



Caribbean Regional Fund for Wastewater Management



Wastewater Management in the Wider Caribbean Region: Knowledge, Attitudes and Practice (KAP) Study

Regional Sectoral
Overview of Wastewater
Management in the Wider Caribbean Region
CEP Technical Report 62



Wastewater Management in the Wider Caribbean Region: Knowledge, Attitudes and Practice (KAP) Study



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*Promoting development with the environment in
mind.....securing a sustainable future*



Project on Testing a
Prototype Caribbean
Regional Fund for
Wastewater Management
(CreW)

DRAFT

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List of Acronyms

CARSEA	Caribbean Sea Ecosystem Assessment
CRew	Caribbean Regional Fund for Wastewater Management
GEF	Global Environmental Facility
GPA	Global Programme of Action
IADB	Inter-American Development Bank
KAP	Knowledge, Attitudes and Practice
LBS	Land Based Sources
PAHO	Pan American Health Organization
SIDS	Small Island Developing State
UNEP	United Nations Environment Programme
USVI	United States Virgin Islands
WCR	Wider Caribbean Region

Background

The United Nations Environment Programme Caribbean Environment Programme has partnered with the Inter-American Development Bank (IADB) and the Global Environmental Facility (GEF) to develop a Prototype Regional Revolving Fund which will provide sustainable financing for environmentally sound and cost-effective wastewater management projects in the Wider Caribbean Region. Funding for this project is being jointly provided by the IADB and GEF.

The objectives of this project is to improve the capacity of States in the region to fulfil the obligations of the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (also known as the Cartagena Convention) and the Protocol on the Control of Pollution from Land-Based Sources and Activities (LBS Protocol), regional agreements governing the management and control of polluting substances in the waters of the Wider Caribbean.

The majority States in the Wider Caribbean Region (WCR)¹ have ratified the Cartagena Convention and the LBS Protocol in recognition of the need for shared responses to the threats which land-based sources of pollution pose to population health, the marine environment and economic welfare.

The Cartagena Convention names domestic wastewater² as a priority pollutant and Annex III of the LBS Protocol sets out specific obligations of state parties to address the urgent and serious problem of inappropriate and ineffective wastewater treatment and management.

Numerous scientific studies, including UNEP/ Global Programme of Action's (GPA) 2006 report on the *State of the Marine Environment*, singled out untreated wastewater entering the world's oceans and seas as the most serious problem contributing to marine pollution. In the region, the recent *Caribbean Sea Ecosystem Assessment*

¹ As defined in the Cartagena Convention, the Wider Caribbean Region comprises the marine environment of the Gulf of Mexico, the Caribbean Sea and the areas of the Atlantic Ocean adjacent thereto, south of 30 north latitude and within 200 nautical miles of the Atlantic Coasts of the United States. The countries of this Region (who are also members of the Caribbean Environment Programme) are: Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Venezuela.

² The LBS Protocol defines "Domestic Wastewater" as "all discharges from households, commercial facilities, hotels, seepage and any other entity whose discharge includes the following:

- i. Toilet flushing (black water);
- ii. Discharges from showers, wash basins, kitchens and laundries (grey water); or
- iii. Discharges from small industries, provided their composition and quantity are compatible with treatment in a domestic wastewater system.

Small quantities of industrial waste or processed wastewater may also be found in domestic wastewater."

(CARSEA) study similarly found that “sewage pollution from land-based sources and from ships has been the most pervasive form of contamination of the coastal environment”.

UNEP/GPA estimates that as much as 85 percent of wastewater entering the Caribbean Sea is currently untreated. According to the Pan American Health Organization (PAHO) (2001), 51.5 percent of households in the Caribbean Region lack sewer connections of any kind and only 17 percent of households are connected to acceptable collection and treatment systems.

Within Caribbean SIDS, less than two percent of urban sewage is treated before disposal; this is even lower in rural communities. On some islands (e.g. Antigua and Barbuda, Dominica, Haiti) there is no sewerage system; sewage is disposed mainly through septic tanks and pit latrines, many of which do not comply with minimum technical specifications or are not adequately maintained.

Indeed, as a result of rapidly expanding populations, poorly planned development, and inadequate or poorly designed and malfunctioning sewage treatment facilities in most Caribbean countries, untreated sewage is often discharged into rivers and bays. This practice has serious repercussions to human health, marine life and ecosystem services, and the already fragile economies. There is thus an urgent need to increase wastewater treatment in the Wider Caribbean, which is presently far below required levels.

While countries increasingly recognize the importance of improving wastewater management, obstacles exist to meeting the obligations of the LBS Protocol and taking such steps necessary to address the problems. UNEP/ GPA reported in the 2006 *State of the Marine Environment Report* that significant financial constraints exist and that there is a lack of adequate, affordable financing available for investments in wastewater management in the Wider Caribbean Region. Smaller communities, in particular, often find it difficult to obtain affordable financing improving wastewater infrastructure.

In addition to financial constraints, other substantial barriers exist: inadequate national policies, laws and regulations; limited enforcement of existing laws and regulations; poor communication and collaboration between various sectors and agencies which contributes to a fragmented approach to wastewater management; and limited awareness, knowledge and understanding of appropriate, alternative and low cost wastewater treatment technologies. Other limitations in technical capacity (e.g. in developing project proposals, operating and maintaining treatment systems, and monitoring and analyzing wastewater discharges and impacts) constrain progress in effectively managing wastewater.

Furthermore, wastewater treatment is considered by many water utility managers and stakeholders as a low priority. In most cases, provision of a reliable and safe potable water supply ranks first, with the second priority being the collection of sewage by means of covered sewerage systems, and wastewater treatment being the least important.

Most countries in the region have failed to take a long-term, integrated approach to wastewater management and few have made adequate budgetary provisions for and investments in sewerage infrastructure, policy reform and public education. Thus, countries often engage in “opportunistic capital planning” based on the availability of funding from donors or governments, and not on best value and net economic benefit.

It is within this context that the development of innovative financial mechanisms and affordable financing to assist countries within the WCR constitutes a very high priority. This is critical to support, expand or establish domestic wastewater management programmes and policies; and to finance cost effective, sustainable and environmentally acceptable wastewater management facilities that meet the needs of communities and other stakeholders.

The Prototype Regional Revolving Fund is being piloted as a possible modality for providing sustainable financing for wastewater management projects in the region while also addressing key capacity constraints within existing legal, institutional, policy frameworks for wastewater management.

