



# Shrimp farming in Myanmar, Trials in Biofloc system

Soe Tun & Nyan Taw

Adelaide, Australia

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# Background

**Trials in Biofloc grow-out cultures had been done in many countries successfully. Biofloc techniques is applied in mass production of Tilapia by Yoram during 1980s and McIntosh (1999) started trials with the shrimp in Belize. Pond were redesigned for Biofloc production in Indonesia and Malyasia with success (Taw 2005, 2009, 2012, 2013)Trials with BFT were done within soft shell crab farm in Kyauk Tan – formally shrimp farming zone.**

**Myanmar have large number of extensive shrimp farms in Rakhine and delta area. But few intensive shrimp farm operate near Yangon ( Kyauk Tan ) and Ngwe Saung ( Pathein ). Myanmar has three shrimp farming zone established in 2002 and when disease and cyclone hit the industry fell apart.**

# Local environment

Myanmar is in the tropic, and tropical climate predominate.

the rainy season starts from May to August. The cold season starts September to December and the warm season started from Jan to April.

Because of the saline intrusion, Kyauk tan's salinity start to increase at December (15 nautical miles from the sea )

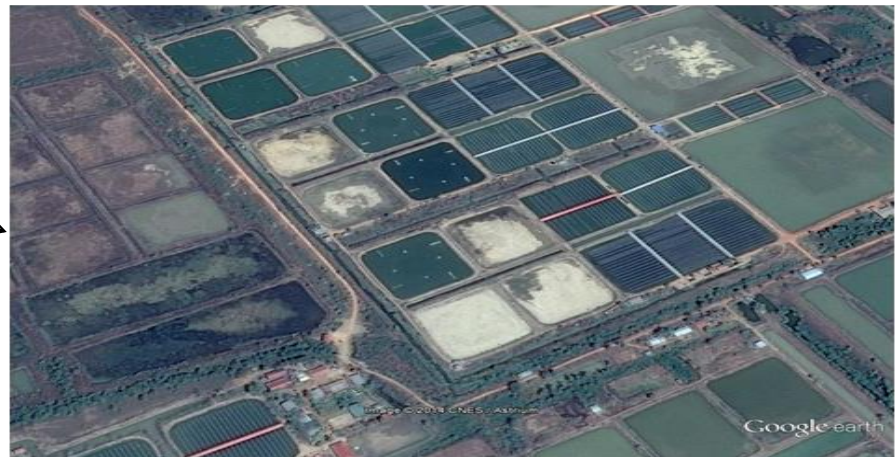
trials are carried out to see the best stocking season for production.

# Biofloc shrimp production trials within the soft shell crab farm.

- **Grow out farming was started in the earthen ponds from March to June. The stable supply of power supply in this area prompted the owners to do the trials. The area was a shrimp farming zone designated by the Government in 2001 with 22 companies working in the area. Many technicians from many countries came to work together with the local partners. Later when white spot disease hit the area many farm stopped operation.**
- **The biofloc was formed after stocking 3 to 4 weeks and the maximum volume with the Hoffman cone was was from 1.5 to 2 ml in Kyauk Tan.**
- **This is the volumn above the settled suspended sediments.**



