and engaging content, including tips for proper wastewater management, success stories, and updates on policy developments.

Objective	Tactic
Promote positive attitudes and behavior changes.	Collaborate with local communities to organize events (through the parish ambassadors), workshops, and competitions that encourage participation and promote behavior change.
	Conduct thought leadership interviews, discussions, and opinion pieces.
Enhance stakeholder engagement.	Forge partnerships with environmental organizations, tourism partners, community leaders, government agencies, and water-related industries to amplify the reach and impact of communication efforts.
	Collaborate on joint initiatives, such as awareness campaigns, community events, and educational programs.
	Engage influencers and experts in the field of wastewater management to advocate for responsible practices and to promote key messages.

Objective	Tactic
Improve policy communication.	Conduct regular stakeholder meetings, workshops, and forums to gather feedback, address concerns, and ensure active participation in decision-making processes related to wastewater management.
	Establish online platforms or forums to facilitate ongoing dialogue and engagement with stakeholders and encourage stakeholders to share their experiences, success stories, and challenges related to wastewater management, fostering a sense of ownership and commitment.
Strengthen knowledge of access to services.	Develop a web page dedicated to water and wastewater management services.
	Create monthly social media campaigns on services.
	Organize workshops, seminars, and webinars to provide in-depth knowledge on wastewater management and to engage stakeholders in learning sessions.

Objective	Tactic
Disseminate information and promote best practices.	Develop and distribute educational materials such as brochures and infographics that explain the importance of wastewater management, its impact on public health and the environment, and the benefits of proper management practices.
	Send out mass mail, including flyers outlining services, using the Barbados Postal Service.
	Collaborate with educational institutions to incorporate wastewater management education into the curriculum; respond promptly to comments, questions, and concerns raised by the public; and provide accurate information and address misconceptions.
	Run paid Google and Social Media ads online.

IMPLEMENTATION PLAN

The implementation plan is meant to guide the campaign's rollout. It should be noted that we have included important dates that celebrate water awareness across the globe. The months for these are stated. Therefore, activities for these celebratory dates should be scheduled to fall within the correct month, regardless of the plan's start date.

Timeline	Activity
Campaign Launch and Social Engagement: Launch the public awareness campaign across multiple communication channels, including, radio and online platforms.	
Month 1	• Website Launch • Stakeholder Event Launch – Special invited guests in government, development agencies, tourism leaders and business for orientation of the promotion • Press Release: Develop and distribute press release announcing the launch of the wastewater campaign • Twice Weekly Social Media Posts also responding to comments, sharing informative content, and partnering with influencers • Media Monitoring and Campaign Evaluation • Start of monthly Google and social media ads.
Month 2 (February)	• Radio Jingle yearlong broadcast on popular radio stations during peak listening hours to reinforce message • Op Ed about importance of wetlands and wastewater for World Wetlands Day • Twice Weekly Social Media Posts – Feature a World Wetlands Day post among regular posts • Stakeholder Event – Media Briefing on the campaign, for questions and answers. Collaborate with influencers, water advocates, and columnists to amplify the campaign's message and win over persons to view wastewater management differently • Media Monitoring and Campaign Evaluation
Month 3 (March)	• Op Ed on World Water Day • Event: World Water Day Lecture collaboration with The UWI • World Water Day Social Media Posts among weekly posts • Public Activity: Work in collaboration with the Barbados Water Authority to host public education activities in the week leading up to World Water Day • Media Monitoring and Campaign Evaluation

IMPLEMENTATION PLAN CONT'D

Timeline	Activity
Behavior Change Initiatives and Stakeholder Engagements – Targeted behavior change messages	
Month 4	• Collaborate with the Barbados Water Authority to appear on its programs and share social posts etc. • Continue Twice Weekly Social Media Posts • Stakeholder Event with Tourism Leaders • Launch TV Ads (Weekly on CBC) all ads on YouTube Channel and post on social media platforms once weekly for duration of campaign • Engage Ministry official for wastewater education to be incorporated into the social science curriculum • Media Monitoring and Campaign Evaluation
Month 5	• Twice Weekly Social Media Posts • Public Activity Targeting Young People – School's Wastewater Challenge (3 months of Promotion) • Stakeholder Event – for Builders/Engineers/Architects/ Plumbers • Mornin' Barbados Appearance • Start Radio Program (For 3 months, weekly on 2 stations, prerecorded program) • Media Monitoring and Campaign Evaluation
Month 6 (June)	• World Environment Day Op Ed on the role that wastewater treatment can play in environmental sustainability • Radio Program • Stakeholder Event - Community Leaders • Social Media Posts including World Environment Day and World Ocean Day • Organize a beach clean-up to recognize World Environment Day and World Ocean Day and highlight how untreated wastewater can impact land and sea • Media Monitoring and Campaign Evaluation including survey on awareness of the campaign

IMPLEMENTATION PLAN CONT'D

Timeline	Activity
Continuous dissemination of information and evaluation	
Month 7	• Op Ed • Radio Program • Twice Weekly Social Media Posts • Mass Mailer to householders with brochure on wastewater management • Media Monitoring and Campaign Evaluation • People's Business/One-on-One Appearance
Month 8	• Op Ed on tapping into the potential of wastewater • Twice Weekly Social Media Posts • Collaborate with the Barbados Government Information Service to develop an educational awareness episode on wastewater and the importance of wastewater management • Host open day at the Environmental Protection Department • Media Monitoring and Campaign Evaluation
Month 9 (September)	• World Tourism Day Op Ed on the importance of wastewater management to enhancing the tourism product • Twice Weekly Social Media Posts including World Tourism Day Post • Stakeholder Event – Half-day seminar targeting stakeholders in tourism and wastewater management • Media Monitoring and Campaign Evaluation

IMPLEMENTATION PLAN CONT'D

Timeline	Activity
Ongoing Communication and Evaluation	
Month 10 (October)	• Op Ed on importance of wastewater management to food security • Social Media Posts including special post for World Food Day • Stakeholder Event – Collaborate with the Ministry of Agriculture to target stakeholders in agriculture, including landscapers (plants) including public and private sector entities • Media Monitoring and Campaign Evaluation
Month 11 (November)	• Op Ed on importance of wastewater management and proper blackwater management • Op Ed on importance of wastewater management and the sea • Social Media Posts recognizing World Toilet Day and World Fisheries Day • Collaborate with the Fisheries Division on media ad for World Fisheries Day • Media Monitoring and Campaign Evaluation
Month 12 (December)	• Op Ed on the importance of wastewater management and soil especially related to Zoning in Barbados • Social Media Posts including post for World Soil Day • Stakeholder Event: Media briefing to provide up on the campaign and announce any successes • Media Monitoring and Campaign Evaluation and survey of public perception on wastewater management

BUDGET, TIMELINES AND RESOURCE LISTING FOR ACTIONING COMMUNICATION STRATEGY

The Integrated Water and Wastewater Management (IWWM) strategic communications plan aims to build a greater understanding of water through a comprehensive public awareness campaign. Such an endeavor emphasizes the importance of wastewater management for key stakeholders and the public. Various communication channels (e.g., radio, television, newspaper, social media, events) will help to reach a vast and varied audience to build trust in the efficacy of the island's water and wastewater management.

The budget gives two scenarios - hiring a full-time employee for one year to execute the plan or for an external agency to execute. There are advantages and disadvantages to both scenarios. Whether hiring an agency or a full-time employee, there is a procurement process in which you hope that you get the right fit for the job at hand. If you decide on a full-time employee, some of the advantages include that they would be dedicated solely to executing the campaign and be more flexible with their time, enabling quicker pivots and adaptations. Working within an organization full-time also allows one to dive deeper into the topic, and wastewater has a steep learning curve. There is also the idea of culture fit, and someone internally would become immersed in the water protection culture to fully understand it, which would enhance the quality and relevance of the communication messages. Paying a salary without additional agency fees can be more cost-effective in the long run as the salary is fixed; with an employee, costs might be hidden since they still have to outsource services outside of their capabilities, such as graphic design, website updating, videography, and photography for example.

The employee may suffer burnout or become ill, causing the campaign to stall since they lack the support of a team. Without a team, they would not benefit from brainstorming with peers and collaborative efforts since the people they work with would be busy with their substantive roles, leaving the communications work solely to the employee. These areas are where the agency would excel since it comes with broad skill sets, bringing a variety of specialists in different areas of communications to offer a well-rounded service. Also, as the campaign intensifies and the needs grow, the agency could usually accommodate the changing requirements more easily than a single employee. It also brings fresh perspectives since multiple persons are working on the campaign, bringing multiple perspectives to reach innovative solutions.

BUDGET, TIMELINES AND RESOURCE LISTING FOR ACTIONING COMMUNICATION STRATEGY

There is also greater accountability with a firm since they often have stringent quality control measures offering an added layer of accountability because of their time management models. Of course, you are not the agency's only client so there is divided attention. Additionally, the size and culture of the agency might potentially not be a good fit, which might also contribute to complexity in communication since multiple parties might be involved, which could slow down decision-making and increase the likelihood of misunderstandings. Confidentiality may also be a concern since third parties are handling your information.

That being said, the implementation plan and accompanying budget are meant to guide the campaign's rollout. They should not be taken as gospel, but as the campaign rolls out, there should be monthly evaluations to determine if it is hitting the target of achieving the objectives set out. In which case, there should be some level of reprogramming within the budget parameters.

BUDGET ASSUMPTIONS:

1. Implementation starts at the beginning of the calendar year in January.
2. The employee has, at minimum, a bachelor's degree in communications; a master's degree is preferred.
3. The employee would manage the social media channels and the website and have a basic knowledge of design to work from templates.
4. Master social media posts have already been developed, so there would be minimal cost in this area for the first three months of the campaign.
5. The agency has a fixed retainer with billings for add-on services.
6. All media costs are paid by the executing agencies, and therefore, there are no agency commissions or markups.
7. Agency administrative fees are built into the retainer.
8. Some events are held at a government office, attracting zero venue fees.
9. For events, the employee assumes the role of an event planner.
10. Op-Eds will be written by partner agencies.
11. Information for schools to be developed by partner agencies

BUDGET

Timeline	Activity	Budget Employee	Budget Agency
Month 1	Website Launch (Included in previous consultancy)	0	0
	Stakeholder Event Launch – Special invited guests in government, development agencies, tourism leaders and businesses for orientation of the promotion. Launch Venue, Branding Materials, Media Coverage, Streaming to Partner Platforms	$80,000	$95,000
	Media Kit	0	$4,500
	Twice Weekly Social Media Posts also responding to comments, sharing informative content, and partnering with influencers	0	$2,000
	Annual Salary/ Annual Retainer included Consultations, Meetings, Media Monitoring and Campaign Evaluation	$90,000	$54,000
	Start of monthly Google and social media ads.	$1,200	$1,200
Month 2	Radio Jingle yearlong broadcast on popular radio stations during peak listening hours to reinforce message (2 Stations)	$90,000	$90,000
	Op-Ed about the importance of wetlands and wastewater for World Wetlands Day	0	0
	Twice Weekly Social Media Posts – Feature a World Wetlands Day post among regular posts	0	$2,000
	Stakeholder Meeting – Media Briefing on the campaign, for questions and answers. Collaborate with influencers, water advocates, and columnists to amplify the campaign's message and win over persons to view wastewater management differently – Intimate small board room setting or similar office environment with appropriate seating and access to AV Materials	$3,000	$5,000

