SESSION 4:
SMART FEED MANAGEMENT

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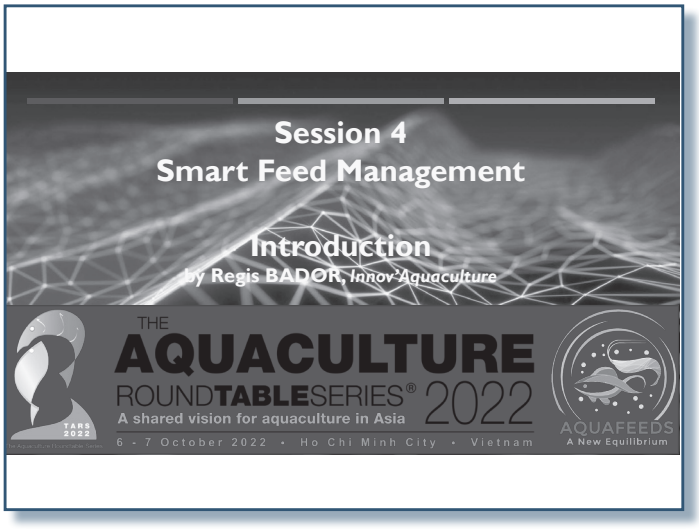
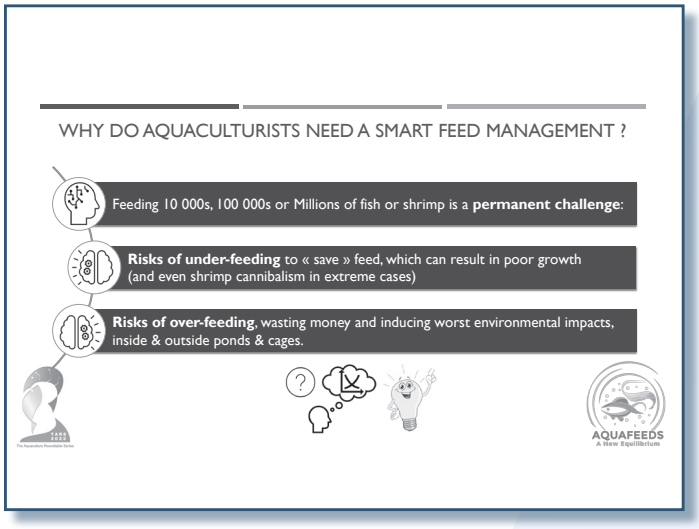
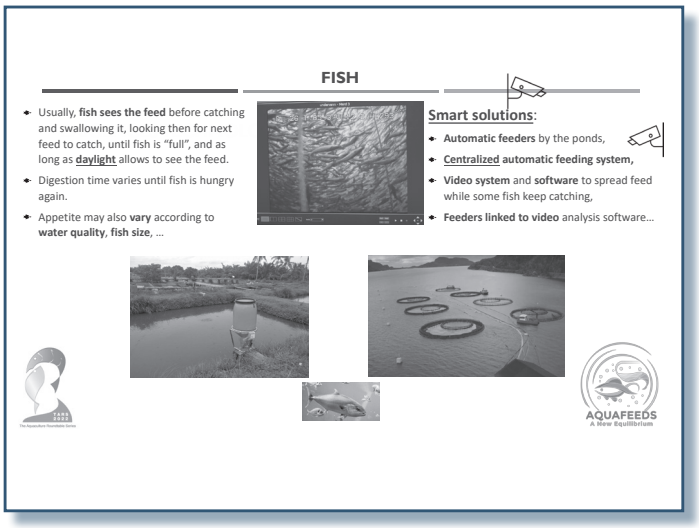
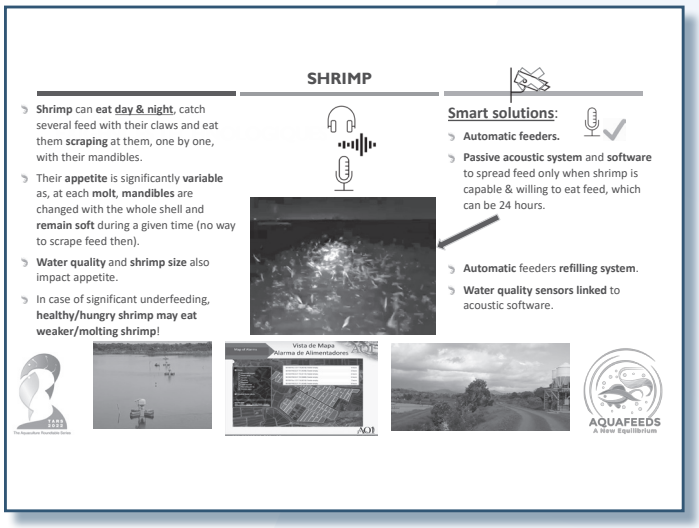
Introduction









