Water Sector Policy

Final

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Abbreviations

ESCO—Energy Service Company

GoJ—Government of Jamaica

IBC—International Building Code

IWRM—Integrated Water Resources Management

M&E—Monitoring and Evaluation

MOH—Ministry of Health

MWLECC—Ministry of Water, Land, the Environment, and Climate Change

NEPA—National Environment and Planning Agency

NIC—National Irrigation Commission

NRCA—Natural Resource Conservation Authority

NWA—National Works Agency

NWC—National Water Commission

OUR—Office of Utilities Regulation

RWSL—Rural Water Supply Ltd.

RWSDS—Rural Water Supply Development Strategy

SWOT—Strengths, Weaknesses, Opportunities, and Threats

UN—United Nations

WHO—World Health Organization

WRA—Water Resources Authority

WUAs—Water Users Associations

Executive Summary

The first Water Sector Policy and Action Plan, which was promulgated in 2000, provided an assessment of the sector and its agencies, the constraints facing the sector, and the financial resources necessary, to provide full access to safe potable water to all Jamaicans. This new Policy provides an update to the 2004 Water Sector Policy, including the setting of new service targets, outlining improved arrangements for service delivery, and mainstreaming objectives from Vision 2030, the National Development Plan.

The national vision for the water sector is to manage water resources in a sustainable and integrated manner so as to facilitate the population having universal access to potable water and adequate sanitation by 2020 and beyond.

Principles and the Goal of the Water Sector Policy

The vision is captured in the six principles guiding the Policy:

1. **Sustainability**: The water resource is to be used sustainably, avoiding and mitigating against contamination of water sources and water storage areas
2. **Efficiency**: Water is an economic resource, and water service provision is costly, so services in the water sector must be delivered efficiently and should be self-financing
3. **Integrated Management:** Integrated Water Resources Management (IWRM) is the coordinated development and management of water, land and related resources in order to maximize economic and social welfare without compromising the sustainability of ecosystems and the environment
4. **Universal Access**: Access to safe water and sanitation is a basic human right. Access to safe water must be convenient, reliable, affordable and at established international standards for quantity and quality. No one should go without basic water and sanitation because of an inability to pay
5. **Gender Responsiveness**: Service delivery in the water sector should be equitable. Women and children must not bear an unfair burden to walk to collect water
6. **Stakeholder Participation**: Everyone should have a voice in how the water resource is managed.

Following these principles, the goal of the Policy is to ensure that Jamaica's water resources are effectively managed so as to provide for our nation's social, economic, and environmental well-being, now and in the future.

Current Situation

The main strengths in the water sector are that about 93 percent of Jamaicans have access to improved sources of drinking water, and 85 percent of Jamaicans have exclusive access to improved sanitation facilities.[1] However, the reliability and convenience of these services needs

[1] 2010 Jamaica Survey of Living Conditions, using UN definitions of improved drinking-water sources.

to be improved, particularly in rural areas. Flood water management and drainage is also a weakness. The institutional structure of the sector has clear strengths, such as an independent regulator and an agency that effectively manages water resources, but also weaknesses in accountabilities, incentives, and finances of some of the Government-owned service providers.

Addressing service gaps will require mitigating external threats and taking advantage of opportunities in the sector. Fiscal constraints and climate change are key threats to improved performance. Opportunities include ample water resources and broad consensus on sector goals. Table 0.1 summarizes performance in the sector in terms of strengths, weaknesses, opportunities, and threats (SWOT analysis).

From the UN/WHO Joint Monitoring Programme, improved drinking-water sources are, "by nature of their construction or through active intervention, protected from outside contamination, in particular from contamination with faecal matter." However, this definition does not necessarily mean that the water source is actually safe to drink.

From the UN/WHO Joint Monitoring Programme. Improved sanitation services, "hygienically separates human excreta from human contact." The data on improved sanitation facilities presented in the table may be an underestimate, as it classifies all pit latrines and flush toilets as improved. The Joint Monitoring Programme makes exceptions for flush toilets that dispose of excreta near the household/property, and pit latrines that are not ventilated improved pit latrines (VIPs) or where the pit is not covered by a slab. However, the Survey of Living Conditions does not differentiate between improved and unimproved facilities, making it impossible to definitively classify facilities as improved or unimproved.

Table 0.1: SWOT Analysis of the Jamaican Water Sector

Strengths	Weaknesses
Service Quality ▪ 93 percent of Jamaicans have access to improved sources of drinking water—97 percent of urban residents, and 87 percent of rural residents ▪ 85 percent of Jamaicans have exclusive access to various modes of improved sanitation facilities. This includes 84 percent of urban residents and 87 percent of rural residents ▪ Services are generally affordable Institutional ▪ The MWLECC provides clear policy guidelines and coordinated oversight of the sector ▪ Office of Utilities Regulation (OUR) is an independent regulator with a clear mandate ▪ OUR and Ministry of Health (MOH) set and enforce clear standards for the piped water supply and sewerage networks ▪ WRA has a clear mandate to manage water resources ▪ Where they exist, private service providers deliver quality service at affordable prices	Service Quality ▪ About seven percent of Jamaicans (13 percent of rural residents) get water from unimproved sources ▪ Public water sources are often far away from homes. 27 percent of those who obtain water from standpipes in rural areas and towns outside the KMA have to walk more than 500 metres ▪ The piped water supply and sewerage systems only reach 70 percent and 22 percent of Jamaicans, respectively ▪ Irrigation methods do not always conform with international best practices. Irrigation is not available in all areas where it would be economical ▪ Inadequate resilience to climate variability leads to gaps in service delivery ▪ Inadequate flood water control measures affect roads, settlements, agriculture, and water facilities Institutional ▪ There is limited ability to enforce standards on NWC for quality of service and financial sustainability ▪ Inadequate focus on maintenance. Assets fail before design life. Non-revenue water is 69 percent for the NWC ▪ Inadequate cost recovery by NWC and NIC
Opportunities	**Threats**
▪ Freshwater is abundant—77 percent of the safe yield is not used ▪ Shared understanding of service gaps and necessary institutional improvements ▪ A credible regulator and overall commitment to cost recovery gives the potential to fund expansion and improve maintenance of service networks by increasing cost recovery ▪ IMF backing of GoJ's economic program increases investor confidence ▪ National commitment and donor interest in funding efforts to increase resilience to climate change ▪ The role of private providers can be expanded to improve performance in the water sector ▪ Can increase storage of fresh water through rainwater harvesting and flood water retention	▪ Climate change could increase external threats to the water sector, especially in the form of: – More frequent droughts – More frequent flooding – More intense hurricanes – Sea level rise and salt water intrusion ▪ Rising energy costs ▪ Freshwater resources are not distributed evenly, spatially, and temporally, creating local and regional shortages ▪ Central and Local Government budget cannot allocate funding to improve services in the water sector because of fiscal constraints ▪ Assets at risk due to physical security environment

Agencies with Responsibility for Implementing the Policy

The Ministry of Water, Land, the Environment, and Climate Change (MWLECC) will oversee the implementation of this Policy, including by monitoring and evaluating implementation. Table 0.2 shows the responsibilities other Government of Jamaica (GoJ) agencies and private sector actors have for a range of functions including: service provision, policy making, and regulation. Households and communities also have important roles in self-providing water supply and sanitation for their own use.

Table 0.2: Entities with Responsibilities in Implementing the Water Sector Policy

Entity	Responsibilities
Overall Implementation	
Ministry of Water, Land, the Environment, and Climate Change (MWLECC)	Implement the Policy nationwide by coordinating agencies' efforts. MWLECC will also monitor and evaluate implementation efforts
Rural Water Supply Ltd. (RWSL)	Provide technical assistance to households and communities in rural areas to build and maintain water supply and sanitation infrastructure. To assist households, the GoJ is committed to develop possible options for funding the implementation of the strategy in non-utility service areas. Final determination will be dependent on available fiscal space in a challenging budgetary environment
Other GoJ agencies with policy making and coordination responsibility	
Ministry of Agriculture and Fisheries	Coordinate implementation in irrigation
Climate Change Division of MWLECC	Monitor and coordinate national climate change adaptation efforts, including in the water sector
Ministry of Local Government and Community Development	Minor Water Supplies, Water Shops and Community Catchment Tanks
Forestry Department	Protect the forest and watersheds
Office of Disaster Preparedness & Emergency Management (ODPEM)	Disaster management, to include drought and major meteorological events
Drought Management Committee	Prepare a Drought Management Plan
Service Providers	
National Water Commission (NWC)	Provide piped water supply in all areas where it is economical to do so, and provide piped sewerage services in all major towns
National Irrigation Commission (NIC)	Provide irrigation services

Entity	Responsibilities
National Works Agency (NWA)	Provide flood water control services around roads, settlements and agricultural lands
Parish Councils and Local Authorities	Provide water supply to the public by operating and maintaining local schemes
Private providers	Provide water supply, sanitation, and irrigation services in the rural areas
Communities and households	Traditionally provide their own water supply and sanitation services in many rural areas, and will continue to do so, with the GoJ's assistance
National Solid Waste Management Authority	Manages solid waste nationwide
Regulators	
Water Resources Authority (WRA)	Regulates abstraction of groundwater, use of surface water, and coordinates integrated water resources management. Will also lead the establishment of IWRM Committees in each hydrological basin along with NEPA.
National Environment and Planning Agency (NEPA)	Sets standards for treating and discharging effluent, along with the MOH. Coordinates integrated water resources management committees, with the WRA. Supports WRA in establishing and building capacity for IWRM Committees
Ministry of Health (MOH)	Sets and monitors standards for potable water supply, and for sanitation facilities in areas not reached by the water supply and sewerage networks. Also works with NEPA to set standards for treating and discharging effluent
Office of Utilities Regulation (OUR)	Set tariffs and regulate service standards for providers of piped water supply and piped sewerage services. Also regulates some irrigation schemes
IWRM Committees	Will be established in every hydrological basin to advise the WRA, NEPA, and other GoJ agencies on water resources protection

Policy Directions

The GoJ's policies in the water sector are summarized below.

Integrated Water Resources Management

The goal of IWRM is to "promote the co-ordinated 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."[2]

The GoJ's policy is to adopt an IWRM approach to managing water resources. In particular, this will include institutional co-ordination and stakeholder participation through IWRM Committees.

The WRA will lead the establishment of IWRM Committees in each hydrological basin, with the support of NEPA. The WRA regulates abstraction of groundwater, use of surface water, and coordinates integrated water resources management. NEPA sets standards for treating and discharging effluent, along with the MOH.

The GoJ will continue to encourage research and development to achieve continuous improvement in technologies and operational efficiencies in water, sanitation and wastewater systems; and to increase resilience to climate change.

The Participatory Approach to Integrated Water Resources Management

The GoJ's policy is to promote IWRM Committees to play a vital role of involving all stakeholders in decision-making in regard to watershed and groundwater protection. Specifically, they should provide input on planning for abstraction, discharge, land-use practices, and service provision. An IWRM Committee will be established in each hydrological basin.

IWRM Committees will make three-year water resources management plans for their hydrological basin, including recommendations on abstraction, discharge, land-use practices, and service provision. These recommendations will be based on consensus and compromise among committee members.

To allow for full participation among all stakeholders, IWRM Committees will include private citizens, especially women and other marginalized groups, and relevant GoJ agencies. Final decisions will be made by the relevant national and local regulators and service providers, but these decisions should generally reflect consensus recommendations made by IWRM Committees.

Environment and Ecosystem Protection and Conservation

Jamaica's water bodies and watersheds, including streams, rivers, ponds, lakes, and costal waterways, should support vibrant aquatic ecosystems. Freshwater sources should also allow for water resources to be sustainably available for human use. These policy goals will be mainstreamed into the goals of IWRM. Goals will be met by protecting watersheds and by preventing point source and run-off pollution.

Climate Change Adaptation and Mitigation

Jamaica aims to avoid, minimize, or adapt to the negative impacts of climate change and climate variability on its natural environment, including water. In particular, Jamaica aims to

[2] From the Global Water Partnership and Integrated Water Resources Management Framework, Jamaica. August 2002

preserve infrastructure and services in the water sector that are necessary to ensure that water resources are able to meet human needs and to promote economic growth.[3]

In addition, bodies in the water sector will limit greenhouse gas emission by adopting economically viable energy efficiency technologies, and by using renewable energy technologies where they are economically viable.

Energy Efficiency in the Water Sector

Entities in the water sector will work to achieve the national goal to "use energy wisely and aggressively pursue opportunities for conservation and efficiency", as stated in the National Energy Policy (2009-2030). In particular, GoJ agencies will be "leaders and models in energy conservation and environmental stewardship in Jamaica". Service providers in the water sector will adopt all energy efficiency technologies and techniques that are economical and that allow them to meet service standards in this Policy. GoJ agencies will adopt regulations that encourage service providers to improve energy efficiency and reduce energy costs.

Private Participation in the Water Sector

The GoJ's policy is to encourage private participation in delivering water-related services, where it can help meet the GoJ's objectives for the sector. Private providers can help improve service delivery through contracts with Government-owned service providers or as service providers themselves.

Water Supply in Rural and Urban Areas

All households will have access to potable water supply by 2020. This means that water supply will be:

- Safe—Potable water will conform to standards set by the Ministry of Health (MOH) and the World Health Organization (WHO)
- Convenient—Water supply will be delivered to the home, or as close as possible. Water supply will not be more than 500 metres from the home
- Of sufficient quantity—Each person will have access to at least 50 litres per day
- Reliable—Water supply will be available 24 hours per day. In some areas this may be impossible to achieve, and in this case it will be available at least 18 hours per day
- Affordable—Pricing for water will continue to be determined by tariff set by the Office of Utilities Regulation (OUR) in consultation with stakeholders. No-one will be denied access to potable water because of inability to pay. A proxy means test will be developed to identify those in need of social water.

Differences in environmental and infrastructural conditions in rural and urban areas create different obstacles to providing water supply in these two areas. To overcome these obstacles

[3] Draft Development of a National Water Sector Strategy Adaptation Strategy to Address Climate Change in in Jamaica, 153

and achieve universal access to safe water supply, different technical solutions and institutional arrangements will be recommended for urban and rural areas.[4]

In urban areas and other towns and densely populated settlements, piped supply from a water utility is the least-cost way to deliver water service. Such areas are called Utility Service Areas. In other areas of the country, piped water service is not economical, and a variety of alternative techniques are needed to provide access to a safe and convenient water supply. Such areas are called Non-Utility Service Areas.

Utilities are companies which serve numerous households, operate electro-mechanical systems such as pumps, and have computerized billing and accounting systems. Small piped systems that operate by gravity flow are thus not considered to be utilities.

Rainwater Harvesting

The GoJ promotes rainwater harvesting for households in areas with adequate rainfall and where groundwater and surface sources are inadequate. The GoJ also promotes the rehabilitation and maintenance of community catchment tanks, where Parish Councils, Local Authorities, or communities themselves wish to take on the responsibility of maintaining these systems. Water supply from rainwater harvesting should be treated or filtered to meet MOH and WHO standards before it is consumed.

Rainwater harvesting systems that are used as a primary source for household or community water supply should be built to deliver adequate quantities of water for at least 90 percent of the year. A reliable backup supply, such as trucked water, must be identified for times when rainfall is inadequate.

Wastewater Management in Urban and Rural Areas

The GoJ's policy is that all households will have exclusive access to sanitation facilities that protect the health of users, community members and the environment by 2020. The MOH sets and enforces standards for safe sanitation facilities. Parish Councils and Local Authorities will help to enforce standards in rural areas.

Different technical solutions and institutional arrangements will be recommended to provide safe sanitation services in rural and urban areas. This is because differences in population densities make for different threats to the environment and people's health. Sewerage networks will be extended to all urban areas[5] by 2020. Rural areas will use safe on-site sanitation facilities for each household. On-site facilities will meet NEPA's and the MOH's standards for safety for users and the environment.

Irrigation Services

By adopting international best practices in irrigation and by continuing to explore diverse financing arrangements for new schemes, irrigation services could be expanded to reach more farmers, while subsidies are reduced.

Irrigation services will continue to contribute to a competitive and productive agricultural sector. To promote economic development and food security, all land where irrigation is

[4] See Vision 2030, 287: "Ensuring vulnerable and poor communities receive adequate [water supply and sanitation services] through appropriate means."

[5] Vision 2030 p. 165

economically viable should be irrigated. Each irrigation scheme should define its service offering to users, typically including the quantities of water that will be available, as well as the times and places it will be available, in a contract with its customers.

Irrigation tariffs will cover at least operations and maintenance costs, and will also cover capital costs where it is possible to do so.

Rain and Storm Water Run-off and Flood Water Control

The GoJ's policy is to ensure that water does not flood settlements or agricultural land, or disrupt transport. Additionally, flood waters will be adequately managed to conserve the environment, including watersheds' capacity to meet sustainable demands on water resources.

Monitoring and Evaluation

The Water Policy and Monitoring Division in MWLECC will monitor and evaluate the implementation of this Policy. This process will be mainstreamed into the corporate planning cycle.

1 Introduction

1.1 Background

The first Water Sector Policy and Action Plan, which was promulgated in 2000, provided an assessment of the sector and its agencies, the constraints facing the sector, and the financial resources necessary, to provide full access to safe potable water to all Jamaicans. A full review of the implementation of the Policy was undertaken in 2004. The main constraints to implementation have been inadequate financing, difficulty allocating social water, inadequate maintenance of infrastructure, and insufficient monitoring and evaluation.

This revised Policy provides an update to the 2004 Water Sector Policy. It outlines the current situation in the water sector and the principles, objectives and policy directions for the management of the country's water resource in line with Vision 2030 Jamaica—National Development Plan. Many key principles remain the same, including access for all, financial self-sufficiency of providers, diversity of public and community provision, and encouraging private sector participation in service delivery. Major additions include a strong commitment to integrated water resources management and efforts to ensure that the sector adapts to climate change and is resilient to climate variability.

The Policy sets new service targets and outlines improved arrangements for service delivery. For each part of the Policy, there is a situational analysis, which includes an analysis of strengths, weaknesses, opportunities, and threats (a SWOT Analysis). Strengths and weaknesses are evaluations of the current state in each part of the Policy. Opportunities are actions that can be taken to improve services and management in the water sector, and threats are potential barriers to improvements.

