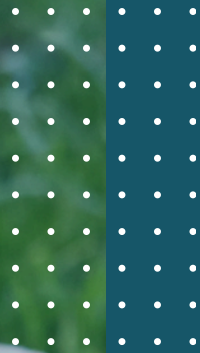
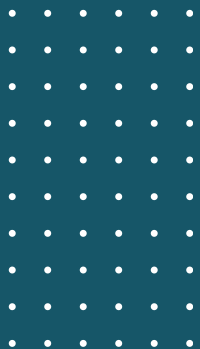
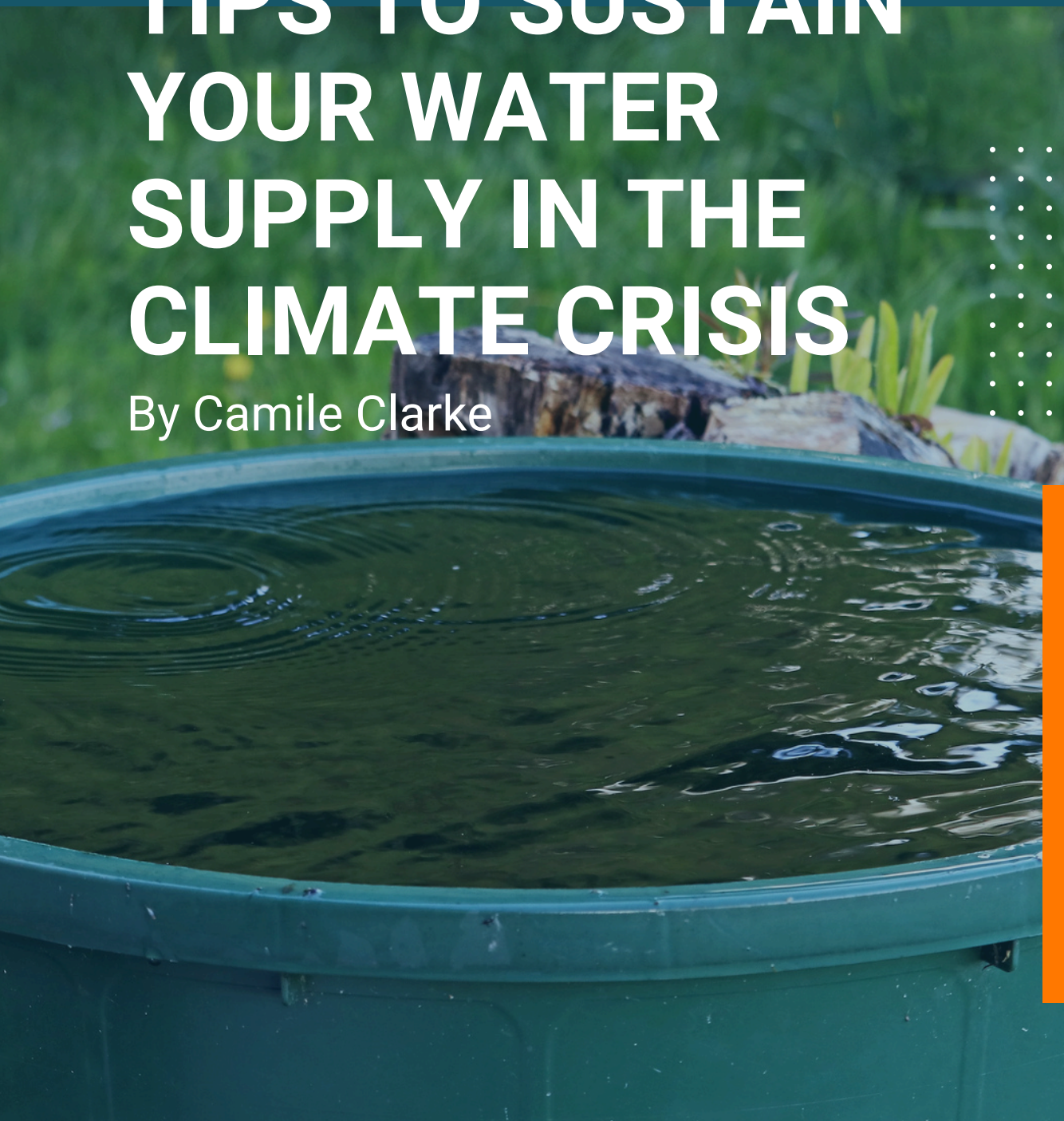


TIPS TO SUSTAIN YOUR WATER SUPPLY IN THE CLIMATE CRISIS

By Camile Clarke





CONTENTS



Introduction

Rainwater harvesting

Purifying your water

Growing food with hydroponics and aquaponics

Conserving water with technology

Solar/renewable pumps

Calculating your household budget

Harvesting grey water for sustainable use

Installing handpumps for reliable
water access

WELCOME

MESSAGE

I'm Camile, an educator and geologist hailing from Jamaica. In 2020, I was honoured to be recognised as a UNCC: Learn Climate Champion, a Global Schools Advocate, a Hundred Ambassador, a Climate Reality Leader, and a National Geographic Certified Educator. My educational journey took me through the University of the West Indies, where I earned both my BSc in Geology and my MEd in Curriculum and Instruction.