Timeline	Activity	Budget Employee	Budget Agency
Month 3	Op-Ed on World Water Day	0	0
	Event: World Water Day Lecture collaboration with The UWI	$10,000	$15,000
	Social Media Posts including World Water Day weekly posts	0	$2,000
	Public Activity: Work in collaboration with the Barbados Water Authority to host public education activities in the week leading up to World Water Day	$15,000	$25,000
Month 4	Collaborate with the Barbados Water Authority to appear on its programs and share social posts etc.	0	0
	Twice Weekly Social Media Posts	0	$2,000
	Stakeholder Meeting with Tourism Leaders - Board Room Type Meeting	$2,500	$2,500
	Launch TV Ads (6 months) all ads on YouTube Channel and post on social media platforms once weekly for duration of campaign	$30,000	$30,000
	Engage Ministry official for wastewater education to be incorporated into the social science curriculum	0	0
Month 5	Twice Weekly Social Media Posts	0	$2,000
	Public Activity Targeting Young People – School's Wastewater Challenge (3 months of Promotion)	$45,000	$65,000
	Stakeholder Meeting – for Builders/Engineers/ Architects/ Plumbers. Venue to hold minimum 50 persons	$10,000	$15,000
	Mornin' Barbados Appearance (3 appearances)	$3,000	$3,000
	Start Radio Program (For 3 months, weekly on 2 stations, prerecorded program)	$15,000	$15,000

Timeline	Activity	Budget Employee	Budget Agency
Month 6	Twice Weekly Social Media Posts	0	$2,000
	World Environment Day Op-Ed on the role that wastewater treatment can play in environmental sustainability	0	0
	Stakeholder Meeting - Community Leaders (Community Venue)	$2,500	$5,000
	Social Media Posts including World Environment Day and World Ocean Day	0	$2,000
	Organize a beach clean-up to recognize World Environment Day and World Ocean Day and highlight how untreated wastewater can impact land and sea	$10,000	$15,000
	Survey on public awareness of the campaign	$8,000	$10,000
Month 7	Twice Weekly Social Media Posts	0	$2,000
	Op-Ed Topic to be determined	0	$2,000
	Write and Design Mass Mailer to householders with brochure on wastewater management	0	$2,500
	Printing 50,000 mailers	$25,000	$25,000
	Distribution of mailers (unaddressed)	$11,500	$11,500
	People's Business/One-on-One Appearance	$1,500	$1,500
Month 8	Twice Weekly Social Media Posts	0	$2,000
	Op-Ed on tapping into the potential of wastewater	0	$2,000
	Collaborate with the Barbados Government Information Service to develop an educational awareness episode on wastewater and the importance of wastewater management	0	0
	Host open day at the Environmental Protection Department/Ministry of Health	$8,000	$12,000

Timeline	Activity	Budget Employee	Budget Agency
Month 9	Twice Weekly Social Media Posts including World Tourism Day Post	0	$2,000
	World Tourism Day Op-Ed on the importance of wastewater management to enhancing the tourism product	0	$2,000
	Stakeholder Event – Half-day seminar targeting stakeholders in tourism and	$25,000	$30,000
Month 10	Stakeholder Meeting – Collaborate with the Ministry of Agriculture to target stakeholders in agriculture, including landscapers (plants) including public and private sector entities	$10,000	$15,000
	Twice Weekly Social Media Posts	0	$2000
	Op Ed on importance of wastewater management to food security	0	0
	Social Media Posts including special post for World Food Day	0	$2000
Month 11	Twice Weekly Social Media Posts including recognizing World Toilet Day and World Fisheries Day	0	$2,000
	Op Ed on importance of wastewater management and proper blackwater management	0	0
	Collaborate with the Fisheries Division on media ad for World Fisheries Day	$3,500	$3,500
Month 12	Op Ed on the importance of wastewater management and soil especially related to Zoning in Barbados	0	0
	Twice Weekly Social Media Posts including post for World Soil Day	0	$2,000
	Stakeholder Event: Media briefing to provide up on the campaign and announce any successes	$3,000	$5,000
	Survey on public knowledge and perception of wastewater management	$15,000	$15,000
	Optional Cost	$511,500	$604,000
	Fixed Cost	$90,000	$54,000
	Total	$601,500	$658,000

EVALUATION AND REPROGRAMMING

Evaluation and reprogramming will form a critical part of the campaign. Communication efforts should be sustained by regularly updating content, engaging with the public through social media, and encouraging feedback from community events. The campaign's success will be based on the degree to which the stated objectives are achieved. There should be regular progress reports on the implementation of the communications plan, evaluation of feedback received from stakeholders and the public, and continuous review of key performance indicators and targets to assess the effectiveness of communication efforts. Some other key performance indicators that should be used to measure the plan's success on an ongoing basis include the following:

1. ***Knowledge and awareness***
   - Number of individuals reached through educational campaigns and workshops
   - Survey on changes in knowledge and awareness levels following the current KAP survey
   - Website and social media analytics, including reach, engagement, and website traffic
2. ***Attitudes and perceptions***
   - Surveys or polls to assess changes in attitudes toward wastewater management
   - Feedback and sentiment analysis from social media and online platforms
   - Qualitative research methods, such as focus groups or interviews, to gauge public opinion
3. ***Behavior changes***
   - Quantitative data on the adoption of responsible wastewater management practices, such as increased reuse or proper disposal rates
   - The number of households implementing recommended behaviors, such as installing water recycling systems or utilizing wastewater for gardening purposes
   - Feedback from community leaders and stakeholders on observed changes in behavior
4. ***Stakeholder engagement***
   - Attendance and participation rates in stakeholder meetings, workshops, and forums
   - Surveys or feedback mechanisms to evaluate stakeholder satisfaction and perceived level of involvement
   - Number of collaborative initiatives or partnerships established with relevant organizations
5. ***Media and public awareness***
   - Media monitoring to track the frequency and tone of media coverage related to wastewater management
   - Social media engagement, including likes, shares, comments, and mentions
   - Analysis of website traffic, page views, and downloads of informational materials
6. ***Public perception and trust***
   - Surveys or perception studies to measure changes in public perception and trust toward wastewater management authorities and initiatives
   - Monitoring of public sentiment on social media and online platforms
   - Analysis of media coverage sentiment and public comments or feedback

PRMR PUBLIC RELATIONS CONSULTANTS

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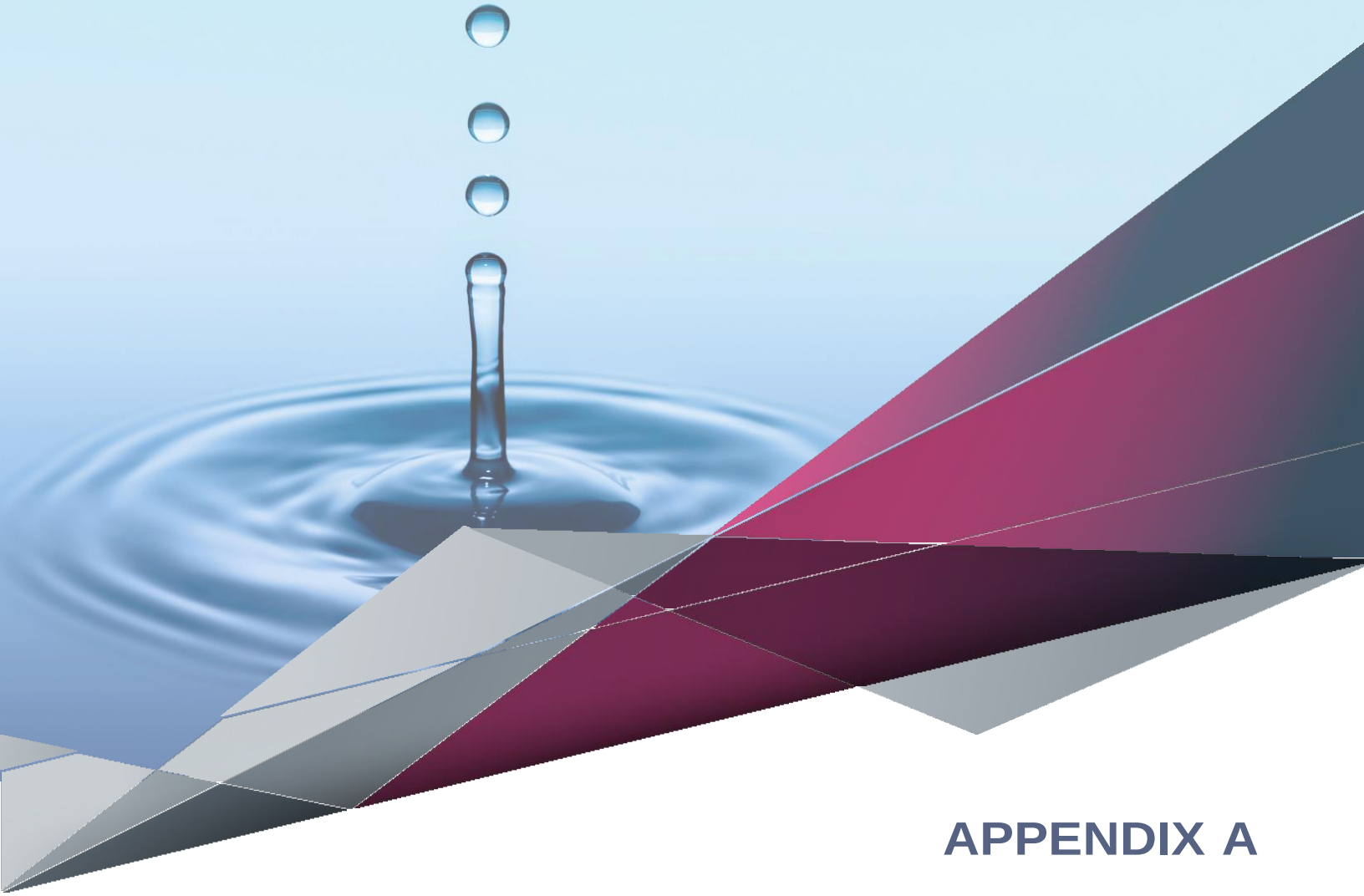

APPENDIX A

Communication Needs Assessments Report

COMMUNICATIONS STRATEGY AND IMPLEMENTATION PLAN FOR THE CREW+ WATER PROJECT IN BARBADOS

Prepared by:
PRMR Inc.

BACKGROUND

The objective of this communication needs assessment is to identify the gaps and requirements in communication strategies related to the development of a National Communications Strategy for Integrated Water and Wastewater Management (IWWM) in Barbados based on the findings of the Knowledge, Attitude, and Practice (KAP) surveys and SWOT analysis conducted by **PRMR Inc.** The full reports of the KAP surveys and the SWOT analysis were presented separately as dictated by the workplan. However, a broad overview of the key findings has been provided.

The assessment has been divided into two sections based on the specific target audiences. *Section 1* specifically targets government and private sector stakeholders specifically, but also includes solutions for a more general audience. *Section 2* targets the general public.

SECTION 1

SYNOPSIS OF THE FINDINGS OF THE KNOWLEDGE, ATTITUDE, AND PRACTICES OF KEY STAKEHOLDERS

KNOWLEDGE AND AWARENESS

Respondents generally understand the importance of wastewater management and its impact on the environment and public health. Given the nature of these audience members, it was no surprise that their workplace is the primary source of information about wastewater management, which is one of the greatest differences between this group and the general public.