Overall, the CReW Project will consist of four components:

- **Component 1:** A flexible and innovative investment and financing mechanism;
- **Component 2:** A policy reform component in support of improved wastewater management, including institutional and legal strengthening and capacity building, as well as public awareness and information exchange;
- **Component 3:** Regional dialogue, linkages, coordination, communications and liaison between CReW staff, counterpart agencies, implementing partners, related programmes and relevant Caribbean stakeholders;
- **Component 4:** A project management component, under which a governance structure would be established as the primary coordination mechanism for launching and implementing the CReW.

This consultancy will assist in designing the most effective intervention by providing needed technical input into the development of the full GEF Project Proposal for a Caribbean Regional Fund for Wastewater Management (CreW). This will be done by:

- Conducting a situational analysis of wastewater management in the Wider Caribbean Region, with particular emphasis on wastewater technologies, policy and legislation for wastewater management;
- Preparing a gap analysis to be derived based on the situation with respect to the management of wastewater in the Region and international best practices related to wastewater management with an emphasis on small island developing states (SIDS);
- Examining knowledge, attitudes and practices regarding wastewater management as well as the modes of information dissemination within the Wider Caribbean region. This analysis will inform the development of a public education and communication strategy on wastewater issues in the Region.

A Snapshot of Wastewater Management Issues in some WCR Countries

The table below provides a snap shot of some issues related to wastewater management in selected WCR countries. The information contained herein is based on a survey instrument administered in November 2009 at a workshop in Cuba entitled, “Terminal Lessons Workshop for GEF Contaminated Bays and Regional Verification for GEF CReW Projects” at one administered at the “18th Caribbean Water and Wastewater Association Conference” held in St. Thomas in the USVI in October 2009.

WCR Country	Key Wastewater Management Issues/Problems
Antigua and Barbuda	<ul style="list-style-type: none"> • Discharge of sewage effluent (untreated) from septic tanks and sewage treatment plants • No proper enforcement programme for wastewater discharge
Aruba	<ul style="list-style-type: none"> • Not all sewage systems are connected to the wastewater treatment facilities (most of them are) • Septic trucks discharge wastewater in illegal places (this is reducing due to new facility that has been constructed specifically for septic tanks) • The polluters are not paying • Lack of legislation and enforcement • Lack of awareness by the general public of wastewater management issues
Bahamas	<ul style="list-style-type: none"> • Need a comprehensive plan for wastewater • Old treatment plants (6 public plants and many private plants at hotels, businesses, condos – supposed to be monitored by Department of Environmental Health Services) • Wastewater is given low focus compared with water. The focus is on providing everyone with water then deal with sewage.

WCR Country	Key Wastewater Management Issues/Problems
	<ul style="list-style-type: none"> • Septage and sludge facility has become a generic liquid waste facility – overwhelmed. • Rates for septage disposal are low - \$11 per truck – therefore no profit in managing septage leading to low focus • Sewer rates are artificially low and based on fixtures, not flows (therefore not equitable or appropriate) • BWS is currently governed by Water and Sewage Act. There is a move to separate the regulatory function from the service provision/utility function.
Barbados	<ul style="list-style-type: none"> • Financing for maintenance of wastewater treatment systems • Human capacity (numbers and technical skills) for monitoring and maintenance • Inadequate treatment of domestic wastewater • Cost of installation of wastewater systems due to the spatial distribution of development
Belize	<ul style="list-style-type: none"> • Incomplete treatment of industrial effluent due to technology and capacity shortfalls • Booming tourism industry – more resorts being built in coastal and off-shore sites • Inadequate treatment of municipal wastewater
Cuba	<ul style="list-style-type: none"> • Inadequate coverage of sewage and wastewater treatment • Defectiveness of some sewerage systems (leakage, tears, insufficient capacity of collectors, obstructions, illegal interconnections, stormwater runoff, operational problems of pumping stations among others) and its existence in part in many cases • Deterioration of processing systems due to lack of maintenance and rehabilitation • Insufficient implementation of a system of regular

WCR Country	Key Wastewater Management Issues/Problems
	<p>monitoring</p> <ul style="list-style-type: none"> • Insufficient reuse of treated wastewater • Employment of obsolete technologies • Evidence of organizational and technological indiscipline in industry • Practices of cleaner production has been incorporated only partially
Grenada	<ul style="list-style-type: none"> • Inadequate infrastructure – no treatment plants
Guyana	<ul style="list-style-type: none"> • Untreated and poorly treated sewage • Lack of water treatment facilities • Discharge of waste from distilleries • Surface runoff (pesticides) • Operation and maintenance of sewer system
Haiti	<ul style="list-style-type: none"> • Industries/companies without wastewater treatment • Lack of drainage in “new” neighbourhoods without control or urban infrastructure • Lack of industrial and community wastewater treatment plants • Lack of application of existing legislature • Lack of awareness in the public and private sector
Jamaica	<ul style="list-style-type: none"> • Lack of adequate numbers of sewage treatment plants. • Majority of plants treat only to secondary level • Low or no maintenance of existing plants • Improper planning/development practices • Lack of adequate enforcement of existing legislation
Trinidad and Tobago	<ul style="list-style-type: none"> • Release of untreated wastewater into receiving environment • Aging infrastructure that is below required capacity • Increase in number of private wastewater treatment plants that are not supervised by state

WCR Country	Key Wastewater Management Issues/Problems
	<p>agency; many dysfunctional</p> <ul style="list-style-type: none"> • Increase of industrial wastewater production as new industries begin operation – industrial estates • Increase in thermal pollution in addition to nutrient pollution • Use of chemical pesticides in agricultural lands has increased • Increase in aggregate demand under 150 ha are not controlled by environmental law (no EIA required) • Increased hillside development has led to increased stormwater run-off and flash flooding in capital city

The main wastewater management issues and problems (most pressing) highlighted in the table could be grouped according to similarity of issue among countries. The management issues/problems could be categorized into the following issues:

1. Poor attitudes and low levels of awareness of wastewater management issues
2. Poor practices
3. Low levels of enforcement
4. Need for improvements in legislative and policy frameworks
5. Low levels of capacity
6. Old infrastructure and technologies

The table below shows each of the categories above aligned by country show similarity of issues faced by countries in wastewater management. The numbers 1 to 6 in the first row of the table correspond to the issues highlighted in the bulleted list above. The table below shows that participants felt that poor attitudes and low levels of awareness of wastewater management issues coupled with poor practices and old infrastructure and technologies were the most pressing concerns of countries. Low levels of capacity (technical) were cited as the least concern of participants. Much of the discussion defined here appears in the analysis in the KAP.