My passion for climate activism was sparked by witnessing firsthand how shifts in weather patterns adversely affected agriculture in my community. Nature is where my heart truly lies, and I find solace in exploring the outdoors, travelling, and cultivating unique fruits and vegetables.





INTRODUCTION

It is evident that the climate crisis is affecting us, with extreme heat and unusual weather becoming increasingly common. For regions like the Caribbean, which are not primarily responsible for causing this issue, the situation is particularly challenging. Our primary defences in this struggle for survival are adaptation and mitigation. One crucial aspect frequently emphasised is water—either too much or too little of it.

This guide aims to empower Caribbean residents to secure their water supply at home using simple methods that anyone can employ. These techniques are practical, easy to follow, and can be tailored to suit the needs of any household.

RAINWATER HARVESTING

Rainwater harvesting entails gathering and storing rainfall from various surfaces, like rooftops and land areas, with the intention of future utilisation. This process involves capturing rainwater runoff and directing it into storage systems such as tanks, cisterns, or underground reservoirs. The stored rainwater serves multiple purposes, including irrigation, landscaping, livestock watering, and potential indoor use following appropriate treatment.

The systems for rainwater harvesting vary, ranging from basic setups like rain barrels connected to downspouts to more intricate systems incorporating filtration, storage, and distribution mechanisms. The collected rainwater offers a supplementary water source, reducing dependence on municipal supplies and easing pressure on natural water reservoirs, particularly in regions susceptible to drought or water scarcity.

In essence, rainwater harvesting is an environmentally sustainable method that fosters water conservation and resilience amidst climate change challenges. It enables the efficient utilisation of rainfall that would otherwise be lost as runoff, additionally aiding in the mitigation of urban and rural flooding and erosion.



RAINWATER HARVESTING

Reliance on Rainwater:

- Some Caribbean citizens solely depend on harvested rainwater.
- Whether you use piped water or tanks, efficient rainwater harvesting is crucial for future water security.

Start with Storage:

- Storage is the initial and vital consideration in rainwater harvesting.
- Options include underground tanks and accessible polyethylene units.

Begin Small:

- Starting with one rain barrel is a great beginning.
- Your journey in water harvesting can grow gradually.
- Additional storage can be added as needed.

By focusing on effective rainwater harvesting, you're taking steps to ensure water security, regardless of whether you rely solely on rainwater or have other water sources. For more information, please see the [Handbook on Rainwater Harvesting for the Caribbean](#) to get started.



PURIFYING YOUR WATER: HOME WATER FILTRATION

Water filtration refers to the procedure of extracting impurities, pollutants, and particles from water with the aim of rendering it safe and appropriate for consumption or particular purposes. This process entails guiding water through a variety of filtration media or mechanisms intended to ensnare and eliminate undesired elements, such as sediment, bacteria, viruses, chemicals, and odours.

Multiple techniques are employed in water filtration, encompassing physical, chemical, and biological methods. Physical filtration employs barriers or screens to obstruct and eliminate particles from the water, while chemical filtration entails the use of chemicals or adsorption media to counteract or eliminate contaminants. Biological filtration, on the other hand, relies on microorganisms to decompose organic matter and pollutants in the water.

Water filtration systems span from basic household filters like pitcher filters or faucet-mounted filters to more sophisticated systems such as reverse osmosis filters, activated carbon filters, and UV disinfection systems. Each type of filtration system targets specific contaminants and may necessitate periodic maintenance or substitution of filter components to uphold effective water purification.

In summary, water filtration is pivotal in ensuring access to uncontaminated and safe drinking water, safeguarding public health, and supporting a variety of industrial, agricultural, and environmental activities.



PURIFYING YOUR WATER: HOME WATER FILTRATION

Filtration for Clean Water:

- Add simple filters to gutters or rain barrels to keep out leaves and dirt.
- First step to prepare water for household use.

Taking Cleanliness Further:

- Water without debris is still not safe for drinking.
- Use chlorine or household bleach to remove harmful microbes.

Example: 1 gallon of bleach for 1000 gallons of water.

Contact the local public health authority for guidance.