ATTITUDES AND PERCEPTIONS

The majority of respondents believe that wastewater management is vital important for households and that proper wastewater management is important for good health. There is also a strong belief that both the government and individuals share the responsibility of managing wastewater. The respondents are annoyed when wastewater is discharged directly into the environment.

PRACTICES

A significant percentage of respondents dispose of household wastewater through a suck well or septic tank, indicating limited reuse or treatment. The reuse of domestic wastewater is low, with the majority not reusing it at all. It was revealed that there is a need for awareness building, education, and new policies to encourage more householders to recycle water.

CONCERNS AND CHALLENGES

Respondents expressed concerns about the adequacy of wastewater management policies and access to services. Diseases related to improper wastewater management, such as diarrhea, skin diseases, intestinal parasites, and dysentery, were mentioned as significant concerns.

SYNOPSIS OF THE FINDINGS OF THE SWOT ANALYSIS

COMMUNICATION CAPABILITIES

Strengths

Communication capabilities were frequently cited as a strength. Some organizations have public and community engagement practices in place, such as the Barbados Water Authority and Solid Waste Management Programme. Several organizations maintain websites that can be used for communication purposes.

Weaknesses

Communication capabilities were occasionally cited as a weakness. Many organizations acknowledged the need for improvement in their communication capabilities. The lack of permanent staff in areas such as social media hinders effective communication.

Opportunities

Communication capabilities were identified as an opportunity. Organizations have the potential to connect with key audiences and develop appropriate messaging. Some organizations have available technology, such as websites, internal linkages, and apps, that could be utilized for communication purposes.

STAFFING

Understaffing is a common issue across various organizations. Insufficient manpower negatively impacts workload management and timely responses.

INTERNAL OPERATIONS

Inefficient internal communications are challenging because they hamper timely decision-making and resolution of human resource issues.

POLICIES AND PROTOCOLS

Government-imposed policies and protocols were cited as weaknesses because they may hinder operations.

SYNOPSIS OF THE FINDINGS OF THE SWOT ANALYSIS CONT'D

CULTURAL ATTITUDES

Threats

Cultural attitudes threaten the project's success, particularly regarding the acceptance of using recycled water. A sustained campaign is recommended to build confidence in existing treatment plants and address the fear of wastewater-causing diseases.

GOVERNMENT POLICIES

Threats

Government policies can create problems for the organizations and the project by disrupting activities and priorities.

BUDGETARY CONSTRAINTS

Threats

Budgetary constraints also were identified as threats. Limited financial resources impact each organization's ability to operate efficiently and may require adjustments to the work program.

COMMUNICATION NEEDS IDENTIFIED FOR STAKEHOLDERS

EDUCATION AND AWARENESS

- Develop and implement educational campaigns to improve knowledge and understanding of the importance of wastewater management to the general public and stakeholders.
- Emphasize the link between proper wastewater management and public health.
- Highlight the benefits and methods of wastewater reuse and recycling.

POLICY COMMUNICATION

- Improve communication about existing wastewater management policies and their implementation.
- Address concerns and provide regular updates on the progress of policy development and implementation.
- Ensure clear messaging about the roles and responsibilities of the government and individuals in wastewater management.

ACCESS TO SERVICES

- Provide information about available wastewater management services and infrastructure.
- Address concerns and improve access to services, particularly in communities where there is a lack of wastewater treatment infrastructure.

BEHAVIOR CHANGE

- Develop targeted communication campaigns to encourage behavior change such as proper disposal, treatment, and wastewater reuse.
- Highlight the environmental and health benefits of responsible wastewater management.

COLLABORATION AND STAKEHOLDER ENGAGEMENT

- Foster collaboration among government agencies, stakeholders, and the public to work toward effective IWWM.
- Engage stakeholders through regular communication channels including meetings, workshops, and online platforms.

COMMUNICATION NEEDS IDENTIFIED FOR STAKEHOLDERS CONT'D

INFORMATION DISSEMINATION

- Utilize government agencies as key information sources for wastewater-related information.
- Engage traditional and digital media to raise awareness and disseminate information on wastewater management.
- Develop informative materials, such as brochures, pamphlets, and online resources, to provide guidance on proper wastewater management practices.

MONITORING AND EVALUATION

- Establish mechanisms to monitor and evaluate the effectiveness of communication efforts.
- Collect feedback from stakeholders and the general public to identify areas for improvement and to measure behavior change.

SECTION 2
COMMUNICATION NEEDS ASSESSMENT – GENERAL PUBLIC

The following communication needs assessment is based on the findings of the Knowledge, Attitude, and Practices (KAP) house-to-house survey CADRES conducted in February and March 2023. The survey aimed to assess residents' knowledge, attitudes, and practices regarding integrated water and wastewater management in Barbados. The assessment provided insights into the communication requirements for developing an effective IWWM. The following is a brief overview followed by communication needs.

KNOWLEDGE ASSESSMENT

Basic Knowledge of Wastewater Management

Nearly half of the respondents were unsure about the existence of a wastewater management plan in Barbados. The majority of respondents did not know how wastewater is currently managed in Barbados. Younger respondents exhibited lower levels of knowledge compared to older age groups.

Sources of Information

Social media was identified as a significant source of information on wastewater management.
The Barbados Water Authority was perceived as the leading entity responsible for wastewater management and regulation.

ATTITUDES ASSESSMENT

Attitudes Toward Wastewater Management in Barbados

Respondents generally expressed positive attitudes toward wastewater management, highlighting its importance for households, health, and the environment. Most respondents agreed that wastewater management training is helpful for behavioral change in communities and that wastewater discharged directly into the environment is undesirable. There was a mix of agreement, neutrality, and disagreement regarding other attitudes related to satisfaction with current wastewater management, access to wastewater management services, and the use of reclaimed water.

Importance of National Water Reuse Policy

Respondents recognized the importance of a national water reuse policy due to rainfall variations and water scarcity.

PRACTICES ASSESSMENT

Respondents demonstrated a lack of active wastewater reuse practices in their homes. Most respondents disposed of household wastewater through suck wells, sewer systems, or septic tanks. Only a small percentage (19%) reported reusing wastewater for gardening purposes.

KEY TAKEAWAYS FOR COMMUNICATION STRATEGY

Barbadians exhibited encouraging levels of basic knowledge of wastewater management, indicating receptiveness to related concepts. Age was identified as a key factor in knowledge gaps, highlighting the need for targeted communication strategies for specific age groups.

Social media emerged as a prominent information source, but the potential for it to be used to disseminate misinformation must be addressed. Leveraging the perceived leadership role of the Barbados Water Authority in wastewater management could be advantageous. Strong public opinion on the importance of wastewater management should be central to communication efforts. Attitudes expressed by respondents can guide the development of effective messaging.

RECOMMENDATIONS FOR COMMUNICATION STRATEGY TARGETING THE GENERAL PUBLIC BASED ON THE FINDINGS

Targeted Messaging: Develop tailored communications materials and campaigns to address the specific knowledge gaps identified, particularly among younger age groups.

Social Media Engagement: Establish a strong presence on social media platforms to disseminate accurate information, address misconceptions, and effectively engage with the public.

Collaboration with Barbados Water Authority: Collaborate closely with the Barbados Water Authority to leverage its perceived leadership role in wastewater management and utilize it as a credible source of information.

Public Awareness Campaign: Design a comprehensive public awareness campaign to highlight the importance of wastewater management for all households, emphasizing the health and environmental benefits.

Behavior Change Communication: Develop messaging and initiatives that promote positive attitudes toward wastewater reuse by focusing on the potential benefits and dispelling concerns or misconceptions.

Partnerships and Stakeholder Engagement: Collaborate with relevant government agencies, environmental organizations, and community leaders to amplify the reach of communication efforts and ensure a unified approach.

SUMMARY

Generally, the research findings suggest that communication capabilities can be improved by leveraging available technology, enhancing social media presence, and ensuring adequate staffing in communication roles. Internal communication processes also must be enhanced to facilitate timely decision-making and problem resolution. Development and implementation of a comprehensive communication strategy are required to address cultural attitudes and promote acceptance of recycled water. This strategy would help mitigate the impact of government policies by advocating for necessary changes and actively engaging with relevant stakeholders. Adequate funding also is needed to support communication initiatives and overcome budgetary constraints.

By implementing these recommendations, the National Communications Strategy for IWWM in Barbados can effectively educate and engage the public, promote positive attitudes and practices, and contribute to the sustainable management of water resources and wastewater in the country.

PRMR PUBLIC RELATIONS CONSULTANTS

Leading Agency In
Communications for Development

APPENDIX B
Stakeholders KAP Survey Report

KNOWLEDGE, ATTITUDES & PRACTICES (KAP) SURVEY TO DEVELOP A NATIONAL COMMUNICATIONS STRATEGY (AND ASSOCIATED IMPLEMENTATION PLAN) FOR INTEGRATED WATER AND WASTEWATER MANAGEMENT (IWWM) IN BARBADOS

Prepared by:

CONTENTS

BACKGROUND

The knowledge, attitude, and practice (KAP) survey was developed by **PRMR Inc.** based on documents provided by the Environmental Protection Department (EPD). The KAP survey will be used along with desk research and a SWOT analysis of stakeholders to develop a National Communications Strategy (and Associated Implementation Plan) for Integrated Water and Wastewater Management (IWWM) in Barbados.

After initial submissions and revisions, the survey instrument (Appendix A) was approved for administration to stakeholders provided by the EPD and the general public. The Director of the EPD, Mr. Anthony Headley, sent an email to 38 organizations introducing **PRMR Inc.** and inviting officials of the organizations to participate in the survey. **PRMR Inc.** conducted the interviews with these stakeholders and Caribbean Development Research Services was hired to conduct the survey among the public.

DATA COLLECTION AND SAMPLING

A purposive sample of EPD stakeholders was used for the KAP. **PRMR Inc.** contacted executives from all the organizations about participating in the survey. Thirty-one (31) persons from 11 organizations participated, representing the following organizations:

BADMC
KOSCAB Coca-Cola/Barbados Bottling Company Ltd.
Barbados Water Authority
Best-dos Santos Public Health Laboratory
Economic Affairs Division
Environmental Protection Department
Ministry of Agriculture, Food, and Nutritional Security
Ministry of Environment and National Beautification, Green and Blue Economy
National Housing Corporation
Project Management Coordination Unit
S. I. R. Water Management (Barbados) Limited

The stakeholder survey results provide interesting insights into the knowledge, attitudes, and practices of the respondents regarding wastewater management. Overall, it appears that the respondents have a good understanding of the importance of wastewater management and its impact on the environment and public health.

One notable finding is that although the majority of persons (68%), responded that Barbados has a wastewater plan, 52% of respondents disagreed or strongly disagreed that Barbados has an adequate waste management policy. However, most respondents (75%) were aware of the need to treat wastewater before it is reused, but with just two treatment plants on the island, more information and investment in wastewater treatment infrastructure might be necessary in some communities.

Regarding attitudes toward wastewater management, it is encouraging to see that the majority of respondents (83%) believed wastewater management is important for households. Additionally, many respondents (68%) believed that it is the responsibility of both the government and individuals to manage wastewater because 100% agreed that a national water policy is important and 91% agreed or strongly agreed that they are annoyed when wastewater is discharged directly into the environment.