1.2 A Vision for the Water Sector

The GoJ's vision for the management of the water resource is guided by the GoJ's Vision 2030 Jamaica—National Development Plan as outlined below:

> *"Water is treated as a fundamental strategic resource that is not only necessary for improved quality of life for our population but also one which can provide us with a competitive advantage in those industries where water represents an important input.*
> *Integrated Water Resources Management (IWRM) is implemented in an established institutional framework anchored in the Dublin and other related principles and informed by regional and national research findings. Under Vision 2030 Jamaica, water, sanitation and hygiene will be linked to support human health, protect ecosystems and reduce poverty. We will provide stronger coordination between the planning and development of water supply, sanitation services and human settlements."* Vision 2030 Jamaica—National Development Plan (Pages 173 – 174)

The national vision is stated as "Jamaica, the place of choice to live, work, raise families and do business". This policy recognizes the critical role that the water resource plays in the realization of this vision, therefore it will be managed in a sustainable and integrated way.

Vision Statement

The water resource is managed in a sustainable and integrated manner so as to facilitate the population having universal access to potable water and adequate sanitation by 2020 and beyond.

1.3 Principles Guiding the Water Sector Policy

Access to water is an essential ingredient to the quality of people's life. Water will be available in the quantity, quality and reliability that not only sustains life but also enables the population to maintain their livelihoods. Additionally, environmental standards must be observed in the treatment and disposal of water-related wastes to protect the resource itself and the integrity of the ecosystems in general.

Principles

1. **Sustainability**: The water resource is to be used sustainably, avoiding and mitigating against contamination of water sources and water storage areas.
2. **Efficiency**: Water is an economic resource, and water service provision is costly. Natural and physical resources in the water sector must be used efficiently. Service providers in the water sector should be efficient and self-financing. A major focus is to be paid to developing energy-efficient systems and maintaining operational efficiencies.
3. **Integrated Management**: Integrated Water Resource Management (IWRM) is the coordinated development and management of water, land and related resources in order to maximize economic and social welfare without compromising the sustainability of ecosystems and the environment (Global Water Partnership, 2000). The relevant policies and strategies are to be unified in order to optimize synergies in the use of natural, physical, human and financial resources and to build resilience to climate change.
4. **Universal Access**: Access to safe water and sanitation is a basic human right. Access to safe water must be convenient, reliable, affordable and at established international standards for quantity and quality. No one should go without basic water and sanitation because of an inability to pay. All residents and visitors should have access to water and related services at the standards necessary for maintaining healthy lives, growing our economy, and enhancing prosperity.

Principles (cont.)

5. **Gender Responsiveness**: Access to water is differentiated according to gender and class. It is most often women and children who have to walk distances in order to obtain the water they need for domestic use and men who farm and carry water for farming purposes. The distance travelled and the time consumed to source water can be a hindrance to increased productivity, and can expose especially women and children to danger. Gender is to be mainstreamed in all policies, programs and projects in the water sector. Gender-responsive approaches should be undertaken in the design of potable water systems and sanitation and wastewater solutions so that individuals who are vulnerable including the aged, youth and the disabled are treated equitably. These approaches should include capacity enhancement of men and women, for the effective, efficient, and equitable solutions to the challenges of water resource management and development.
6. **Stakeholder Participation**: Everyone should have a voice in how the water resource is managed. Various participatory mechanisms are to be used to facilitate stakeholder involvement in the integrated planning, decision making, implementation and monitoring in water resource management.

1.4 The Goal and Objectives of the Water Sector Policy

The GoJ is committed to ensuring that the objectives of the Water Sector are anchored within the Vision 2030—National Development Plan and that the Millennium Development Goals for safe and adequate water and sanitation are met and surpassed. The Water Sector Policy focuses on the IWRM approach, and the mainstreaming of Climate adaptation initiatives and participatory processes in the sector. This section sets out the goal and objectives of the policy.

Goal of the Water Sector Policy

To ensure that Jamaica's water resources are effectively managed so as to provide for our nation's social, economic, and environmental well-being, now and in the future.

1.5 Roles and Responsibilities

The MWLECC will oversee the implementation of this Policy, including by monitoring and evaluating implementation. Table 1.1 shows the responsibilities other GoJ agencies and private sector actors have for a range of functions including: service provision, policy making, and regulation. Households and communities also have important roles in self-providing water supply and sanitation for their own use.

Table 1.1: Entities with Responsibilities in Implementing the Water Sector Policy

Objectives of the Water Sector Policy

1. To improve institutional arrangements for **integrated water resources management**.
2. To ensure a **participatory approach** in water resource management.
3. To protect watershed areas, ecosystems, catchments and networks and promote effective programs for water conservation and protection.
4. To put in place the policy, programs and physical structures for **climate adaptation** and energy efficiency in the water sector.
5. To allow for increased **private sector participation** in the Water Sector.
6. To effectively manage **water supply** in Utility Service Areas and Non-Utility Service Areas by ensuring equitable sharing of the water resource in the ten hydrological basins.
7. To encourage **rainwater harvesting** both as a primary source of access and as a drought management mechanism.
8. To ensure **effective management of wastewater**.
9. To provide sufficient water for achieving food security by improving **irrigation services.**
10. To provide for appropriate management of **rain and storm water run-off and flood water control**.

Entity	Responsibilities
Overall Implementation	
Ministry of Water, Land, the Environment, and Climate Change (MWLECC)	Implement the Policy nationwide by coordinating agencies' efforts. MWLECC will also monitor and evaluate implementation efforts
Rural Water Supply Ltd. (RWSL)	Provide technical assistance to households and communities in rural areas to build and maintain water supply and sanitation infrastructure. To assist households, the GoJ is committed to develop possible options for funding the implementation of the strategy in non-utility service areas. Final determination will be dependent on available fiscal space in a challenging budgetary environment
Other GoJ agencies with policy making and coordination responsibility	
Ministry of Agriculture and Fisheries	Coordinate implementation in irrigation
Climate Change Division of MWLECC	Monitor and coordinate national climate change adaptation efforts, including in the water sector

Entity	Responsibilities
Ministry of Local Government and Community Development	Minor Water Supplies, Water Shops and Community Catchment Tanks
Forestry Department	Protect the forest and watersheds
Office of Disaster Preparedness & Emergency Management (ODPEM)	Disaster management, to include drought and major meteorological events
Drought Management Committee	Prepare a Drought Management Plan
Service Providers	
National Water Commission (NWC)	Provide piped water supply in all areas where it is economical to do so, and provide piped sewerage services in all major towns
National Irrigation Commission (NIC)	Provide irrigation services
National Works Agency (NWA)	Provide flood water control services around roads, settlements and agricultural lands
Parish Councils and Local Authorities	Provide water supply to the public by operating and maintaining local schemes
Private providers	Provide water supply, sanitation, and irrigation services in the rural areas
Communities and households	Traditionally provided their own water supply and sanitation services in many rural areas, and will continue to do so, with the GoJ's assistance
National Solid Waste Management Authority	Manages solid waste nationwide
Regulators	
Water Resources Authority (WRA)	Regulates abstraction of groundwater, use of surface water, and coordinates integrated water resources management. Will also lead the establishment of IWRM Committees in each hydrological basin along with NEPA.
National Environment and Planning Agency (NEPA)	Sets standards for treating and discharging effluent, along with the Ministry of Health. Coordinates integrated water resources management committees, with the WRA. Supports WRA in establishing and building capacity for IWRM Committees
Ministry of Health (MOH)	Sets and monitors standards for potable water supply, and for sanitation facilities in rural areas. Also works with NEPA to set standards for treating and discharging effluent
Office of Utilities Regulation (OUR)	Set tariffs and regulate service standards for providers of piped water supply and piped

Entity	Responsibilities
	sewerage services. Also regulates some irrigation schemes
IWRM Committees	Will be established in every hydrological basin to advise the WRA, NEPA, and other GoJ agencies on water resources protection

2 Situational Analysis

This section summarizes the current situation in the water sector. It also gives context for this Policy in the wider legal and policy frameworks for the water sector. Each section after this one includes a more detailed analysis of the current situation for that sub-sector.

2.1 SWOT Analysis of the Water Sector

A SWOT analysis evaluates performance in terms of the main strengths, weaknesses, opportunities and threats. Table 2.1 summarizes the SWOT analysis.

Strengths

The main strengths in the water sector are that about 93 percent of Jamaicans have access to improved sources of drinking water, and 85 percent of Jamaicans have exclusive access to improved sanitation facilities.[6]

The MWLECC provides clear policy guidelines and coordinated oversight of the sector. The OUR is an independent and credible regulator. The OUR and the Ministry of Health set and enforce clear standards for the piped water supply and sewerage networks.

The vast majority of our water resources are in good condition—only ten percent are contaminated. In Vision 2030 and other policy documents, the GoJ has made a clear commitment to implementing integrated water resources management (IWRM).[7] The existing institutional framework for water resources management largely supports this goal. The Water Resources Authority is the main body with responsibility for water resources management, and fulfils its role well. GoJ agencies already receive and act upon the recommendations of a variety of stakeholders, including businesses and civil society groups, with regards to water resource management.

The private sector is involved in the water sector through provision of piped water supply, piped sewerage services, and irrigation services. In many cases, private sector involvement has been effective at increasing the speed of development, delivering essential services to Jamaicans, and speeding up growth.

Weaknesses

Sewerage systems need to be expanded to reach more urban residents. Treatment of sewage also needs to be improved. The main weaknesses in water supply are that reliability and convenience are sometimes low, especially in rural areas. Many households, especially in rural

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[6] 2010 Jamaica Survey of Living Conditions, using UN definitions of improved drinking-water sources.

From the UN/WHO Joint Monitoring Programme, improved drinking-water sources are, "by nature of their construction or through active intervention, protected from outside contamination, in particular from contamination with faecal matter." However, this definition does not necessarily mean that the water source is actually safe to drink.

From the UN/WHO Joint Monitoring Programme. Improved sanitation services, "hygienically separates human excreta from human contact." The data on improved sanitation facilities presented in the table may be an overestimate, as it classifies all pit latrines and flush toilets as improved. The Joint Monitoring Programme makes exceptions for flush toilets that dispose of excreta near the household/property, and pit latrines that are not ventilated improved pit latrines (VIPs) or where the pit is not covered by a slab. However, the Survey of Living Conditions does not differentiate between improved and unimproved facilities, making it impossible to definitively classify facilities as improved or unimproved.

[7] Vision 2030 Jamaica—National Development Plan

areas, have to go long distances to collect water. Some of the Government-owned service providers have weaknesses in accountabilities, incentives, and finances.

Flood water control infrastructure is poor in many parts of the country. Services for roads, in urban areas, and in some agricultural areas are often poor. Institutional responsibility for flood water control is fragmented, an important cause of poor services.

While water resources are generally in good condition, many watersheds are in poor condition. Ten of our 26 watersheds are classified as degraded or severely degraded. Many citizens lack opportunities to participate in decision-making on water resources management.

Energy efficiency improvements are needed in public water supply and irrigation. NWC is the single largest electricity consumer in Jamaica, and energy is often not used efficiently.[8] Non-revenue water of 69 percent means that NWC produces about four times more water than it bills for. NIC does not cover operating costs from tariffs, it uses energy-intensive pumps to abstract groundwater for most of its irrigation systems, and water losses for some irrigation systems is high.

While private sector participation in the water sector has had benefits, it has sometimes come at the expense of other GoJ objectives. Some private service providers engaged in 'cherry picking'—that is, providing piped water and sewerage services only in areas where they make profits, seemingly at the expense of the profits that could be made by NWC.

Opportunities

Opportunities include ample water resources and broad consensus on sector goals. This Policy sets out clear targets for service delivery that are consistent with the legal framework and other GoJ policy. Where institutional change is needed to meet these targets, GoJ has drafted and plans to shortly pass needed laws (see Section 2.2).

Expanding the use of household rainwater harvesting systems in rural areas is an important opportunity to improve the reliability and convenience of water supply in many parts of the country. Rainwater harvesting is a reliable and safe form of water supply, used by 15 percent of households as their main source of water supply, including 31 percent of rural households. Average annual rainfall across the island is very high, at 1,981mm per year[9].

Threats

While freshwater resources are plentiful nationwide, they are not distributed evenly, spatially, and temporally. This can create local and regional shortages of fresh water.

Our water sector is susceptible to multiple risks associated with climate change and climate variability. Average temperatures have risen in recent decades and average rainfall has declined. The risk of lower rainfall and more droughts could put services at risk. More intense hurricanes are also possible, which could damage infrastructure.

Fiscal constraints are another important threat to improved performance. In general, Central and Local Government do not have the budget flexibility to allocate funding to improve services in the water sector.

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[8] National Energy Policy 2009-2030, Ministry of Energy and Mining, October 2009

[9] WRA

Energy costs have been rising in recent years, making services more expensive. This threatens the financial sustainability of some service providers. It also makes investments in energy efficiency imperative.

Table 2.1: SWOT Analysis of the Jamaican Water Sector

Strengths	Weaknesses
Service Quality ▪ 93 percent of Jamaicans have access to improved sources of drinking water—97 percent of urban residents, and 87 percent of rural residents ▪ 85 percent of Jamaicans have exclusive access to various modes of improved sanitation facilities. This includes 84 percent of urban residents and 87 percent of rural residents ▪ Services are generally affordable Institutional ▪ The MWLECC provides clear policy guidelines and coordinated oversight of the sector ▪ OUR is an independent regulator with a clear mandate ▪ OUR and Ministry of Health set and enforce clear standards for the piped water supply and sewerage networks ▪ WRA has a clear mandate to manage water resources ▪ Where they exist, private service providers deliver quality service at affordable prices	Service Quality ▪ Seven percent of Jamaicans (13 percent in rural areas) get water from unimproved sources ▪ Public water sources are often far away from homes. 27 percent of those who obtain water from standpipes in rural areas and towns outside the KMA have to walk more than 500 metres ▪ The piped water supply and sewerage systems only reach 70 percent and 22 percent of Jamaicans, respectively ▪ Irrigation methods do not always conform with international best practices, and irrigation is not available in all areas where it would be economical ▪ Inadequate resilience to climate variability leads to gaps in service delivery ▪ Inadequate flood water control measures affect roads, settlements, agriculture, water facilities Institutional ▪ There is limited ability to enforce standards on NWC for quality of service and financial sustainability ▪ Inadequate focus on maintenance. Assets fail before design life. Non-revenue water is 69 percent for the NWC ▪ Inadequate cost recovery by NWC and NIC
Opportunities	**Threats**
▪ Freshwater is abundant—77 percent of the safe yield is not used ▪ Shared understanding of service gaps and necessary institutional improvements ▪ A credible regulator and overall commitment to cost recovery gives Jamaica the potential to fund expansion and improve maintenance of service networks by increasing cost recovery ▪ IMF backing of GoJ's economic program increases investor confidence ▪ National commitment and donor interest in funding efforts to increase resilience to climate change ▪ The role of private providers can be expanded to improve performance in the water sector ▪ Can increase storage of fresh water through rainwater harvesting and flood water retention	▪ Climate change could increase external threats to the water sector, especially in the form of: – More frequent droughts – More frequent flooding – More intense hurricanes – Sea level rise and salt water intrusion ▪ Rising energy costs ▪ Freshwater resources are not distributed evenly, spatially, and temporally, creating local and regional shortages ▪ Central and Local Government budget cannot allocate funding to improve services in the water sector because of fiscal constraints ▪ Assets at risk due to physical security environment

2.2 Legal Framework in the Water Sector

The following laws set out the structure for the national water sector:

Parishes Water Supply Act (1889) permits Parish Councils to supply water, but does not require them to do so. The Act also allows Parish Councils to enter into contracts with independent persons to supply water.

Irrigation Act (1949, and amendments) allows the GoJ to license an Irrigation Authority as the owner and operator of all public irrigation works. The National Irrigation Commission (NIC) is licensed as the Irrigation Authority under the Act.

National Water Commission Act (1963, and amendments) creates and governs the National Water Commission (NWC). NWC is the primary provider of potable water supply, and also owns and operates wastewater services.

Public Health Act (1985) sets national standards for the collection and disposal of waste materials and assigns the responsibility for monitoring and enforcing these standards to the MOH.

Office of Utility Regulation Act (1995) creates the Office of Utilities Regulation (OUR) and gives it permission to regulate water supply and sewerage, among other utility services. The Act empowers the OUR to issue licences and determine and monitor service charges, rates, or other fees payable by consumers for utility services.

Flood-Water Control Act (1958) gives responsibility for the construction, improvement, repair, and maintenance of works for flood water control. This responsibility is fragmented among a variety of agencies, but the planned amendment to the Water Resources Act would repeal the Flood-Water Control Act (see below).

Natural Resources Conservation Act (1991) gives the Ministry of Health and the Environment (MOHE) has the mandate to protect Jamaica's physical environment. The implementing authority, the National Environment and Planning Agency (NEPA), has the broad responsibility for managing Jamaica's natural land and aquatic environments. NEPA is an Executive Agency that became operational on 1 April 2001. Its mission is to promote sustainable development by ensuring protection of the environment and orderly development in Jamaica.

Water Resources Act (1995) establishes the Water Resources Authority (WRA) to regulate, allocate and conserve and manage water resources. The Act governs the abstraction and use of natural water resources.

Public Bodies Management and Accountability Act (2001) sets out the financial accountability and reporting standards that public bodies must meet. It also sets out processes for auditing public bodies.

In addition to these existing laws, the GoJ will plans to pass two laws that will help implement this Policy:

- Umbrella legislation that will put GoJ Policy on implementing IWRM into law. The MWLECC has commenced work on the preparation of an industry-specific law for water, which is expected to be completed in 2017
- *Building Act, 2011*, and enact a new National Building Code based on the International Building Code (IBC). The National Building Code will consider issues

of water resources management, including resistance to floods and hurricanes, and the need for adequate water supply and sewage disposal in newly constructed buildings.

2.3 Other Important Policies in the Water Sector

Vision 2030 is Jamaica's National Development Plan. It sets out the national vision that Jamaica will be the 'place of choice to live, work, raise families, and do business' by 2030. Achieving this vision includes four national goals:

- Jamaicans are empowered to meet their fullest potential
- Jamaican society is secure, cohesive, and just
- Jamaica's economy is prosperous
- Jamaica has a healthy national environment.

