بسم الله الرحمن الرحيم

Work Shop In

The Recent Advancements in Shrimp Culture Industry in KSA

Tuesday 11th Jumada II 1439H Corresponding to 27th February 2018

# Outlook
# of using recent Advanced Technology
# for shrimp farming
# In the Kingdom of Saudi Arabia

# White shrimp

The shrimp farm sector of the Kingdom of Saudi Arabia produces around 42,213 MT of shrimp
and around 13000 MT of fish
in 2017

Our target to reach 100 thousand MT in 2020
and 600 thousand MT in 2030
from aquaculture

To reach the target
We have to increase the production and to increase we have to understand the shrimp farm requirements in KSA

The farmers choice of shrimp culture techniques is influenced by

Climate
Location
Land, water, power availability and cost
Transportation and cost
Credit availability and cost and repayment terms
Labor availability and cost
Feed/Fertilizer/availability and cost
National planning regulations & environmental controls
Import/export costs
Proximity to existing market

shrimp culture techniques:

- Extensive
- Semi-Intensive systems
- Intensive systems
  - # Biofloc technology
  - # Recirculating Aquaculture System (RAS)
  - # Hi water exchange
- Superintensive systems

# Semi-Intensive systems

- Semi-intensive pond farming use a monoculture system.
- Average pond sizes range between 1 to 10 hectare.
- Use a commercial pellet feeds.
- Average productivity 9 – 12 tones/ha/year.
- Number of crops per year 2.
- Number of days per crop 160.
- limited aeration system.
- pumping water exchange.
- earthen pond

# Intensive systems

Intensive systems :

- use a monoculture system.
- Average pond sizes range between 0.1-0.3 hectare.
- Average productivity 3,400- 40,000 tones/ha/year
- Use a commercial pellet feeds.
- Number of crops per year 2 to 4.
- can use a nursery unit.
- efficient aeration system.
- control pumping water.
- lined or concrete pond.
- The culture can be in green house or in shaded pond

Intensive systems
Can be

- RAS
- Biofloc
- Hiflow water exchange

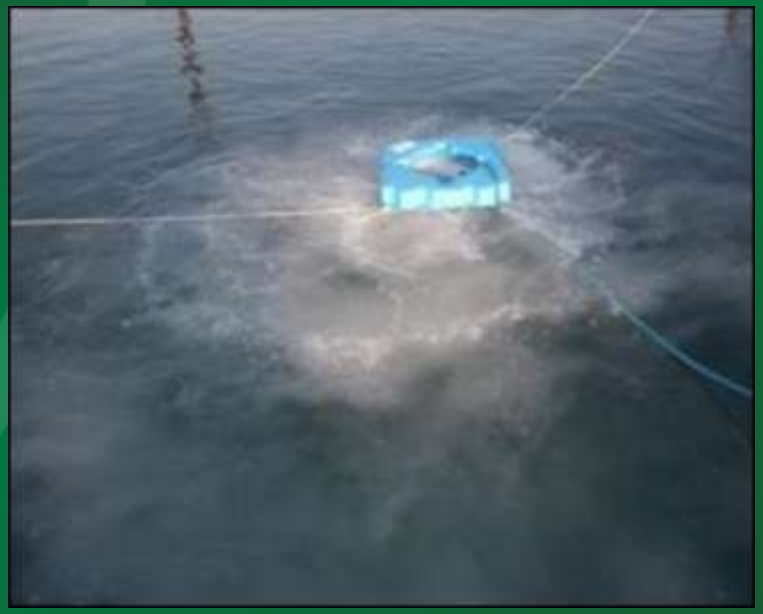
RAS consist out of the following components:

green house
Solids filter removing suspended particles
stabilize the ph and alkalinity
Reservoir & Bio filter, nitrification removing organic matter and ammonia products
Sludge removal & discharge
Temperature control (heat and cool)

# RAS System offers the following advantages:

Higher biosecurity against shrimp diseases
Higher yield, (more shrimp per volume water, higher grow rates, lower FCR, higher survival rates)
Smaller area needed for your production
Less water needed from a water source or sea
Effluent water can be reduced to a minimum
Location and climate independent
Zero water exchange during culture
Possibility of partial harvests
Full traceable end product

# RAS in shrimp culture



# RAS in shrimp culture

# Biofloc technology

- Light
- Feed
- Waste

- Aeration
  (air or pure oxigen)
- Circulation
- Turbolence

- Bacteria
- Cyanobacteria
- Green algae
- Diatoms
- Dinoflagellates

- Chemoautotrophs
  - photoautotrophs
  - heterotrophs

Complex
Dinamic
Microbial community

↓

**Bio Floc**

↓

0,1-5mm

45% proteins content

- Biosecurity
- Supplemental nutrition
- Water quality
- Water exchange ↓
- Waste managment
  - water reuse
  - waste conversion

acqua&co

# Biofloc

Waste from food, feces and urine concentrations increased ammonia, nitrite and nitrate that affect water quality in fish culture

**Nitrogen gaseous**
**$N_2$**

Bacteria convert nitrate gaseous nitrogen (*Pseudomona, Achromobacter*)

Increases nitrifying bacterial colonies that maintain water quality and together with phytoplankton and zooplankton are additional food in aquaculture farming system.

**Ammonia**
**$NH_3$-N**

**Aeration + Carbon source**
**Carbon / Nitrogen (10-20 : 1)**

**Nitrates**
**$NO_3$-N**

Bacteria convert ammonia to nitrite (*Nitrosomonas, Nitrosococcus*)

**Nitrites**
**$NO_2$-N**

Bacteria convert nitrite to nitrate (*Nitrobacter, Nitrospira*)

# MIXING and AERATION are the key factor of BFT

Keep Biofloc in suspension
Provide vertical circulation
Generate turbulence
Supply oxygen to water
Degas $CO_2$ from the water

# Biofloc

# Biofloc vertical circulation

# BFT offers the following advantages:

Higher biosecurity against shrimp diseases
Higher yield, lower FCR, higher survival rates)
Smaller area needed for your production
Less water needed from a water source or sea
Effluent water can be reduced to a minimum
Location and climate independent
Zero water exchange during culture
Possibility of partial harvests
can be indoor or out door
low cost system

Attention points:

The system is relatively advanced compared with traditional farming systems. It need a back up power supply and alarm systems
Workers need to be trained
The initial investment is relatively higher, and requires a minimum production capacity for an economical operation

# THANK YOU