The survey also revealed some interesting findings regarding the practices of the respondents when it comes to wastewater management. For example, the majority of respondents (75%) reported that they dispose of household wastewater through a suck well or septic tank, and a significant minority (16%) reported that they did not reuse domestic wastewater. Given the scarcity of Barbados' water this might suggest that policies, education, and awareness building are needed to get more householders to recycle water. Given that the respondents of this survey belong to the informed class, the responses from the public are expected to be just as bleak for the practice of water conservation.

Overall, the results of this survey highlight the need for increased investment in wastewater treatment infrastructure and education on proper wastewater management practices. By improving the knowledge, attitudes, and practices of individuals and communities, we can better protect the environment and public health from the harmful impacts of improperly managed wastewater.

Herein are the results of the stakeholder survey.

SURVEY RESULTS

DEMOGRAPHIC INFORMATION

The Knowledge, Attitude and Practices (KAP) Survey was completed by 31 persons, 68% male and 32% female. Just 6% had no more than a secondary education (1 male and 1 female), while 94% had a tertiary education, with 80% being from the public sector and 20% from the private sector. In terms of sectors, 12% worked in agriculture, 15% industrial, 26% service, and 12% health. Regarding housing, 82% owned their homes, while 18% rented. Although we asked about the housing situation, which we thought might influence some of the answers, all the respondents were participating in their work capacity.

KNOWLEDGE

Q12. Do you know whether Barbados has a wastewater management plan?

A majority of participants, 68%, responded that there is a wastewater management plan (Figure 1). Persons who worked in the public sector were more likely to answer in the affirmative as to whether there was a plan, while persons in the private sector tended to answer that they didn't know (Figure 2).

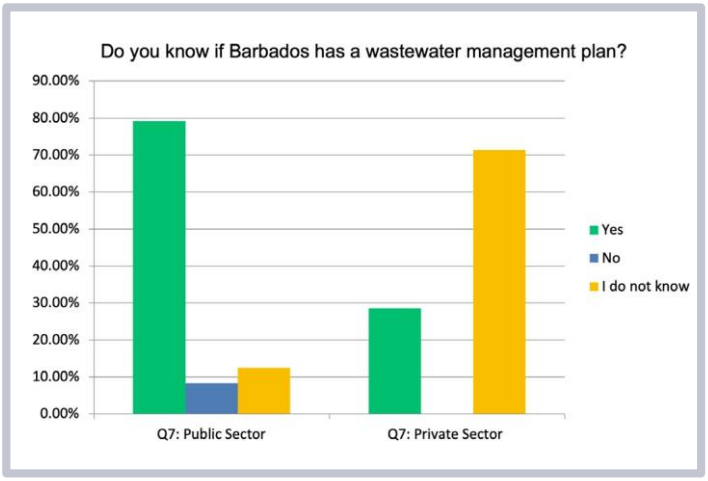

Figure 1. General Knowledge of a Wastewater Management Plan

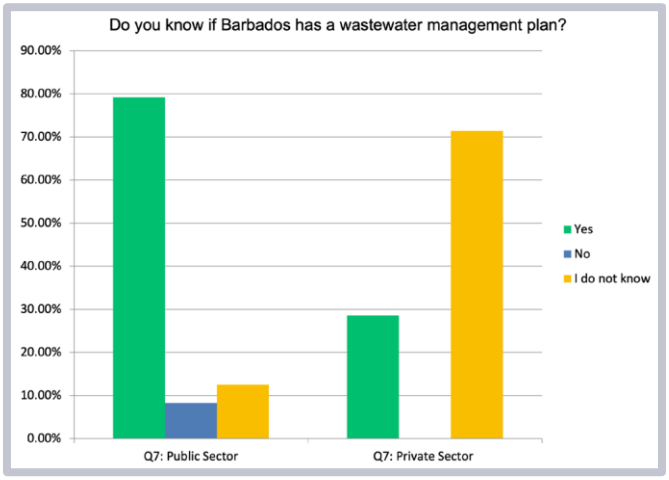

Figure 2. Sectors Knowledge of a Wastewater Plan

Q 13. Do you know how wastewater is currently managed?

The majority of respondents, 90%, responded in the affirmative to whether they knew how wastewater is currently managed (Figure 3).

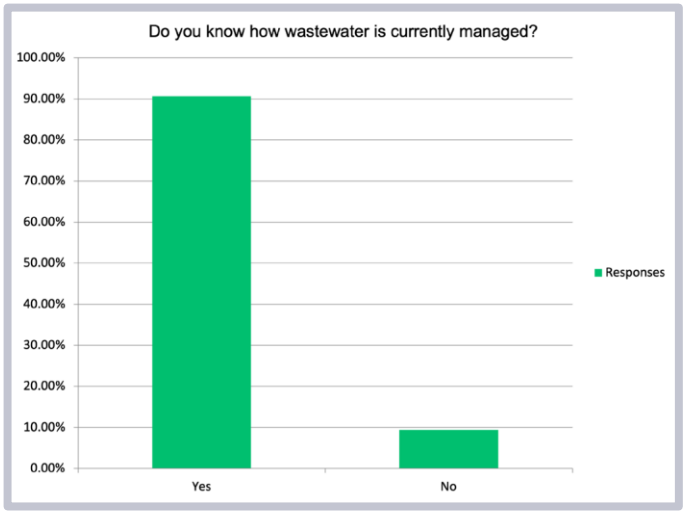

Figure 3. Knowledge of How Wastewater is Currently Managed

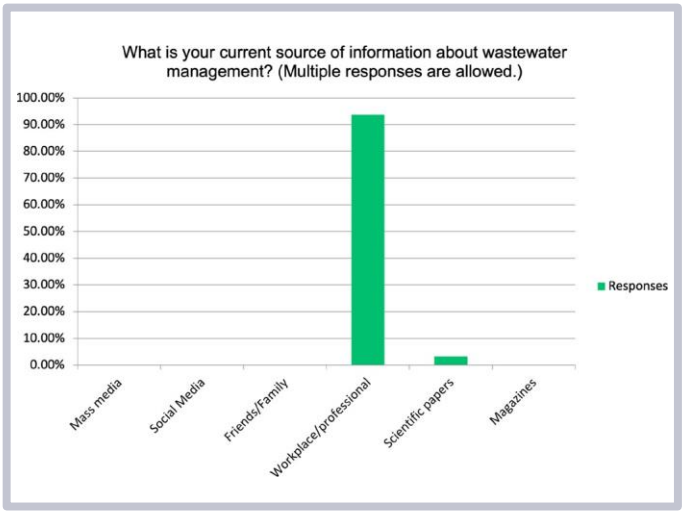

Figure 4. Sources of Information about Wastewater Management

Q15. Do you treat wastewater at home?

The majority of respondents (Figure 5) did not treat wastewater at home. However, 29%, who were all male from the private sector (Figure 6), said they treated wastewater.

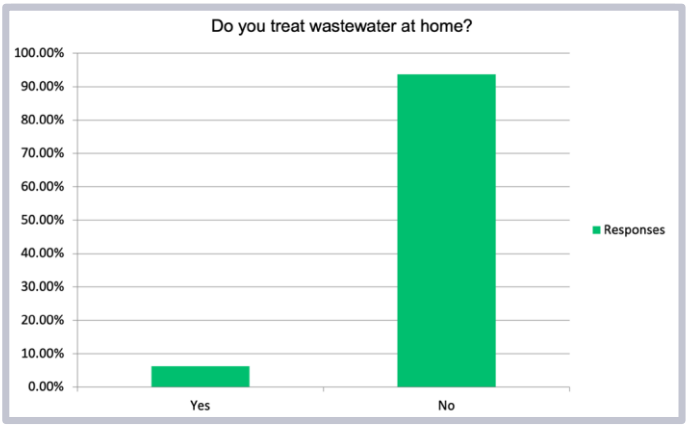

Figure 5. Treating Wastewater at Home

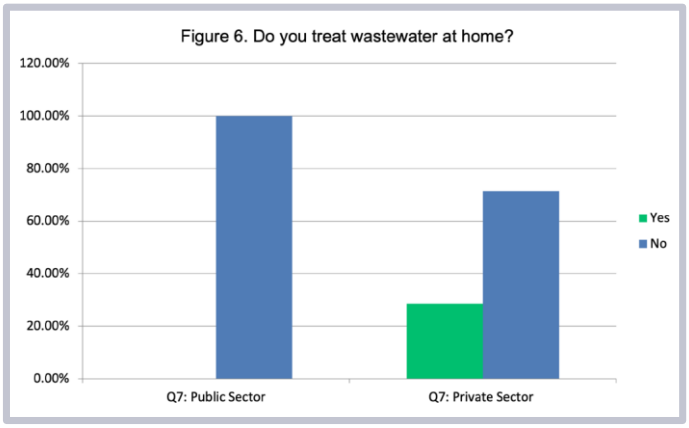

Figure 6. Sector Treatment of Wastewater

Q16. Reuse of Wastewater

In terms of reusing water at home, 19% said they did, while 81% said they didn't (Figure 7). The individuals answering in the affirmative were 14% male and 27% female, with 19% (5) being homeowners, with just one individual, who was a tenant, answering that they did. Also, 42% of those who reused were from the private sector and 12% from the public sector (Figure 8).

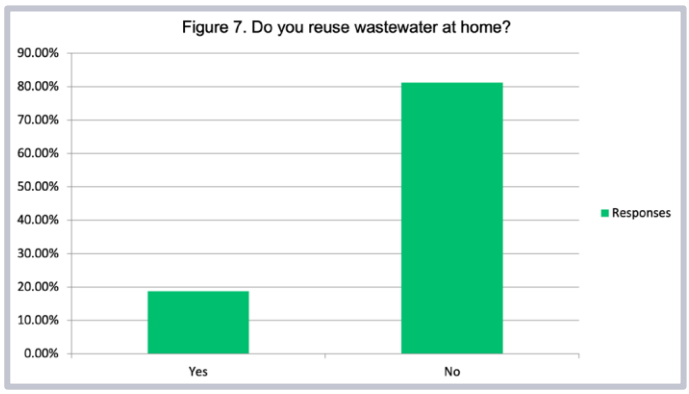

Figure 7. Reuse of Wastewater at Home

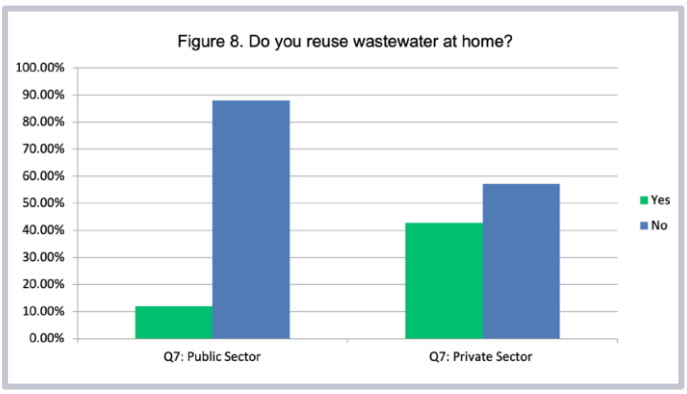

Figure 8. Sector Reuse of Wastewater at Home

Q17. Do you treat wastewater at your workplace?

For this question, 50% answered in the affirmative; 41% said no; and 9% said they did not know (Figure 9). Of these, all the private sector individuals treated wastewater, while just 36% of public servants said that they did at work, with 52% saying no, and 12% did not know (Figure 10). The females were evenly split in terms of knowing whether their companies treated wastewater, but the majority of the men, 52%, said that they did, while 38% said no, they didn't, and 2% did not know.