**Kyauktan Shrimp farm Zone**



**Aung Moe Khaing Farm**

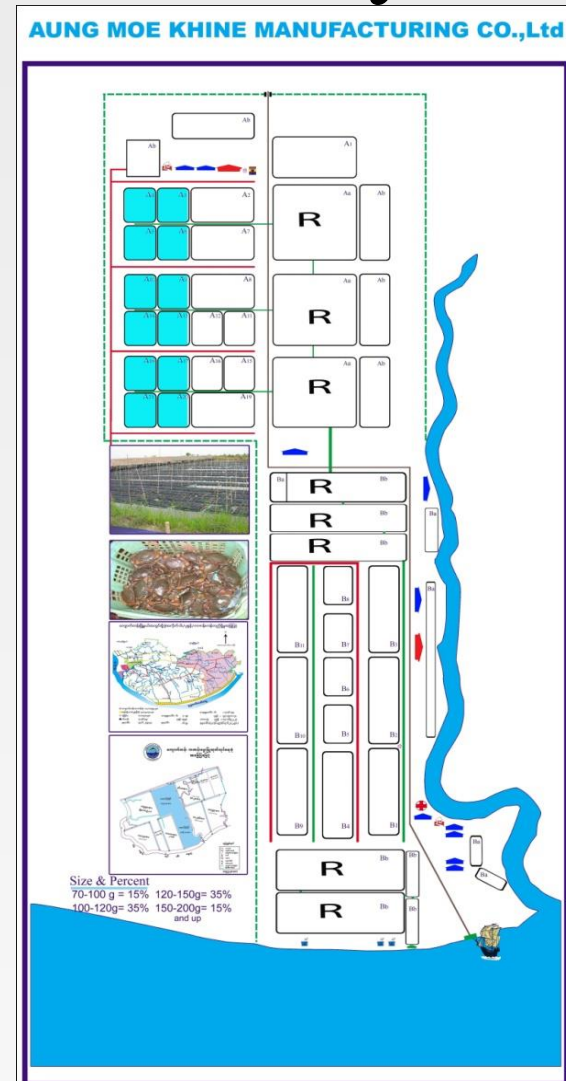
## Site Location

# Biosecurity

- Following of Taw (2013) biosecurity protocols before stocking  
Seawater through passing through 250 micron screen.
- Liming pond bank more on crab pond side
- Keeping only one entrance /exit to the farm
- Regular patrol of guards to ward off birds
- Aging
- Trichlorofon treatment in the pond and chlorine treatment in reservoir.

# Water intake and distribution system

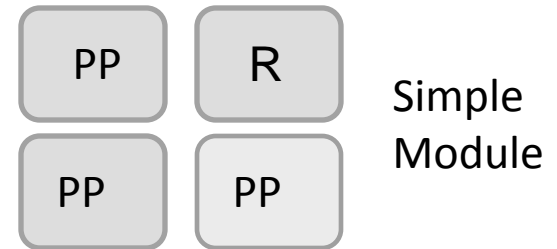
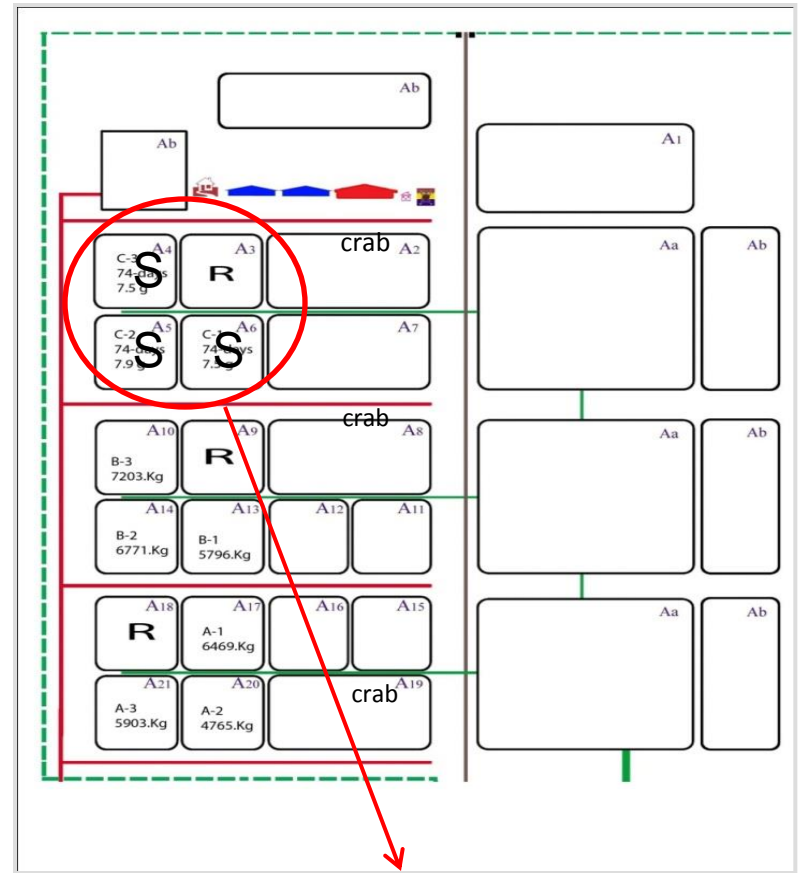
**Main pump of 20 inches diameter was used to take water from the Maw Win creek were there was Kyauk Maw Win Pagoda. The water was pump during every high tide into a series of reservoir as indicated by arrows. The water used in shrimp farming had passed through a series of 7 reservoir each with a range of 2 to 2.5 hactre. Both crab and shrimp ponds take water from these reservoir.**