Extra Protection with Faucet Filters:

- Remove microbes and some heavy metals from water.
- Enhances water quality for various uses in your home.
- Ensuring clean water is essential for your home's water security.

Follow these simple steps to safeguard your water supply against the challenges posed by a changing climate.



GROWING FOOD WITH HYDROPONICS AND AQUAPONICS

Hydroponics is a technique for cultivating plants without soil, whereby plants obtain nutrients dissolved in water. In a hydroponic system, plants are typically grown in a nutrient-rich solution or within a medium such as perlite, coconut coir, or gravel. This approach enables precise regulation of nutrient levels, water pH, and other environmental factors to optimise plant growth.

Aquaponics, conversely, combines aquaculture (the raising of aquatic animals) with hydroponics. In aquaponic systems, fish or other aquatic animals are raised in a tank or pond, and the nutrient-rich water from the aquaculture system is circulated to grow beds where plants are cultivated hydroponically.

The plants subsequently filter the water, extracting surplus nutrients and purifying it before it is returned to the aquaculture system. This symbiotic relationship between fish and plants establishes a closed-loop ecosystem where both organisms benefit from each other's presence, and it is frequently utilised in sustainable farming practices.



GROWING FOOD WITH HYDROPONICS AND AQUAPONICS

Hydroponics and aquaponics play a role in combating climate change through various avenues:

Water Efficiency: Both hydroponic and aquaponic systems demonstrate significantly lower water usage compared to traditional soil-based agriculture. Through water recycling and reuse within the system, they curtail water wastage and decrease overall water consumption, a particularly vital consideration in regions susceptible to drought or water scarcity worsened by climate change.

Reduced Land Use: Hydroponic and aquaponic systems can be established in indoor or controlled environments, demanding less land in contrast to conventional farming techniques. This eases strain on natural habitats and ecosystems, mitigating deforestation and habitat destruction linked with traditional agriculture.

Lower Greenhouse Gas Emissions: These systems can integrate renewable energy sources like solar or wind power, lessening dependence on fossil fuels for agricultural activities. Additionally, by optimising growing conditions and minimising transportation distances, hydroponics and aquaponics can diminish emissions related to food production and distribution.

Carbon Sequestration: Certain hydroponic and aquaponic configurations, especially those utilising vertical farming methods or incorporating carbon capture technologies, possess the potential to capture carbon dioxide from the atmosphere. This aids in mitigating greenhouse gas concentrations and contributes to broader climate change mitigation endeavours.

Hydroponics and aquaponics provide sustainable alternatives to conventional agriculture, championing resource efficiency, emission reduction, and the advancement of environmentally friendly food production practices that aid in the fight against climate change.

GROWING FOOD WITH HYDROPONICS AND AQUAPONICS

Water and Food Prices:

- Food costs are tied to water availability.
- Hydroponics and aquaponics offer a chance to grow food while conserving and using harvested water.

Hydroponics Explained:

- Hydroponics involves cultivating crops without soil, using water instead.
- Aquaponics combines fish farming with crop growth.

Simple Hydroponic Setup:

- Hydroponic systems are easy to create and can be a fun family DIY project.
- Basic systems can grow leafy greens and select fruits.

Optimising Water Use:

- Most vegetables can be grown using this method, maximising harvested water use.
- Cultivate a variety of produce with your stored water.

Aquaponics Benefits:

- Introducing fish to your setup reduces the need for artificial nutrients.
- Fish also provide a protein source for your household.
- Hardy species like Tilapia are well-suited for home rearing.



GROWING FOOD WITH HYDROPONICS AND AQUAPONICS

Overcoming Challenges:

- Aquaponics might appear complex initially.
- Seek online training and support from organisations like [INMED Caribbean](#) or local branches of your country's Ministry of Agriculture.

Hydroponics and aquaponics empower you to grow your own food while conserving water. These methods can help mitigate the impact of fluctuating food prices and water availability, contributing to a more sustainable and secure future.



CONSERVING WATER WITH TECHNOLOGY

Water Smart Fixtures

- Conserving water is now easier with water-smart features.
- Discharge regulators used with shower heads or sinks permit a steady but restricted flow.
- Automatic shut-off valves greatly reduce water waste at sinks and wash stations.
- Dual-flush toilets reduce water use over time and are worth the investment for homeowners.

Start Small

- Water-smart fixtures are essential to households that rely solely on harvested rainwater.
- Gradually upgrade fixtures to match your budget.

Your local hardware store should carry basic water conservation fixtures. For training and more expert advice, contact [Isratech Jamaica Limited](#), a regional supplier of sustainable water and energy solutions.



SOLAR/RENEWABLE PUMPS

Renewable water distribution

- Efforts to harvest, store, and use water should be environmentally friendly.
- Invest in solar or wind-powered pumps to distribute harvested water around the home.