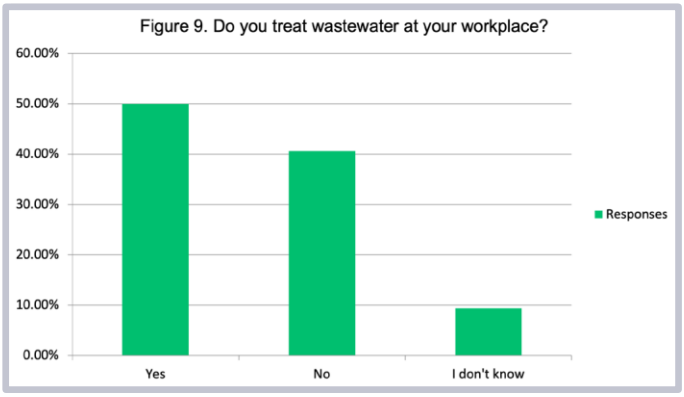

Figure 9. Workplace Treatment of Wastewater.

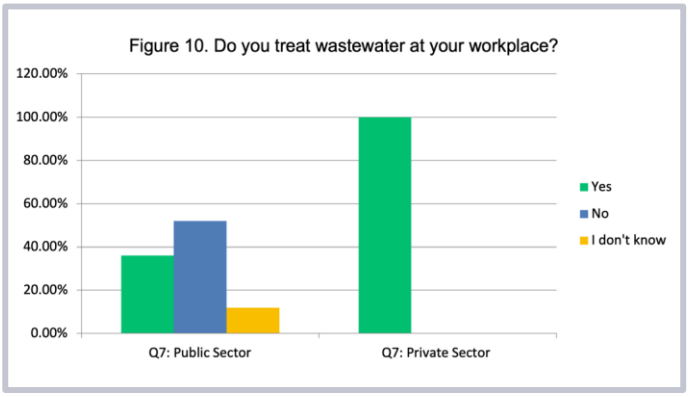

Figure 10. Sector Workplace Treatment of Wastewater

Q18. Do you reuse wastewater at your workplace?

A high percentage of respondents, 63%, said they did not reuse wastewater, while 34% said that they did, with 3% not knowing (Figure 11). Private sector respondents were more likely to reuse, accounting for 85%, compared to 20% from the public sector (Figure 12).

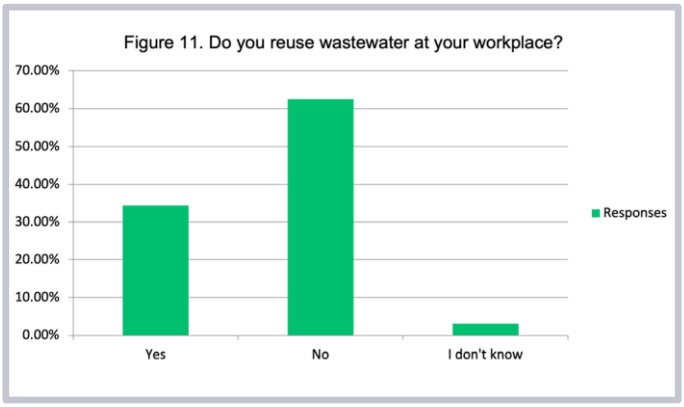

Figure 11. Reuse of Wastewater at the Workplace

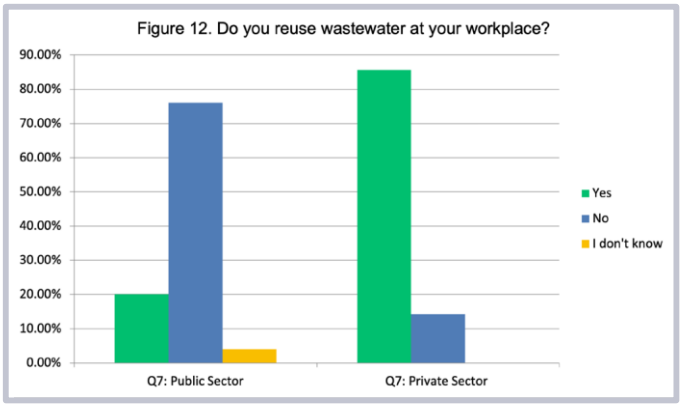

Figure 12. Sector Reuse of Wastewater at the Workplace.

Q19. Can diseases be transmitted because of improper wastewater management?
All the participants agreed that diseases can be transmitted because of improper wastewater management (Figure 13).

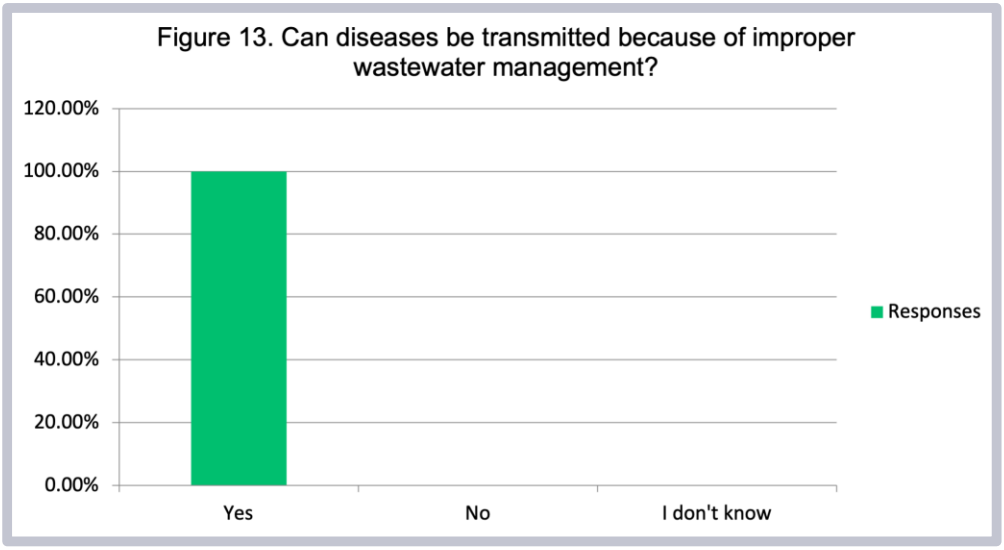

Figure 13. Improper Wastewater Management and Transmission of Diseases

Q20. Is it possible for drinking water to be cross-contaminated from wastewater sources? Just 3% of respondents said they did not know, whereas the rest answered in the affirmative (Figure 14).

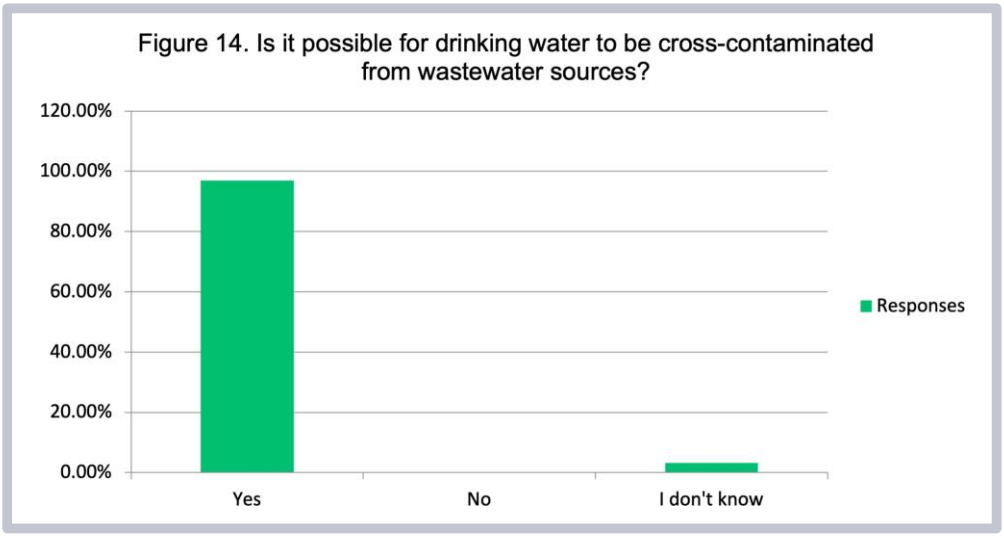

Figure 14. Drinking Water and Cross Contamination

Q21. Can wastewater from domestic sources be reused?

Of the respondents, 94% answered in the affirmative, while 3% answered no or don't know (Figure 15). In Question 22, respondents were asked to give examples of how wastewater can be reused. The following word cloud gives the answers with the most prominent answers highlighted.

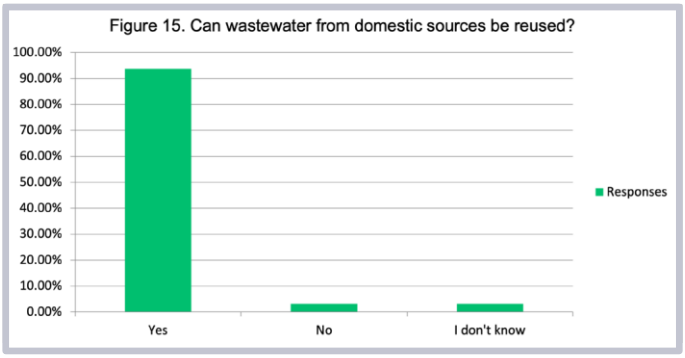

Figure 15. Reusing Wastewater from Domestic Sources

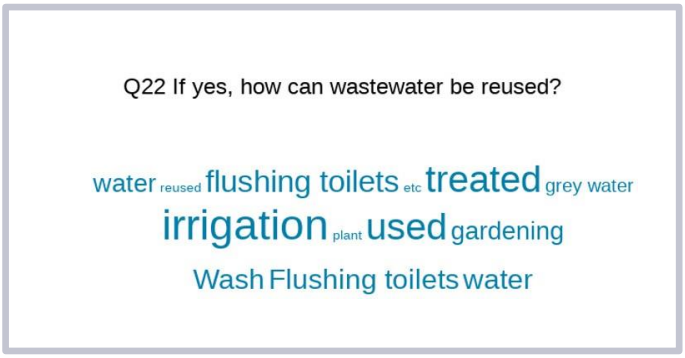

Figure 16. Ways Wastewater Can Be Reused

Q23. Should wastewater be treated before it is reused?

Eighty-eight percent of respondents answered yes that wastewater should be treated before it is reused, while 6% answered no or I don't know (Figure 17). There was no significant difference in the answers of males versus females, nor by sector to this answer.