# Simple modular system

Simple modular system consisting of one reservoir and 3 production .

Modular system is based on Law ( 2013 ) and followed though in operation.





# Pond preparation

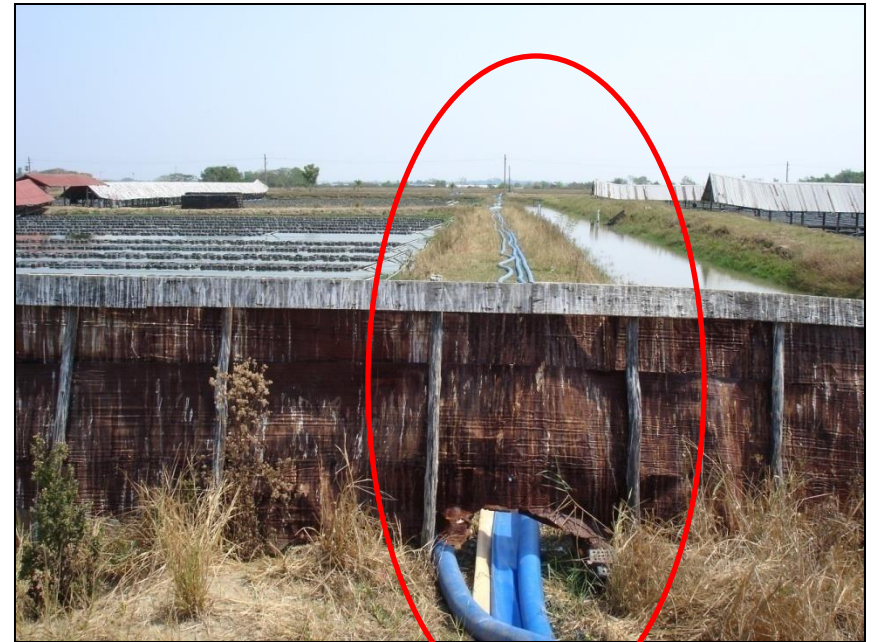
Sluice gates were packed with earth to control water loss.

Zero water exchange – only topping up.



# Water intake from the reservoir bypassing the inlet canal of the crab ponds

- There is an water intake canal but due to bio security reasons brackish water was taken using separate pipe without using the canal.
- In take canal was treated with chlorine before being filled up.



# Nursery

- Pl 6 and 7 imported from Thailand
- nursed in the indoor nursery for 10 days were stocked into ponds.





# Intake of seawater from the common reservoir - Crab & Shrimp farms



# **Trials of long arm paddle wheels in the reservoir**

- \* Paddle wheel trial performances were checked in the reservoir and water current to the front and from the back was determined**
- \* unit of 2HP paddle wheel were used for each 6,400 m<sup>2</sup> pond and their performance checked in a reservoir before used.**





# Positioning of long arm paddle wheels in the pond (2 hp eight units )



# Biofloc development in production pond

**There is a large amount of suspended sediments in the ponds as it is an earthen pond,**

**The biofloc was monitored every week.**

**Biofloc together with suspended sediments were found in the Hoffman cone**

**The sediment settled first and then the biofloc settled slowly above the sediments. This volume was measured .**

**The first biofloc was observed within 3 to 4 weeks after stocking Pls.**

**The floc volume recorded was between 1.5 to 2 ml per liter of pond water. A maximum of 5 ml was observed once only.**



# Sampling

Sampling was done every 10 days and the record was taken and feed adjusted accordingly.





