Project Title: Atmospheric Water Generation (AWG) Hub: Climate Resilience and Social Sustainability at the Port of Surigao

Project Category: Health, Safety and Security / Climate and Energy

1. Executive Summary

In response to the intensifying impacts of the 2026 El Niño phenomenon, the Philippine Ports Authority (PPA) through the Port Management Office (PMO) of Surigao has launched a groundbreaking, circular-economy hydration initiative. By deploying a state-of-the-art Atmospheric Water Generator (AWG) manufactured by AKVO, the Port of Surigao harvests moisture from the tropical air to provide completely free, medically certified, chilled drinking water to frontline dockworkers and port users.

This project bridges environmental innovation and social responsibility, transforming the port's high ambient humidity into a vital resource that protects labor health, mitigates climate-induced water scarcity, and establishes an independent disaster-resilience mechanism for the region.

2. Context & The Challenge

The Philippines faces severe freshwater vulnerabilities, compounded heavily during El Niño dry spells when standard utility frameworks collapse or experience extreme strain. Historically, the Port of Surigao has stood on the frontlines of these environmental crises; during the catastrophic onslaught of Typhoon Odette in December 2021, the complete destruction of local municipal infrastructure left the port community in dire need of potable water.

With the official activation of the 2026 El Niño dry spell, the port faced immediate challenges:

- **Occupational Health Risks:** Frontline dockworkers and cargo handlers endure prolonged, grueling physical labor directly exposed to extreme radiant heat, escalating the risk of heat exhaustion and heat stroke.
- **Resource Strain:** The surrounding community faces municipal water shortages, rendering traditional water sourcing unsustainable and socially irresponsible for large-scale industrial hubs.

3. The Innovative Solution: Harvesting Water From Air

Instead of drawing from depleted local water tables, PMO Surigao looked to the sky. Tropical regions like Surigao City possess a consistent relative humidity ranging from 60% to 80%. While this high humidity causes physical discomfort, it represents an untapped, renewable aquifer.

Technical Specifications & Capacity

The port deployed an AKVO AWG system designed for high-efficiency, large-scale moisture condensation:

- **Generation Capacity:** Equipped with an advanced "Water Block" system, the machine extracts **10 to 12 liters of water per hour**, translating to an impressive **250 to 300 liters of pure water daily**.
- **Storage & Continuity:** Features an integrated **500-liter water storage tank** coupled with a dedicated backup generator, guaranteeing uninterrupted operation and disaster-readiness even during total municipal grid blackouts.

4. Operational Rigor, Safety, and Engineering Design

To transition this unit from an alternate calamity source into a daily public utility for the 2026 El Niño launch, PMO Surigao instituted a flawless, multi-layered Standard Operating Procedure (SOP) verified by rigid scientific data.

Laboratory Validation & Rehabilitation

Upon arrival from India, initial baseline testing in May 2025 indicated high Heterotrophic Plate Count (HPC) levels due to stagnant moisture during shipping and prolonged storage. In April 2026, as El Niño conditions loomed, port engineers executed an intense chemical and physical purging of all internal water paths, pipes, and tanks.

Per the **"AWG Potability Report.jpg"** issued by the Department of Pathology at **Caraga Regional Hospital**, the results proved a resounding success:

- **HPC Levels:** Drastically reduced from 1,406 CFU/mL down to **410 CFU/mL**, comfortably below the national safety threshold of <500 CFU/mL.
- **Coliforms:** Achieved **<1.1 MPN/100 ml** for both Total and Thermotolerant (Fecal) Coliforms.
- The water officially **PASSED** the stringent Philippine National Standards for Drinking Water (PNSDW 2017, DOH AO 2017-0010), verifying its absolute **The Closed-Loop, Zero-Waste Protocol**
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To prevent any possibility of bio-film reformation or microbial growth in the untreated water, the port implemented a strict, daily zero-waste lifecycle:

1. **The 0500H Ecological Flush:** Every morning at 0500H, a dedicated utility worker flushes out any remaining water from the previous day.
2. **Circular Economy Reuse:** Instead of wasting this water, it is redirected entirely to hydrate the port’s perimeter greenery, plants, and shrubbery—preserving municipal water supplies during the drought.
3. **Fresh Generation:** The AWG immediately begins generating a fresh, highly oxygenated batch of water for the day's oncoming shifts.

Biosecurity & Contact Isolation

To protect the source water from external environmental contamination or human contact:

- **Physical Enclosure:** An "Authorized Personnel Only" safety enclosure was constructed around the AWG unit, creating an isolated biosecurity zone.
- **Managed Dispensing:** Port users do not access the machine directly. A designated operator fills **brand-new, dedicated 5-gallon water jugs** in the sterile zone, which are then loaded onto heavy-duty water dispensers.
- **Chilled Hydration:** The water is served chilled, maximizing physical relief and accelerating core body cooling for dockworkers working under the grueling sun.

5. Sustainability and Impact (WPSP Alignment)

Environmental Sustainability

By generating water out of thin air, the Port of Surigao bypasses the local water grid, completely avoiding the depletion of groundwater assets during a critical drought period. The zero-waste irrigation routine further embodies the circular port principles championed by the IAPH.

Social & Governance Sustainability (SDG Alignment)

This project directly addresses several United Nations Sustainable Development Goals (SDGs):

- **SDG 6 (Clean Water and Sanitation):** Provides verified, free access to premium safe drinking water.
- **SDG 8 (Decent Work and Economic Growth):** Actively protects the physical well-being, stamina, and occupational safety of dockworkers, who form the backbone of the maritime logistics chain.
- **SDG 13 (Climate Action):** Proactively adapts port infrastructure to handle the immediate, extreme weather realities of climate change.

Through this initiative, the Philippine Ports Authority and PMO Surigao demonstrate how technological innovation, operational discipline, and humanitarian care can merge, turning a climate adversity like tropical humidity into a sustainable shield for its community.