Vision 2030 also specifies objectives for the water sector, as described above (Section 1.2).The Water Sector Policy will help realize all four national goals. Reliable services for all will help empower Jamaicans to meet their fullest potential, and will also bring about a more just society. Reliable services are also needed to ensure a prosperous economy. Finally, the Water Sector Policy sets out ways to conserve our natural environment and its water resources, even in the face of the global challenge of climate change.

The 2009-2030 Water Sector Plan is part of Vision 2030. The Plan's vision is for "Integrated and sustainable water resources management and development; adequate and safe water supply and sanitation sewage to support the social and economic development of Jamaica."

The Plan outlines an updated Implementation Framework and Long-Term Action Plan for the sector to reach its vision statement. The targeted outcomes to reach this goal are outlined in the Long-Term Action Plan as:

- All water and sewage needs are met using modalities that are safe and sustainable;
- Capabilities to address hazards and climate change improved;
- Stakeholders participate in the planning and managing of the development and use of the island's water resource;
- Capacity enhance to effectively plan and manage the development and use of the island's water resources; and
- The financial base for future water and sewage needs strengthened.

Two key actions identified in the Plan are to:

- Develop and implement a National Water Resources Master Plan
- Update the previous Water Sector Policy (2004). This is accomplished through this updated Water Sector Policy.

The National Energy Policy (2009) includes goals for energy conservation and efficiency in the water sector. The Policy identifies public water supply and irrigation as two areas where energy efficiency improvements are needed. The Policy seeks to develop "a specific programme of energy management for the National Water Commission, the single largest consumer of energy in the public sector, focusing on intensification of loss reduction,

improvement in pumping efficiency and the introduction of a distributed storage programme which will facilitate better management of pumping operations."

3 Integrated Water Resources Management (IWRM)

3.1 Current Situation

In Vision 2030 and other policy documents, the GoJ has made a clear commitment to implementing IWRM.[10] The existing institutional framework for water resources management largely supports this goal. In particular, the Water Resources Authority (WRA) and the National Environment and Planning Agency (NEPA) coordinate water resources management well at the national level.

Our national water resources are generally well managed. Jamaica is endowed with abundant water resources that have low levels of pollution and contamination. Seventy-seven percent of the current sustainable yield, or roughly 3,165 million cubic metres of water, is available for development.

However, some improvements in water resources management are needed. Although water resources are more than sufficient to meet demand at the national level, some areas of the country face water shortages because local resources are not sufficient, and because infrastructure is not able to transport water resources from areas with excess supply. In addition, NWC's water supply infrastructure is highly inefficient, with non-revenue water of about 69 percent. Only nine percent of cultivated land in Jamaica is irrigated but the agricultural sector consumes 75 percent of water resources.

There are many opportunities to improve water management. Constructing household or community-level storage systems can mitigate local water shortages and reduce the need for expanding or increasing the size of national infrastructure. Changing local behaviour in consumption and increasing the efficiency of water use, especially in the agricultural sector, can reduce stress on water resources.

Climate change may increase the stress on water supply and the water distribution system. The distribution of water resources may geographically or temporally shift, which could lead to water shortages in some areas while leading to flooding in others. A wide scale use of rainwater harvesting systems could decrease the recharge of groundwater sources.

Table 3.1: SWOT Analysis of Integrated Water Resources Management

Strengths	Weaknesses
▪ There is clear commitment to implementing IWRM in GoJ policy and the existing institutional framework largely supports this goal ▪ Island wide, 77 percent of the current reliable and safe yield, or 3,165 million cubic metres of water, are available for development ▪ Surface and groundwater are of excellent quality. Less than 10 percent of the island's water resources have been contaminated	▪ There is no overarching legislation that codifies the IWRM ▪ Infrastructure is not sufficient to bring water resources from areas of extra supply to areas with demand shortages ▪ NWC's non-revenue water of 69 percent is an inefficient use of water resources ▪ The tariffs charged to agricultural producers is far below the cost of providing the water

[10] Vision 2030 Jamaica—National Development Plan

	▪ Large quantities of water are wasted in the agricultural sector due to inefficient irrigation infrastructure on farms
Opportunities ▪ Building individual storage systems can help mitigate local water shortages, and reduce the need for national infrastructure ▪ Encouraging sustainable farming and irrigation practices can reduce stress on water resources while maintaining output	**Threats** ▪ Climate change could reduce the availability of water resources in some areas, and lead to increased flooding in others ▪ Freshwater resources are not distributed evenly, spatially, and temporally, creating local and regional shortages ▪ Using rainwater harvesting for water supply in rural areas may decrease recharge of groundwater. As such, groundwater levels should be monitored in areas where rainwater harvesting is used.

3.2 Policy Directions

The goal of IWRM is to "promote the co-ordinated 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."[11]

Policy on Integrated Water Resources Management

The GoJ's policy is to adopt an IWRM approach to managing water resources. In particular, this will include institutional co-ordination and stakeholder participation through IWRM Committees.

IWRM efforts will be supported by GoJ subject to available funding. The WRA will lead the establishment of IWRM Committees in each hydrological basin, with the support of NEPA.

The GoJ will continue to encourage research and development to achieve continuous improvement in technologies and operational efficiencies in water, sanitation and wastewater systems; and to increase resilience to climate change.

The GoJ will adopt umbrella legislation that will put its Policy on implementing IWRM into law. The MWLECC has commenced work on the preparation of an industry-specific legislation for water, which is expected to be completed in 2017.

[11] From the Global Water Partnership and Integrated Water Resources Management Framework, Jamaica. August 2002

3.2.1 Institutional

Individuals, businesses, and civic society will all have the opportunity to participate in decision-making processes in the water sector. Decision-making processes will be holistic, cross-sectoral, and participatory.

The Water Resources Authority (WRA) and the National Environment and Planning Agency (NEPA) coordinate IWRM efforts at the national level. The Climate Change Division coordinates an integrated strategy for climate resilience in the water sector, as explained below in Section 6. WRA will lead the creation of IWRM Committees to coordinate IWRM efforts at the local level, working with the Ministry of Local Government. All other bodies in the water sector will have clear roles in implementing IWRM, including participating in IWRM Committees.

NEPA, WRA coordinate IWRM implementation at the national level

WRA and NEPA will coordinate activities with other stakeholders in water resources management. WRA has responsibility for managing abstraction of water from surface and groundwater and ensuring that water for the environment is included in the allocation/water balance, and NEPA has responsibility for managing the prevention of discharge of pollution into the environment.

By controlling all water abstraction, and all discharge to bodies of water, WRA and NEPA together control the majority of activities that directly affect water resources. As such, it is essential that WRA and NEPA establish clear administrative processes for coordination.

WRA along with NEPA also have responsibility for creating IWRM Committees and building their capacity, as described in Section 4.2. IWRM Committees will foster citizen participation, especially women and other marginalized groups, in IWRM.

Implementation roles of GoJ agencies

GoJ agencies will play the following roles in implementing IWRM (see Table 3.2). All of these agencies will be active in IWRM Committees and participate in decision-making processes.

Table 3.2: Implementing Roles of GoJ Agencies

Agency	Responsibilities
WRA	Regulates abstraction of groundwater, use of surface water, and coordinates integrated water resources management. Leads the establishment of IWRM Committees in each hydrological basin along with NEPA
NEPA	Controls the prevention of discharge of pollutants. Supports the establishment of IWRM Committees in each hydrological basin along with WRA
Climate Change Division	Coordinates an integrated strategy for climate change resilience
National Water Commission (NWC)	Provides piped water supply and sewerage services

Agency	Responsibilities
Ministry of Health	Monitors drinking water quality and the safety of sanitation facilities in areas not reached by water supply and sewerage pipes
The Ministry of Local Government and Parish Councils	Minor Water Supplies, Water Shops and Community Catchment Tanks
Forestry Department	Protect the forest and watersheds
Rural Water Supply Ltd. (RWSL)	Assists households and communities in rural areas in obtaining safe drinking water
National Irrigation Commission (NIC)	Provides irrigation services
National Works Agency	Provide flood water control services around roads, settlements and agricultural lands
National Solid Waste Management Agency	Manages solid waste in watersheds

3.2.2 Financial

IWRM benefits all users of water resources. The management process for protecting and allocating water resources also has costs. GoJ's policy is that major abstractors and dischargers should pay for the costs of this process, through resource-use fees. Specifically, WRA and NEPA charge fees to the companies and organizations that they regulate to recover the full cost of providing regulatory services. The fees should also cover the cost of establishing and running IWRM Committees, an integral part of the regulatory decision-making process.

4 The Participatory Approach to IWRM

4.1 Current Situation

GoJ agencies already receive and act upon the recommendations of a variety of stakeholders, including businesses and civil society groups, with regards to water resource management. Donors have implemented pilot programs that create citizen-based IWRM programs in Jamaica. These programs have been proven successful in creating IWRM programs with significant citizen participation.

However, many citizens lack opportunities to participate in decision-making on water resources management. In addition, many citizens are unaware of the importance of water resource management. This is particularly true for marginalized groups, such as women. To engage communities in water resources management, successful pilot programs can be brought to scale. These efforts to empower socially marginalized groups in IWRM can lead to their empowerment in other ways.

Obstacles to scaling up successful models for citizen participation include lack of information on the importance of water resources management, or the technical knowledge to make decisions. Further, parties with a vested interest in water management, such as farmers or manufacturers, may attempt to dominate IWRM because they have a greater incentive to participate than private citizens.

Table 4.1: SWOT Analysis of the Participatory Approach to IWRM

Strengths	Weaknesses
▪ Many stakeholders, including a variety of GoJ agencies, businesses, and civil society groups, already participate in water resources management ▪ Donors have implemented successful pilot programs for citizen participation in IWRM	▪ Most citizens lack opportunities to participate in water resource management ▪ Women and other marginalized groups, in particular, do not have the opportunity to participate in IWRM ▪ Many people are unaware of the importance of water resources management
Opportunities	**Threats**
▪ Scaling up successful pilot programs for citizen participation in IWRM could result in wide spread participation in IWRM ▪ Empowering women and other marginalized groups to participate in IWRM decision-making can help empower them in other ways	▪ Citizens may not prioritize water resource management and not participate IWRM ▪ Citizens lack experience and technical knowledge to effectively participate in IWRM ▪ Groups with vested interests(such as farmers and industrialists) might exert disproportionate influence in water resource management

4.2 Policy Directions

IWRM Committees will play a lead role in managing IWRM in each of the ten hydrological basins in the country. IWRM Committees have demonstrated success as models for effective

water resources management that involve community members in decision-making processes. Studies have recommended expanding this model nationwide.[12]

IWRM Committees

The GoJ's policy is to promote IWRM Committees to play a vital role of involving all stakeholders in decision-making in regard to watershed and groundwater protection. Specifically, they should provide input on planning for abstraction, discharge, land-use practices, and service provision. The WRA will lead the establishment of IWRM Committees in each hydrological basin, with the support of NEPA.

IWRM Committees will make three-year water resources management plans for their hydrological basin, including recommendations on abstraction, discharge, land-use practices, and service provision. These recommendations will be based on consensus and compromise among committee members.

To allow for full participation among all stakeholders, IWRM Committees will include private citizens, especially women and other marginalized groups, and relevant GoJ agencies. Final decisions will be made by the relevant national and local regulators and service providers, but these decisions should generally reflect consensus recommendations made by IWRM Committees.

Structure and responsibilities of IWRM Committees

Each IWRM Committee will, taking into account GoJ policies related to IWRM Committees, establish a Memorandum of Understanding on their processes for decision-making and issuing recommendations. The Memorandum of Understanding will include specific ways that the IWRM Committee will involve as many community members as possible in decision-making. It will also include specific ways that GoJ agencies will allow community members to participate more fully in water resources management by building capacity.

Upon formation, each IWRM Committee will agree on a water resources management plan, which will be updated every three years.

The plan will include:

- The IWRM Committee's understanding of resource demands and challenges
- Action steps to meet challenges, including what data will be gathered.

These plans will guide the decisions of WRA and NEPA in issuing abstraction and discharge permits. They will also guide other regulatory and town-planning bodies.

[12] IWCAM and NEPA, "Global Environment Facility—Integrating Watershed and Coastal Areas Management Project/National Environment and Planning Agency Project (GEF-IWCAM/NEPA) Watershed Area Management Model (WAMM)."

WRA has lead responsibility for establishing the IWRM Committees, and will be supported by NEPA. WRA will lead, and will be supported by NEPA, in helping to build the capacity of the IWRM Committees so that the Committees can carry out their responsibilities effectively.

Community members, especially women and other marginalized groups, will participate in IWRM Committees

IWRM Committees will meet regularly and at convenient times announced in advance. IWRM Committees will use diverse methods to involve local community members in decision-making processes and to build local capacity. All community members will be welcome to provide input, and each IWRM Committee will establish structures to reach out to private citizens and ensure that interested individuals do not gain undue influence on decision making.

IWRM Committees will make special considerations for the effects of water resource management decisions on marginalized groups, such as women, the poor, and rural residents, among others.

Coordination with other community organizations

To maximize stakeholder involvement and ensure coordinated decision making, IWRM Committees will include members of Local Forest Management Committees and Water Users Associations (WUAs). Members of Local Forest Management Committees coordinate water resources decisions with forestry management decisions. WUAs manage irrigation schemes in some areas.

Watershed Management Committees (WMCs) have been set up in some Watershed Management Units, and already play a consultative role in decision making on water resources management. Each WMC will decide whether it would like to be subsumed into the new IWRM Committees, or whether it would like to continue operating as an advisory body the local IWRM Committee. This will avoid overlapping mandates between WMCs and IWRM Committees.

5 Environment and Ecosystem Protection and Conservation

5.1 Current Situation

The majority of Jamaica's water resources are good, but degradation threatens some watersheds around the country. Only 10 percent of the island's water resources are contaminated. However, ten of the 26 watersheds are classified as degraded or severely degraded.

Improperly treated sewage, industrial effluent, and agricultural run-off are three relevant contaminants of water resources. Sewage treatment facilities often produce effluent that fails to meet the health standards established by the MOH and NEPA. In some places, sewers become blocked or backed up, spilling sewage directly into the environment, sometimes in residential areas. Industrial effluent adds to the burden on sewage treatment plants. Agricultural production creates run-off that pollutes freshwater supplies and coastal waters.

A variety of GoJ agencies have responsibility for protecting the environment and ecosystems. NEPA is the main regulatory body in environmental protection, and has a clear mandate and adequate capacity. It has set standards for ambient water quality and discharge from sewage treatment plants and industrial facilities. However, there are no comprehensive regulations on preventing non-point source pollution from agricultural areas or urban areas. Further, NEPA often lacks the necessary resources to enforce the standards that it sets.

Fully adopting an IWRM approach to water resources management, including involving a variety of stakeholders in decision making, can help protect the environment and ecosystems. Contamination from improperly treated sewage can be minimized by expanding the capacity of existing treatment facilities or constructing new facilities. Increasing the capacity of sewage treatment facilities will result in decreased amounts of undertreated sewage entering the environment and causing damage.

Poor agricultural practices, pollution, and squatting pose the biggest threats to the nation's watersheds. Climate change may increase the rate of watershed degradation, as temperatures rise and flooding risks increase. Failure to expand the sewerage system could lead to increased contamination from soak away systems, which serve as the main alternative of improved toilets for those that do not have access to the sewerage network.

Table 5.1: SWOT Analysis of Environment and Ecosystem Protection and Conservation

Strengths	Weaknesses
▪ Less than 10 percent of the island's water resources have been contaminated ▪ 16 of 26 watersheds are classified as not degraded or less degraded. ▪ There are clear and established standards for ambient water quality and industrial and sewage effluent ▪ NEPA has a clear mandate and capacity to protect the environment by regulating polluters	▪ Ten out of 26 watersheds in the country are degraded or severely degraded ▪ Sediment from land-clearing and contaminated run-off from sewage and agricultural areas often pollutes ecosystems, including damaging coral reefs ▪ Discharge from sewage treatment plants often fails to meet Ministry of Health and NEPA standards[13] ▪ Discharge from sewage treatment plants and run-off from agricultural production contaminates freshwater supplies and coastal waters ▪ NEPA and other agencies sometimes lack adequate funds to enforce established standards ▪ There are no established standards or best practices for preventing non-point source pollution
Opportunities	**Threats**
▪ Fully adopting an IWRM approach to water resources management can help ensure that watersheds are protected ▪ Increasing wastewater treatment capacity by expanding existing plants or adding new treatment facilities can decrease pollution from improperly treated sewage and soak away systems	▪ Poor agricultural practices, pollution, and squatting pose the biggest threats to watersheds ▪ Climate change may increase the rate of watershed degradation ▪ Failure to expand the sewerage system could lead to increased contamination of aquifers from soak away systems

[13] Johnson, Nilsia *et al.*, "Assessment of Wastewater Treatment Plants in Jamaica by the Ministry of Health." Ministry of Health, Pan-American Health Organization/World Health Organization. 6th Caribbean Environmental Forum and Exhibition (CEF), Saint Kitts and Nevis, 21 to 25 May 2012. http://cehi.org.lc/cef5/documents/CEF%20papers%20and%20presentations/PAPERS/Parallel%20Session%206%20Environmental%20Health%20and%20Water%20Quality/Nilsia%20Johnson%20Assessment%20of%20Wastewater%20Treatment%20Plants%20in%20Jamaica%20by%20the%20Ministry%20of%20Health.pdf accessed 15 August 2014.

5.2 Policy Directions

Goals for Protecting Ecosystems and the Environment

The GoJ's policy is that Jamaica's water bodies and watersheds, including streams, rivers, ponds, lakes, and costal waterways, should support vibrant aquatic ecosystems. Freshwater resources should be managed to allow for water resources to be sustainably available for human use.

These policy goals will be mainstreamed into the goals of IWRM. Goals will be met by protecting watersheds and by preventing point source and run-off pollution.

5.2.1 Protecting Watersheds

Watershed degradation is most often caused by people, who remove trees and other vegetation around headwaters for lumber, to clear land for farming, and to develop land for residential or other commercial uses. However, maintaining healthy watersheds requires protecting animals as well as plants, since plants and animals in all ecosystems are interdependent. As such, a vibrant watershed ecosystem is not only an important goal, but contributes to healthy watersheds and sustainable water resources.

