



# WASTEWATER REUSE STANDARD DEVELOPMENT IN TRINIDAD AND TOBAGO

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**Abstract:** Integrating wastewater reuse (WWRU) into national water management schemes is necessary as Caribbean SIDS adapt to climate change. The development of a national voluntary standard for WWRU applicable to the agricultural sector and landscaping of green areas is an enabling precursor. Noting this, the Ministry of Public Utilities in Trinidad and Tobago (TNT), through the GEF CReW+ Project, spearheaded this initiative. The Trinidad and Tobago Bureau of Standards is currently leading the efforts to develop the standard. Six monitoring parameters were identified for inclusion in the standard based on alignment with international safety standards and monitoring capabilities in TNT. Developing this standard acts as a starting point for safe WWRU, that will contribute to increasing the region's resilience to climate change.

**Keywords:** Wastewater Reuse; Circular Economy; Standard

## BACKGROUND

In Trinidad and Tobago (TNT), the Ministry of Public Utilities (MPU) is responsible for oversight and policy development for the water and wastewater sector. The Water and Sewage Authority (WASA) is the main operator in TNT, with 37 centralized wastewater treatment facilities and ongoing projects for wastewater network growth. An estimated 30% of TNT's total wastewater volume is treated by centralised treatment. An overview of wastewater management in TNT is illustrated in Figure 1.

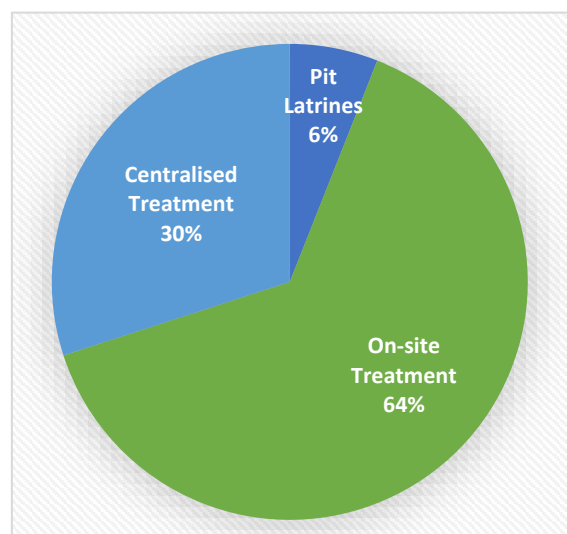


Figure 1: Overview of wastewater management in TNT.



Several policies and regulations in TNT encourage the pursuit of wastewater reuse (WWRU). These include the Draft National Integrated Water Resources Management Policy (2022), the National Environment Policy (2018) and the Water Pollution Rules (2019). Additionally, a baseline assessment for WWRU in TNT (GEF CReW+, 2021) states that treated wastewater can be an economically feasible non-potable supply option, particularly in agriculture and landscaping. Therefore, the opportunity exists for WWRU in TNT.

