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## Phos-Value: Sustainable solutions for nutrient recycling by AqualnSilico

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The quality of wastewater effluents is responsible for the degradation of the receiving water bodies such as coastal waters and the sea. Untreated or inadequately treated wastewater effluent may lead to eutrophication in receiving water bodies and also create environmental conditions that favour proliferation of waterborne pathogens of toxin-producing cyanobacteria. Better wastewater management is critical to stop marine eutrophication, protect marine life and communities' livelihoods, as well as serve as a solution to combat water, energy and fertilizer shortages.

The Phos-Value project is using the AqualnSilico's digital twin tool to provide technical assistance to wastewater treatment plant authorities in identifying problems in the operation and maintenance of the treatment plant and provide technical solution to increase the performance of these treatment plants.

Cape Verde faces challenges with coastal eutrophication due to nutrient releases from poorly treated wastewater like many Small Island Developing States. With the support of the OIC, AqualnSilico is testing its digital twin tool in Santa Catarina wastewater treatment facility in Cape Verde.



The company started the technical assessment of the wastewater treatment plant from May to December 2021. In early 2022, the company started to run the digital twin tool to identify the main challenges affecting the performance of the treatment plant. AqualnSilico and Cape Verde authorities agreed on certain interventions to improve the treatment performance. AqualnSilico supervised the facility operational team during the implementation of these interventions where it has been ended in September 2022, where AqualnSilico is monitoring the performance of the treatment plant and fine tuning the operation process to reach the optimal operating conditions. AqualnSilico plans to conclude the pilot test in January 2023 and to conduct a final workshop in February 2023 to present the results of this pilot study.

According to the preliminary results obtained during the test period, the proposed interventions will reduce the pollution load realised from this facility as follow:

1. Marine eutrophication will be reduced by 55%;
2. Marine and freshwater aquatic ecotoxicity will be reduced by 70-80%; and
3. Human toxicity will be reduced by 95%.

In addition to environmental improvements, Phos-Value project also contributes to an increase of the local operational team knowledge and know-how in using this digital twin tool.



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By helping other wastewater facilities to increase treated water quality and availability, AqualnSilico is setting a path for Cape Verdean stakeholders to create a circular economy model for wastewater treatment with the potential for other commercial opportunities, such as recycling treated water for non-potable applications and biofertilizers for agriculture.

AqualnSilico developed a sustainability plan based on a win-win business model to provide support to the existing treatment utilities to switch their strategies to be more economic and environmentally efficient, addressing environmental challenges related to resource scarcity and preserving natural resources. They are building a strong and recurring business model based on a Software as a Service (SaaS), ideally charging based on the achievement of success factors (e.g. a percentage of the achieved savings or new revenues).

To continue the improvements achieved so far in the pilot project in Cape Verde, AqualnSilico is working on the endorsement of a Memorandum of Understanding in cooperation with the national authority in Cape Verde responsible for the operation of wastewater treatment plants (ANAS), and the Cape Verdean government in the field of wastewater management. The goal is not only to replicate the Phos-Value innovation in the others wastewater treatment plants of the country but also in other Portuguese speaking countries and SIDS.