When watersheds are degraded, there are at least three negative effects on the environment and ecosystems:

- **Increase in Flooding**. Reduced vegetation does not absorb and store as much water. This endangers buildings and infrastructure (including, often, water supply infrastructure) as well as the environment
- **Increase in Erosion**. Exposed soil washes away at a greater rate than previously, reducing the ability of the land to support plant cover or crops
- **Increase in Water Turbidity**. Increased particulate matter in water makes water more difficult and expensive to treat. Too much turbidity may be impossible for some water treatment facilities to manage safely, which leads NWC and other providers to interrupt service in some cases.

A key goal of water resources management decisions is to protect watersheds at all points—from ridges and headwaters to the coastal waters that they feed into. IWRM means that all stakeholders will be consulted in decision-making processes. To protect watersheds, it is particularly important that the Forestry Department and Local Forest Management Committees be involved in decisions on protecting the environment and ecosystems.

5.2.2 Preventing Point Source Pollution

Point source pollution comes from sewage treatment plants, industrial users, and other sources that discharge improperly treated waste directly into the environment.

Service Targets for Point Source Pollution

It is the GoJ's policy that effluent discharged into the environment from sewage treatment plants, industry, and other sources will be treated so that it does not endanger the environment or people's health. All sewage treatment plants and other dischargers will comply with NEPA standards for effluent discharges by 2020.

Managing effluent from industry and sewage treatment plants

NEPA and the Environmental Health Unit of the Ministry responsible for Health regulate the quality and quantity of all effluent that is released directly into the environment. To carry out its enforcement duties, regulating bodies must have the necessary resources to monitor and enforce the comprehensive standards they set.

Consistent with the GoJ's objectives for cost recovery for services in the water sector, NEPA will set and charge permitting and discharge fees to the businesses and organizations it monitors. Specifically, NEPA will charge fees to all dischargers to cover administrative costs. NEPA may also impose pollution charges on discharge that damages the environment, provided the charge is set in advance and is no more than a reasonable estimate of the environmental damage caused by the discharge.

Parish Councils and Rural Water Supply Ltd. (RWSL) play key roles in ensuring that effluent from on-site sanitation facilities does not pollute the environment or endanger people's health, as described in Section 12.4.

Trade Influent Rules

NWC and other wastewater service providers will set trade influent rules that allow sewage treatment plants to recover the cost of treating trade influent released into the sewerage system.

The trade influent rule will set out what types of influent may be discharged into a sewer, and how much wastewater service providers will charge. The rule will also set out what types of influent may not be discharged into a sewer, because they block the sewerage network or because the treatment plant cannot treat them.

Because this is a tariff on polluters, the OUR will need to approve trade influent rules for sewerage providers. The OUR will regulate trade influent rules in accordance with the OUR Act, taking into account these policy objectives.

Wastewater Re-use

The GoJ encourages the re-use of treated wastewater where it is safe and economical. Wastewater that is properly treated at sewage treatment plants may be safe for activities such as irrigation and some industrial processes.

To implement this policy, NEPA will establish safety standards for different types of wastewater re-use. Those that treat wastewater, including NWC and industrial facilities, are encouraged to seek buyers for treated wastewater, or at least a user who will accept treated wastewater for re-use.

Reducing groundwater use

NIC, private irrigation providers, and industrial facilities will seek to re-use treated wastewater instead of abstracting freshwater. When considering applications to abstract groundwater, WRA will consider whether the applicant has made efforts to re-use treated wastewater.

5.2.3 Preventing Non-point Pollution

Non-point pollution comes from diffuse sources, where contaminants (for example, from agricultural fertilizers or urban runoff) infiltrate in the soil and reach water table.

NEPA will set and enforce standards on non-point pollution for agricultural and urban areas. NEPA will also promulgate formal guidelines on best practices to meet these standards in agricultural and urban areas, including measures such as:

- Appropriately managing waste from livestock
- Periodically adjust grazing intensity for livestock to prevent overgrazing
- Adopting best practices in efficient irrigation (see Section 13.2.1)
- Limit and manage fertilizer and pesticide use, including by using natural barriers
- In urban areas, limiting impervious surfaces
- In urban areas, using landscaped areas to filter and infiltrate run-off.

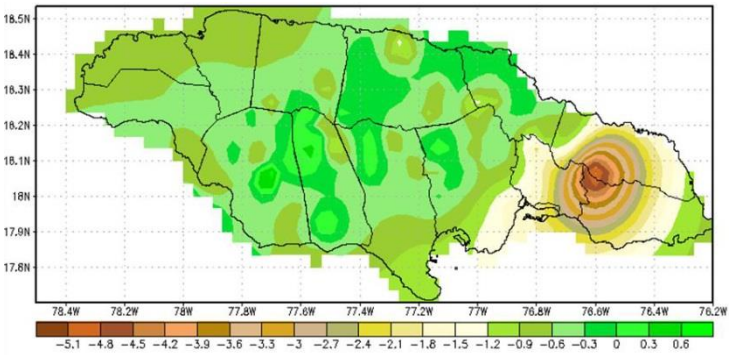
6 Climate Change Adaptation and Mitigation

6.1 Current Situation

Jamaica's water sector is susceptible to multiple risks associated with climate change and climate variability. Climate change is any long-term significant change in the average weather over a period of thirty-years or more. Climate variability refers to fluctuations in average weather or shorter periods, such as one year to the next or one decade to the next. Average weather includes average temperature, precipitation, and wind patterns. Average weather involves changes in the variability or average state of the atmosphere over durations ranging from decades to millions of years.[14] Climate change risks for Jamaica include changing rainfall levels and patterns, rising temperatures, and more intense hurricanes.

Rainfall patterns have changed in recent decades. Between 1960 and 2006, the national average rainfall has decreased slightly. Average rainfall increased slightly during the dry season (December to May), and decreased slightly during the rest of the year. Figure 6.1 shows the difference between average annual rainfall for 1992 and average annual rainfall for 2010. Rainfall levels have increased since 1992 in the centre of the island, and they have increased in in the eastern and western Parishes.

Figure 6.1: Rainfall Trend Slope for 1992-2010



Source: State of the Jamaican Climate Report 2012

Average temperatures have increased in the Caribbean and Jamaica in recent years. Annual mean temperatures across the Caribbean have increased over the last century by about 0.5°C.[15] Between 1960 and 2006, the average temperature in Jamaica increased by 0.27°C per decade.[16] Records also show an increase in the number of very warm days and nights since 1950.[17]

[14] Draft Development of a National Water Sector Strategy Adaptation Strategy to Address Climate Change in Jamaica, 17

[15] State of the Jamaican Climate Report 2012, 4-7.

[16] State of the Jamaican Climate Report 2012, 4-8.

[17] State of the Jamaican Climate Report 2012, 4-8.

For Jamaica, climate models project an increase in mean temperature of between 0.3°C and 1.3°C by the 2030s. Models project a range of possible changes in average rainfall, from a decrease of 32 percent to an increase of 25 percent. The median projects a decrease in average rainfall of three percent (these projections are shown in Table 6.1).[18] A projected decline in overall precipitation levels, together with increased variability in rainfall, suggests risk of more frequent droughts.[19]

Table 6.1: Predictions for Annual Mean Temperature and Rainfall by 2030 vs. 1970–1999

	Increase in Temperature	Change in Rainfall	
	Range	Range	Median Projection
Jamaica	0.3°C to 1.3°C	-32% to +25%	-2%

Source: State of the Jamaican Climate Report 2012, 6-6.

Tropical cyclones in the North Atlantic have become more frequent and intense since 1995.[20] Much or all of the increase in the frequency of cyclones has been attributed to the Caribbean region being in the positive (warm) phase of the Atlantic multi-decadal oscillation (AMO) and not necessarily to climate change.

While changes in the frequency and intensity of tropical cyclones in the future are hard to predict[21], the UNDP concludes that cyclones are likely to become more intense in the Caribbean region in the future[22] [23], bringing heavier precipitation, and probably also stronger winds.

These potential changes in Jamaica's climate threaten the water sector in the following ways:

- **Flood control**—The increase in frequency of high intensity rainfall events and the intensity of hurricanes could increase the frequency of landslides and floods
- **Water supply**—Increased droughts would endanger the water supply in communities where water supply is already limited, while increased flooding would increase sediment load and demands on water treatment infrastructure
- **Watershed protection—**Increased frequency of more intense rainfall events would accelerate sediment erosion, movement and transport within basin river systems

[18] State of the Jamaican Climate Report 2012, 6-15.

[19] Note that none of these projections take in to account the possible effect of changes in the pattern of tropical cyclones on rainfall

[20] CCSP, 2008, and Webster, 2005.

[21] IPCC Fourth Assessment Report. Regional Climate Projections, Small Islands, Tropical Cyclones, 2007; Peilke, 2005, and Webster 2005.

[22] McSweeney, Carol, et. al. UNDP Climate Change Country Profiles.

[23] State of the Jamaican Climate Report 2012, 6-24.

- **Insufficient infrastructure—**There is a lack of infrastructure to mitigate the effects of climate change such as flooding or localized water shortages caused by climate change
- **Non-irrigated agriculture—**This is an important sector with respect to food security, but it remains vulnerable to fluctuations in rainfall and temperature.

The Climate Change Division is well-positioned to lead national efforts to adapt to climate change, but so far lacks a comprehensive policy framework to guide it. Draft documents such as the Water Sector Adaptation Strategy to Address Climate Change and the Climate Change Policy Framework have been prepared.

Climate variability, the natural fluctuation in weather patterns across shorter time periods, also threatens the water sector. For instance, years with rainfall that is lower than average can threaten the water supply in some parts of Jamaica. Unlike climate change, climate variability can be predicted with a high degree of confidence, which allows service providers and households to plan for climate variability. For example, investments in storage capacity can ensure adequate water supply during years with rainfall that is lower than average, but within the expected range of climate variability.

Table 6.2: SWOT Analysis of Climate Change

Strengths	Weaknesses
▪ There is a dedicated Climate Change Division to lead national efforts to adapt to climate change ▪ The GoJ is committed to adapting infrastructure and policy to meet challenges expected along with climate change ▪ There is a comprehensive policy framework for adapting to climate change	▪ Storage of water supply is often inadequate for dry periods, which could increase with climate change, including public and household storage ▪ Drainage infrastructure is insufficient in many areas, especially on roads and in urban areas
Opportunities	**Threats**
▪ Finalizing and passing national policies related to climate change adaptation and climate change adaptation in the water sector would result in a comprehensive policy framework for adapting to climate change ▪ Increasing use of rainwater harvesting with adequate storage will increase resilience to dry periods ▪ Investments in infrastructure for water supply, irrigation, and drainage can increase service providers' resilience to extreme weather.	▪ Decreased rainfall levels or changing rainfall patterns could threaten water supply and irrigation services in some areas ▪ A variety of extreme weather conditions, such as hurricanes, pose a danger to infrastructure and increase the risk of flooding ▪ Saltwater could contaminate groundwater resources due to the intrusion of sea water into groundwater resources, which provide 85 percent of the nation's water supply

6.2 Policy Directions

Goals for Adapting to and Mitigating Climate Change

Jamaica aims to avoid, minimize, or adapt to the negative impacts of climate change and climate variability on its natural environment, including water. In particular, Jamaica aims to preserve infrastructure and services in the water sector that are necessary to ensure that water resources are able to meet human needs and to promote economic growth.[24]

Bodies in the water sector will limit greenhouse gas emissions by adopting economically viable energy efficiency technologies, and by using renewable energy technologies where they are economically viable.

To achieve this objective, the GoJ will complete the climate change policy framework by quickly adopting the Climate Change Policy Framework and the Water Sector Adaptation Strategy to Address Climate Change.

The GoJ will also adopt the Building Act, 2011, and enact a new National Building Code based on the International Building Code (IBC) (see Section 2).

The GoJ will also ensure:

- Rainwater harvesting with adequate storage is promoted for households with adequate rainfall and where groundwater and surface sources are not available (see the GoJ's complete policy on rainwater harvesting in Section 11)
- A Drought Policy and a Flood Policy will be promulgated, both of which will address land use restrictions and prevent vulnerability increases in drought-prone areas
- More integration and stricter enforcement of physical planning laws and regulations
- Sufficient investment in hydrological and water quality monitoring and adequate dissemination of data to the stakeholders and decision-makers in water resources management
- Development of appropriate hydrological and water resources modelling tools in parallel with capacity building within key stakeholder organizations
- Identification and replication of best practice programs in local community and stakeholder engagement, as a vehicle for watershed management and protection
- Increased efficiency in water delivery systems
- Planning that includes the effects of climate change and the range of climate variability in infrastructure investments and service delivery methods for each service area and in managing water resources.

[24] Draft Development of a National Water Sector Strategy Adaptation Strategy to Address Climate Change in Jamaica, 153

The Climate Change Division coordinates national climate change efforts

Consistent with the GoJ's objectives for implementing IWRM and adapting to climate change, the GoJ recently created the Climate Change Division as part of the Ministry responsible for water. The GoJ's policy is that the Climate Change Division will monitor and coordinate national climate change adaptation efforts, including in the water sector. The role of the Climate Change Division is to ensure that:

- Each agency's roles in regard to climate change adaptation are clear
- Agencies do not engage in redundant climate change efforts
- All GoJ and donor efforts accord with these and other national policy priorities and plans for climate change adaptation.

7 Energy Efficiency in the Water Sector

7.1 Current Situation

Energy efficiency improvements are needed in public water supply and irrigation. Increasing energy efficiency is an important part of reducing emissions, as set out in the GoJ policy in Section 6.2.

NWC is the single largest electricity consumer in Jamaica, and energy is often not used efficiently.[25] NWC uses about as much energy as water utilities in neighbouring countries to produce water, and monitors its energy consumption well. However, non-revenue water of 69 percent means that NWC produces about four times more water than it bills for.

The National Irrigation Commission (NIC), the public authority that provides irrigation services, does not use energy efficiently in at least three ways:

- Its tariffs cover less than half of operating costs. As a result, more energy is used to produce and pump water for irrigation than is efficient
- It relies on energy intensive pumping to abstract groundwater for eight of its ten systems. NIC's electricity costs for pumping increased 145 percent between 2006 and 2012, to a total of $265 million[26]
- Water losses are high in in some systems. Water losses were as high as 63 percent in the Mid-Clarendon irrigation system[27]

Further, NIC often does not collect data on water production and losses, which makes it difficult to assess or improve efficiency. At 29 of its 73 pump stations, NIC either does not have production meters or the meters do not work. For four of nine main systems, NIC did not track water losses in 2011-2012.[28]

High energy costs also hurt the financial performance of NWC and NIC. Because there is no electricity surcharge in water supply or irrigation tariffs, NWC and NIC suffer financially when energy prices rise.

Throughout the country, farmers' use of more efficient irrigation techniques would conserve water and energy (see Section 13.2.1). In addition, using treated wastewater for irrigation would reduce the need for pumping to abstract groundwater (see Section 5.2.2).

Many households in rural areas use rainwater harvesting systems for water supply, and the GoJ encourages the increased use of this technology in appropriate areas. Rainwater harvesting systems do not require energy to operate, and are therefore not vulnerable to changes in energy costs. Other technologies and techniques can also be adopted to increase energy efficiency in water supply and irrigation and reduce energy costs.

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[25] National Energy Policy 2009-2030, Ministry of Energy and Mining, October 2009

[26] Auditor General's Department, "Performance Audit Report of the National Irrigation Commission (NIC)." June 2013.

[27] Auditor General's Department, "Performance Audit Report of the National Irrigation Commission (NIC)." June 2013.

[28] Auditor General's Department, "Performance Audit Report of the National Irrigation Commission (NIC)." June 2013.

Table 7.1: SWOT Analysis of Energy Efficiency in the Water Sector

Strengths	Weaknesses
▪ NWC has designed a system of evaluating energy efficiency of water purification and distribution ▪ NIC is taking steps to reduce the energy cost of water by using renewable energy to pump water ▪ 15 percent of households (31 percent of rural households) use rainwater harvesting systems as their primary source of drinking water—these systems do not require continual energy inputs and are therefore extremely energy efficient	▪ Non-revenue water of 69 percent means that NWC produces about four times more water than it bills for ▪ Water losses are high in some irrigation systems ▪ Eight of ten NIC irrigation systems rely on energy-intensive pumping to extract groundwater ▪ NIC's tariffs cover less than half of operating costs
Opportunities	**Threats**
▪ Reducing non-revenue water in water supply and irrigation will reduce energy needs for water production and distribution ▪ Increasing use of rainwater harvesting in rural areas will expand the use of systems that are not vulnerable to changes in energy costs ▪ Increasing use of efficient irrigation techniques will decrease water and energy use while maintaining service levels	▪ Increases in energy prices negatively affect NWC's and NIC's financial performance, since it cannot pass on electricity prices to consumers in most cases ▪ NWC requests adjusting tariff rates, service standards, and service targets and set these rates for a 5-year period. This limits NWC's ability to adjust tariffs to account for volatility in energy prices ▪ NIC does not have a comprehensive maintenance plan, which could result in more leaks, and therefore higher energy use in irrigation

7.2 Policy Directions

Entities in the water sector will work to achieve the national goal to "use energy wisely and aggressively pursue opportunities for conservation and efficiency", as stated in the National

Energy Policy (2009-2030). In particular, GoJ agencies will be "leaders and models in energy conservation and environmental stewardship in Jamaica"[29].

Goals for Energy Efficiency in the Water Sector

Service providers in the water sector will adopt all energy efficiency technologies and techniques that are economical and that allow them to meet service standards in this Policy. GoJ agencies will adopt regulations that encourage service providers to improve energy efficiency and reduce energy costs.

7.2.1 Technical

Economical technologies will vary depending on how and where they are used. Some rural water supply systems do not require any energy inputs to operate. The following are examples of some technologies that will often be economical throughout Jamaica:

- **Rainwater harvesting systems**—The GoJ promotes the use of rainwater harvesting in areas where piped water supply is not economical, as a safe way to provide water supply. Rainwater harvesting systems do not require energy inputs to operate. Section 11 describes rainwater harvesting systems and their advantages in more detail
- **Piped gravity-fed water supply systems**—Gravity-fed water systems are constructed where there are naturally occurring springs located in higher elevation than the community. The community channels the water into a storage tank. The community builds a network of pipes that connect the households to the tank using gravity to deliver water from the tank to the households. Because they are gravity-fed, these systems can deliver reliable water supply to communities without any need for pumping
- **Solar panels for pumping and other uses**—The use of solar panels as an energy source for the use of irrigation components (either pumps or electro valves) can significantly decrease energy costs
- **Irrigation hours—**Land owners should irrigate their crops outside heat hours. By decreasing evaporation, they are saving water and energy and increasing irrigation efficiency
- **Weather stations**—Local weather stations can provide rainfall and evaporation information. This data will allow land owners to irrigate exactly the amount of water needed for the crop, reducing wastes. These weather stations operate with solar panels
- **Other efficient irrigation technologies**—Other technologies and methods to improve irrigation efficiency, such as drip irrigation and fertigation, are described in Section 13.2.1.

