

Optimizing Pond Aquaculture. What can be done?

WHAT IS MOST IMPORTANT - OXYGEN OR FEED?

If you do not feed the fish they will not grow, but they will stay alive for some time. If the oxygen level is low you will get poor feed conversion.

4.4 % saturation is not enough to keep most fish alive! *Pangasius, however, can breathe air...*

Oxygen is important in order to get the most from the feed. Good, stable dissolved oxygen levels help keep both fish stress and disease outbreak to a minimum.

Maintaining a good level of oxygen in the water is also an environmental issue since there is usually an outflow from a fish farm, and a low DO level in the outflow water will harm the surrounding waters.

SPOT MEASUREMENTS

You can start with a Handy instrument – very good for spot measurements in many places & ponds. The use of a Handy will help you know what is happening and optimise conditions.



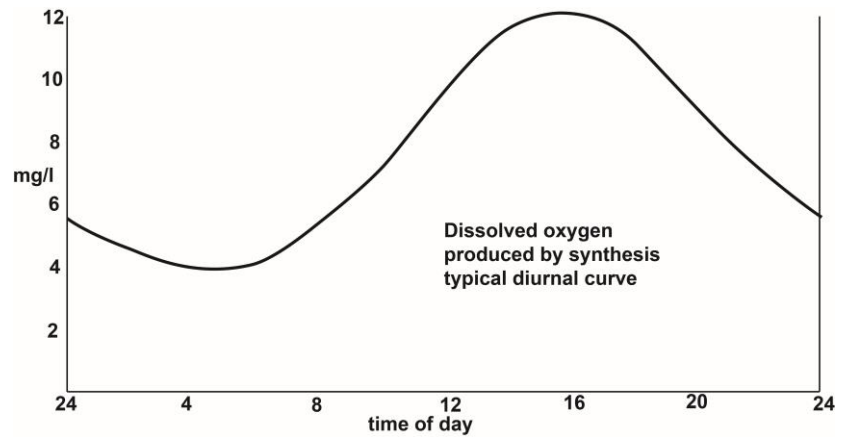
CONTINUOUS MEASUREMENT AND CONTROL



You can use an Atlantic to switch paddle wheels on when the DO is low, and to start stirrers when the temperature is high.

It is sensible to have both aerators and stirrers. If you turn paddle wheels on in the afternoon you might blow oxygen out of the water:

Photosynthesis can produce dissolved oxygen levels well above 100% saturation.



FULL MEASUREMENT, MONITORING AND CONTROL

If you have many tanks and ponds you can use a Commander system, with Pacific for local control and wireless connection. Such a system can monitor and control everything.



The design of the farm, what you do and how it is done are all important. It is not enough just to measure oxygen and switch the paddle wheels on when needed.

THE FILTRATION AND PURIFICATION OF INLET WATER IS IMPORTANT.

A traditional method simply uses bags on the inlet pipes or a sedimentation tank to prevent various predators and other larger unwanted creatures from entering the pond.

This does not stop pathogens, and can be done better.



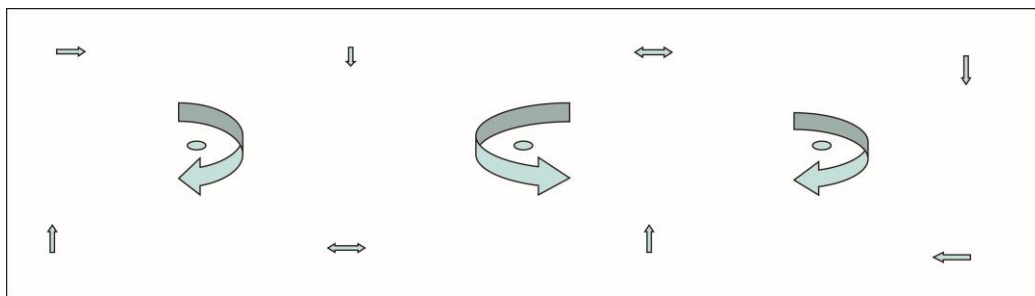
AMAZING RESULTS WITH FILTRATION/PURIFICATION

2 ponds were each stocked with 75000 post-larvae. As much feed as was eaten was given. The pond with **traditional** inlet filtration produced a **growth of 71 kg**. The pond with inlet **filtration and purification** produced a **growth of 214 kg**. The nitrogen discharge was 22% less, and the phosphorous discharge was 19% less than with traditional inlet filtration.

EVEN MORE CAN EASILY BE DONE

Sludge build-up on the bottom of the tanks can use a lot of oxygen as it decays. So remove the sludge continuously.

Circulate the water and the sludge concentrates in the centre
Remove it by placing the outlet pipe in the centre.
Divide long ponds into sections:



The circulation will also let you get the most out of aeration/oxygenation
Save you some electricity bills!



Poly-tunnel shrimp pond with circulation and central outlet pipe



The outlet water is fed to a drum filter, bio-filter

INTENSIVE PRODUCTION

Shrimp can be farmed intensively, for example in a poly tunnel pond as shown above. This can give a high biomass density:

Pond volume 300 m^3 Max Stocking density: $5\text{-}10 \text{ kg shrimp/m}^2 = 1\frac{1}{2}$ to 3 tons per 300 m^3 pond

A feed conversion ratio of 1,2 can be achieved.

To do this you need close control of water quality.

FROM TRADITIONAL TO INTENSIVE

Aeration is the first step.

As indicated above, aeration can be improved by using dissolved oxygen measurements to turn aeration on and off, and by using temperature measurements to turn stirrers on and off.

The correct design of the installation can help considerably

Circulation will enable sludge to be removed from the centre of the circulating water, and will also help to maintain optimal temperatures.

Filtration and Purification are very important factors towards successful and efficient intensive production. There are two reasons for this. Shrimp and fish grow faster and better in clean water, and disease can destroy all the stock in an entire farm.

There are **Drum Filters – Bio Filters and UV treatment units.**



Oxygenation

The transition from aeration to oxygenation can give a 3 to 5 times increase in production, for fish that need oxygen like tilapia and shrimp.

Oxygenation can be performed in many ways (photos from left to right – floating devices, pump/venturi device, high-pressure cone).



Recirculation is the final step.

Recirculation gives you the greatest degree of control and the smallest possible environmental loading.

HOW CAN OXYGUARD HELP?

OxyGuard equipment will help you measure, monitor and control everything. You will be in charge. You can choose the degree of automation that suits you and your resources.

Data from the measuring and monitoring equipment can be used to provide a record of exactly what has happened and give you the proof of conditions you need as basis for certification.