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Let's Solve Water

Case study
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DB600 and YSI EXO2 for Water Quality Monitoring for Seaweed Farming in South Sulawesi, Indonesia.

Introduction

Seaweed farming is setting itself as a competitive candidate in biomass production at sea, particularly in Southeast Asia. Using current technology, the crops require no freshwater or fertilizers. Compared to other types of aquaculture, seaweed farming has generally low impact on the environment while providing a variety of valuable ecosystem services, such as CO2 sequestration, recycling of nutrients, and regenerating marine ecosystems.

At the same time, similar to other trophic forms of aquaculture, abiotic stressors and climate risks such as temperature and salinity compound negative feedbacks, such as the occurrence of unwanted pathogens, reduction in dissolved oxygen and subsequent crop loss.

Overall, seaweed cultivation reaps more outweighing economic and food security benefits when proper management is put in place. Just like fish, different seaweed species require different environmental conditions to thrive, which is why implementing a site suitability study it is important prior to seaweed farming operations.

Sea Green, headquartered in Singapore, is an integrated end-to-end solution harnessing the potential of seaweed aquaculture to develop coastal community resilience, mitigate climate change and deliver food security. By cooperating with MARI Oceans' grassroots cooperative structures, Sea Green's technology is adapted to fit local needs. Sea Green aims to continually add value for the people and their environment through industry-wide transparency and innovation. Xylem is proud to be partnering with Sea Green to promote sustainable seaweed farming along the Indonesian archipelago.

Figure 1: Location of DB600 buoy at South Sulawesi, Indonesia.

YSI
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Figure 2: Local Indonesian farmer harvesting seaweed (Credits to Dodon Yamin, MARI Oceans)

Project Scope

In support of this initiative, Xylem has provided a water quality monitoring buoy (DB600) equipped with a YSI EXO2 sonde to carry out real-time monitoring of coastal waters to determine site's suitability for seaweed farming. The buoy measures 600 mm in diameter and weighs 21 kg, making it possible for a one-person deployment. The buoy platform can support a multi-parameter probe, an Aanderaa single point current sensor, along with solar panels and the AI1 (All-in-One) datalogger, which manages the collection and transmission of data for real-time monitoring.

Methodology

Sea Green collaborates with MARI Oceans to train local teams in assembling the DB600 buoy and calibrate the EXO sensor, namely, Conductivity, Temperature, Dissolved Oxygen, pH,ORP and Photosynthetically Active Radiation (PAR). The EXO2 is also equipped with a central wiper to mitigate the negative effects of marine bio-fouling on the sensor. The real-time data feed can be viewed through a Cloud-based environmental IoT platform, such as Eagle IO, which allow users to work with simple data files remotely. This remote access allows a Xylem technician to troubleshoot any technical hardware or configuration issues remotely.

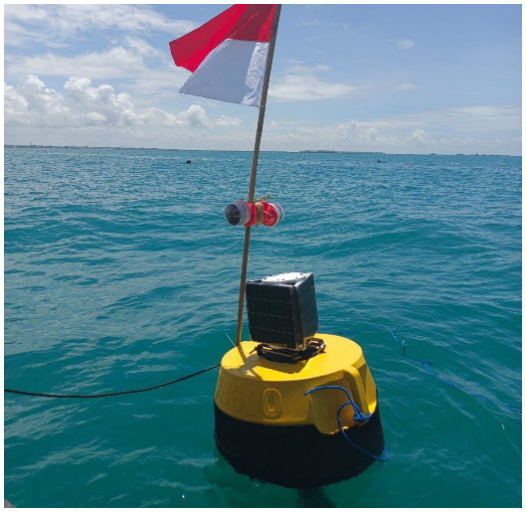

Figure 3: (LEFT) Local communities are trained to assemble and deploy the DB600 buoy with sensors. (RIGHT) DB600 deployed with Indonesian Flag to monitor water quality parameters for Seaweed farming operations, as well as identifying potential coastal sites for new seaweed farms.

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info.em@xylem.com

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