[29] National Energy Conservation and Efficiency Policy 2010–2030, Ministry of Energy and Mining, October 2010.

Energy efficiency can also be increased by maintaining infrastructure adequately. Piped water supply and irrigation infrastructure should be maintained so that all economical repairs are made.

7.2.2 Institutional

Service providers have responsibility for adopting economical energy efficiency technologies and techniques. NWC, NIC, and private service providers should reduce leaks to optimal levels, and should adopt all economical energy efficiency technologies. NWC is the largest electricity consumer in Jamaica and much of that electricity could be saved by reducing non-revenue water, and therefore the need to abstract and pump water that is not paid for.

7.2.3 Financial

Service providers should invest in implementing energy efficient technologies and techniques that will save money in the long term.

8 Private Participation in the Water Sector

8.1 Current Situation

The private sector is involved in the water sector through provision of piped water supply, piped sewerage services, and irrigation services. In many cases, private sector involvement has been effective at increasing the speed of development, delivering essential services to Jamaicans, and speeding up growth. In other cases, there have been problems, because this development has come at the expense of other GoJ objectives.

For example, some private service providers engaged in 'cherry picking'—that is, providing piped water and sewerage services only in areas where they make profits, seemingly at the expense of the profits that could be made by NWC. Cherry picking undermines NWC's ability to offer service at below cost to poor and rural customers, because it undermines NWC's ability to cross-subsidize these users by charging large, well-off, and urban customers a tariff above cost.

Private sector participation can help the GoJ achieve its objectives in the water sector in at least four important ways:

- Providing finance when GoJ-owned companies are not able to borrow because of fiscal or balance sheet constraints
- Providing access to improved technology and expertise that reduces cost and improves service quality for consumers
- If they are properly regulated, they can act on strong incentives to find ways to reduce the costs of service
- Responding more quickly and nimbly to customer demands for expanded and improved service

Table 8.1: SWOT Analysis of Private Participation in the Water Sector

Strengths	Weaknesses
▪ Private sector operators often provide good service efficiently to their customers ▪ Private sector participation has allowed for development where it might otherwise have been limited by the lack of a water supply or sewerage connection from NWC	▪ 'Cherry picking' has reduced NWC's ability to make profits in certain communities, undermining its ability to use profits from high-income customers to subsidize tariffs for low-income customers ▪ Freeze in approvals for new privately operate water and sewerage systems has limited access to benefits of private sector involvement
Opportunities	**Threats**
▪ Private sector operators may have access to finance when Government-owned companies do not ▪ Private sector operators often have access to cutting-edge technologies and world-class expertise	▪ Future private sector participation could lead to further cherry picking ▪ Lack of clarity in the process and criteria for approving licenses for private operators could reduce participation and slow down

▪ Private sector operators can provide good service efficiently, when properly regulated ▪ Often respond quickly and nimbly to customers' needs	development and service expansion in some areas

8.2 Policy Directions

Policy on Private Participation in the Water Sector

The GoJ's policy is to encourage private participation in delivering water-related services, where it can help meet the GoJ's objectives for the sector. Private businesses can help improve service delivery through contracts with GoJ-owned service providers or as service providers themselves.

Private participation in the water sector will be encouraged through public-private partnerships and through private companies directly providing water-related services. Businesses in public-private partnerships with public agencies will be regulated through contracts, and private enterprises that provide services directly will be regulated by the OUR.

8.2.1 Public-Private Partnerships—GoJ-owned Service Providers Contracting with Private Companies to Improve Services

The GoJ's policy is to encourage GoJ-owned service providers, such as the National Water Commission (NWC) and the National Irrigation Commission (NIC), to contract with private companies to provide water-related services. These services might range from performing a specific function—such as billing and collections or operations and maintenance—up to taking responsibility for building out, financing, and operating infrastructure to supply water and wastewater services. The GoJ expects NWC to continue to explore and develop ways to contract with and incentivize private firms to reduce water losses, increase energy efficiency, improve and expand services, reach effluent discharge standards, and improve commercial performance.

8.2.2 Private Companies Directly Providing Water-related Services

Private service providers will also be encouraged to provide piped water supply, piped sewerage services, and irrigation services directly to consumers, wherever this can maintain and expand services in a sustainable and equitable way.

Area-specific licences are required to provide piped water supply and piped sewerage services

To provide piped water supply and piped sewerage services, private companies will need to apply to the Minister responsible for water for an area-specific licence**.** The Minister will approve licences on a case-by-case basis. The Minister will approve licences where he believes the private firm will be able to provide services better, faster, or at lower cost than NWC can.

In issuing licences, the Minister, on the advice of the OUR and in collaboration with WRA, NWC, and the Ministry responsible for health, will decide on the boundaries of the area. To prevent cherry picking, licence areas will typically include an entire community. Providers would have an obligation to offer service to all potential customers in the service area. New licences must offer service to everyone in the area. In deciding on the licence-area, the Minister (on the advice of the OUR) will balance the social goal of expanding service to poor and rural areas with the need to attract investment into schemes that provide water services to new housing and tourist developments. In general, service licences will not be exclusive.
Licences in force at the date of adoption of this Policy will continue to be respected on the terms under which they were issued.

8.2.3 Regulation of Private Service Providers

The OUR regulates water quality and coverage for both the Government-owned service providers and private providers. Government-owned providers will hold private companies with which they contract accountable directly, through the contracts.

Regulation of public-private partnerships

Where a Government-owned provider pays any private company for specific services and the quality of those services will be governed in contracts between the two parties. These rates will be established through a competitive bidding process. The OUR will approve such rates prior to contract signature, provided the OUR is satisfied that the rates result from a reasonable competitive process that provides good value for the services.

Where appropriate, Government-owned providers will be allowed to pass on contracted costs to consumers in the tariff. This will be appropriate in cases where private firms are investing in expanding service networks—for example, where private firms have contracts to design, build (or rehabilitate), operate, and maintain water or sewerage treatment plants or networks. In such cases, the public provider should apply to the OUR for approval for cost pass-through before contracting with the private partner. If the OUR is satisfied that the service offered is likely to serve the public interest and establish reasonable rates, the OUR should allow the pass-through proposal.

Regulation of direct service providers

Tariffs and service standards of licenced, direct service providers will be regulated by the OUR. Tariffs should allow private service providers to recover reasonable cost of service and to finance necessary investments. Tariffs may differ among providers. The OUR will regulate in accordance with the OUR Act, taking into account these policy objectives.

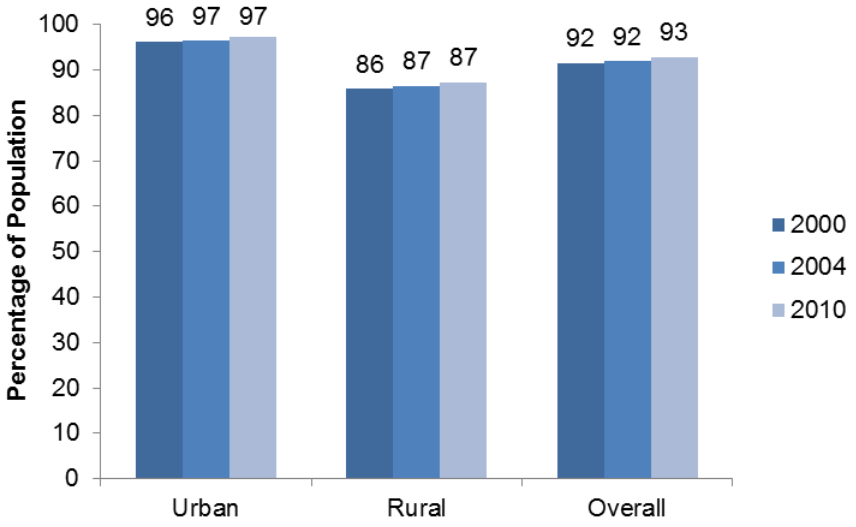
9 Standards for Access to Potable Water Supply and Improved Sanitation

9.1 Access to Potable Water Supply

9.1.1 Current Situation

Ninety-three percent of Jamaicans have accessed to improved water sources (see Figure 9.1). Access is higher in urban areas, at 97 percent of the population, than in rural areas, where only 87 percent of the population has access. Access has improved by one percent between 2000 and 2004. An improved water supply source is one that is likely to be safe for drinking, based on its construction.

Figure 9.1: Access to Improved Water Sources



Source: Jamaica Survey of Living Conditions

9.1.2 Policy Directions

This Policy sets that target for reliable water supply should be based on the following:

> *The United Nations makes recommendation in urban areas for a distance of no more than 500 metres from a home to be considered reasonable access. In rural areas, reasonable access implies that people does not have to spend a disproportionate part of their days collecting water. When water sources are far away from the home, the burden of collecting water often falls to women and children.*
>
> *This policy strives to provide access within this context utilizing all available means to provide the most convenient access possible through available modalities such as home and community solutions.*

Service Targets for Water Supply

All households will have access to potable water supply by 2020. This means that water supply will be:

Safe—Potable water will conform to standards set by the MOH and the WHO

Convenient—Water supply will be delivered to the home, or as close as possible. Water supply will never be more than 500 metres from the home

Of sufficient quantity—Each person will have access to at least 50 litres per day

Reliable—Water supply will be available 24 hours per day. In some areas this may be impossible to achieve, and in this case it will be available at least 18 hours per day

Affordable—Pricing for water will continue to be arrived at by consultation with stakeholders. No-one will be denied access to potable water because of inability to pay. A proxy means test will be developed to identify those in need of social water.

These service targets will ensure a common standard of access to potable water for all Jamaicans. Meeting these targets is also essential for ensuring equity for women, who often bear the burden of collecting water. Equity, including gender equity, is one of the guiding principles of Vision 2030, our national development policy.[30]

To meet the GoJ's target of universal access, seven percent of Jamaicans will need improved service by 2020. Section 10 describes the GoJ's strategies for achieving these targets in rural and urban areas. The Rural Water Supply Development Strategy (RWSDS) provides more detail on the GoJ's strategy in rural areas, including rural areas in each Parish.

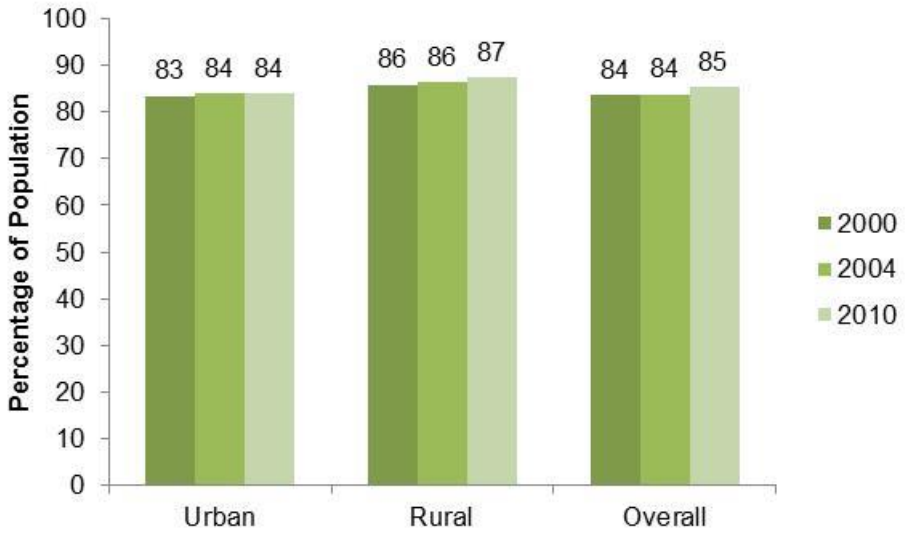
9.2 Access to Improved Sanitation

9.2.1 Current Situation

Eighty-five percent of Jamaicans have exclusive use of an improved sanitation facility (see Figure 9.2). Access is slightly higher in rural areas, at 87 percent, than it is in urban areas, at 84 percent. From 2000 to 2010, access nationwide rose by only one percent. An improved water supply source is one that hygienically separates human excreta from human contact.

[30] Vision 2030, 13.

Figure 9.2: Access to Improved Sanitation



Source: Jamaica Survey of Living Conditions

9.2.2 Policy Directions

Service Targets for Sanitation

Cities and major towns will have sewerage services provided by a utility company. Where sewerage service is not possible, all households will have exclusive access to safe and environmentally friendly sanitation solutions. These solutions will preserve the privacy and dignity of users. Standards for non-sewerage areas will be established and enforced by the National Building Code, MOH regulations, stipulations by the Parish Councils and Local Authorities, and NEPA guidelines.

10 Water Supply in Rural and Urban Areas

10.1 Current Situation

Access to improved sources of drinking water is high in Jamaica—93 percent of residents use improved water sources. Water supply is generally affordable, and tariffs are set by the OUR, an independent and credible regulator. Further, the OUR and MOH set and enforce clear standards for the piped water supply network.

A major service gap is lower access to improved drinking water sources in rural areas, at 87 percent of the population. In addition, the piped water supply network reaches only 70 percent of the population. NWC has responsibility for providing piped water supply throughout the island, but often does not deliver the service quality that its customers would like, and much of its infrastructure is poorly maintained. Because NWC's tariffs do not cover the full cost of service provision, its ability to invest to expand services and improve service quality is limited.

Opportunities in water supply include a shared understanding of institutional and service gaps and stakeholders' commitment to the principle of cost recovery in service provision. Governmental budget limitations mean that cost recovery is necessary to expand and improve services. On the other hand, rising energy costs could raise the cost of treating and pumping water. Illegal tapping into NWC's pipes could further damage the piped network.

Table 10.1: SWOT Analysis of Water Supply in Rural and Urban Areas

Strengths	Weaknesses
▪ 93 percent of Jamaicans have access to improved sources of drinking water—97 percent of Urban residents, and 87 percent of Rural residents have access to improved sources ▪ Services are generally affordable ▪ OUR is an independent regulator with a clear mandate ▪ OUR and MOH set and enforce clear standards for the piped water supply network ▪ Where they exist, private service providers deliver quality service at affordable prices	▪ Access to improved water supply is lowest in rural areas, at 87 percent ▪ The piped water supply network reaches only 70 percent of the population ▪ NWC's service is not as reliable as customers would like, and has missed MOH targets in recent years ▪ Water supply tariffs does not fully cover NWC's cost of providing service, limiting its ability to make adequate investments in infrastructure ▪ Inadequate focus on maintenance. Assets fail before design life. Non-revenue water is 69 percent for NWC
Opportunities	**Threats**
▪ Shared understanding of service gaps and necessary institutional improvements ▪ Commitment to principles of cost recovery and IMF backing of GoJ's economic program increases investor confidence ▪ A credible regulator and overall commitment to cost recovery gives Jamaica the potential to fund expansion	▪ Freshwater resources are not distributed evenly spatially and temporally creating local and regional shortages ▪ Rising energy costs could raise costs for pumping and treating water ▪ Central and Local Government budget cannot allocate funding to improve

and improve maintenance of service networks by increasing cost recovery	services in the water sector because of fiscal constraints ▪ Assets at risk due to physical security environment

10.2 Policy Directions

Differences in environmental and infrastructural conditions in rural and urban areas create different obstacles to providing water supply in these two areas. To overcome these obstacles and achieve universal access to safe water supply, different technical solutions and institutional arrangements are needed for urban and rural areas.[31]

Defining Utility Service Areas and Non-Utility Service Areas

In urban areas and other towns and densely populated settlements, piped supply from a water utility is the least-cost way to deliver water service. Such areas are called Utility Service Areas. In other areas of the country, piped water service is not economical, and a variety of alternative techniques are needed to provide access to a safe and convenient water supply. Such areas are called Non-Utility Service Areas.

Utilities are enterprise which serve numerous households, operate electro-mechanical systems such as pumps, and have computerized billing and accounting systems. Small piped systems that operate by gravity flow are thus not considered to be utilities.

The NWC is preparing to expand its piped water supply networks, to offer service to all households in Utility Service Areas by 2020. NWC will work with Parish Councils, Local Authorities, and RWSL in joined-up planning exercises in each Parish. Through these planning exercises, planned investments in piped water supply will be finalized, as will needed investments outside the piped utility network. These planning exercises will be based on the information in the RWSDS and the existing NWC Parish Plans. The exercises will confirm, or where necessary adjust, the Parish Plans NWC has prepared. Once plans for improvements and extension in service in the rural areas of each Parish are agreed, NWC will implement the extensions.

In developing the RWSDS, an analysis was carried out to determine which parts of the country should be Utility Service Areas. The analysis considered: locations of existing NWC systems, plans to extend the utility systems, water resource availability, rainfall, settlement density, elevations, and the cost of non-utility options such as rainwater harvesting.