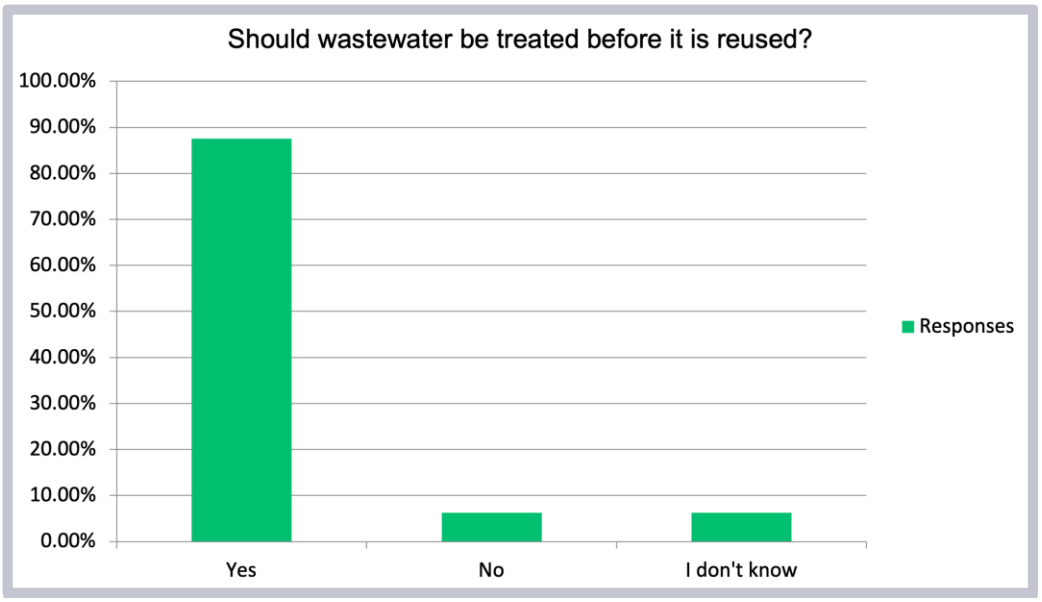

Figure 17. Treating Wastewater before Reuse

Q24. Can improperly managed wastewater serve as a breeding site for mosquitoes?

Eighty-four percent agreed that improperly managed wastewater could serve as a breeding site for mosquitoes; 6% said no, and 9%, I don't know (Figure 18). The percentage difference to the answer was also similar across sectors. However, 95% of males answered in the affirmative, whereas 66% of females answered yes, 9% no, and 27%, don't know.

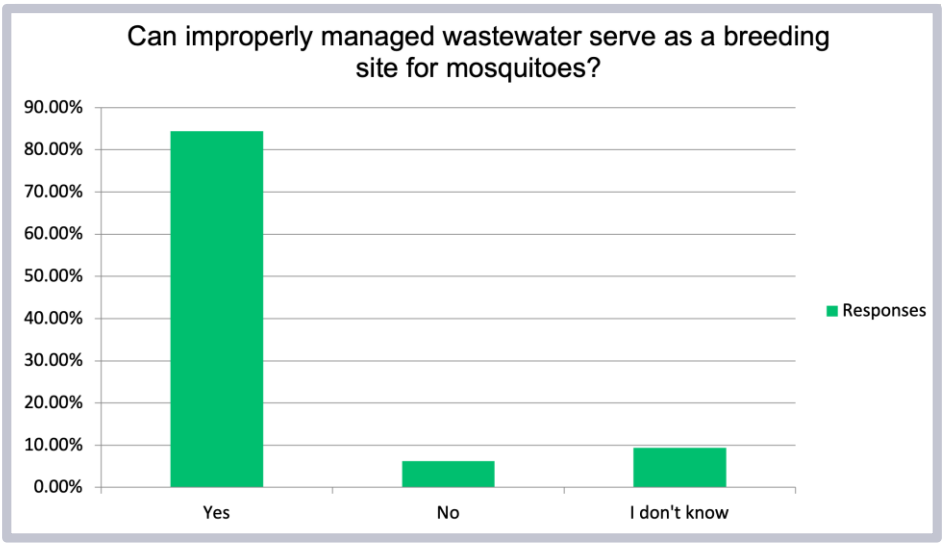

Figure 18. Improper Wastewater Management and Breeding Sites of Mosquitoes

Q25. What preventable diseases can be transmitted because of improper wastewater management?

The most frequent preventable disease mentioned was diarrhea followed by skin diseases, intestinal parasites, and dysentery (Figure 19).

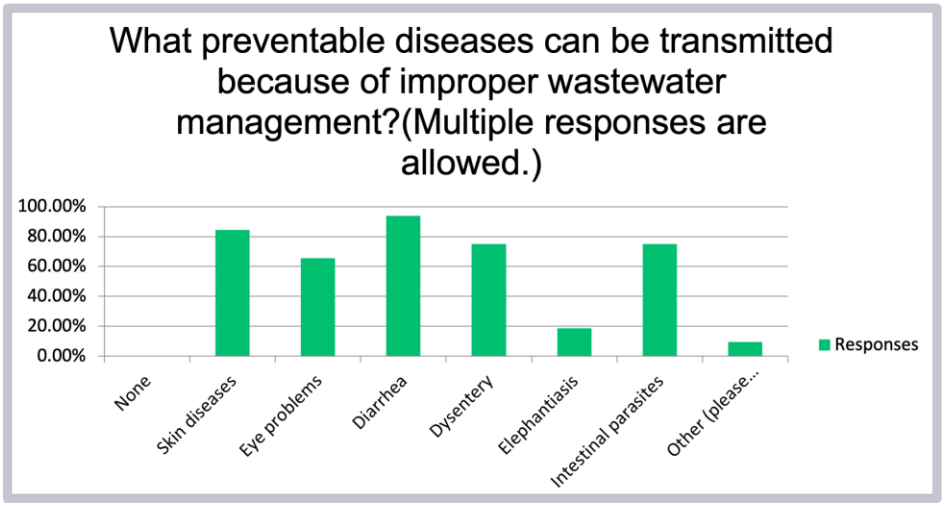

Figure 19. Preventable Diseases

Q26. Which agencies are responsible for wastewater management?

The agency mentioned most frequently as being responsible for wastewater management was the Environmental Protection Department, followed by the Barbados Water Authority and the Environmental Health Department, Ministry of Health (EHD) (Figure 20). Persons from the private sector, however, ranked this question differently. The most frequent selection was the EHD at 71%, followed by the Barbados Water Authority; EPD; Ministry of Environment; and Town and Country Planning, all at 57% (Figure 21).

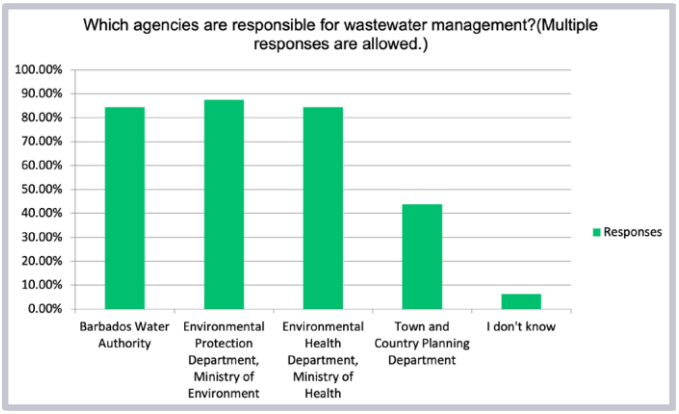

Figure 20. Agencies Responsible for Wastewater Management

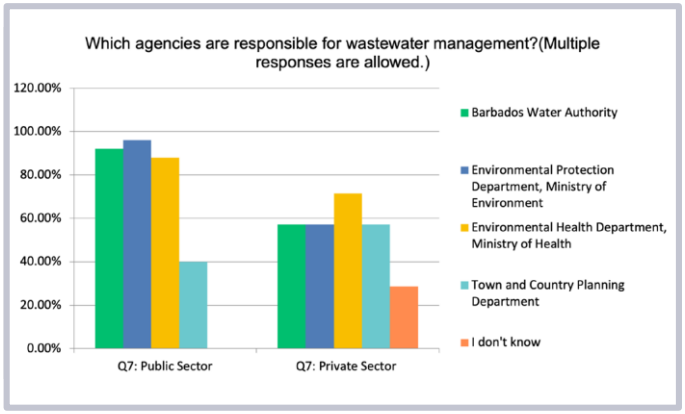

Figure 21. Sectors on Agencies Responsible for Wastewater Management

Q27. Which agencies are responsible for regulating wastewater management?

The EPD was chosen by most respondents (94%) as the regulating agency for wastewater management, followed by the EHD (66%) and Water Authority (34%; Figure 22).

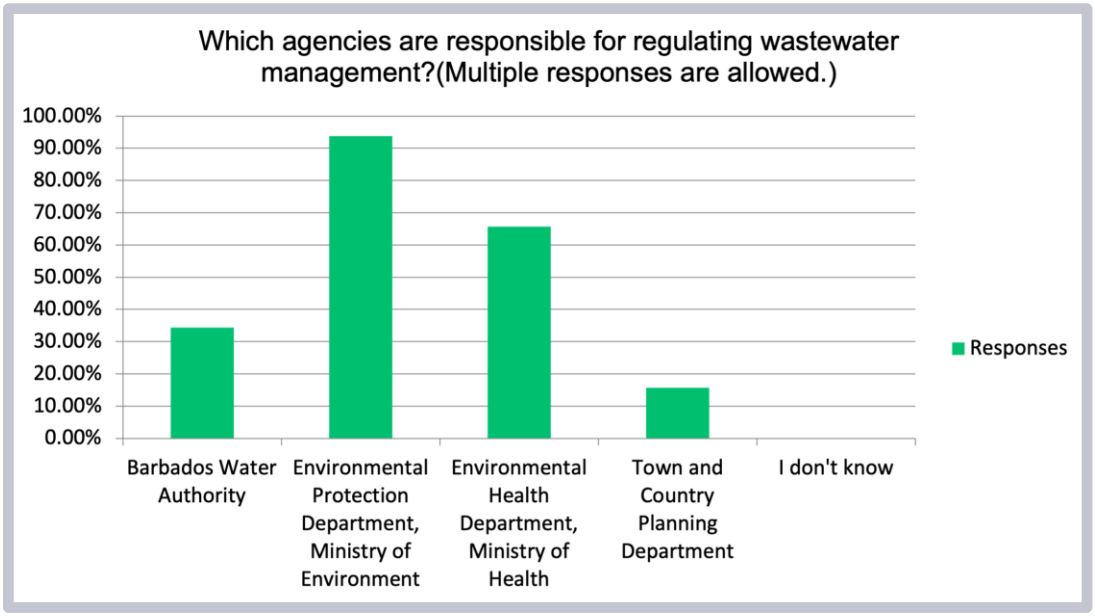

Figure 22. Agencies Responsible for Regulating Wastewater

Q28. Is wastewater management important for all households?

One hundred percent of respondents answered yes, that waste management is important for all households (Figure 23).

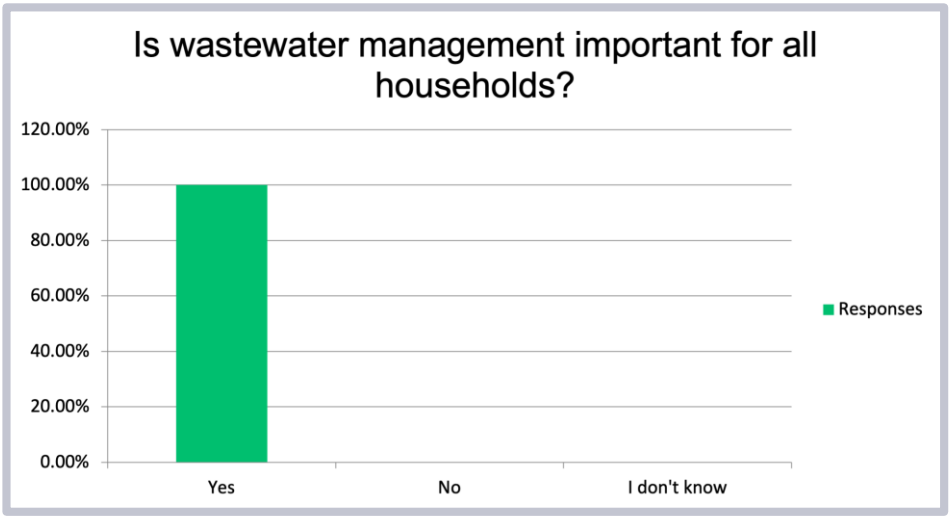

Figure 23. Importance of Wastewater Management for Households

Q29. Do you know of any wastewater management treatment plants? If so, name them.