Country	1	2	3	4	5	6
Antigua and Barbuda						
Aruba						
Bahamas						
Barbados						
Belize						
Grenada						
Guyana						

Country	1	2	3	4	5	6
Haiti						
Trinidad and Tobago						
Jamaica						
Cuba						

Introduction – Purpose of Report

In order to improve wastewater management, it is widely accepted that there needs to be a new emphasis on changing attitudes of key decision makers and increasing public consciousness of wastewater and health issues and acceptance of appropriate technologies and practices. Also, it is essential to leverage the scarce resources in the region by pooling expertise and sharing knowledge in the specialized areas required for proper wastewater management and sanitation. This can help to support on-going data-gathering, formulation of policy recommendations and promoting the adoption of policy changes. To complement this institution-building dimension, must be public awareness and incentives for changes in behaviour.

This report presents an analysis of the knowledge, attitudes and practices pertaining to wastewater management in the Wider Caribbean Region.

Defining KAP

A KAP survey is a representative study of a specific population to collect information on what is known, believed and done in relation to a particular topic — in this case, wastewater management in the Wider Caribbean. In KAP surveys, data are collected orally by an interviewer using a structured, standardized questionnaire or by conducting surveys of written information contained in reports to glean key pieces of information. These data then can be analysed quantitatively or qualitatively depending on the objectives and design of the study. A KAP survey can be designed specifically to gather information about wastewater management practices, but it may also include questions about environmental conditions in the WCR.

Essentially, the report identifies:

- the level of awareness about wastewater management concepts, issues and technologies
- perceptions of wastewater management issues
- attitudes towards implementing proper practices
- types of wastewater handling practices currently used

The document also examines the capacity of countries in the region to collect and share information, data and best practices related to wastewater management and the avenues used for communicating this information within the sector and with the general public.

The analysis conducted for this report is designed to provide a basis for recommending targeted awareness programmes and activities at the local, national and regional levels

and the development Terms of Reference for a comprehensive Communication Strategy on wastewater management which builds on principles from the GEF IW:LEARN programme. It also will provide a basis for the development of Terms of Reference for establishing and maintaining a basin-wide knowledge and information system/ clearing house mechanism of tools and approaches for wastewater management that are effective and appropriate to the expectations and context of the beneficiaries in the Wider Caribbean.



Approach and Methodology

The methodology for preparing this KAP/clearinghouse analysis uses three approaches:

- Use of existing documents and reports
- Use of questionnaires
- Informal interviews of experts and participation in workshops/meetings

Use of existing documents and reports

Information about current practices and issues was obtained from reports documenting the state of wastewater management in countries of the Wider Caribbean Region obtained from Caribbean and international organizations. Also, reports and presentations at two regional meetings – the 18th Caribbean Water and Wastewater Association Conference and the “Terminal Lessons Workshop for GEF Contaminated Bays and Regional Verification for GEF CREW Projects” – provided valuable information. The reports were supplemented by internet research. Much of this information is included in the Situation Analysis document. The information in the reports was used to infer the level of knowledge, attitudes and practices among the countries assessed.

Use of questionnaires

Three questionnaires were used to gather data from regional representatives (see Annexes 1, 2, and 3).

Questionnaire 1 was submitted to participants at the two regional meetings to gather information related to general wastewater management issues and practices.

Questionnaire 2 was submitted to participants at the Terminal Lessons workshop to determine the state of the legislative framework in each country. Participants at both regional meetings included representatives of government agencies with responsibility for water/wastewater and environment and water utility personnel.

Questionnaire 3 was submitted to professionals in the wastewater sector to determine levels of awareness regarding wastewater and sanitation issues and practices and to gather information about public education and information dissemination practices. The questionnaires were submitted to leaders in the sector who would be aware of the national and local conditions and who could answer “on behalf of” the sector.

Informal interviews of experts and participation in workshops/meetings

At the CWWA Conference, information was obtained from informal interviews conducted with select participants, and participation in meetings and workshop sessions

such as the Caribbean Water Operators Partnership (CARIWOP) Meeting and Workshop and the CWWA Annual General Meeting.

The timeline for gathering this data precluded the possibility of administering a KAP survey among the general public to ascertain awareness levels and attitudes.

The key questions presented in the tables below will be used to assess (make inferences of) the knowledge, attitudes and practices with regard to wastewater management in the WCR. These questions will be assessed to glean knowledge, attitudes and practices in the areas of, institutional framework, legal and policy issues, technology and information and awareness. The questions presented are designed to provide information related to knowledge, attitudes or practice. This information is highlighted below.

Key Questions

Institutional Framework

Question		Question Type Knowledge or Attitude or Practice
1.	Is there a designated/ lead national authority for wastewater management?	Practice
2.	Do decision-makers develop needs-based wastewater projects, which are on par with other infrastructure priorities?	Attitude
3.	Has the country highlighted domestic wastewater/ sewage as a priority pollutant in national objectives/ sustainable development planning?	Attitude
4.	How are wastewater treatment service providers perceived?	Attitude
5.	To what extent are public authorities assisted by	Practice

Question	Question Type
other stakeholders including community groups, private development companies etc. in wastewater management?	Knowledge or Attitude or Practice
6. Are the current institutional arrangements for wastewater management at the community, local and national levels adequate?	Practice

Policy and Legislative Framework

Question	Question Type
	Knowledge or Attitude or Practice
1. Are (government) wastewater and sanitation policies, laws, regulations, guidelines adequate? Does the country have a national programme/ plan of action for Wastewater Management	Practice

Technology Issues

Question	Question Type
	Knowledge or Attitude or Practice
1. Is sanitation infrastructure considered adequate?	Practice
2. Are there adequate resources for proper construction, operation, and maintenance of sewage collection systems?	Practice

3.	How likely is it that decentralised natural treatment systems (e.g. ecological sanitation, constructed wetlands, sand filters) would be accepted as options for domestic wastewater treatment?	Attitude
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Knowledge and Awareness, Information Sharing and Clearing House Mechanisms

Question		Question Type Knowledge or Attitude or Practice
1.	To what extent are people aware of the impact of current methods of disposal on health and environment? Are people aware of the link between sewage, poor sanitation and health problems such as diarrhoeal diseases etc.?	Knowledge
2.	Do officials in government/decision makers have a comprehensive knowledge of wastewater management issues and can link these with other areas of socio-economic development?	Knowledge
3.	Are wastewater operators aware of proper operations and maintenance techniques?	Knowledge
4.	Do national, local and sectoral education and public awareness programmes and campaigns exist for wastewater management or for environmental management (which includes wastewater management)?	Practice
5.	Is there periodic assessment of short-term and long-term data-collection and research needs for wastewater management?	Practice
6.	Is there adequate access to information related to wastewater management issues for decision-making?	Practice

Explaining Knowledge, Attitudes and Practice Questions

Key Questions - Knowledge

In this area, these questions are concerned, for example, with levels of awareness about general wastewater issues and practices among the general public, knowledge among technicians in the wastewater sector and understanding of wastewater issues by local and national decision makers.

