



**WSRN Internship
Research
findings**

GENDER CERTIFICATION PROJECT

By:
Destinee
Eastmond(Mentee)
Mentor: Dr. Maya
Trotz

- Mostly based on assessing the connection between gender and water in Barbadian communities and educating the public about the topic.
- The interconnection of COVID-19, the volcanic ashfall, and the hurricane season has underscored the importance of water access, and this project will explore how gender influences one's experience with water outages and water management in Barbadian communities due to absence of information on this issue.
- Although health issues such as poor sanitation/hygiene and disease are often emphasized when the need for water is discussed, the lack of water also leads to social disruption.

GENDER CERTIFICATION PROJECT

By:
Destinee Eastmand

- In the context of interruptions in water availability, women are disproportionately impacted since they are responsible for most domestic water-related activities (Suchorski, 2009).
- Caribbean women hold major responsibility for water management in the household, which overlaps with their reproductive responsibilities [i.e. cleaning, cooking, washing] (ECLAC, 2008).
- The absence of a gender policy at a national and organizational level (as proven by the absence of a gender policy at the Barbados Water Authority) makes it easier to overlook issues of gender inequality. This is an area of concern since the decreased availability of water in the region continues to disproportionately impact Caribbean women (ECLAC, 2008).

IMPORTANCE OF WATER ACCESS

6 CLEAN WATER AND SANITATION



Water is an essential part of health and human life.

For example based on SDG 6, the access to water, sanitation and hygiene are central to the eradication of poverty and hunger.

WHAT ARE THE HEALTH RISKS?

According to the World Health Organization (2019)

Poor sanitation, along with the contamination of water can lead to the transmission of these diseases:

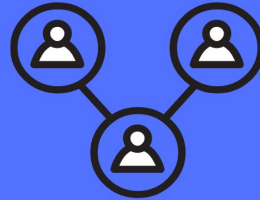
CHOLERA, DIARRHEA, DYSENTERY, HEPATITIS A, TYPHOID, AND POLIO

DENGUE is also an issue of concern considering that it has been endemic in Barbados for over 30 years (Douglas et al. 2020). Keeping water accessible in containers outdoors makes it easier for mosquitoes to breed, and increases health risks.

The COVID-19 pandemic has further emphasized the importance of hygiene and sanitation in fighting the spread of the virus.



SOCIAL IMPACTS



Although access to water is a universal human right, the lack of it affects persons differently.

Factors such as age, physical ability, socio-economic status can have an impact on the way water affects us.

During water shortages, elderly persons, along with persons with differing physical abilities may have difficulties accessing water (i.e. lifting heavy buckets, going outside to collect water)



Your socio-economic status can determine how easily you access specific resources (i.e. ability to purchase bottled water during water shortages or the ability to afford a water tank).

GENDER CONSIDERATIONS

What makes women and girls more vulnerable?

Due to gender stereotypes women (especially those in female-headed households) are mostly responsible for domestic care, whether it be for young children or the elderly.

GLOBAL FACTS

"Women and children spend 125 million hours each day collecting water, which is on average more time spent on any other domestic water related activity" (Water.org 2016).



REGIONAL FACTS

Although the decreased availability of water in the Caribbean disproportionately impacts women, policy-makers tend to overlook the fact that women bear the responsibility of water management in most households, which overlaps with their reproductive responsibilities [i.e. cleaning, cooking and washing] (ECLAC, 2008)

LOCAL FACTS

Within the context of Barbados, multiple reports were made of "women's inability to cook and subsequent diet substitution with dry foods, inability to wash and clean their households, and rash development on babies and young children" (Isaacs, 2017).

HOW ARE MEN IMPACTED?

Gender stereotypes also impact men negatively, for example, "expectations of male heroism require boys and men to engage in risky behavior in the face of danger" (Bradshaw, 2010)

In the context of water outages/accessing water, this stereotype may require men to undertake heavy lifting or other activities, which can be physically straining and lead to potential health risks.

Please check all that apply:

Water Source	Drinking	Cooking	Washing dishes/laundry	Cleaning indoors	Cleaning outdoors	Watering plants
Directly from BWA						
From BWA through a personal storage tank						
BWA water tanker						
Community standpipe						
Community tank						
Rainwater harvesting tank						
Private Well						
Purchase bottled water						
Greywater reuse						
Other _____						

6. Please specify accompanying residents within your home by gender and age (i.e one female – 20, one male - 27), and indicate any water collection and/or domestic water-related activities (i.e washing the dishes, laundry, cooking) done by each individual?