The Bridgetown and South Coast sewage projects were the most frequent mentions. However, some private treatment projects were also mentioned. See Figure 24 below.

Figure 24. Wastewater Treatment Plants

Among males and females, Bridgetown was also the most frequent answer. However, respondents from the private sector tended to extend their answers beyond the government facilities.

Q30. Is a permit needed to sell treated water for agricultural purposes?

The majority of respondents, 59%, said that they did not know the answer to this question; 25% answered yes, and 16% answered no (Figure 25). In terms of the private sector, 57 % said yes and 43% said they did not know. In the public sector, 64% replied I don't know, 16% yes, and 5% no (Figure 26).

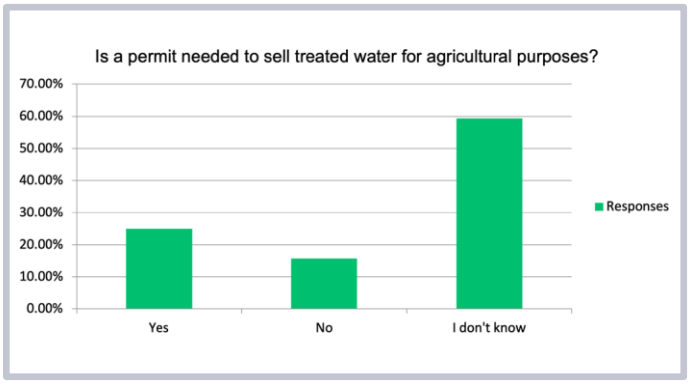

Figure 25. Selling Treated Water

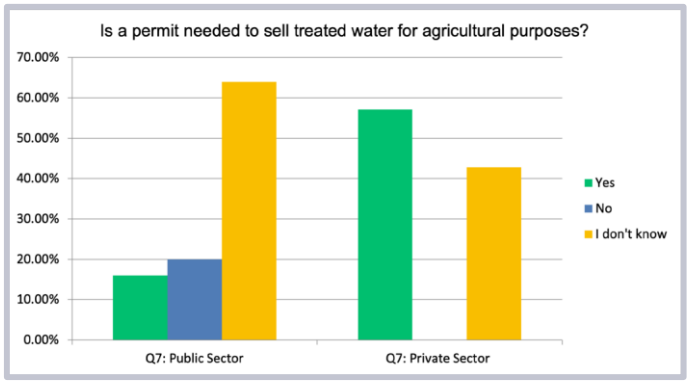

Figure 26. Sector Response to Selling Treated Water

Q31. Is a permit needed to treat wastewater?

Forty-one percent of participants responded yes, 22% no, and 38%, I don't know (Figure 27); 40% of the public sector respondents said a permit is needed; another 40% said they did not know; and 20% replied no (Figure 28).

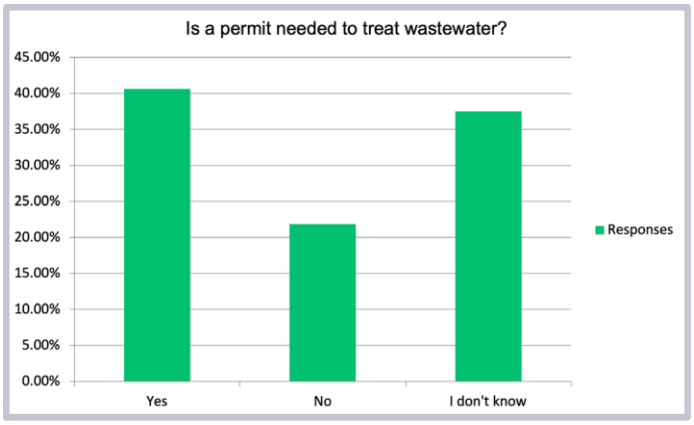

Figure 27. Wastewater Treatment Permit

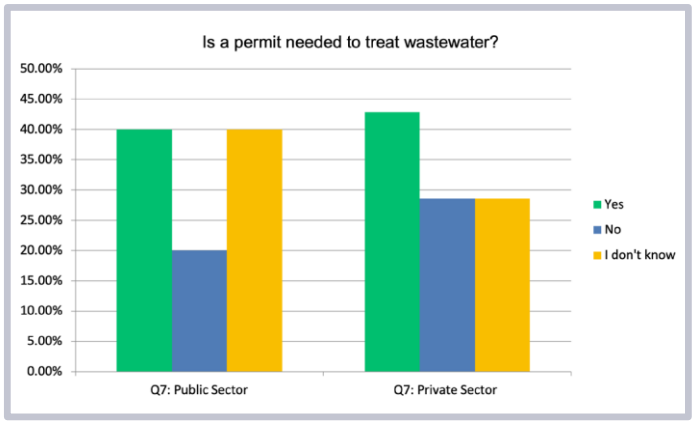

Figure 28. Sector Response to Permit to Treat Wastewater

Q32. What are the sources of wastewater?

All the sources given were selected by the respondents. Water from the hand-washing basin, shower, dishwasher, and kitchen were selected 100% of the time (Figure 29). Water from the washing machine was chosen 97% of the time, and toilets 91% of the time. Other sources given were water from manufacturing, storm water, and industrial and commercial wastewater.

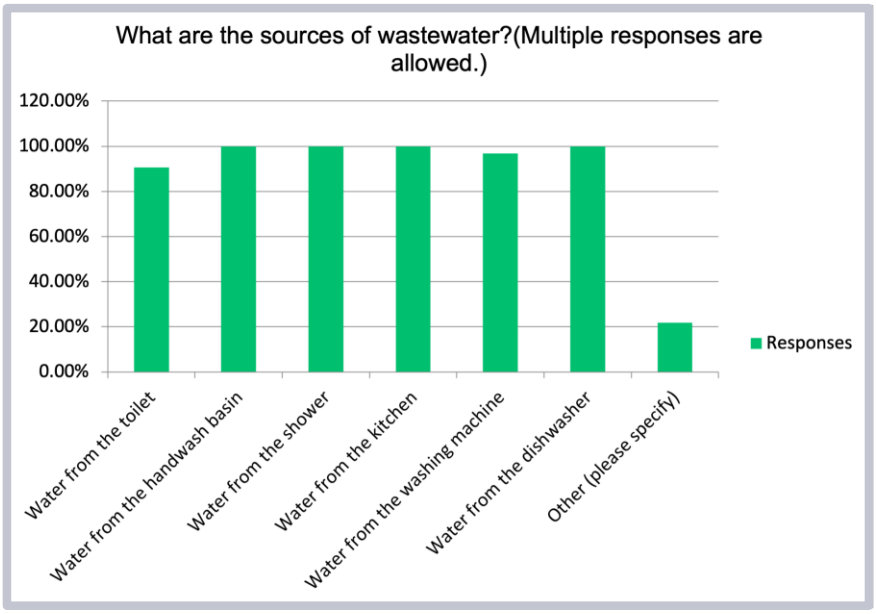

Figure 29. Sources of Wastewater

SUMMARY

Most respondents knew about wastewater management, and the primary source of information was the workplace. Only a small percentage of respondents treated wastewater or reused it at home, and the private sector was more likely to do so. Respondents agreed that diseases could be transmitted because of improper wastewater management and that wastewater should be treated before reuse. The most frequently mentioned preventable diseases due to improper wastewater management were diarrhea, skin diseases, intestinal parasites, and dysentery. The EPD was mentioned as the primary agency responsible for wastewater management and regulation. The Bridgetown and South Coast sewage projects were the most frequently mentioned treatment plants.

ATTITUDE

The attitude of the respondents toward wastewater was tested in this section using questions on a five-point Likert scale ranging from strongly agree to strongly disagree. The results can be found in Table 1.

Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Q.33 Wastewater management is important for households.	9.09	0	3.03	33.33	54.55
Q34. Wastewater management training is helpful for behavioral change in communities.	12.12	0	0	24.24	63.64
Q35. Improper wastewater management may expose you to different diseases.	12.12	0	0	15.15	72.73
Q36. Proper wastewater management is important for good health.	9.09	0	0	24.24	66.67
Q37. Barbados has an adequate wastewater management policy.	18.18	33.33	27.27	21.21	0
Q38. I worry about wastewater management.	0	12.12	27.27	39.39	21.21
Q39. I am satisfied with the current wastewater management at my facility.	3.03	27.27	33.33	18.18	18.18
Q40. I am satisfied with the wastewater management in my area.	9.09	45.45	30.3	12.12	3.03
Q41. I am annoyed when wastewater is discharged directly into the environment.	3.03	0	6.06	48.48	42.42
Q42. I worry about access to wastewater management services.	0	18.18	33.33	39.39	9.09
Q43. I am satisfied with wastewater disposal through the current method.	21.21	48.48	21.21	6.06	3.03
Q44. I think wastewater has value.	0	0	0	36.36	36.36
Q45. I believe a national water reuse policy is important for Barbados.	0	0	0	12.12	87.88
Q47. I would feel comfortable using reclaimed water.	3.03	3.03	24.24	51.52	18.18

Table 1 Question to Test Respondents' Attitudes toward Wastewater Management (%)

Q33. Wastewater Management is Important for Households.
The majority of respondents (54.6%) strongly agreed that wastewater management was important for households.

Q34. Wastewater management training is helpful for behavioral change in communities.
The majority of respondents (63.6%) strongly agreed that training is helpful for behavioral change in communities.

Q35. Improper wastewater management may expose you to different diseases.
Most respondents (72.7%) strongly agreed that wastewater management can expose you to different diseases.

Q36. Proper wastewater management is important for good health.
Most respondents (66.7%) strongly agreed that proper wastewater management is important for good health.

Q37. Barbados has an adequate wastewater management policy.
Respondent were divided on whether Barbados has an adequate wastewater management policy: 18% strongly disagreed, 33% disagreed, 27.2% were neutral and 21.2% agreed.

Q38. I worry about wastewater management.
Most of the respondents (60%) strongly agreed or agreed that they worry about wastewater management.

Q39. I am satisfied with the current wastewater management at my facility.
Thirty-three percent of respondents neither agreed nor disagreed that they are satisfied with the current wastewater management facility at their workplace. A combined 39% strongly disagreed or disagreed that they were satisfied, whereas 36% agreed or strongly agreed.

Q40. I am satisfied with the wastewater management in my area.
Most respondents (45%) disagreed that they were satisfied with the wastewater management in their area, whereas 9% strongly disagreed, 30% were neutral, 12% agreed, and 3% strongly agreed.

Q41. I am annoyed when wastewater is discharged directly into the environment.
The largest number of respondents (48%) agreed that they are annoyed when wastewater is discharged into the environment.

Q42. I worry about access to wastewater management services.
Thirty-nine percent of respondents agreed that they worry about access to wastewater management services; 9% strongly agreed, while 33% were neutral, and 18% disagreed.

Q43. I am satisfied with wastewater disposal through the current method.
The largest number of respondents, (48%) disagreed that they were satisfied with the current wastewater disposal method; 21% strongly disagreed while 21% were neutral, 6% agreed, and 3% strongly agreed to being satisfied.