Low level of knowledge: less than 25% of persons (very few) have knowledge

Moderate level:
25% - 75 % of persons have knowledge

High level: more than 75% of persons (most) have knowledge

Negative attitude: Perceptions and attitudes toward wastewater management working against improvements in the sector

Neutral attitude: Attitudes indicating that wastewater sector could be improved if the opportunity presents itself

Positive attitude: Attitudes showing the active promotion and improvement of wastewater management

Key Questions - Attitudes

In this area, the questions include examination of the attitudes of political decision makers concerning the priority assigned to wastewater management and perceptions among the general public about certain wastewater treatment techniques.

Key Questions - Practices

In this area, the questions include actual demonstration of specific technologies, existence of relevant laws and regulations and implementation of public education initiatives about wastewater and sanitation.

Poor practices: Practices being used that are harmful to human health and the environment

Standard practices: Practices being used that meet the minimum requirements for protecting human health and the environment or include a few best practice elements which are, however, insufficient to affect the overall practice.

Best practices: Innovative practices that protect human health and the environment that could be models for other countries

Analysis of Knowledge, Attitudes and Practices related to Wastewater Management in the WCR

A comprehensive analysis of knowledge, attitudes and practices with regard to wastewater management in the WCR will be undertaken below based on the questions listed above and based on the analysis of questionnaires presented at two regional workshops.

Twenty-one countries are assessed. These answers to these questions are provided in most cases in tabular form and were based on document reviews, A Situational Analysis of wastewater management issues in the WCR; analysis of the questionnaires; and personal interviews and discussions as described above. As stated in the Approach and Methodology Section, the questions have been categorized, allowing for the analysis to be similarly categorized along the following lines - Institutional Framework; Policy and Legislative Framework; Technology Issues; and Clearing House Mechanisms/General Awareness of Wastewater Management Issues.

Institutional Framework Analysis

Characteristics of Water Service and Wastewater Management in the Region

- Diverse ownership structures with some sub-regional groupings
- Caribbean - primarily island-wide government owned utilities (Jamaica, Saint Lucia, Barbados)
- Central America— mixture of municipalities, municipal enterprises (Belize) and one private mixed-capital company (Honduras), along with some national governmental entities that provide services
- Mexico (Yucatán) – State-owned public entity, with one water and sewerage concession (Cancún)
- South America – local and regional governments and private companies (Colombia)

Practice Question

Is there a designated/ lead national authority for wastewater management? Are the current institutional arrangements for wastewater management at the community, local and national levels adequate?

Country	Poor practices	Standard practices	Best practices
Antigua & Barbuda		x	
Aruba		x	
Barbados		x	
Bahamas			x
Belize		x	
Colombia		x	
Costa Rica		x	
Cuba		x	
Dominican Republic		x	
Grenada		x	
Guatemala		x	
Guyana		x	
Haiti		x	
Jamaica		x	

Country	Poor practices	Standard practices	Best practices
Panama		x	
St. Lucia		x	
St. Vincent & the Grenadines		x	
Suriname		x	
Trinidad & Tobago		x	
Venezuela		x	

Almost all countries were able to identify lead authorities or agencies responsible for wastewater management. In most cases, wastewater management issues tended to be spread across many different entities. In determining the ranking, various criteria were assessed and a number of key issues emerged across most countries (some of these issues were more prevalent in some countries than in others – but most countries experienced at least two of the issues). Some of these issues included:

- No clear or weak legislative direction with respect to wastewater management
- Low levels of technical capacity in most agencies responsible for wastewater management
- Overlap of responsibility among various agencies and fragmented approach in the institutional framework with respect to wastewater management

For example, in Guatemala there are a multitude of government entities involved in water and sanitation and none of them has been assigned a clear leadership role in the sector.

Whilst on the one hand multiple agency responsibility is a problem and can give rise to inefficiencies, on the other hand, the various agencies oftentimes lead to a multi-stakeholder approach to the execution of certain relevant actions leading in most cases to better management of sewage - this being is evident from the development of multi-stakeholder bodies e.g. Coastal Zone Units, Environmental Protection Agencies, Water Resources Management Agencies, among others, in the various countries. These agencies interact with several other bodies including Government departments, the

water utility companies and the Solid Waste Management agencies for example to coordinate and discharge their duties. One such country example of this is St. Lucia.

Bahamas was designated a best practice as it has in place a quasi government body (organization) responsible for wastewater management whose mandate includes the development and implementation of a National Water and Wastewater Plan that reinforces Integrated Water Resource Management (IWRM) to enable good quality and expanded services, operation and maintenance of all facilities for the collection, treatment and disposal of wastewater, including opportunities for wastewater reuse, and to achieve the transfer of appropriate technology.

Attitude Question

Do decision-makers develop needs-based wastewater projects, which are on par with other infrastructure priorities?

Country	Negative Attitude	Neutral Attitude	Positive Attitude
Antigua & Barbuda		x	
Aruba			x
Barbados			x
Bahamas			x
Belize		x	x
Colombia		x	
Costa Rica	x		
Cuba			x
Dominican Republic	x		
Grenada	x		
Guatemala		x	
Guyana		x	
Haiti	x		
Jamaica			x
Panama			x
St. Lucia		x	
St. Vincent & the Grenadines	x		
Suriname	x		
Trinidad & Tobago	x		
Venezuela		x	

To determine whether decision-makers were developing needs-based wastewater projects, which are on par with other infrastructure priorities the following elements were analyzed: the existence of infrastructural and other types of sanitation-related projects geared towards meeting the wastewater management needs of the country; the amounts of resources/per capita resources put into wastewater management projects and the access to improved sanitation services by 2006 for the public.

