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## **Lessons learned from drinking water safety and security planning in Vanuatu: 2016-2020**

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**EQUITABLE AND SUSTAINABLE WASH SERVICES:  
FUTURE CHALLENGES IN A RAPIDLY CHANGING WORLD**

**Lessons learned from drinking water safety and security  
planning in Vanuatu: 2016-2020**

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**Introduction**

Water Safety Plans (WSPs) are a comprehensive risk management strategy that encompass all steps in the drinking water supply chain (catchment through consumer).<sup>1</sup> As of 2017, 93 countries have implemented WSPs, demonstrating political support for implementation of the planning strategy globally.<sup>2</sup> WSPs in small, community-managed and rural water supplies experience incomplete implementation, weak capacity to support the WSP process, and a need for financial and technical support.<sup>3</sup> In 2016, an evaluation of nascent WSP implementations in Vanuatu found they were of higher quality than counterpart countries, but lacked full support to address technical and capital assistance needs.<sup>4</sup> However, in 2018, Vanuatu adopted Drinking Water Safety and Security Plan (DWSSP) mandates nationwide through their National Implementation Plan for Safe and Secure Water (NIP),<sup>5</sup> with implementation lead by the Department of Water Resources (DoWR) and a goal to implement in all communities by 2030. A corresponding Capital Assistance Program (CAP) is designed to provide funding for communities after they have completed no and low cost improvements and a registered water committee that is outlined in their DWSSP. Differing from traditional WSPs, DWSSPs highlight water security in addition to safety, reflecting the natural hazards Pacific Island countries are increasingly susceptible to in the wake of climate change.<sup>6</sup>

The goal of this research was to understand the current state of DWSSP documentation in Vanuatu and make recommendations to inform key actors supporting the DWSSP part of the NIP/CAP process. To accomplish this, we databased existing DWSSPs, assessed their completeness, developed a completeness score, and summarized the state of documented water systems, existing risks, and needed improvements.

**Methods**

DWSSPs consist of six sections and two appendices; therefore, we developed seven databases to extract contents of DWSSPs. We assigned sections a completeness score (“no data entered”, “<10% entered or key information missing”, “partially complete”, “fully complete”, or “section missing from report”). All data entry was conducted by two individuals who met frequently to ensure consistency. Databases were cleaned for standardization, de-duplicated, and qualitative data was re-coded into general categories where possible.

In consultation with partners at DoWR and UNICEF, an overall completeness score for each DWSSP was calculated by assigning weights (0-1) to critical tables that had previously been scored. The maximum potential overall score was 11.2. Summary statistics on the dataset were completed in Excel and ANOVA tests were performed in STATA to assess scores by DWSSP implementation year.

**Results**

After database entry, de-duplication, cleaning, and removal of documents pre-dating 2016 which excluded many sections included in the DWSSP format precluding further analysis, a dataset containing 257 DWSSPs was used for analysis. This final dataset represented roughly 10% of rural supplies in Vanuatu.

When assessed for completeness, more than half of DWSSPs (63%) contained fully completed community details section and many DWSSPs (74%) had partially completed water supply descriptions, most frequently omitting critical details such as GPS coordinates. Furthermore, 98% of DWSSPs pre-dating 2018 did not include sanitary surveys while 70% post 2018 had partial or fully complete sanitary surveys. For overall completion scores, the mean and median scores were 6.1 and 6.3. Additionally, DWSSP scores showed statistically different average scores by year for overall completeness scores and for four DWSSP section scores: DWSSP team and water committee, water supply description, O&M and maintenance schedules, and committee actions. In two of these sections, water supply description and O&M and maintenance schedules, increased clarity and question focus in DWSSPs were observed from 2016-2020.

DWSSPs (n=257) covered communities with an average population of 325 (range 12-3,139) and 65 households (range 1-630). On average DWSSP Teams consisted of 9 members (range 1-31). Of DWSSPs that indicated community water source (n=173), rainwater, river/spring, and groundwater sources were most common (88%, 77%, 28%, respectively). Furthermore, 248 DWSSPs recorded community water system details; 66% indicated presence of storage tanks and 53% indicated presence of a distribution/piped system. More than half of assessed water systems rated 'high-risk' for drought (62%) and flood (50%), and >50% of communities needed system-level infrastructure or general upgrades/replacements to improve water security. Additionally, beginning in 2019 DWSSPs assessed risk of volcanoes and climate related hazards, such as cyclones.

## Discussion and conclusion

Results indicate: DWSSPs completeness improved over time, especially in sections with clarified surveys, however, DWSSP completeness varies by section; sanitary surveys, a key risk indicator, are seeing increased inclusion; communities are high risk for multiple disaster scenarios; and, many communities already have concerns about water security. Completion improvements through time suggest that simple document modifications focused on survey question prompts and conducting facilitator refresher training to could improve document completion. Additionally, DWSSPs contain valuable data that are currently under utilized for planning. Mobilizing risk, improvement needs, and health information by enhancing data storage and extraction would support success of the NIP long-term and capitalize on current investment. Finally, this work highlights the time intensive process of WSP implantation and evaluation, suggesting a need to further assess realistic timelines for effective WSP implementation in developing countries.

Although challenges in complete and accurate documentation of community water and sanitation systems exist, DWSSPs are important planning tools for local, provincial and national government. Critically, this study summarizes the current state of DWSSP documentation allowing key actors to make evidenced-based decisions to improve quality as they work to ensure every Vanuatu community has a DWSSP by 2030.

## References

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