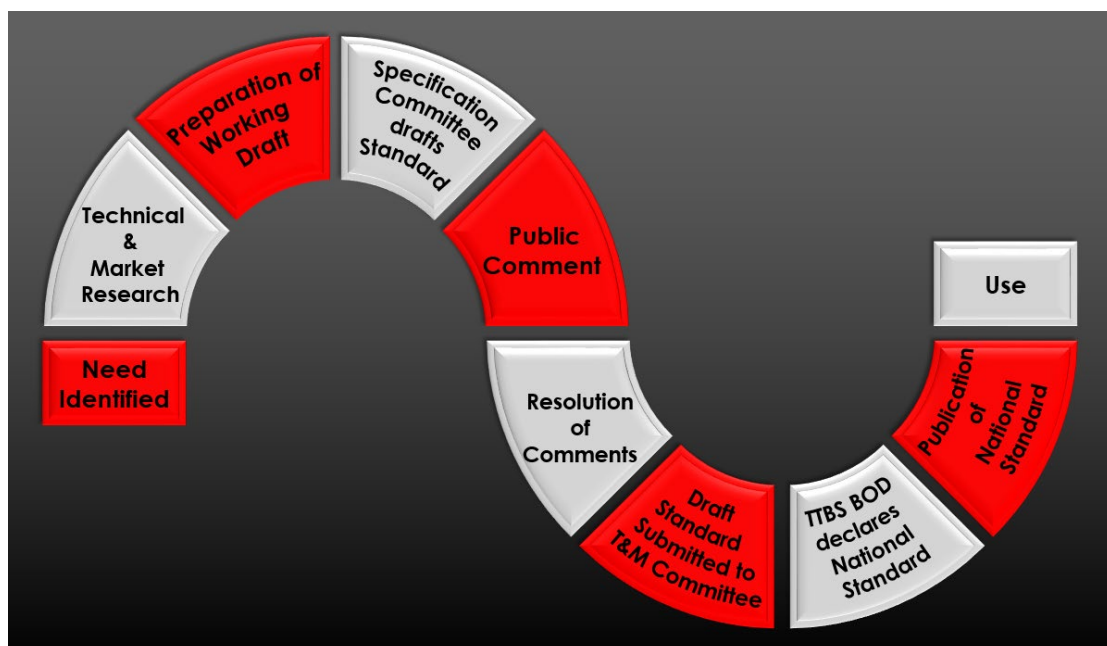
### RATIONALE

Developing a WWRU standard is a necessary precursor for safe wastewater reuse. Caribbean SIDS face increasing water demand and supply limitations associated with climate change and socio-economic pressures. WWRU for non-potable applications will reduce the demand on the potable water supply, alleviating water stress. Additionally, WWRU for agriculture and landscaping will reduce pollution, as plants absorb nutrients in wastewater, therefore protecting the water supply. As such, the integration of WWRU into water management schemes is instrumental in building resilience to climate change.

### DEVELOPMENT OF THE WWRU STANDARD

A voluntary standard for technical guidance on WWRU applicable to agriculture and irrigation of green spaces in TNT is being developed through the GEF CReW+ Project: *An integrated approach to water and wastewater management in the Wider Caribbean Region using innovative solutions and sustainable financing mechanisms*. The GEF CReW+ project is a partnership project funded by the Global Environment Facility (GEF) that is being co-implemented by the Inter-American Development Bank (IDB) and the United Nations Environment Programme (UNEP) in 18 countries of the Wider Caribbean Region (WCR). In TNT, this project is being spearheaded by the MPU.

The Trinidad and Tobago Bureau of Standards (TTBS) is leading the development of the standard. The TTBS voluntary standards development process is illustrated in Figure 2 below.



**Wastewater Reuse Standard Development in Trinidad and Tobago**



**Figure 2:** TTBS Voluntary Standards Development Process.

TTBS established a team comprising relevant technical and institutional expertise, including AKUT Consultants engaged by the GEF CReW+, to develop the working draft standard. A survey of fifty-seven international standards and regulations (GEF CReW+, 2022) was conducted as an input into the standards development process. Following this, TTBS established a Specification Committee (SC), comprising key stakeholders in the sector. The SC reviewed monitoring parameters relevant to WWRU in TNT. Upon completion of the Committee Draft Standard, it was advertised for public comment. A virtual Stakeholder Consultation was held on the 21st July 2022 to solicit additional feedback. The SC will review and dispose of the public comments, in the short term, and the standard is expected to be approved and published by December 2022.

### **CRITICAL PARAMETERS FOR WWRU**

The six monitoring parameters described below, were identified in the standard development process and included in the draft standard (TTS 664:20XX).

1. *Faecal Coliform and Escherichia Coli* both indicate the presence of pathogenic bacteria and viruses of faecal origin, and are measured in colony forming units per 100 millilitres (CFU/100 ml) or most probable number per 100 millilitre (MPN/100 ml), depending on the measurement technique. Both units can be compared directly. While, *Escherichia Coli* is the more accurate indicator, key laboratories in TNT, have the capacity to measure faecal coliforms only. Therefore, either parameter may be monitored to increase the accessibility of laboratory services. However, if WWRU is used for agriculture intended for export, limitations for *Escherichia Coli*, in alignment with the TTS 648:2020 Good Agricultural Practice (GAP) standard, should be monitored.
2. *Helminth ova* is an indicator of pathogens and parasites, and is measured in number of *Helminth ova* per litre ( $n^0/L$ ). Countries with warm climates are especially vulnerable to the spread of parasites. Therefore, this parameter should be monitored in all instances where reuse wastewater will come in contact with persons.
3. *Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD)* are both indicators of organic matter and are measured in milligrams of oxygen per litre of wastewater ( $mgO_2/L$ ) required to biologically or chemically degrade organic matter (Metcalf and Eddy, 2014). Organic matter affects the colour, odour and application of the water. The draft standard allows either BOD or COD to be monitored.
4. *Turbidity* is an indicator of the particle content of wastewater. It is measured through the scattering of light and expressed in nephelometric turbidity units (NTU) (Metcalf and Eddy, 2014). This parameter implicates the pathogen content and practical concerns such as clogging irrigation systems.
5. *Residual Chlorine* measured in milligrams of Chlorine per litre ( $mg/L$ ), is harmful to plants above a certain threshold. Since agriculture is a major



application for WWRU in TNT, maximum limits for residual chlorine was included. Wastewater treatment plants in TNT use either chlorine or UV disinfection in wastewater treatment. Monitoring of this parameter is not applicable where UV disinfection is used.

The draft Standard includes limitations for these six monitoring parameters for each of three WWRU classes, and makes further recommendations for WWRU.

### **RELEVANCE TO CONFERENCE THEME**

WWRU is a means of alleviating water stress and protecting water sources in Caribbean SIDS. Therefore, the pursuit of WWRU in TNT, as a part of the regional GEF CReW+, is instrumental in building regional resilience to climate change.

### **REFERENCES**

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