Wastewater management projects and investments vary widely among countries & utilities in the region. Of the 20 countries analyzed, 35% of the countries showed an active promotion and improvement of wastewater management even though this sector tends to have much difficulty in attracting private capital for investments. Barbados can be cited as an example of where there is significant and on-going investment in sewage disposal facilities with the objective of stemming contamination of coastal water, preventing contamination of groundwater and generally improving the sanitary conditions on the island.

In 30% of the countries it was clear that whilst wastewater management was a priority there were a number of factors such as lack of financing, the need to do other things in the sector first (such as preparation of legislative frameworks for example) that impeded progress in larger investments. Some of these countries included Jamaica, St. Lucia and Antigua & Barbuda. In Venezuela, for example, the government approved significant quantities of money for the improvement of wastewater management projects in 2006, however there has been a lot of delays in getting the projects off the ground, whilst in Guatemala investments in water and sanitation stood at only US\$14 million or about US\$ 1 per capita, one of the lowest levels in Latin America.

Primary Source of Funding for Water and Wastewater Projects

- Caribbean – primarily annual grants to utilities from the central government although some borrowing and in one case (Grenada) financing from the national social security fund
- Central America – grants and loans from central government to local water providers
- Mexico – grants from Federal Government to state provider along with private investment from concessionaire (in Cancún)
- South America – Private sector financing thorough PPPs and public sector financing (e.g., in Colombia from FINDETER, a national government lending agency)

Attitude Question

Has the country highlighted domestic wastewater/ sewage as a priority pollutant in national objectives/ sustainable development planning?

Country	Negative Attitude	Neutral Attitude	Positive Attitude
Antigua & Barbuda			x
Aruba			x
Barbados			x
Bahamas			x
Belize			x
Colombia		x	
Costa Rica		x	
Cuba			x
Dominican Republic		x	
Grenada		x	
Guatemala		x	
Guyana			x
Haiti	x		
Jamaica			x
Panama		x	
St. Lucia		x	
St. Vincent & the Grenadines			x
Suriname	x		
Trinidad & Tobago			x
Venezuela		x	

In deciding whether wastewater, and domestic wastewater/ sewage is a priority pollutant in national objectives/ sustainable development planning of countries, the following key elements were assessed: is wastewater management incorporated in national development plans and are there strategies, indicators and targets associated with the development of this sector; the existence of national policies in wastewater management, including a National Plan of Action; levels of investment in the wastewater management sector; the adequacy of existing policies and legislation to

enable national compliance with Annex III of the LBS Protocol of the Cartagena Convention; and, political will.

50% of the countries/governments have a positive attitude towards wastewater management and there exists active promotion of proper wastewater management by at least two of the key elements assessed. Many of these countries are not more far advanced in terms of improvements in the management of wastewater due to financial constraints that limit government's ability to develop, implement and enforce the right policies and laws, to build capacity of key stakeholders among others. Guyana can be cited as one of these country examples where Chapter 18 of the country's National Development Strategy highlights sewage pollution as a major national concern and identifies wastewater management and pollution control as a priority. The policy proposes legislative reform as a critical strategy and articulates the need for the establishment of an Environmental Protection Agency (EPA) and the promulgation of the Environmental Protection Bill. Barbados for example, captures wastewater management under goal 4 (Preservation of the Environment) of its national strategic Plan 2006-2025. Its Sustainable development policy also speaks to the improvement of wastewater treatment and improvement of the environmental quality and the quality of life for all Barbadians.

In Trinidad and Tobago for example, its Vision 2020 Draft National Strategic Plan, 2005 (NDSP) presents the national strategy to guide the country to 'developed nation' status by the year 2020, and was prepared by the Vision 2020 Multi-sectoral Core Group through a process that involved extensive consultation with stakeholders in the national community. The main Plan identifies various environmental issues to be addressed including: pollution from non-functioning sewerage treatment plants; industrial effluents and oil spills; indifferent attitudes and values toward the environment; and failure to implement or enforce important environmental and natural resource management legislation. To address these issues the Plan points to the need to "apply a new set of values to the treatment of our environment"... a new "environmental consciousness", and the modification of human behaviour toward the environment through public awareness, education and regulation at all levels, and founded upon a number of tenets including:

- Respect and care for the full ecosystem
- Conservation of the vitality and diversity of the natural environment
- Changing personal attitudes and practices to manage the environment
- Empowering communities to care for their environment

Another 40% of the countries are highlighted as giving wastewater management issues more of a medium priority. However, there is evidence to suggest that if given the opportunity to improve wastewater management issues, the opportunity will be pursued. This is evidenced by the existence of some policies and legislation but with recognition that more must be done. In Guatemala for example, the National Plan of the Public Services of Potable Water and Sanitation for Human Development 2008-2011 can

be cited as an example of a policy emphasizes the importance of wastewater management. St. Lucia on the other hand does not have a national development plan or a national plan on wastewater, but respondents felt there were initiatives being taken that indicate that this will be a future direction.

Practice Question

To what extent are public authorities assisted by other stakeholders including community groups, private development companies etc. in wastewater management?

All of the countries in the WCR showed some level of involvement by community groups and private sector companies in wastewater management. For example, in many of the countries in the WCR, the tourism sector employs the use of sewage packaging plants. In some cases hotels in the sector treat wastewater and reuse it for irrigation in drip irrigation systems on golf courses and flower gardens (i.e. Sam Lords Castle, Almond Village Resorts in Barbados and the Sandals Hotel Chains in Jamaica). Some agricultural and industrial establishments across the region have installed systems to improve the quality of their wastewater prior to sub-surface discharge.

Also, in many WCR countries, there are relatively well established systems of community-based providers such as non-governmental organizations (NGOs) of water and sanitation services. One such example of this is in Guatemala.

Some other key examples of various stakeholders' involvement in the wastewater management sector include:

- In Costa Rica, the development and implementation of a pilot programme for incorporating the private sector in the provision of water and sanitation services in four medium size cities
- In Guyana, the Hinterland is served by a separate unit within Guyana Water Incorporated which provides support to community-based organizations that provide services in that part of the country
- There are a number of international and indigenous nongovernmental organizations (NGOs) working in Suriname on matters related to the environment and public health, including water supply and sanitation

It must be recognized that whilst there is involvement of the private sector and others in wastewater management, many issues remain and need to be addressed. Chief among these are poor functioning sewage treatment plants, old technologies, lack of proper laws and regulations and good policies, low levels of financing in the sector. Additionally, many treatment plants are staffed by operators who lack the necessary

technical knowledge. Many plants are simply being run mechanically but are not operating properly. There were some plants that were in fairly good working condition but are producing effluent of poor quality, most likely as a result of poor operation.