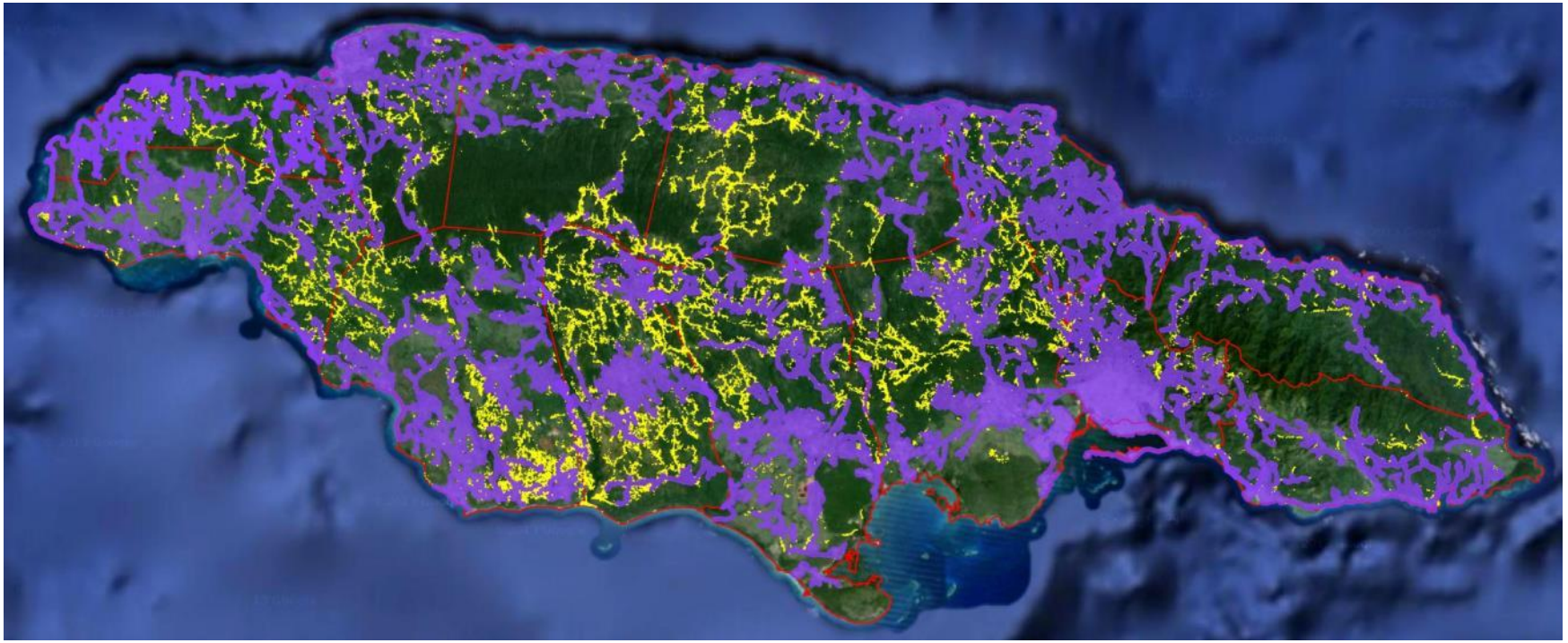
The Utility Service Area determined through this analysis is shown in Figure 10.1 (the purple shaded area). Figure 10.1 also shows the communities outside the Utility Service Area. These

[31] See Vision 2030, 287: "Ensuring vulnerable and poor communities receive adequate [water supply and sanitation services] through appropriate means."

are the yellow shaded areas. The map shows a single yellow dot for each dwelling unit, shop or other building outside the Utility Service Area.

The joined-up planning exercises involving NWC, Parish Councils, Local Authorities, and RWSL will gather more detailed information on the most economical investments in all Parishes than is currently available. As a result, the utility service boundaries given in Figure 10.1 will change slightly in some areas.

Figure 10.1: Map of Utility Service Areas and Non-Utility Service Areas



Key:

- Parish boundaries
- Utility Service Areas
- Buildings in Non-Utility Service Areas—these are shown larger than they actually are, so they can be seen

10.3 Water Supply in Utility Service Areas

Utility Service Areas are the parts of the country where piped water supply is the least-cost method of providing water supply. About 91 percent of Jamaicans live in Utility Service Areas, but piped water supply only reaches about 70 percent of Jamaicans.

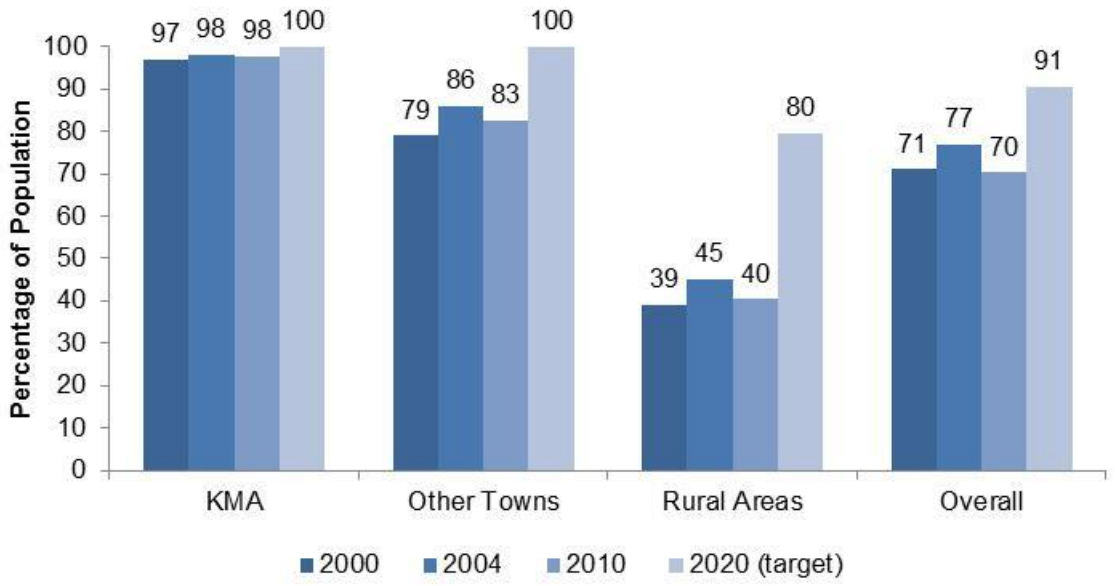
Service Targets for Water Supply in Utility Service Areas

All households in Utility Service Areas will have piped water supply to their residences by 2020. This means that piped will meet the service and affordability standards in Section 9.1.2. In addition, utility service providers will be responsive and courteous to customers.

10.3.1 Technical

Piped water supply networks will reach all households in Utility Service Areas—about 91 percent of the population—by 2020 (see Figure 10.2). Meeting this target will require expanding access from 70 percent of the population in 2010 to 91 percent in 2020. Access to piped water has increased by three percent from 2000, when the previous Water Sector Policy was drafted.

Figure 10.2: Access to Piped Water Supply



Source: Jamaica Survey of Living Conditions

Service providers in Utility Service Areas will take advantage of opportunities to improve operational efficiency, especially reducing non-revenue water to economically optimal levels.

10.3.2 Institutional

The GoJ encourages a diversity of solutions and providers to effectively provide piped water services.

The NWC will continue to serve customers on its piped networks, and will expand piped water supply networks to meet national targets for service coverage, water quality, and financial sustainability. NWC will have the autonomy to pursue new business models to meet national goals for water supply in Utility Service Areas.

In particular, NWC will promote efficiency in service provision by:

- Providing strong incentives for employees to improve service delivery
- Achieving strong commercial autonomy
- Involving the private sector, where it is consistent with the principles set out in Section 8.2

Private service providers will also be encouraged to apply for area-specific licences to provide piped water supply, as set out in Section 8.2.2. The Minister with responsibility for water must approve any licences issued to private providers.

Regulation

The OUR will continue to regulate private service providers as well as NWC and hold them accountable for meeting service standards.

10.3.3 Financial

Tariffs will allow utility service providers to recover reasonable cost of service and to finance necessary investments. Charges for water supply will reflect all costs of service provision, including capital costs. Likewise, tariffs will not exceed reasonable costs of service. So that tariffs reflect the cost imposed by users, they may differ between regions if justified by cost differences.

The OUR will continue to set tariffs for both NWC and private service providers in accordance with the OUR Act, taking into account these policy objectives.

Assistance to meet basic needs

Some Jamaicans in Utility Service Areas cannot afford the full cost of providing piped water service. To enable universal access in Utility Service Areas, Government-funded social programs will assist vulnerable persons to pay for water to meet basic needs, which are defined as 50 litres per person every day. This assistance will be available to all vulnerable persons in Utility Service Areas, including customers of NWC and private providers.

To assess vulnerable persons' need, the GoJ will use a means-tested program. This will ensure that the neediest households receive the assistance they require to afford basic needs.

10.4 Water Supply in Non-Utility Service Areas

Non-Utility Service Areas are the parts of the country where piped water supply is not the least-cost method of providing water supply. About 87 percent of Jamaicans in rural areas

have access to safe water supply. About nine percent of Jamaicans live in Non-Utility Service Areas.

Service Targets for Water Supply in Non-Utility Service Areas

The GoJ's policy is that everyone in Non-Utility Service Areas will have access to potable water by 2020, as defined in Section 9.1.2. The Rural Water Supply Development Strategy details how the GoJ will achieve this target, including the technical options, institutional responsibilities, and financing mechanisms that will be used.

Meeting this target is especially important for achieving equality and improving the livelihoods of women. When families live far from water sources, women and children often bear the burden of collecting water for the family.

10.4.1 Technical

Diverse methods of water supply will be used to provide water supply in Non-Utility Service Areas. The appropriate supply method will depend on the area being served, and be decided on by the community or household that will benefit from the water supply system. Technologies used will include spring entombments, small piped gravity-fed systems, community rainwater harvesting (catchment tanks) and rainwater harvesting by individual households.

The technology chosen for each community will depend on water resource availability. Where reliable springs are available in proximity to a community, they will be used. Elsewhere, rainwater harvesting will often be the best option to access water.

Institutional options will also affect technology choices. Community systems can be used where there are strong community organizations or Parish Councils with the funds and expertise to maintain them, and to ensure water is shared and not wasted. Where these conditions are not in place, individual rainwater harvesting systems will often be the best solution. Households have proven to be relatively good at maintaining their own systems, and at conserving their water.

All systems will be designed with a back-up option in case of drought. Water trucking will generally be the back-up option. The convenience and cost effectiveness of trucking will be improved under the RWSDS. Households and communities with storage tanks can have their tanks filled directly from trucks. RWSL will work with truckers to encourage them to offer more convenient services, such as making regular 'runs' where water can be sold in the quantities that citizens need (as opposed to only making a delivery when a full truckload can be sold). Integration of GoJ and private trucking options can reduce cost—this may be done by having NWC and Parish Councils contract with private firms for trucking services.

10.4.2 Institutional

Institutional roles in Non-Utility Service Areas include roles in building and maintaining rural water supply infrastructure and roles in the Rural Water Planning Process.

Building and maintaining rural water supply systems

Households and communities understand their local situations best, and are best-placed to meet local challenges. Households and communities have traditionally self-provided water supply, and will continue to do so in many areas. In some cases, communities and individuals may need technical, institutional, or financial assistance to self-provide water supply.

Parish Councils, Local Authorities, and community groups will continue to be involved in water supply.

- **Parish Councils and Local Authorities** may provide water supply to the public by operating and maintaining local schemes. Research has shown that, while some Parish Councils do a good job as providers, many lack the skills and funds needed. Parish Council that want to rehabilitate existing systems and then continue to maintain them are encouraged to do so. The same applies for Councils that want to build new systems and then maintain and operate them. Councils will need to show that they have the organizational and financial capacity to do so, if they want RWSL assistance. If Parish Councils choose to provide water supply, they may wish to establish water shops—physical locations attended by staff that collect fees from users to cover the cost of provision

  Consistent with the Parishes Water Supply Act (1889), Parishes will have the right[32], but not the obligation, to supply water. Where Parishes do not which to provide water, communities and households outside the Utility Service Area will organize to meet their own needs, and will be assisted by the RWSL

- **Community groups (such as Benevolent Societies)** may be water service providers. These community groups may already be operating systems, or may be formed for the purpose of developing and operating new schemes. Community groups may take over schemes that Parish Councils no longer want to operate.

MWLECC will enter into a contract with Rural Water Supply Limited (RWSL) to assist in meeting the national objectives for water supply in Non-Utility Service Areas. Where necessary, RWSL will provide technical, institutional, and financial support to community and household self-providers, but will not provide services directly. RWSL will also play a monitoring role, keeping track of past projects to ensure that they continue to deliver target levels of service for their beneficiaries.

In responding to requests for assistance, RWSL will prioritize areas that require assistance according to the urgency of the need. RWSL will work with communities and households to identify problems, needs, and ideas to improve service. Communities and households will be able to easily request assistance from RWSL through their members of Parliament, Parish Councils, or other appropriate means.

All solutions must be institutionally sustainable, meaning that RWSL will work with communities and households to set up long-term and participatory local structures that will ensure that new water supply systems are adequately maintained. These structures will be set up in accordance with the guidelines in the RWSDS.

[32] On application to the Minister

In its monitoring role, RWSL will establish timelines to check back in with communities and households to ensure that new water supply schemes continue to meet national objectives for water supply, and that sustainable and participatory institutional structures are still in place. The MOH will monitor all rural water systems, including those in which the RWSL is not involved, to ensure that they meet national health standards. Where these systems fall short of national standards, the MOH will also play a role in referring communities and households to RWSL.

Rural water planning process

Communities in Non-Utility Service Areas that need support to provide potable water supply will be identified in the Rural Water Planning Process—a joined-up planning process in each Parish. NWC, RWSL, Parish Councils, and Local Authorities will participate in the Rural Water Planning Process, which will be based on NWC's Parish Plans and the Parish information in the RWSDS.

The Rural Water Planning Process will involve the following steps:

- **Initiation**. Parish Councils that want comprehensive rural water service improvement plans developed for their Parish will apply to the MWLECC. The Ministry and the Council will then coordinate the remainder of the planning process
- **List communities and options**. The Parish Council, the NWC, and RWSL. will meet and review the Parish sections in the Rural Water Supply Strategy and NWC's Parish Plans. They will:
  - Confirm (or if necessary amend) the list of 'water scarce communities' that were identified in each Parish
  - Confirm the list of communities which will benefit from assistance
  - Assess technical options for improving water supply to each community, taking into account available water resources.
- **Choice of preferred option for each community**. The Parish Council, the NWC, and RWSL. with consult with the community to select the option to be implemented, taking into account:
  - Community preferences
  - The capability of possible service providers
  - Costs.

Note that in some cases this process will show that a community in the non-utility service area would be best served by extending the utility network, or *vice versa*. The option which emerges from the local planning process is the one that should be implemented in these cases.

10.4.3 Financial

To assist households, community organizations, and Parish Councils the GoJ will consider options for funding. This will be revolving funding under the aegis of the MWLECC, and RWSL will act as Technical Secretariat.

The funding options considered by the GoJ will provide finance, on a loan or grant basis, to non-utility projects recommended and supervised by RWSL as part of the RWSDS. Given the wide range or projects and providers, this funding will offer a diversity of financing options, including:

- Loans to households for individual rain-water harvesting systems. These loans could be administered through co-operative banks, farm-stores, or on a micro-finance basis with community responsibility for repayment
- Grants to households toward part of the cost individual rain-water harvesting systems. These grants could provide part-payment for tanks when RWSL is managing a scheme to improve rainwater harvesting for houses in a single community, or in the form of vouchers which can be used in part-payment for tanks from hardware providers
- Loans to community organizations for rehabilitation or construction of small community schemes. These loans would be on concessional terms, based on the ability of the community to service the loan
- Loans to Parish Councils for rehabilitation or construction of small community schemes such as community catchment tanks and gravity-operated, spring-fed piped systems.

Eligibility criteria for financial assistance from these funding options would include an assessment by RWSL that:

- In the case of a loan, the borrower is likely to repay the loan
- In the case of a grant, that the grant is no more than is needed to make the facility affordable
- That the design is technically sound
- That construction will be properly supervised
- That the facility is likely to be maintained by its owner.

Administration of disbursements and collection would be contracted out to a financial entity with the relevant experience, and a network of operations in rural areas throughout Jamaica. The MWLECC will seek a partnership with a multi-lateral development bank to rapidly create and capitalize the considered funding options.

Non-Utility Projects identified through the Rural Water Planning Process outlined above would be eligible finance from the funding options considered by the GoJ. Each project would need to be identified in community consultations, designed, and assessed for cost and viability.

Because communities and households will mostly provide these services themselves, they will also need to maintain systems that they establish. Community schemes will be able to charge cost-recovery tariffs, as agreed upon among community members.

10.5 Drought Management

Jamaica has experienced several droughts in the last few years, and climate variability may increase the risk of droughts in the future. A Drought Management Committee has been established and a drought management plan will be prepared.

10.5.1 Utility Service Areas

In Utility Service Areas, drought management is the responsibility of NWC (and other utilities). Utilities are responsible for drought management planning for the systems that they operate, as a part of their resource and network planning.

The Offices of Utilities Regulation (OUR) regulates utilities, and imposes reliability standards. It is GoJ policy that utilities should meet these reliability standards. The OUR is expected to work with utilities to ensure that their infrastructure is adequate to meet these needs, and that costs of strengthening the infrastructure, where needed, can be factored into the tariff.

NWC is already increasing drought resilience by reducing loss of water from its pipes. Reducing water losses means that more of the water resource already been abstracted and stored will be available to meet customer demands. To reduce water loses, NWC's Parish Plans include extensive pipe replacement and rehabilitation. NWC is also engaging in performance-based contracting for non-revenue water reduction. Effective implementations of such strategies can double the amount of water available to legitimate customers, without any new investment in water resources and storage. Stopping the leaks and waste is an essential element in drought-proofing NWC.

In addition to preventing losses, NWC will develop new sources, new storage, and increased ability to transfer water from one part of the country to another. All of these investments will reduce the impact of drought on water service.

In those cases where water shortages mean NWC is unable to supply its customers, it will continue to truck water to them to meet basic needs. These trucking operations will be coordinated with RWSL to ensure that they are integrated with any trucking to any nearby communities in Non-Utility Service Areas, and that they contribute to development of a strong and competitive private water trucking market.

10.5.2 Non-Utility Service Areas

The proposed solution for Non-Utility Service Areas will greatly reduce the problems of drought in rural Jamaica, because:

- **Water harvesting and storage will be increased**. The Strategy encourages residents to harvest and store more rainwater, and tap more springs. By having more water harvesting, the demand on existing sources and storage tanks will be less. For any given rainfall pattern, demand will be able to be met for longer time periods. This is particularly relevant for areas that currently rely on community rainwater harvesting. Households farthest from the tanks will be encouraged and assisted to install their own rainwater harvesting systems. This will improve the supply for those households, while leaving more water in the community tank for those members of the community who continue to rely on it

- **Responsible use of water will be promoted**. Water shortages result not only from inadequate rainfall, but also from excessive consumption of what water there is. The Strategy will encourage households to conserve water through the use of water shops and household rainwater harvesting. Each household will know how much water it has, and will know that no other families can draw from the same water. RWSL, in combination with other GoJ agencies, will educate households on how to conserve water. Households will be motivated to save water because they know they will benefit from the savings
- **Increased storage will make back-up supply better.** Rainwater harvesting systems will not be designed for 100 percent reliability. Very large storage tanks would be needed to store enough water to last through even the longest droughts. A better solution is to accept that for a small portion of the time, back-up supplies will have to be transported to households and communities. A better water trucking market will be developed to do this, as discussed below. The fact that most households will have their own tank means that trucks will be able to fill individual tanks—a fairer, more convenient and ultimately more economical solution than the current approach. Community tanks will also be filled by tanker when necessary and paid for by the organization that manages the community scheme.