Aquaponics and Home Gardens

- Hydroponics or aquaponics systems would require an electric pump to keep the setup going.
- You can start small with a grid-tie or stand-alone renewable system for water distribution.
- Over time, you can upgrade your system to meet most of your energy needs at home.

Homeowners can access renewable energy loans from [First Caribbean International Bank](#) or contact your local agriculture or energy ministry for guidance.



CALCULATING YOUR HOUSEHOLD WATER BUDGET

PROJECTED MONTHLY INCOME		ACTUAL MONTHLY INCOME		PROJECTED COST		ACTUAL COST	
Income 1		Income 1		€	1,500.00	€	
Extra income		Extra income		€	60.00	€	
Total monthly income		Total monthly income		€	50.00	€	
Income 1		Income 1		€	200.00	€	
Extra income		Extra income		€	50.00	€	
Total monthly income		Total monthly income					
HOUSING							
Mortgage or rent							
Phone							
Electricity							
Gas							
Water and sewer							
Cable							
Waste removal							
Maintenance or repairs							



Understanding Your Water Needs:

- The initial step in home water conservation is knowing how much water your household uses daily. Water usage patterns vary among households.

Break It Down per Person:

- Begin by determining the daily water consumption per person.
- This step is especially crucial for homes reliant solely on harvested rainwater.

Observation and Noting:

- Observe and record activities to measure individual water use.
- Track aspects like shower durations, laundry loads, and dishwashing frequency.
- Transform this into a fun family activity.

Tailoring Storage to Your Needs:

- Determine the water volume each person consumes in your household.
- Take into account regional rainfall frequency.
- Adapt your storage capacity accordingly.

CALCULATING YOUR HOUSEHOLD WATER BUDGET

PROJECTED MONTHLY INCOME		ACTUAL MONTHLY INCOME	
Income 1		Income 1	
Extra income		Extra income	
Total monthly income		Total monthly income	

	Projected Cost	Actual Cost
HOUSING		
Mortgage or rent	€ 1,500.00	€
Phone	€ 60.00	€
Electricity	€ 50.00	€
Gas	€ 200.00	€
Water and sewer	€ 50.00	€
Cable		
Waste removal		
Maintenance or repairs		

Considering Beyond Household Use:

- Factor in water needs for your home garden.
- Include estimates for pets or livestock you may raise for household use.

By gauging your household's water consumption and needs, you lay the foundation for effective water management. This awareness is particularly important for households dependent on harvested rainwater.

HARVESTING GREY WATER FOR SUSTAINABLE USE

What is Grey Water?

- Grey water comes from sinks and washing machines, not toilets or kitchen sinks.
- It's a valuable resource for reuse in your home.

Reuse in Gardens:

- Grey water can be a primary source for irrigating gardens and food forests.
- Offers consistent irrigation throughout the year.

Setting Up the System:

- A simple arrangement by a plumber can evenly distribute grey water to a designated area.
- Proper distribution helps avoid water waste.

Mindful Usage for Crops:

- Unprocessed grey water should be directed to plants underground.
- This prevents crops, especially leafy vegetables, from being contaminated.

Harvesting grey water contributes to a more sustainable water cycle. By recycling water from sinks and washing machines, you provide essential nourishment for your gardens and promote responsible water use.



INSTALLING HAND PUMPS FOR RELIABLE WATER ACCESS

Benefits of Hand Pumps:

- Hand pumps are valuable tools in water management.
- Conditions should be considered before installation, but the benefits are significant.

Easy Maintenance, Specific Depth:

- Hand pumps are relatively simple to maintain.
- Suitable for wells less than 7 metres deep.

Rural Water Supply Solution:

- Hand pumps are especially useful where water access is limited in rural areas.
- They provide a reliable source of domestic water.

Initial Cost, Long-Term Gain:

- While installation might have an initial cost, the long-term benefits are worth it.
- It's an investment in stable water access.

Seek Expert Guidance:

- Consult your country's water management authority for hand pump suitability and proper setup guidance.



INSTALLING HAND PUMPS FOR RELIABLE WATER ACCESS

Hand pumps are an effective way to secure water access, particularly in areas with limited resources. Though installation might require an initial investment, the long-term reliability and positive impact make it a worthy consideration. Consulting your local water management authority ensures a successful setup.

- [Jamaica](#)
- [Trinidad and Tobago](#)



Thank you for taking the time to go through this tool I produced. I hope we can all work together to have a healthy water household. Thanks to Climate Tracker's Caribbean Community Climate Resource Grant which allowed me to be able to share this information with you.

Camile Clarke

THANK YOU