# Harvesting of *Penaeus vannamei*



# Harvest and quality of white shrimp



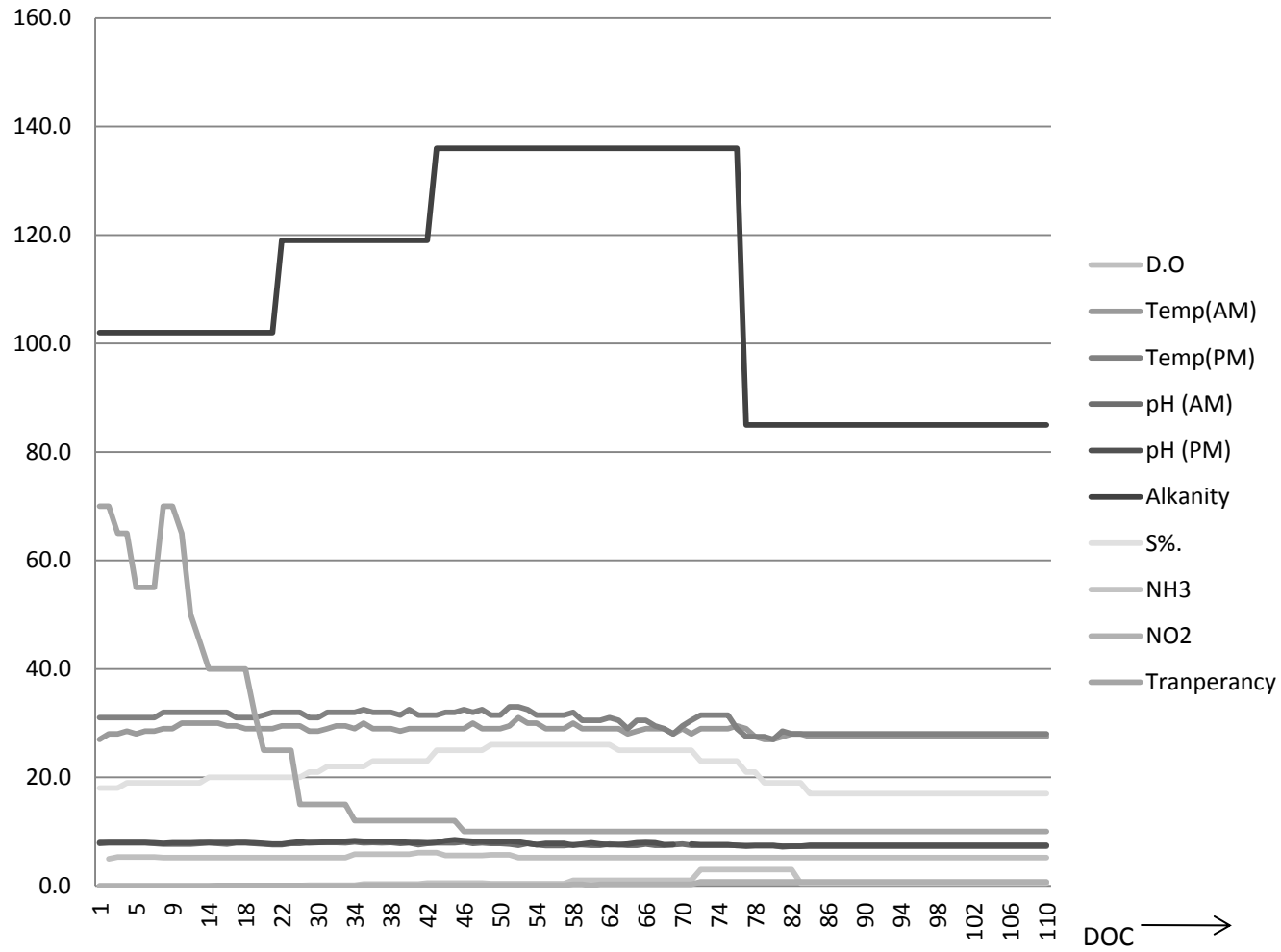


**Table 1.** Production performance of the *P. vannamei* farm trials at Kyauktan shrimp farming zone

| Pond no<br>(All of<br>6,400 m <sup>2</sup> ) | Aeration<br>energy<br>(hp) | Stocking<br>density<br>(m <sup>2</sup> ) | Survival<br>(%) | FCR*        | Partial      | Harvest |                    |            | Production<br>(kg/ha) | Carrying<br>capacity<br>(kg/hp) |
|--|----------------------------|--|-----------------|-------------|--------------|---------|--------------------|------------|-----------------------|---------------------------------|
|  |                            |  |                 |             |              | DOC     | Production<br>(kg) | MBW<br>(g) |                       |                                 |
| A 1  | 16                         | 91                                       |                 |             | 1            | 90      | 2,643              | 10.0       |                       |                                 |
|  |                            |  |                 |             | Final        | 107     | 3,826              | 14.5       |                       |                                 |
|  |                            |  | <b>90.7</b>     | <b>1.23</b> | <b>Total</b> |         | <b>6,469</b>       |            | <b>10,107.8</b>       | <b>631.8</b>                    |
| A 2  | 16                         | 83                                       |                 |             | 1            | 90      | 2,760              | 10.0       |                       |                                 |
|  |                            |  |                 |             | Final        | 102     | 2,005              | 13.0       |                       |                                 |
|  |                            |  | <b>71.2</b>     | <b>1.17</b> | <b>Total</b> |         | <b>4,765</b>       |            | <b>7,445.0</b>        | <b>465.3</b>                    |
| A 3  | 16                         | 93                                       |                 |             | 1            | 89      | 2,430              | 10.0       |                       |                                 |
|  |                            |  |                 |             | Final        | 107     | 3,451              | 14.6       |                       |                                 |
|  |                            |  | <b>82.6</b>     | <b>1.26</b> | <b>Total</b> |         | <b>5,881</b>       |            | <b>9,189.0</b>        | <b>574.2</b>                    |
| B 1  | 16                         | 98                                       |                 |             | 1            | 82      | 2,570              | 10.0       |                       |                                 |
