BLUE ECONOMY
COOPERATIVE RESEARCH CENTRE

Australian Government
Department of Industry, Science and Resources

AusIndustry
Cooperative Research Centres Program

Structural and hydrodynamic modelling of scalable offshore seaweed mariculture platforms

Summary

This project aims to enhance seaweed farming using Marine Permaculture (MP), a technique that utilises submersible platforms to access deepwater nutrients, ensuring seaweed growth despite warming temperatures.

In collaboration with the University of Queensland, the project will model and validate the structural resilience and hydrodynamic behaviour of Climate Foundation's 0.1-hectare prototype platform deployed in the Western Pacific utilising field data collected at its offshore site and provide solutions to scale the platform to support a 1-hectare offshore mariculture production.

The research will test the following key hypotheses in determining the key features of the innovative seaweed platform:

1. Tensegrity architecture may reduce platform capital costs while achieving structural integrity, strength and flexibility goals.
2. Pressurization of HDPE structures transforms compressional forces into tension and may provide compressional structural elements at low cost and high performance.
3. Designs may be scalable to hectare scale and beyond without exceeding material stress limits in open ocean. The largest salmon aquaculture pens are a fraction of a hectare, but parasitic loads (including nets) may be lower for seaweed cultivation, suggesting that hectare scale is feasible with existing material strengths.
4. Collar-tie designs developed by the Blue Economy CRC and used in salmon aquaculture can be applied in offshore seaweed mariculture platforms.

The successful implementation of this innovative solution will revolutionise seaweed mariculture, offering a sustainable and scalable response to the challenges of climate change.

Outputs will accelerate scaling of Marine Permaculture platforms in the western Pacific, including the Philippines and accelerate the development of the Marine Permaculture deep water irrigation industry for offshore mariculture platforms through licensing and franchising throughout Australasia.

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Research Program
RP1 Offshore Engineering and Technology (OET) Program

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Duration
18 months

Participants
- Climate Foundation
- The University of Queensland

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