Policy and Legislative Framework

Practice Question

Are (government) wastewater and sanitation policies, laws, regulations, guidelines adequate? Does the country have a national programme/ plan of action for Wastewater Management?

Country	Poor practices	Standard practices	Best practices
Antigua & Barbuda	x		
Aruba	x		
Barbados		x	
Bahamas	x		
Belize		x	
Colombia			x
Costa Rica		x	
Cuba			x
Dominican Republic			x
Grenada	x		
Guatemala		x	
Guyana		x	
Haiti	x		
Jamaica		x	
Mexico			x
Panama		x	
St. Lucia	x		
St. Vincent & the Grenadines	x		
Suriname	x		
Trinidad & Tobago		x	
Venezuela			x

The legislative and policy framework of the countries was analyzed using the following elements: the body of laws and regulations pertaining to wastewater management; the

inclusion of wastewater management in national development plans; the existence of sanitation policies and plans; and the presence of wastewater standards.

38% of the countries in the region can be considered to have a weak policy and legislative framework, translating into poor practices; while 23% have made considerable progress and provide a comprehensive framework for wastewater management in their country.

Regional Best Practices in Policy and Legislative Framework

- Colombia
- Cuba
- Dominican Republic
- Mexico
- Venezuela

Another 38% of the countries in the region do not have national wastewater/ sanitation plans or policies. One exception is Guatemala, which has developed the National Plan of the Public Services of Potable Water and Sanitation for Human Development 2008-2011.

There is growing recognition among governments in the region of the importance of holistic national sustainable development planning and some countries in the region have national development plans all of which include environmental protection with wastewater management included as a sub-component. All countries in the region have some form of environmental legislation. However, very few have legislation specifically focusing on wastewater management. Belize is being proactive - effluent regulations are being modified to include domestic sewage.

The analysis also shows that there is fragmentation of legislative instruments for wastewater management. In most countries, there are various different legislative instruments, governing from protection of public health to conservation of ground and surface freshwater resources, which may or may not be leading to the desired outcome of better management of wastewater. In most of the English-speaking Caribbean, the Public Health Act is established to control the quality of sewage discharge, while there are separate regulations for environmental management. The Table below summaries the ideal suite of legislation for effective sewage pollution control and the extent of coverage in each country (this information was gathered during a UNEP organized workshop in Cuba in November 2009).

Status of Elements of the Ideal Suite of Legislation in the Wider Caribbean

Legislation, Regulations for:	AN	AR	BD	BH	BZ	CO	CU	DR	GR	GT	GY	HA	JA	MX	PA	SL	SU	TT	VZ
1. Emission limits	X			G													X		
2. Marine areas, fish										G									
3. Recycled water			D		P	S	S						S		S				
4. Urban ww ³ management				Y				S											
5. Agricultural pollutants						D													
6. Storm water runoff				G		D										G			
7. Pesticides				G															
8. Regulation of industry types				G													G		
9. Construction of treatment plants		X															G		
10. Marine protected areas		D																	
11. Good agricultural practices								D											
12. Levels of treatment				G				N					G						
13. Septic tanks								N	G		G				G	G	G		
14. Municipal ww standards				G												G			
15. Public education		D									S		G		G				
16. Specific pollutants																		G	
17. EMS, codes of practice					G	SV							G			G	G	G	
18. IWRM ⁴															P				

	Yes – legislation and/or regulations exist
	No – legislation or regulations do not exist
G	Only guidelines exist
X	External standards are used
D	Draft legislation or regulations exist
S	Legislation and/or regulations for some aspects exist
P	Policies or plans exist
	Unknown

AN – Antigua & Barbuda
AR – Aruba
BD – Barbados
BH – Bahamas
BZ – Belize
CO – Colombia
CU – Cuba

DR – Dominican Republic
GR – Grenada
GT – Guatemala
GY – Guyana
HA – Haiti
JA – Jamaica
MX – Mexico

PA – Panama
SL – St. Lucia
SU – Suriname
TT – Trinidad & Tobago
VZ – Venezuela

A Snapshot of Policy, Legislative and Institutional Framework Issues in Selected Countries in the WCR

The table below provides a snap shot of some issues related to policy, legislative and institutional framework issues in the WCR³ countries. The table shows that the sample countries all have similar issues with respect to the policy, legislative and institutional framework. Most of these issues relate to low levels of capacity within institutions responsible for wastewater management, lack of policies and laws or outdated laws and low levels of compliance and enforcement.

Country	Key Issues – Policy, Legislative and Institutional Framework
Antigua and Barbuda	<ul style="list-style-type: none"> Institutional capacity lack of policy and enforcement

³ The information contained herein is based on a survey instrument administered in November 2009 at a workshop in Cuba entitled, “Terminal Lessons Workshop for GEF Contaminated Bays and Regional Verification for GEF CREW Projects” at one administered at the “18th Caribbean Water and Wastewater Association Conference” held in St. Thomas in the USVI in October 2009.

Country	Key Issues – Policy, Legislative and Institutional Framework
Aruba	<ul style="list-style-type: none"> • Lack of specific environmental laws and solid and liquid waste laws • Lack of legislation and regulations
Barbados	<ul style="list-style-type: none"> • Outdated policies and laws that do not reflect the reality of present day development and the impacts from development. • Limited technical human capacity in terms of numbers of personnel
Belize	<ul style="list-style-type: none"> • Low levels of institutional capacity • Low levels of technical capacity
Guyana	<ul style="list-style-type: none"> • Low levels of institutional capacity • Lack of specific legislation for wastewater management
Haiti	<ul style="list-style-type: none"> • Low levels of institutional capacity – there is no technical staff • Inadequate laws and policies and a lack of applying those in existence • Lack of adequate labs
Jamaica	<ul style="list-style-type: none"> • Inadequate institutional capacity, training • Limited resources (financial, human)
Suriname	<ul style="list-style-type: none"> • Lack of policies and laws in regard to wastewater management
Trinidad and Tobago	<ul style="list-style-type: none"> • Need to implement more compulsory legislation, e.g. trade effluent standards • Lack of compliance with standards

Technology Issues

Practice Question

Is sanitation infrastructure considered adequate?