Non-utility solutions must be designed to ensure adequate water supply even during drought. In the RWSDS this has been done with designs and costings that give 90 percent to 95 percent service reliability with current rainfall patterns, and include backup options for the approximately five percent of the time that the primary option is inadequate.

Trucked water delivered by private vendors is a standard backup option, because it is reliable and available all over the island. Trucked water is expensive—about US$93 per household per month. However, it will only be used in emergencies, so most of the time this cost will not be incurred. The reliability level of the primary systems should be set to minimize the total cost of a reliable supply, including both the primary system and the emergency back-up.

In some cases, other backup options may be part of the overall solution. For example, a community that relies primarily on a gravity-fed piped system may use a rehabilitated community rainwater harvesting system as a backup. Communal rainwater storage facilities will be considered as a back-up option in case a spring source fails. These facilities will be supplied by truck for additional back-up if the water stored is running low.

10.6 Non-Potable Water Supply

Not all water is used for drinking. Non-drinking water does not need to meet potability standards. However, water which is non-potable should be clearly marked as such. Non-drinking water does not need to meet national potability standards, but must be safe for the purpose for which it is supplied. The Ministry responsible for Health will set and enforce standards for non-potable water, such as for bathing and irrigation.

11 Rainwater Harvesting

11.1 Current Situation

Rainwater harvesting systems catch rainwater and feed water into a storage tank. Water is then drawn from the storage tank to meet daily needs, either directly from a tap on the storage tank. Rainwater harvesting systems can serve individual households or communities. Household systems typically use the house's roof to catch water, include an elevated storage tank, and may include a system of pipes to deliver water to indoor taps. Community systems collect rainwater from a large concrete or metal catchment area and transfer it to a large storage tank through pipes.

Rainwater harvesting is a reliable and safe form of water supply, used by 15 percent of households as their main source of water supply, including 31 percent of rural households. There are 353 community rainwater harvesting tanks that serve rural communities. Maintaining rainwater harvesting systems is low-cost and does not require advanced technical knowledge. In many parts of the country it is the least-cost method of delivery reliable water supply, combined with a reliable backup option, such as trucked water. Backup supply is most often necessary during the dry periods of December to April and July to September.

Average annual rainfall across the island is very high, at 1,981mm per year[33]. However, variations in rainfall levels across the country and mean that rainwater harvesting is not the most economical option in all Non-Utility Service Areas.

Figure 11.1 shows that the eastern and western parts of the country have high levels of rainfall—often 2,000mm or more per year. Rainwater harvesting is likely to be an attractive water supply option in these areas. In other areas, such as the southern parts of St. Catherine and Clarendon, rainfall levels are below 700mm annually, meaning that other technical options are likely to be needed.

[33] WRA

Figure 11.1: Rainfall Levels in Jamaica

Source: Water Resources Authority

Expanding rainwater harvesting, especially at the household level, is a good option to increase access to potable water in parts of the country in Non-Utility Service Areas that lack access to groundwater or surface water sources. Because household rainwater harvesting systems are at or near the home, these systems can reduce time spent collecting water outside the home. In most households, women and children are the ones that collect water. Existing community catchment tanks may also be rehabilitated in many communities as a low-cost method of providing reliable water supply.

Although they are inexpensive to maintain, upfront costs for rainwater harvesting systems can be too high for households to afford. As such, financing may be needed, but could be difficult to obtain. Finally, expanding rainwater harvesting could reduce the rate of groundwater recharge.

Table 11.1: SWOT Analysis of Rainwater Harvesting

Strengths	Weaknesses
▪ 15 percent of Jamaicans (31 percent of rural Jamaicans) use rainwater harvesting as their primary source of water supply ▪ Rainwater harvesting systems are reliable and safe for drinking with minimal treatment, such as a small amount of household bleach ▪ Maintenance costs for rainwater harvesting systems are low, and little technical expertise is needed	▪ Low rainfall in some areas means large storage and catchment facilities are needed in those areas ▪ Many rainwater harvesting systems, especially community systems, have fallen into disrepair, reducing security of water supply ▪ Many rainwater harvesting systems are not sufficiently reliable due to inadequate storage, mean that costly or inconvenient back-up systems such as water trucking are needed too often
Opportunities	**Threats**
▪ Rainwater harvesting can be used in areas without access to groundwater or reliable surface sources ▪ Households can manage their own rainwater harvesting systems, and control their own water supply ▪ Rehabilitating existing community catchment tanks is a low-cost way to increase water supply security in many rural communities	▪ Rainwater harvesting may reduce the rate of groundwater recharge ▪ Capital costs for new systems are high relative to households' ability to pay ▪ Financing for new systems may be difficult to obtain, and public funds to subsidize new systems could be limited

11.2 Policy Directions

The GoJ recognizes the importance of rainwater harvesting in providing potable water for many households, and the potential to expand access to potable water through rainwater harvesting. For these reasons, the GoJ will develop and adopt a Rainwater Harvesting Policy, including the following policy statement:

Policy on Rainwater Harvesting

The GoJ promotes rainwater harvesting for households in areas with adequate rainfall and where groundwater and surface sources are not available. The GoJ also promotes the rehabilitation and maintenance of community catchment tanks, where Parish Councils, Local Authorities, or communities themselves wish to take on the responsibility of maintaining these systems. Water supply from rainwater harvesting should be treated or filtered to meet MOH and WHO standards before it is consumed.

Rainwater harvesting systems that are used as a primary source for household or community water supply should be built to deliver adequate quantities of water for at least 90 percent of the year. A reliable backup supply, such as trucked water, must be identified for times when rainfall is inadequate.

11.2.1 Technical

With a rainwater harvesting system, households are dependent on the amounts and frequency of rainfall for their water supply. The frequency and quantity of rain is, to some extent, unpredictable and may provide insufficient water to meet the household's needs at times. Systems should be able to supply water at least 90 percent of the year to be adequately resistant to drought. When designing or rehabilitating rainwater harvesting systems, three measures will be used to ensure reliable supply:

- **Increasing the size of the catchment area** to increase the amount of water harvested. This is done by adding metal extensions to the roof for a household, or of the sloped catchment area for a community catchment tank
- **Increasing water storage capacity** can ensure that sufficient amounts of water are stored during times of rainfall to meet the household's needs during times of drought. Increasing storage capacity is done by increasing the number of tanks or the size of the tanks used to store water
- **Ensuring reliable back-up supply**. Regardless of the modifications that households undertake to ensure that rainwater harvesting systems supply sufficient water, there is a possibility that households may face water shortages due to irregular weather patterns. Households can ensure continual access to water by supplementing rainwater harvests with water delivered by truck.

  While trucking water is expensive, it is a good back-up option for long periods with no rainfall, when storage capacity runs dry. Because household rainwater harvesting systems can be designed to limit periods when storage runs dry, trucked water should be needed to fill storage tanks only about five to ten percent of the time.

11.2.2 Institutional

Different maintenance and water management arrangements are appropriate for household rainwater harvesting systems and community catchment tanks. Households will maintain their own household rainwater harvesting systems and manage their own water use. This is

appropriate because households directly benefit from their own system. Communities must share the responsibility of maintaining community catchment tanks and managing water. Communities should organize to manage tanks directly, or Parish Councils or Local Authorities should maintain them.

For communities and households that need help, RWSL will provide technical assistance to install rainwater harvesting systems, or to upgrade existing systems to meet GoJ safety and reliability standards.

11.2.3 Financial

Households and communities have responsibility for paying for and maintaining rainwater harvesting systems. Financial assistance may be available for households and communities through the options for funding considered by the GoJ, as described in Section 10.4.3.

12 Wastewater Management in Urban and Rural Areas

12.1 Current Situation

Eighty-five percent of all Jamaicans have exclusive access to improved sanitation facilities. The legal framework clearly defines roles and responsibilities of Ministries with respect to wastewater management. The Public Health Act sets national standards for the collection and disposal of waste materials and assigns the responsibility for monitoring and enforcing these standards to the MOH. The Natural Resource Conservation Authority (NRCA) (Permits and Licenses) Regulations implements a system of permits for waste disposal. The National Environment & Planning Agency monitors the health of the environment.

However, only 22 percent of the population of Jamaica is connected to a sewerage network. Effluent from sewage treatment plants, other types of sanitation facilities, and industrial discharge, pollute the environment and endanger people's health. For example, 75 percent of sewage waste disposal systems are soak away systems which have a potential to contaminate groundwater sources especially in densely populated areas. NWC operates the national sewerage network, but recovers only 64 percent of the average cost of service.

Increasing the level of access to the sewerage network could serve as an incentive for NWC to increase wastewater treatment capacity by improving the capacity of existing treatment facilities or creating new treatment facilities. NEPA is monitoring current levels of environmental contamination and may advocate for increased sewerage network access and wastewater treatment capacity if environmental conditions deteriorate.

These problems in wastewater management threatens the environment and people's health in several ways. Run-off and overflow from latrine pits or septic tanks damages the environment and, especially in areas with high population density, create risks to human health. The lack of wastewater treatment capacity creates a potential for fecal matter to enter the environment and contaminate both coastal waters and freshwater sources. Thirty-six percent of freshwater sources show increased levels of fecal matter or fecal bacteria.

Table 12.1: SWOT Analysis of Management of Wastewater in Urban and Rural Areas

Strengths	Weaknesses
▪ 85 percent of Jamaicans have access to various modes of improved sanitation facilities—84 percent of Urban residents, and 87 of Rural residents have access to improved sanitation ▪ Clear legal framework assigns responsibility for service provision ▪ Services are generally affordable ▪ OUR is an independent regulator with a clear mandate ▪ NEPA monitors the quantities of wastewater produced, the capacity of the wastewater treatment facilities, and the environmental contamination caused by untreated wastewater	▪ Only 22 percent of the Jamaican population is connected to the sewerage network ▪ 75 percent of sewage waste are disposed through soak away systems which have the potential to contaminate aquifers[34] ▪ Wastewater services fees recover just 64 percent of the average cost of service provision ▪ Sewage reaching various sewage treatment plants exceed the plant design capacity
Opportunities	**Threats**
▪ Private firms can be engaged to improve wastewater treatment services ▪ Increased sewage treatment is expected to improve water quality and minimize environmental damage	▪ Run-off from septic tanks and pit latrines may endanger human health and cause environmental issues in densely populated areas ▪ The potential for fecal matter to enter coastal areas is very high due to run-off from sewage treatment facilities lacking processing capacity ▪ 36 percent of fresh water sources show increasing levels of fecal matter contamination[35]

12.2 Policy Directions

Different technical solutions and institutional arrangements are needed to provide safe sanitation services in rural and urban areas.[36] This is because differences in population densities make for different threats to the environment and people's health.

[34] NEPA, "State of the Environment Report 2010."

[35] NEPA, "State of the Environment Report 2010."

[36] See Vision 2030, 287: "Ensuring vulnerable and poor communities receive adequate [water supply and sanitation services] through appropriate means."

Policy on Wastewater Management in Urban and Rural Areas

The GoJ's policy is all households will have exclusive access to sanitation facilities that protect the health of users, other people, and the environment by 2020. Only in rare cases will it be necessary for more than one household to share a sanitation facility. The MOH sets and enforces standards for safe sanitation facilities. Parish Councils and Local Authorities will help enforce standards in rural areas.

12.3 Wastewater Policy in Urban Areas

About 54 percent of Jamaicans—1,453,000 people—live in urban areas. Slightly more than half of the urban population lives in the Kingston Metropolitan Area.

Wastewater Service Targets for Urban Areas

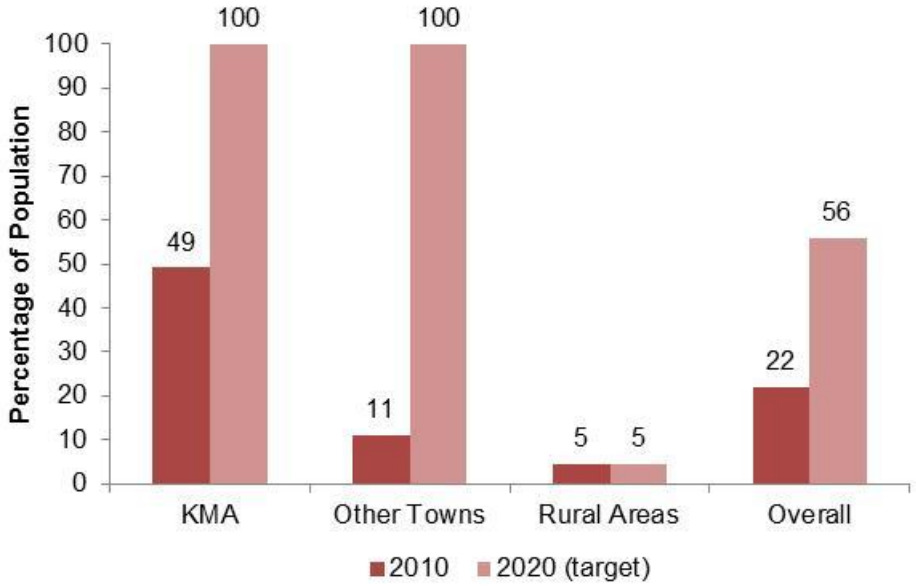
The GoJ's policy is that sewerage networks will be extended to all urban areas[37] by 2020. Additionally, service providers will be responsive and courteous to customers.

12.3.1 Technical

Piped sewerage services will reach all Jamaicans in the Kingston Metropolitan Area and other towns by 2020 (see Figure 12.1). Meeting this target will require expanding access from 22 percent of the population in 2010 to about 56 percent in 2020. About five percent of the rural population already has access to piped sewerage networks, and will continue to be served. However, the GoJ's policy is that rural residents outside the piped sewerage network will be better served with appropriate on-site sanitation facilities than by the piped sewerage network.

[37] Vision 2030 p. 165

Figure 12.1: Access to Piped Sewerage Services



Source: Jamaica Survey of Living Conditions

Sewage from these piped systems will be treated in accordance with the policy set out in Section 5.2.

12.3.2 Institutional

The GoJ encourages provision of piped sewerage services, by NWC and by community and private service providers.

The NWC will continue to serve existing customers on the piped sewerage networks, and will expand piped sewerage networks to meet national targets for service coverage and financial sustainability. In general, NWC is best placed to plan, coordinate, and implement the expansion of the sewerage network. In providing sanitation services, NWC will operate accountably, with commercial autonomy, and in a financially sustainable way.

NWC will involve the private sector in expanding sewerage networks, consistent with the policy principles for private sector participation in the water sector (see Section 8.2). In particular, NWC is encouraged to issue tenders for private companies to design, build, finance, operate, and maintain expansions to the sewerage system.

Consistent with policy principles for private sector participation in the water sector (see Section 8.2.2), private service providers will be encouraged to apply for area-specific licences to provide piped sewerage services. The Minister with responsibility for water will approve any licences issued to private providers.

Regulation

The OUR will continue to regulate private and public service providers (including NWC), and hold them accountable for meeting standards of service.

NWC will ensure performance of any private service providers that it contracts to expand central sewerage networks, through quality and service standards in the contracts.

12.3.3 Financial

Sewerage tariffs will allow service providers to recover reasonable costs for providing sewerage services. So that tariffs reflect the cost imposed by users, they may differ between regions if justified by cost differences.

The OUR will continue to set tariffs for both NWC and private service providers in accordance with the OUR Act, taking into account these policy objectives.

Assistance to meet basic needs

There are some Jamaicans who cannot afford the full cost of sewerage services. To meet its objectives of universal access to piped sewerage services in major towns, the GoJ will fund social programs that will assist vulnerable populations that cannot afford to pay for piped sewerage services. This assistance will be available to all vulnerable persons, including customers of NWC and private providers.

To assess vulnerable persons' need, the GoJ will use a means-tested program. This will ensure that the neediest households receive the assistance they require to afford basic needs.

12.4 Sanitation Policy in Rural Areas

About 1,244,000 Jamaicans live in rural areas. In general, rural Jamaicans will be best served by on-site sanitation facilities.

Service Targets for Sanitation in Rural Areas

The GoJ's policy is that all households have exclusive access to convenient sanitation facilities that protect health for users, the health of others, and the environment. Such facilities will be on-site. On-site facilities will meet NEPA's and the Environmental Health Unit's standards for safety for users and the environment.

12.4.1 Technical

In rural areas, diverse on-site sanitation facilities will be used to meet the policy objectives. On-site sanitation facilities are built to safely treat effluent and human excreta at the point of use. Ideally, each household will have their own sanitation facility. Communally shared facilities may be necessary in some cases. The best supply method will depend on the area being served, and be decided on by the community or household that will benefit from the facility.

For example, conditions and solutions will differ for formal sector houses and developments, traditional rural houses and communities, and squatter settlements.

- **Formal sector houses and developments**—In rural areas, septic tanks will largely be the appropriate solution. As a condition of planning permission for subdivision

of land for development, or construction of a new home, it is a requirement that adequate sanitation facilities be provided

- **Traditional rural houses and communities**—Many rural communities in Jamaica have developed in an unplanned manner. While some people in these communities have indoor flush toilets and septic tanks, this cannot be made a requirement for every household. Some households cannot afford such systems. Others lack the land in which to install them. For such households, other appropriate on-site sanitation solutions are needed
- **Squatter communities**—Squatter communities are home to many Jamaican households. While it is unfortunate that these communities have grown up in an unplanned way, these communities cannot be ignored. An integrated approach to providing all basic services, including water supply, is needed. For some squatter settlements, communal hygiene blocks may be appropriate. Sometimes, flush toilets connected to a sewerage system will be possible.

12.4.2 Institutional

In rural areas, households and communities have primary responsibility for providing safe sanitation services. Some households and communities will need financial, technical, and institutional assistance. As in water supply, RWSL will provide technical and institutional assistance to households and communities that request it. RWSL will provide this assistance under a contract with MWLECC to meet policy objectives for sanitation services in rural areas.