Gender of person	Age of Person	Water Collection Activity	Domestic Water-Related Activity

The Story of Water in Barbados

Intern: Stacia Martindale

Mentor: Dr. Maya Trotz

Dr. Henderson Carter

Affiliation: UWI Cave Hill

Overview of Project

Use of newspapers,
reports and legislations

Identification and
Extraction of key dates,
time spans and photos

Creation of a timeline to
display these events



Recommendations

Declare water sites and catchment areas as areas of historical significance

Erect disaster-resilient water sites

Educate the public



HISTORY
BY:
JUSTIN Roachford



Findings from the 1951 Advocates Newspaper
Findings from Documents in The Barbados
Museum
Findings from Field tour June 21st
Field tour 1st June

Justin



Justin



Personal Tank Program

Mentee: Victor Clarke

Mentor: Anthony Franklyn – Assistant Engineer BWA
~~(Projects Department)~~

INTRODUCTION

- What is the personal tank program?
- Primary target of the personal tank systems
- Pilot Program

RESEARCH

- Acquiring a tender for materials
- Spreadsheet with components
- Comparative Pricing

MARKETING TEAM

- Creating and Distributing a Green Initiative Survey
- Target Market and Program Rollout
- Poster Design

ITEM	COST BBD
Base (6ft. X 6ft. X 6in.)	
Plumbing Fittings	
Filter	
Tank	
Pump with Smart Head	
Electrical Components	
TOTAL	

Material Breakout Cost

Item	Quantity	Unit	Unit Cost (BBD)	Total Cost (BBD)
BASE (6ft. X 6ft. X 6in)				
Excavation	127	ft ³		
Fill	106	ft ³		
Concrete	18	ft ³		
Trucking	2	nr		
Total Base				\$ -
Plumbing Fittings				
1" PVC Ball Valve	2	nr		
3/4" PVC Ball Valve	2	nr		
1" Brass Stopcock				
3/4" Brass Stopcock	1	nr		
1" Brass Check Valve				
3/4" Brass Check Valve	2	nr		
PVC Ball Float Valve	1	nr		
Float Switch (5m)	1	nr		
1" PVC Union	4	nr		
3/4" PVC Union	2	nr		
3/4" PVC Tee	1	nr		
1" PVC Tee	2	nr		
3/4" PVC Elbow	6	nr		
1" PVC Elbow	5	nr		
45 Deg 1" PVC Bend	2	nr		
45 Deg 3/4" PVC Bend				
1" PVC Male Adapter	4	nr		
3/4" PVC Male Adapter				
1" PVC Coupler	2	nr		
3/4" PVC Coupler	1	nr		
1" - 3/4" PVC reducer	4	nr		
3/4" - 1/2" PVC reducer	1	nr		

MARKETING TEAM

Interest FREE **Full Tank Solution**



Low income households could qualify for a full tank solution under a **5 - year Interest FREE** hire purchase agreement from the **BWA**

**Special conditions apply*

Phase two open to **ALL** parishes

Come and apply TODAY!!!

Information to be provided:

- Welfare Recipients (letter from Welfare dept.)
- Persons on Disability Income and Pension Cheque recipients (Letter from National Insurance Scheme)
- Identification Card
- Job Letter
- Recent Pay slip
- Water Bill
- Land tax bill



For further information, please call

Ms Ruth Ramjit 836-4734

(246) 434-4200 ext [redacted], [redacted], 4578 or 4579

Email: ptp@bwa.gov.bb

FIELD WORK



FIELD WORK



FIELD WORK



H3E Caribbean: Effect of Water Pollution on Human Health and Genomics

By:

Mentee: Vivian Arthurs Mentor: Dr. Elon Cadogan

Arthurs

AIM

- Write a literature review using information on diseases prevalent in the Caribbean that are related to water contamination
- Explore a possible Solution

HOW DID I GO ABOUT THIS?

Include:

- Research from the Caribbean Region
- Related to pollutants in water that affect human health and genomics

Exclude:

- Research from developed countries
- Pollutants that are not contaminants of water

H3E Caribbean: Effect of Water Pollution on Human Health and Genomics

By:

Vivian Arthurs

COMPARISONS

- The BWA tests for :

Total hardness, Bicarbonate, Alkalinity, Sodium, Potassium, Calcium, Magnesium, Chloride, Sulphate, Nitrate-N, Nitrite-N, Ortho-phosphorus, Total Phosphorus, Ammonia, Total Suspended Solids, pH, Turbidity, Total Coliform, Faecal Coliform, Faecal Streptococcus