Country	Poor practices	Standard practices	Best practices
Antigua & Barbuda	X		
Aruba			X
Barbados		X	
Bahamas	X		
Belize	X		
Colombia	X		
Costa Rica	X		
Cuba	X		
Dominican Republic	X		
Grenada	X		
Guatemala	X		
Guyana	X		
Haiti	X		
Jamaica	X		
Mexico	X		
Panama		X	
St. Lucia	X		
St. Vincent & the Grenadines	X		
Suriname	X		
Trinidad & Tobago	X		
Venezuela		x	

To determine the status of sanitation infrastructure, the following elements were analyzed: the coverage of sewage collection throughout the country; the sewage treatment facilities available and the effectiveness of those facilities. The overwhelming majority of countries (81%) in the WCR showed poor practice with

regard to sanitation and wastewater infrastructure. In many countries, this is due to the use of old technologies and infrastructure. For example, in Grenada the system was constructed in the 1920s for lower volume and can no longer handle the country's current needs. Throughout the region, there are insufficient numbers of treatment plants and those that do exist do not function adequately, largely due to improper operation and maintenance. There are signs of pending improvement: Trinidad and Tobago's Water and Sewage Authority is committed to an infrastructure upgrade.

In Venezuela and Panama, the coverage of service provision to large segments of the population is good, however, not complete. As in many countries, coverage is concentrated in the cities and coastal areas. Access to services by rural communities is less than in urban areas. In Barbados, the entire population has its sewage collected but the deficiencies occur when the sewage is being treated. One country in the region, Aruba, could be said to have adequate sanitation infrastructure for its citizens.

Practice Question

Are there adequate resources for proper construction, operation, and maintenance of sewage collection systems?

Country	Poor practices	Standard practices	Best practices
Antigua & Barbuda	X		
Aruba		x	
Barbados		X	
Bahamas	X		
Belize	X		
Colombia		X	
Costa Rica	X		
Cuba	X		
Dominican Republic	X		
Grenada	X		
Guatemala	X		
Guyana	X		
Haiti	X		
Jamaica	X		

Country	Poor practices	Standard practices	Best practices
Mexico	X		
Panama		X	
St. Lucia	X		
St. Vincent & the Grenadines	X		
Suriname	X		
Trinidad & Tobago	X		
Venezuela	x		

To assess the adequacy of resources for wastewater management, the following elements were analyzed: the levels of expenditure on wastewater and sanitation; the source of funds for wastewater management; and a comparison of spending on the wastewater sector, compared with other sectors. The same percentage of countries that had poor wastewater infrastructure also had inadequate resources allocated to this sector (81%). This confirms the direct relationship between resources and service provision. This sector is characterized by high investment needs; low tariffs and poor cost recovery.

A few countries have dedicated funds for wastewater, for example, Belize which has an effluent licence fee of BZ\$ 300 per annum for industries, but they are woefully inadequate. Wastewater management is low priority in most countries, when compared with water supply. In Trinidad & Tobago, only 6% of the budget for wastewater and water production allocated specifically for wastewater treatment. In This is true in Panama as well. One reason is that there is no sewer tariff, providing no incentive to expand access. Every time the water authority, IDAAN builds sanitation infrastructure, its operation and maintenance costs increase, with no concomitant increase in revenues, which further deteriorates its financial health.

However, there are positive signs. In Colombia, a new institutional framework is being developed with clear roles of the water sector entities. There is strong momentum from the central level with financial support and for the creation of sanitation projects. In Jamaica, developers are now asked to be responsible for the construction and maintenance of sewage treatment plants for new residential developments.

Attitude Question

How likely is it that decentralised natural treatment systems (e.g. ecological sanitation, constructed wetlands, sand filters) would be accepted as options for domestic wastewater treatment?

Knowledge and Awareness, Information Sharing and Clearing House Mechanisms

Knowledge Question

To what extent are people aware of the impact of current methods of disposal on health and environment? Are people aware of the link between sewage, poor sanitation and health problems such as diarrhoeal diseases etc.?

Country	Low level of knowledge	Moderate level of knowledge	High level of knowledge
Antigua & Barbuda			
Aruba			
Barbados			
Bahamas			
Belize		x	
Colombia			
Costa Rica			
Cuba			
Dominican Republic			
Grenada			
Guatemala		x	
Guyana			
Haiti			
Jamaica			
Mexico			
Panama			
St. Lucia			
St. Vincent & the Grenadines			
Suriname			
Trinidad & Tobago			
Venezuela			

A common complaint by representatives in the wastewater sector throughout the WCR is that there needs to be greater public awareness of wastewater issues and the links between sanitation and health. This lack of awareness continues to pose health risks among some countries. For example, in Guyana, health data show that the population suffers from environment-related diseases that are transmitted to humans from contaminated water, food, or soil. These include cholera, dysentery, gastroenteritis, typhoid, dysentery, gastroenteritis, infectious hepatitis and hookworm. In many countries, however, it has been recognised that contaminated bays should not be used for recreation and fishing, although some members of the public choose to ignore the risks of doing so.

[To be completed from KAP questionnaire.]

Knowledge Question

Do officials in government/decision makers have a comprehensive knowledge of wastewater management issues and can link these with other areas of socio-economic development?

Country	Low level of knowledge	Moderate level of knowledge	High level of knowledge
Antigua & Barbuda	X		
Aruba	X		
Barbados		X	
Bahamas		x	
Belize			
Colombia		X	
Costa Rica	X		
Cuba		X	
Dominican Republic	X		
Grenada	X		
Guatemala	X		
Guyana	X		
Haiti	X		
Jamaica		X	
Mexico	X		
Panama		X	
St. Lucia	X		

Country	Low level of knowledge	Moderate level of knowledge	High level of knowledge
St. Vincent & the Grenadines	X		
Suriname	X		
Trinidad & Tobago		X	
Venezuela		X	

To assess the level of knowledge among government leaders and decision makers, the perceived level of “political will” was examined, as well as actions taken by these leaders with respect to wastewater management and sanitation.

It can be said that 62% countries, the key decision makers do not have adequate knowledge of wastewater management issues; with 38% having a moderate level of knowledge. In the Bahamas, a hepatitis scare a few years ago resulted in the government promulgating regulations governing the water supply for preschools. This showed quick action to a health threat to a vulnerable subset of the population. Similarly, the President of Colombia recently specifically incorporated water management issues in his government plan.

Knowledge Question

Are wastewater operators aware of proper operations and maintenance techniques?

