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### Sustainable intensive shrimp farming: Development of shrimp farm design and operation systems for possible control of shrimp diseases

The major diseases affecting the farmed shrimp industry were of bacterial origin in Asia from late 1980s. At present world-wide the appearance of various major viral diseases — such as White Spot Syndrome Virus (WSSV), Yellow Head Virus (YHV), Infectious Myonecrosis Virus (IMNV), Acute Hepatopancreatic Necrosis Syndrome AHPNS and others — led to changes in design and operation systems of shrimp farms to prevent and control disease outbreaks. The most important development in early 2000 was *L. vannamei* SPF brood stock from Hawaii. Early shrimp farming design and operation were based on simple culture ponds with water intake and waste water discharge back into the environment known as ‘single-pond base management’. In operation also to keep good pond environment the water was pumped in as required or known as ‘flow-through system’. With intensive operation system the required DO was acquired through aerators and phytoplankton (DO production cycles) in pond water. This leads to unsustainable in production due to unstable water environmental condition and environmental degeneration. Shrimp bacterial diseases such as *Vibrio spp* started to appear which a threat to shrimp farming industry was. This

forced shrimp farmers to use reservoirs to treat the water before use and some most farmers constructed waste water system to treat waste water before discharging into environment. For stable environment and prevent diseases more energy was used with less exchange of pond water which was to some extent successful. From mid-1900s the WSSV appeared in Asia. These again prompt shrimp farmers to treat incoming water and waste water before discharging into environment. Recently, due to re-appearance of WSSV and outbreaks of AHPNS (EMS) farmers were using RAS systems in small shrimp farms or in raceways systems or modular systems in large shrimp farms. Recently the environment friendly biofloc technology, Aquamincry, organic shrimp farming, etc, are being applied. However, the important factor for sustainable production was the farm biosecurity to control or prevent from shrimp disease entering hatchery or farm facilities. In any aquaculture business, sustainability of a system can improve profits. What investors, shrimp farmers and technicians need to be aware of is that, whatever waste is discharged into the environment, it will likely come back to you in the form of disease sooner or later.

#### Biography

Nyan Taw received his PhD in marine biology from the University of Tasmania, Australia under Colombo Plan Fellowship. On his return he rejoined as assistant lecture at Rangoon Arts and Science University. Later he joined Fisheries Corporation to head the R&D department. In 1983, he became project manager for ADB Inland Fisheries Development Project and technical counter-part for JICA projects in Myanmar. In 1988, he joined the FAO of the UN and served in aquaculture projects in Indonesia, Vietnam and the Philippines culminating the position of chief technical advisor. He had supervised 13 master's theses for Zoology Department, Rangoon University and also published a book entitled ‘Prawn Culture in Burma’ in 1984. He has published and presented over 80 papers and co-authored a chapter in the book by Yoram Avnimelech on Biofloc Technology: A Practical Guidebook (2012 & 2014).

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