Combining outreach on water and sanitation in rural areas is expected to have significant synergies, not only in terms of reducing cost, but also in increasing effectiveness. As such, RWSL will identify communities that need assistance to improve their sanitation facilities as part of the Rural Water Planning Process (see Section 10.4.2).

RWSL will, in coordination with the Ministry responsible for health, take on a sanitation and hygiene role, working with communities to promote hand washing and other good hygiene habits, as well as ensuring that adequate water and sanitation facilities are in place. International experience shows this is an effective way to build healthier communities.

Regulation

NEPA and the Environmental Health Unit of the Ministry responsible for health have responsibility for setting and enforcing standards for on-site sanitation facilities. These standards will take into account the density of settlement and vulnerability for groundwater, and balance cost against environmental protection to achieve an economic optimum. These two bodies will work together to establish guidelines for types of sanitation facilities that are permitted.

The relevant planning authorities will require new buildings to comply with these standards, as a condition of planning approval. NEPA and the Environmental Health Unit will monitor sanitation facilities in rural areas to ensure that the national guidelines are effective and being followed.

In addition, NEPA will regulate septage hauling and disposal. To ensure safe disposal of septage, haulers must dispose of septage in sewage treatment plants operated by NWC or

another licenced sewage treatment provider. All sewage treatment plants that accept septage must have adequate facilities to treat it, and should charge haulers to fully recover their costs.

Inspecting septic tanks is the responsibility of the local public health committee, typically the local council under the Public Health Act.

12.4.3 Financial

Because communities and households will mostly provide these services themselves, they will also need to maintain systems that they establish. Households need to adequately maintain all on-site sanitation facilities. In the case of community solutions, the community organizations should recover costs from community members.

Where necessary, the GoJ may assist with grants or loans for construction or rehabilitation costs for on-site facilities. The GoJ will also consider other available funding options for finance assistance. As described in Section 10.4.3, funding options will provide finance, on a loan or grant basis, to on-site projects recommended and supervised by RWSL.

13 Irrigation Services

13.1 Current Situation

Irrigation contributes to agricultural production on many farms throughout the country. They are provided by the NIC, a public entity, and private operators. The OUR regulates some irrigation providers, and sets guaranteed and overall standards for service quality.

Main weaknesses in the irrigation sector are the poor financial performance of NIC, lack of efficiency in service provision, and lack of services in areas where irrigation would be economical. In 2011-2012, NIC received about J$660 million in subsidies from the GoJ to provide irrigation services. For the six years between 2006-7 and 2011-12, GoJ subsidies provided 64 percent of revenues ($2.8 billion), while water sales and drainage charges only accounted for 26 percent ($1.2 billion) of revenues. The remaining ten percent was made up of grant funding from the GoJ and other income.[38]

The OUR has emphasized cost recovery in recent tariff decisions, but overall tariffs do not cover costs, and if they did, some farms would likely not be able to sustain operations. By adopting international best practices in irrigation and by continuing to explore diverse financing arrangements for new schemes, irrigation services could be expanded to reach more farmers, while subsidies are reduced.

Table 13.1: SWOT Analysis of Irrigation Service

[38] Auditor General's Department, "Performance Audit Report of the National Irrigation Commission (NIC)." June 2013.

Strengths	Weaknesses
▪ Irrigation contributes to agricultural production on many farms ▪ OUR sets guaranteed and overall standards for service quality	▪ Some areas where irrigation would be economical are not served ▪ NIC depends on GoJ subsidies for 64 percnet of its revenue. It is not financially sustainable ▪ Most irrigation schemes do not recover operating or capital costs ▪ Best practices in efficiency service provision are often not used ▪ Financing is often not available for economical investments to expand irrigation
Opportunities	**Threats**
▪ Services can be expanded through diverse financing mechanisms, including PPPs, without spending scarce public funds ▪ Taking advantage of efficient irrigation technologies and techniques can improve efficiency and reduce prices ▪ OUR has emphasized the importance of recovering costs in recent tariff decisions	▪ Certain crop patterns are not economically viable if the true cost of water were borne by the farmer ▪ By-products of agricultural production such as pesticides and fertilizer runoff can contaminate water sources and cause environmental damage ▪ Limited water storage capacity on farms may cause farmers to go without water and damage crops at critical times

13.2 Policy Directions

By adopting international best practices in irrigation and by continuing to explore diverse financing arrangements for new schemes, irrigation services could be expanded to reach more farmers, while subsidies are reduced.

Service Targets for Irrigation

Irrigation services will continue to contribute to a competitive and productive agricultural sector. To promote economic development and food security, all land where irrigation is economically viable should be irrigated. Each irrigation scheme should define its service offering to users, typically including the quantities of water that will be available, as well as the times and places it will be available, in a contract with its customers.

Irrigation tariffs will cover at least operations and maintenance costs, and will also cover capital costs where it is possible to do so.

13.2.1 Technical

Irrigation schemes will utilize the most economical irrigation method that achieves the desired results. GoJ agencies in the irrigation sector, WUAs, and farmers will explore a diversity of modern irrigation techniques to reduce costs and increase energy efficiency and water-use efficiency.

To ensure that appropriate measures are adopted, irrigation providers will monitor and minimize water and energy use as much as possible. Irrigation providers and users should consider the following technologies and techniques:

- Drip irrigation—method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone. This technique can increase yields compared to traditional flood irrigation
- Fertigation—applying fertilizers through irrigation systems
- Rainwater harvesting—harvesting rainwater for use in irrigation
- Soil-moisture-based irrigation controls—measuring the amount of moisture in soil, allowing irrigation only when plants need water
- Weather-based irrigation controls—using historical and/or current weather information to allow irrigation only when plants need water.

13.2.2 Institutional

The GoJ encourages a diverse arrangement of irrigation schemes to meet farmers' irrigation needs. Regardless of the arrangement, the irrigation provider should have the financial, technical, and managerial capacity to plan, build, operate and maintain irrigation systems, while remaining responsive to the farmers it is serving.

The NIC, private investors, and farmers that self-provide irrigation services all successfully provide irrigation services in Jamaica. The best institutional arrangement for providing irrigation services will vary according to physical needs and the type of irrigation system.

Water users associations

Water Users Associations (WUAs), made up of local farmers who benefit from the irrigation schemes, have in the past been identified as the body with responsibility for setting tariffs, carrying out maintenance, planning capital expenditures, and managing the day-to-day operations of publicly funded irrigation schemes. However, individual and organizational capacity to carry out the tasks delegated to the WUAs is limited. The problems WUAs have experienced in Jamaica are similar to those experienced in other countries where they have been implemented. In many cases, it was found that WUAs needed long-term support as they implemented and managed irrigation schemes.[39]

[39] Morardet, S., D. J. Merrey, J. Seshoka, and H. Sally, "Improving Irrigation Project Planning and Implementation Process: Diagnosis and Recommendations" (37). August 2005. International Water Management Institute. http://siteresources.worldbank.org/RPDLPROGRAM/Resources/459596-1170984095733/IMWIprojectplanningandimplementation.pdf accessed September 19, 2013.

In light of these limitations, actual development and operation of irrigation schemes will only be done by entities with strong capabilities in infrastructure network management. Those WUAs that are capable of delivering irrigation services will do so. However, where WUAs lack capacity to deliver irrigation services, they may make decisions on irrigation schemes, while NIC or private companies deliver services. In each case, the choice will be based on which entity has the requisite financial, technical, and managerial capacity. NIC will not prioritize capacity building for WUAs to allow them to take over a service delivery, since this is not judged to be the most efficient way to provide services.

13.2.3 Financial and Regulatory

The GoJ has long provided subsidies in the irrigation sector to increase agricultural productivity and protect employment for the many Jamaicans who work in agriculture. Fiscal constraints mean that the GoJ will be unable to increase subsidies to irrigation, and will likely have to decrease them. However, maintaining existing irrigation schemes and building new ones where it is economical to do so are vitally important for the agricultural sector and the national economy.

As such, irrigation tariffs must recover at least the cost of operating and maintaining systems. At a minimum, this level of cost recovery will guarantee that existing irrigation schemes continue to support agricultural production. Where possible, irrigation tariffs will also recover capital costs.

For new NIC-run irrigation schemes, the GoJ may finance all or a portion of the capital costs. The appropriate financing option for each new scheme will depend upon the GoJ's development goals. Specifically, any of the following three financing options may be appropriate for new NIC-run schemes:

- GoJ pays all capital expenditures
- Farmers that benefit from NIC-run irrigation schemes pay some capital expenditures, while the GoJ pays the remaining portion
- Farmers that benefit from NIC-run irrigation schemes pay charges that allow full capital cost recovery.

Private irrigation providers will be held accountable by the contracts that they sign with farmers. Private irrigation providers, investors, and farmers are encouraged to engage in any arrangement to provide irrigation services that all believe to be beneficial.

The OUR will regulate service quality and tariffs for publicly run irrigation schemes, in accordance with the OUR Act and taking into account the objectives of this policy. Private irrigation providers may opt into regulation by the OUR, by agreement with users.

14 Flood Water Control and Drainage

14.1 Current Situation

Flood water control infrastructure is inadequate in many parts of Jamaica. Services for roads, in urban areas, and in some agricultural areas are often poor, due to inadequate infrastructure and maintenance. Institutional responsibilities are not clearly or fully defined in some cases. Finally, agencies often cannot recover costs for providing services, which limits their ability to build and maintain needed infrastructure.

The GoJ and service providers recognize the need to improve flood water control infrastructure. To provide institutional clarity, the GoJ is committed to amending the Water Resources Act and include Planning and Flood Plain Mapping. The Ministry of Transport, Works and Housing will also amend the Flood Water Control Act to take responsibility for drainage and flood damaged facilities.

Taking steps to implement policies that prepare for natural disasters and decrease the damage they cause are becoming increasingly important as climate change increases the risk of flooding and the intensity of hurricane. These threats can be increased by altering the use of land and removing plant life that absorbs flood water.

Table 14.1: SWOT Analysis of Rain and Storm Water Run-Off and Flood Water Control

Strengths	Weaknesses
▪ The GoJ is committed to improve services by improving the institutional framework by amending the Water Resources Act and the Flood Water Control Act ▪ Vision 2030 recognizes the need to a national policy for infrastructure in the transport sector, including flood water control infrastructure[40]	▪ Services for roads, in urban areas, and in some agricultural areas are often poor, due to inadequate infrastructure and maintenance ▪ Institutional responsibilities are not clearly or fully defined in some cases ▪ Agencies often cannot recover costs for providing services ▪ Lack of flood water control infrastructure can result in deterioration of road surfaces
Opportunities	**Threats**
▪ Improved flood water control infrastructure will help mitigate effects of climate change ▪ Increasing cost recovery can give service providers needed funds to build and maintain infrastructure	▪ Jamaica is prone to natural events that cause large-scale flooding, particularly hurricanes ▪ Climate change models predict that hurricanes will increase in intensity and future rainfall will be more concentrated, putting Jamaica at even greater risk of floods

[40] Vision 2030, 284

14.2 Policy Directions

Service Targets for Flood Water Control

The GoJ's policy is to ensure that water does not flood settlements or agricultural land, or disrupt transport. Additionally, flood waters will be adequately managed to conserve the environment, including watersheds' capacity to meet sustainable demands on water resources.

To ensure that service targets for flood water control are met, the GoJ will amend the Water Resources Act and the Flood Water Control Act to clarify and amend institutional responsibilities. This expected legal change is reflected in this Policy. The GoJ will also develop and adopt a comprehensive Flood Policy.

14.2.1 Technical

Flood water control and drainage service providers will utilize the least-cost methods that will effectively meet the policy objectives for flood water control.

Methods should conform to international best practices for flood water control and watershed management. Specifically, the GoJ will encourage the following practices where they are economical:

- Using natural features, such as floodplains and swales, to provide space for flood water
- Construction of permeable rather than impermeable surfaces on commercial and residential plots
- Harvesting of flood waters through groundwater recharge and storage.

14.2.2 Institutional

Institutional responsibilities for flood water control are divided among bodies with responsibility for providing flood water control services; the Water Resources Authority (WRA), which will have responsibility for flood plain mapping and planning; and bodies with responsibility for planning flood water control efforts.

Bodies with responsibility for providing flood control services

Flood water control responsibilities are assigned as follows:

- Local roads and settlements—Parish Councils and Local Authorities
- National transport infrastructure—the transport infrastructure provider (generally the National Works Agency)
- Irrigated lands—the irrigation provider has responsibility for providing drainage services on irrigated lands
- Other agricultural land—drainage is primarily the responsibility of the land-owner, but large drainage issues that affect multiple land-owners need to be coordinated through the IWRM Committees.

Bodies with responsibility for planning flood water control efforts

Agencies that have responsibility for providing flood control services will establish plans for providing these services at the appropriate level, taking into account the objectives in this policy, in consultation with relevant IWRM Committees. For example, the NWA will establish a plan to provide flood control to prevent flooding of national transport infrastructure.

The WRA will be responsible for Flood Plain Mapping.

14.2.3 Financial

Bodies with responsibility for improving and maintaining flood water control should have adequate cost recovery mechanisms when providing flood water control services:

- Local roads and settlements—Parish Councils and Local Authorities will pay for flood water control through property taxes
- National transport infrastructure—the national transport infrastructure provider will recover costs from users of that infrastructure (through road user charges and a petrol tax, in the case of highway infrastructure)
- Irrigated lands—irrigation providers will include the cost of drainage in its tariffs
- Other agricultural land—land-owners will pay to self-provide these services.

Funding will be available to the WRA to carry out flood plain mapping and planning for flood prone areas.

15 Monitoring and Evaluation

The Water Policy and Monitoring Division in MWLECC will monitor and evaluate the implementation of this Policy. This process will be mainstreamed into the corporate planning cycle.

MWLECC has two objectives to monitoring and evaluating this Policy:

- **Ensuring proper implementation of the Policy**. Through the monitoring process, MWLECC will ensure that agencies with responsibility to implement the Policy are doing so and will provide guidance and coordination
- **Allowing for policy learning and adaptation**. Monitoring the results of implementation of the Policy will allow for mid-course corrections, and adaptation to emerging developments. Evaluation of the Policy after a period of time will allow lessons to be learned to inform future policy developments.

The Water Policy and Monitoring Division will develop a Monitoring and Evaluation Plan

Within one year of the approval of this Policy, the Water Policy and Monitoring Division will develop a Monitoring and Evaluation Plan ('the M&E Plan'). The M&E Plan will identify specific metrics to evaluate success against goals and service targets in this Policy. The M&E Plan will include metrics for:

- Integrated water resources management
- Environment and ecosystem protection and conservation
- Climate adaptation and mitigation processes
- Energy efficiency in the water sector
- The participatory approach to IWRM
- Private participation in the water sector
- Water supply in Utility Service Areas
- Water supply in Non-Utility Service Areas
- Rainwater harvesting
- Wastewater management in urban areas
- Sanitation policy in rural areas
- Legislative amendment to the WRA Act

Reporting

Starting one year after the approval of this Policy, the Water Policy and Monitoring Division will issue an annual Monitoring Report on progress against the identified metrics. The report will include recommended adaptation measures to improve performance in areas where targets are not being met.

Starting in 2017, the Water Policy and Monitoring Division will comprehensively evaluate the Policy. The results of the evaluation will be presented in an Evaluation Report, to be released to the public no later than June 2021. The Evaluation Report will include an assessment on against policy goals, and will make a recommendation to the Ministry responsible for water on whether an update to this Policy is needed.

Appendix A: Definitions of Key Terms

Affordability—a situation in which fees charged for services do not create undue financial hardship.

Climate change—any long-term significant change in the average weather, typically defined in thirty-year periods. Average weather may include average temperature, precipitation and wind patterns. It involves changes in the variability or average state of the atmosphere over durations ranging from decades to millions of years.[41] Long-term models can help understand likely future climate trends, but climate change is difficult to predict with precision.

Climate variability—the natural variation in the climate in the short or medium terms. While climate change refers to long-term trends, climate variability refers to fluctuations in average weather over shorter periods, such as one year to the next or one decade to the next. Climate variability can be predicted with a high degree of confidence, based on past trends.

Cost Recovery—a situation in which charges for services reflect all costs of providing the services, including capital costs. This means that charges for services in the water sector should vary in different areas of the country.

Environmental Sustainability—a situation in which water resources are used in a way that does not diminish the potential for future generations to benefit from them.

Equity—a guiding principle of Vision 2030, explained there as, "This guiding principle will facilitate and ensure equality of opportunity and equal rights for all citizens including access to public goods and services… [and] promote the human rights of our people, including the poor, and the most vulnerable and marginalized groups."[42]

Financial Sustainability—a situation in which there are consistent and reliable funding sources to pay for service provision that cover all costs of service provision, including capital costs, and maintenance and rehabilitation/replacement costs.

Improved drinking-water source—a source for drinking water that "by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter".[43]

Improved sanitation facility—a facility that "hygienically separates human excreta from human contact".[44]

Integrated Water Resource Management (IWRM)—"a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment."[45]

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[41] Draft Development of a National Water Sector Strategy Adaptation Strategy to Address Climate Change in in Jamaica, 17

[42] Vision 2030, 13

[43] WHO / UNICEF Joint Monitoring Program for Water Supply and Sanitation

[44] WHO / UNICEF Joint Monitoring Program for Water Supply and Sanitation

[45] Global Water Partnership, "What is IWRM." March 3, 2010. http://www.gwp.org/The-Challenge/What-is-IWRM/ (accessed September 9, 2013).

Least cost—the cheapest method of providing a service that meets the minimum standards of quality for that service. Least cost can refer to methods of service provision (for example, on-site solutions vs. sewerage systems in the sanitation sector) or service provider (for example, public vs. private provision).

Non-Utility Service Area—an area where piped water service is not the least-cost way of providing water supply. The least-cost method of providing water supply or sanitation services will vary for communities in Non-Utility Service Areas. Methods may include rainwater harvesting, piped gravity-fed systems, entombed springs, others, or a combination.

Principle—a statement of general beliefs about the water sector, against which policy in the water sector can be judged.

Redistribution—a situation in which wealth is taken from one group (social class, economic class, or other any other social division) and given to another. This happens in service provision when there is unequal access to services that all members of society pay for through taxes, or when some members of society pay different amounts for services that cost the same to provide.

Utility Service Area—an area where piped water service is the least-cost way of providing water supply.

Target—a clear outcome in the water sector that the GoJ aims to achieve.