EARLY FINDINGS

- Legionnaires' disease having prevalence in the Caribbean; caused by *Legionella pneumophila* - a gram-negative intracellular bacterial pathogen
- Pesticides mostly cause an array of diseases with the most common being brain diseases
- Gaps exist with the amount of research on contaminants done regionally
- Gaps in specifying concentrations of specific organophosphates and POPs
- Gaps in variety of Caribbean countries where research was done (mostly Barbados)

Early Findings Cont'd

- Chemicals of Emerging Concern such as pharmaceuticals, beauty products and pesticides were recorded to be contaminating drinking water and surface water
- It is generally theorized that contamination of these water sources come from wastewater
- Combined with drought and climate change there is urgent need for these issues to be addressed
- A New approach will be taken to include all contaminants of the environment

What's the Solution? : Innovative Membranes for Enhanced Water Management

- Barbados' main source of potable water are underground water, springs and brackish water desalination
- Brackish Water Reverse Osmosis Desalination Plant (BWRO)
- The focus is on reviewing the most recent technological innovations with respect to the technologies used for membrane fabrication and operation
- The aim is for Barbados' energy requirement to be kept minimal by identifying methods to stop the deterioration of the permeate flux
- There has been growing interest among the academic and industrial community to intensify the exploration on inorganic membranes and blends
- There are environmental applications of nanotechnology with regards to membrane technology
- There are various polymeric membrane designs and pore sizes

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CONCLUSIONS

- Increasing membrane water permeability has the potential to decrease the membrane surface area (which is a function of RO elements), however, the average operating flux must then be increased to maintain the permeate flow rate, and higher flux increases the risk of fouling.
- In order to more accurately evaluate the influence of membrane area on RO plant cost, the effect of fouling must be considered as well.
- This review has also considered a wide range of RO element performance factors, beyond permeability. Today, major parts of the RO system have been highly optimized, particularly the energy recovery devices.



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CONCLUSIONS

- Further reduction in energy use and plant cost will be more dependent upon optimization around different operating conditions, such as feed water and permeate water quality, time-varying performance factors, and the local costs of electricity and land.
- These issues will drive improvements to element design, membrane anti-fouling properties and selectivity, pretreatment methods, anti-fouling feed spacers, and real-time monitoring techniques.
- Much more precise modeling and validation of plant performance will be required.



Water Conservation Campaign

By: Mentees
Shaniah Halliday
Ryan Toppin
(Marketing and
Communications)

Mentor: Yvette
Harris-Griffith &
Sara Odle
Affiliation: UWI Cave
hill

PROJECTED GOALS

-To launch an aggressive water conservation campaign aimed to the youth

Aims and Purpose

To effectively portray the message that water is a finite resource which should be used delicately

(MARKET RESEARCH)

- The market research component aims to accomplish two objectives:
- **GAIN INSIGHT FOR WATER CONSERVATION AND AWARENESS**
- **GAIN A BETTER UNDERSTANDING FOR BEHAVIORS AND HABITS RELEVANT TO WATER USAGE and STORAGE**

(CAMPAIGN DESIGN)

- The campaign for this project will comprise of **THREE** main components:
- **THE BRANDING PROCESS :**
- **THE CONTENT CREATION PROCESS:**
- **THE MARKETING STRATEGY PROCESS:**

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Primary Research, through surveys.

Focus of surveys:

To gain accurate insight on behaviours and attitudes of the target audience through invasive questioning

Secondary research through the use of archives, internet sources and news paper articles.

The purpose of secondary readings were to gain a deeper insight and detail into characteristics of water flow in barbados.

CAMPAIGN DESIGN

THE BRANDING PROCESS :

- The campaign must be designed under a clearly defined brand, along with its promise to consumers, its core values and effective brand drivers relevant to the marketing mix.
- The campaign must find methods to strategically position the brand and make a link between the value proposition of the BWA and the brand promise.
- The campaign must also effectively express the brand through effective names, logos, music, and messages which revolve around the core values of the brand.

THE CONTENT CREATION PROCESS:

- After the branding process, the campaign must use this knowledge to create content in the form of awareness videos, social media posts, online articles, pamphlets.
- All content must be directly linked and developed from the brand promise and its core values.
- All content must be designed with the aim to resonate with the target market, and to encourage an increase in awareness for all necessary issues.
- The content must also be directly linked to the brand promise and its core values, all of which must be directly linked to the value proposition of the BWA.

CAMPAIGN DESIGN

THE MARKETING STRATEGY PROCESS:

- This component of the campaign will focus on the conceptualisation of effective marketing strategies based on the data from the online survey.
- Creative and innovative ways of spreading awareness of the campaign brand, along with its promise and core values will be designed.
- Digital Marketing strategies will be designed. (Email Marketing, Social Media Marketing, Google Ads and Search Engine Optimisation)