Master thesis BIOVIT 2021/22

Topic/Title:

Testing of solar powered aeration technology for tropical aquaculture

Summary

It is a widely accepted statement that aquaculture will be perhaps the most important contributor to food security in Africa. Still water and freshwater in particular is a scares resources with competition from many sectors. Today, small scale pond aquaculture in particular, water is far from efficiently utilized. Stocking densities at harvest are often as low as 0.1 kg/m^3 and at the maximum below 1 Kg/m^3, without aeration.

By adding oxygen (aerators) when biomass increases efficient use of land and water can be increased two or threefold and at the same time reduce risk related to poor water quality that may cause stress, mortality, and economic losses. Existing aerator systems are mainly electric connected to the grid or powered by generators. Most systems have low efficiency in terms of increased DO per kwh. Also, reliable electric grids are seldom available in rural areas where fish farming takes place.

The proposed study is about documentation of how new solar powered aeration technology can be used off-grid to improve productivity as well as improve water quality management systems.

Assumptions and justifications:

- Freshwater is becoming a scares resource and potential conflict topic in many areas, as for instance salinity is “creeping inland” and large areas where freshwater fish farming took place earlier around the year can now only be used during the rainy season.
- Fish farming is linked to risk. Water quality and fish health management is crucial for profitable fish farming over time.
- Existing aeration systems are cheap to install but have low efficiency and high operational cost

The proposed Pilot Project wants to demonstrate:

- That the solar powered AirTURBO™ technology is robust, reliable and more cost efficient in terms of adding oxygen to water (O_2/kwh)
- The off-grid solar powered AirTURBO™ systems may contribute to increased productivity in ponds (and even cages)
- How the technology will contribute to improved water quality that will reduce risk of stress, disease and mortalities

Subject area

Water quality, aquaculture technology, tropical aquaculture, fish welfare, bio-production

Language thesis

English

Bachelor or Master thesis

Master thesis

Credits

30/60

Project/company

The partners behind the proposed study are: (proposed study still under elaboration)

- Glava Energy Center (www.glavaenergycenter.se)
- EdenAquatech – AirTURBO™ (www.edenaquatech.se)
- Grundfos (www.grundfos.com)
- Frost Innovation AS (www.frostinnovation.eu)

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