|  |                            |  |                 |             | Final        | 97      | 3,226              | 13.5       |                       |                                 |
|  |                            |  | <b>82.3</b>     |             | <b>Total</b> |         | <b>5,796</b>       |            | <b>9,056.0</b>        | <b>566</b>                      |
| B 2  | 16                         | 95                                       |                 |             | 1            | 83      | 3,026              | 9.2        |                       |                                 |
|  |                            |  |                 |             | Final        | 110     | 3,750              | 15.0       |                       |                                 |
|  |                            |  | <b>91.2</b>     | <b>1.34</b> | <b>Total</b> |         | <b>6,776</b>       |            | <b>10,588.0</b>       | <b>661.8</b>                    |
| B 3  | 16                         | 98                                       |                 |             | 1            | 84      | 1,700              | 9.4        |                       |                                 |
|  |                            |  |                 |             | 2            | 97      | 2,328              | 12.7       |                       |                                 |
|  |                            |  |                 |             | Final        | 105     | 3,174              | 15.5       |                       |                                 |
|  |                            |  | <b>94.3</b>     | <b>1.27</b> | <b>Total</b> |         | <b>7,202</b>       |            | <b>11,253.0</b>       | <b>703.3</b>                    |

\*FCR –Feed conversion ratio

# Physico-chemical parameter of Kyauktan Shrimp farm ( March-June cycle )



# Conclusion

- Trials in Kyauk tan indicate that Semi Biofloc grow-out studies were possible in earthen ponds.
- It was found that stocking in March to June cycle seems to be the best with environment as shown by the present trial attaining good production.
- The SPF pls imported from Thailand at Pl 6 and 7 were nursed for 10 days before stocking could possibly a solution to avoid outbreak of EMS. The trial produced an average 7 tons per pond ( 9.5 Tons per hectare) in earthen pond in Biofloc technology.

# Acknowledgement

- We are deeply indebted to the owner of the soft-shell crab farm U Aung Naing for giving the land to operate and let us do the trial.
- Thanks are due to Dr Kyaw Tun Myint for financing the project with U Aung Naing and for the supply the shrimp feed.

# References

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Thank you for your attention