Q44. I think wastewater has value.
All the respondents strongly agreed (64%) or agreed (36%) that wastewater has value.

Q45. I believe a national water reuse policy is important for Barbados.
All the respondents strongly agreed (88%) or agreed (12%) that a national water reuse policy is important for Barbados.

Q46. Why is a national water reuse policy important?
The most frequent answer chosen for why a national policy is important was that Barbados' water supply is vulnerable to variations in rainfall, followed by water is scarce (Table 2).

Answer Choices	
Water is abundant	0.00%
Water is scarce	45.45%
Barbados' water supply is vulnerable to variations in rainfall	51.52%
Other (please specify)	3.03%

Table 2. Why a Reuse Policy Is Important

Q47. I would feel comfortable using reclaimed water.
Most persons (52%) agreed that they were comfortable using reclaimed water; 18% strongly agreed while 24% were neutral, 3% disagreed, and 3% strongly disagreed.

SUMMARY

According to the survey responses, most respondents strongly agreed (54.55%) that wastewater management is important for households, and that proper wastewater management is important for good health (66.67%). A large percentage of respondents (63.64%) also strongly agreed that wastewater management training is helpful for behavioral change in communities, and that improper wastewater management may expose people to different diseases (72.73%). Respondents were less satisfied with the current wastewater management policies in their area and in their facility. A significant percentage of respondents were worried about access to wastewater management services (39.39%) and agreed (48.48%) or strongly agreed (42.42%) that they were annoyed when wastewater is discharged directly into the environment. Overall, the importance of proper wastewater management was recognized, but concerns remained about the adequacy of wastewater management policies and access to service.

PRACTICES

Q48. How do you dispose of household wastewater?
The majority of respondents (76%) disposed of household wastewater in suck wells (Table 3).

Suck well	75.76%
Septic tank	9.09%
Sewer system	9.09%
Reclaim on-site by treatment	0.00%
Other (please specify)	6.06%

Table 3. Disposal of Household Wastewater

Q49. How do you reuse domestic wastewater?
Most respondents (79%) did not reuse domestic wastewater. The 18% who did reuse it for gardening were split evenly across the public and private sectors (Table 4).

Answer Choices	
I do not reuse it	78.79%
I treat it	0.00%
For gardening	18.18%
Flushing toilets	0.00%
Other (please specify)	3.03%

Table 4. Reuse of Domestic Wastewater

Q50. Which of the following sources do you prefer to receive wastewater information from? The majority of respondents, 73%, said they preferred to receive wastewater information from government agencies. Other sources were the media (12%), social media (3%) and other sources such as journals (12%; Table 5).

Answer Choices	
Government agencies	72.73%
Media	12.12%
Social media	3.03%
Other (please specify)	12.12%

Table 5. Preferred Sources of Wastewater Information

Q51. Do you reuse treated black water?

The majority of respondents (76%) disposed of household wastewater in suck wells (Table 3).

Answer Choices	
Yes	6.06%
No	93.94%

Table 6. Reuse of Black Water

Q52. The two persons who answered in the affirmative to Question 51 noted that they used a sewage treatment system or primary, secondary, and tertiary treatment, and in Question 53 noted that they used the water for irrigation.

Q54. Do you reuse treated grey water?

The majority of respondents (85%) said no to this question (Table 7).

Answer Choices	
Yes	15.15%
No	84.85%

Table 7. Reuse of Grey Water

Q55. If yes, how do you treat it?

Some of the answers given were wastewater treatment plant; sewage treatment system; and primary, secondary, and tertiary treatment.

Q56. For what purpose do you use to treat grey water?

The most frequent answer given was for irrigation and gardening, followed by washing outside areas such as yards and patios.

SUMMARY

Based on the given information, the majority of respondents (75.76%) dispose of their household wastewater by using a suck well. Only a small percentage use a septic tank (9.09%) or a sewer system (9.09%). No one reported reclaiming wastewater on-site by treatment.
Regarding the reuse of domestic wastewater, the majority of respondents (78.79%) reported not reusing it at all. Among those who reused it, 18.18% used it for gardening, and 3.03% reported other purposes.

In terms of receiving information about wastewater, the majority of respondents (72.73%) preferred to receive it from government agencies. Only a small percentage reported preferring information from the media (12.12%) or social media (3.03%).

Only 6.06% of respondents reported reusing treated black water, while 93.94% reported not reusing it. Among those who reused it, two respondents noted that they used sewage treatment systems with primary, secondary, and tertiary treatment, and that they used the water for irrigation.

A slightly higher percentage of respondents (15.15%) reported reusing treated grey water. Some respondents reported treating grey water by using wastewater treatment plants or sewage treatment systems with primary, secondary, and tertiary treatment. Those who reused grey water reported using it for irrigation and gardening and for washing outdoor areas such as yards and patios.

APPENDIX

Consent Form

The Ministry of Environment and National Beautification, through the Organization of America States (OAS), has contracted PRMR Inc. to develop a communications strategy and implementation plan for the CReW+ water project in Barbados. CReW+ is an integrated approach to water and wastewater management using innovative solutions and promoting financing mechanisms in the Caribbean region. By building on the frameworks and lessons of earlier projects, CReW+ will implement small-scale, local, rural, and community-based technological solutions for integrated water and wastewater management. The primary aim of this study is to assess the knowledge, attitude, practice, and associated factors regarding reclaimed water and water products among Barbadian residents. *Reclaimed water means effluent that has been adequately and reliably treated so that, as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater.*

Participation is not obligatory. We selected study participants from organizations in academia, tourism, and the agricultural, industrial, and residential sectors. You have the right to withdraw consent and discontinue participation at any time. You may or may not benefit from the survey, but there are no risks to participating. To obtain accurate information, this survey is confidential, and you will not be personally identified in this research. The information will be used for research purposes only. We kindly request you complete the questionnaire, which will take a maximum of 30 minutes. All the information given to us will be coded for anonymity. Only the principal investigator and data collector will have access to the data.

Are you volunteering to participate in the survey? **1. Yes** **2. No**

Thank you in advance for your participation!

Knowledge, Attitude, and Practices (KAP) Survey Integrated Water and Wastewater Management in Barbados

Questionnaire for the study of the assessment of KAP regarding reclaimed water and water products among Barbadian residents.

Definitions

Black water: *Water from toilet flushing.*

Effluent: *Unless otherwise provided, effluent refers to treated wastewater flowing out of a wastewater treatment facility.*

Grey water: *Water from showers, handwashing, kitchen sinks, and laundry.*

Reclaimed Water: *Reclaimed water means effluent that has been adequately and reliably treated so that, as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater.*

Treat: *An interaction with wastewater that causes it to improve its quality, whether biological, mechanical, or chemical.*

Wastewater: *A combination of one or more domestic effluents consisting of black water and grey water; water from commercial establishments and institutions, including hospitals; industrial effluent, stormwater, and other urban runoff; or agricultural, horticultural, and aquaculture effluent. Wastewater includes any water that has been used by human activities and contains dissolved and/or suspended pollutants. It may contain pollutants such as excessive nutrients, pathogens, and viruses.*

Part I: Sociodemographic Characteristics of the Respondent The following questions are targeted to differentiate your sociodemographic characteristics.			
No.	**Question**	**Response**	
101	Gender	1. Male 2. Female	
102	Age	_____	
103	Educational level	1. Primary 2. Secondary 3. Tertiary	
104	Occupation	1. Public Sector 2. Private Sector 3. NGO	4. Student 5. Retired 6. Other:_____

105	Sector	1. Academia 2. Agriculture 3. Industrial 4. Services	5. Tourism 6. Health 7. Other:_____
106	Housing	1. Owner 2. Tenant	
107	Are you representing a household or business?	1. Household 2. Business	
108	If you are representing a business, please state your main product.		

Part II: Knowledge Questions
The following questions are targeted to gauge your knowledge of liquid waste management and its importance.

No.	Question	Response
201	Do you know if Barbados has a wastewater management plan?	1. Yes 2. No 3. I do not know
202	Do you know how wastewater is currently managed?	1. Yes 2. No
203	What is your current source of information about wastewater management? (Multiple responses are allowed.)	1. Mass media 2. Social media 3. Friends/family 4. Workplace/professional 5. Scientific papers 6. Magazines 7. Other: _____
204	Do you treat wastewater at home?	1. Yes 2. No
204A	Do you reuse wastewater at home?	1. Yes 2. No
205	Do you treat wastewater at your workplace?	1. Yes 2. No
205A	Do you reuse wastewater at your workplace?	1. Yes 2. No
206	Can diseases be transmitted because of improper wastewater management?	1. Yes 2. No
207	Is it possible for drinking water to be cross contaminated from wastewater sources?	1. Yes 2. No
208	Can wastewater from domestic sources be reused?	1. Yes 2. No
208A	If yes, how can wastewater be reused?	
208B	Should wastewater be treated before it is reused?	1. Yes 2. No
209	Can improperly managed wastewater serve as a breeding site for mosquitoes?	1. Yes 2. No
210	What preventable diseases can be transmitted because of improper wastewater management? (Multiple responses are allowed.)	1. None 2. Skin diseases 3. Eye problems 4. Diarrhea 5. Dysentery 6. Elephantiasis 7. Intestinal parasites 8. Other _____
211	Which agencies are responsible for wastewater management? (Multiple responses are allowed.)	1. Barbados Water Authority 2. Environmental Protection Department, Ministry of Environment 3. Environmental Health Department, Ministry of Health 4. Town and Country Planning Department

310	I worry about access to wastewater management services.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
311	I am satisfied with wastewater disposal through the current method.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
312	I think wastewater has value.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree
313	I believe a national water reuse policy is important for Barbados.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
313A	Why is a national water reuse policy important?	1. Water is abundant 2. Water is scarce 3. Barbados' water supply vulnerable to variations in rainfall 4. Other _____
314	I would feel comfortable using reclaimed water.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Part IV: Practice Questions		
The following questions are targeted to gauge your practices regarding reclaimed water management in your home. Black water is water from toilet flushing. Grey water is water from showers, handwashing, kitchen sinks, and laundry.		
No.	**Question**	**Response**
401	How do you dispose of household wastewater?	1. Suck well 2. Septic tank 3. Sewer system 4. Reclaim onsite by treatment 5. Other _____
402	How do you reuse domestic wastewater?	1. I do not reuse it 2. I treat it 3. For gardening 4. Flushing toilets 5. Other _____
403	Which of the following sources do you prefer to receive wastewater information from?	1. Government agencies 2. Media 3. Social media 4. Other: _____
404	Do you reuse treated black water?	1. Yes 2. No
404A	If yes, how do you treat it?	
404B	For what purpose do you use treated black water?	
405	Do you reuse treated grey water?	1. Yes 2. No
405A	If yes, how do you treat it?	
405B	For what purpose do you use treated grey water?	

Thank you!

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APPENDIX C
Design Concepts

Prepared by:
By Dr. Pamala Proverbs,
MD, PRMR Inc.


MR. SMART WATERMAN SAMPLES
Head of the Waterman Family Household


ALL IS WATER
DID YOU KNOW?
Reclaimed water can be used to irrigate hydroponic plants in a greenhouse.
In a hydroponic system plants are supplied water and nutrients by contact with the plant roots.


ALL IS WATER
BE SMART!
Use reclaimed water for irrigating crops.
Protect our freshwater reserve.

PRMR Inc. is a full service public relations agency located in Bridgetown, Barbados.
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