Country	Low level of knowledge	Moderate level of knowledge	High level of knowledge
Antigua & Barbuda	X		
Aruba		X	
Barbados	X		
Bahamas	X		
Belize		X	
Colombia	X		
Costa Rica	X		
Cuba	X		
Dominican Republic	X		
Grenada	X		
Guatemala	X		
Guyana	X		

Country	Low level of knowledge	Moderate level of knowledge	High level of knowledge
Haiti	X		
Jamaica	X		
Mexico		X	
Panama	X		
St. Lucia	X		
St. Vincent & the Grenadines	X		
Suriname	X		
Trinidad & Tobago	X		
Venezuela	X		

To assess the level of knowledge of operators of proper sanitation technologies and operations, the following elements were analyzed: the recommended training requirements for operators; the areas in which water utilities indicated that they would be proficient in providing training; and the actual training offered in the region. It is widely said that operators do not have adequate knowledge of operations and maintenance that would be required to facilitate effective operations of sewage treatment plants.

It has been found that most operators have had no formal training, but gain knowledge of wastewater treatment through on the job training, private studies and experience. (Assessment of Operational Status of Wastewater Treatment Plants in the Caribbean (CEHI, 1992). A recent “market place” exercise for water utilities in the region allowed utilities to “buy” and “sell” their service to each other. The greatest training need was for assistance in operations and maintenance knowledge and skill development.

Practice Question

Do national, local and sectoral education and public awareness programmes and campaigns exist for wastewater management or for environmental management (which includes wastewater management)?

Country	Poor practices	Standard practices	Best practices
Antigua & Barbuda			
Aruba			
Barbados			
Bahamas			
Belize		x	
Colombia			
Costa Rica			
Cuba			
Dominican Republic			
Grenada			
Guatemala		x	
Guyana			
Haiti			
Jamaica			
Mexico			
Panama			
St. Lucia			
St. Vincent & the Grenadines			
Suriname			
Trinidad & Tobago			
Venezuela			

Most environmental management agencies in the region have public environmental education as part of their mandate and most, if not all, environmental education programmes will include sanitation and wastewater issues. However, targeted interventions focusing on specific sanitation issues are necessary, especially in some communities. Cuba has a number of environmental education initiatives focused on

particular bays and watersheds which have been effective in educating local communities who have a stake in that particular watershed. A national awareness programme is being planned in Aruba to be implemented in 2010. In Jamaica, environmental issues, including sanitation, is integrated into the formal school curricula, beginning in primary schools.

[To be completed from KAP questionnaire.]

Practice Question

Is there periodic assessment of short-term and long-term data-collection and research needs for wastewater management?

Country	Poor practice	Standard practice	Best practice
Antigua & Barbuda			X
Aruba			X
Barbados	X		
Bahamas			X
Belize	X		
Colombia		X	
Costa Rica	X		
Cuba		X	
Dominican Republic			X
Grenada		X	
Guatemala	X		
Guyana		X	
Haiti	X		
Jamaica		X	
Mexico	X		
Panama		X	
St. Lucia	X		
St. Vincent & the Grenadines	X		
Suriname	X		
Trinidad & Tobago		X	
Venezuela		X	

In assessing data collection systems, the following elements were analyzed: the coverage of data monitoring sites; the frequency of monitoring; the quality of data analysis and the facilities in which the analysis is conducted; and the revision or expansion of the data collection system.

All countries have some form of water quality data collection and analysis, although in some countries, this occurs on a more ad hoc basis. 38% of countries in the region could be said to have moderate standards of data collection with 19% having excellent systems. Less than half the countries (43%) have poor systems. Trinidad has excellent quality, accredited water testing labs.

Practice Question

Is there adequate access to information related to wastewater management issues for decision making?

The Caribbean Water and Wastewater Association has stated that reporting and sharing of data is a Caribbean challenge. Fortunately, the attitude of protecting data and keeping it secret is changing throughout the region. In some countries such as Jamaica, this is being facilitated by access to information legislation, which allows the general public to request documents from public agencies and which compels the agency to provide the information (within prescribed limits).

Barbados boasts that there is excellent communication and sharing of information between the Environmental Protection Department and the Barbados Water Authority. In addition, there are several initiatives that form collaborative bodies that officially bring organizations together in partnership to solve wastewater problems. Guyana has formed the national water Council to lead to the national water policy and St Lucia has established a coordinating committee to better manage natural resources, and communicate on institutional plans and programmes in order to harmonize policies and regulations.

Water and wastewater operators in the Caribbean will soon have access to the newly formed Caribbean Water Operators Partnership (CARIWOP) whose purpose is:

- knowledge development and dissemination
- connecting mentors and recipients
- capacity building
- funding arrangements

CARIWOP will have a website and will enable members to have access to a database, which will include a “skills bank”, to facilitate collaboration among water and sanitation operators.

Other modes of communication regarding wastewater issues in the region include:

- The CWWA monthly e-newsletter put together by an intern that pulls news from the region using keywords such as “utilities” and “environment”
- The annual CWWA conferences that bring together water and wastewater professionals from throughout the region to share experiences and lessons learned. CWWA has hosted 18 annual conferences. However, the proceedings from these conferences have not been published and disseminated.

- The Caribbean Basin Water Management Programme Inc. (CBWMP Inc.) - a regional organization of water utilities dedicated to facilitating the sustainable growth and development of Caribbean water utilities and the promotion of water and water related issues through the delivery of quality training and utilizing collective resources and experiences. Its website (www.cbwmp.org) is deemed to be "the Caribbean Water e-Source."

Key Conclusions from the KAP

A number of key conclusions/observations could be drawn from the KAP and used to inform the development of the full project proposal. These observations highlight some key areas for needed intervention in the management of the wastewater sector for improvements in the overall state of the natural environment. These include:

Low levels of technical capacity in most agencies responsible for wastewater management
30% of countries in the WCR do not have access to adequate financing to make large scale investments in wastewater management projects
50% of WCR countries view wastewater management as a priority, with another 40% showing willingness to improve its view on wastewater management if given the opportunity
81% of the countries in the WCR have inadequate resources for expenditure in wastewater management projects
38% of the countries in the WCR have a weak policy and legislative framework, translating into poor practices
38% of the countries in the WCR do not have national wastewater/ sanitation plans or policies
81% of the countries in the WCR have poor sanitation and wastewater infrastructure
Need for greater public awareness of wastewater issues in all WCR countries
In 62% of WCR countries, decision makers do not have adequate knowledge of wastewater management issues
Most wastewater operators do not have formal knowledge of wastewater treatment
37% of countries in the WCR have moderate standards of data collection



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