Session 4
Smart Feed Management

Introduction

by Regis BADOR, *Innov'Aquaculture*

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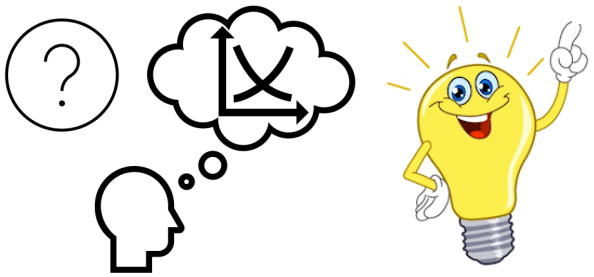
WHY DO AQUACULTURISTS NEED A SMART FEED MANAGEMENT ?

Feeding 10 000s, 100 000s or Millions of fish or shrimp is a **permanent challenge**:

Risks of under-feeding to « save » feed, which can result in poor growth (and even shrimp cannibalism in extreme cases)

Risks of over-feeding, wasting money and inducing worst environmental impacts, inside & outside ponds & cages.



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FISH

- Usually, **fish sees the feed** before catching and swallowing it, looking then for next feed to catch, until fish is “full”, and as long as **daylight** allows to see the feed.
- Digestion time varies until fish is hungry again.
- Appetite may also **vary** according to **water quality**, **fish size**, …

Smart solutions:

- **Automatic feeders** by the ponds,
- **Centralized automatic feeding system,**
- **Video system** and **software** to spread feed while some fish keep catching,
- **Feeders linked to video** analysis software…

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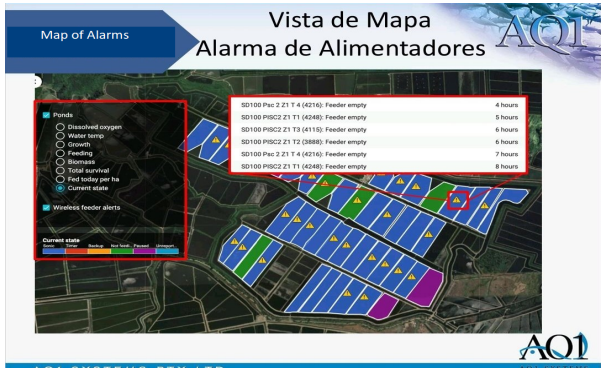
SHRIMP

- **Shrimp** can **eat <u>day & night</u>**, catch several feed with their claws and eat them **scraping** at them, one by one, with their mandibles.
- Their **appetite** is significantly **variable** as, at each **molt**, **mandibles** are changed with the whole shell and **remain soft** during a given time (no way to scrape feed then).
- **Water quality** and **shrimp size** also impact appetite.
- In case of significant underfeeding, **healthy/hungry shrimp may eat weaker/molting shrimp**!

<u>Smart solutions</u>:

- **Automatic feeders.**
- **Passive acoustic system** and **software** to spread feed only when shrimp is capable & willing to eat feed, which can be 24 hours.
- **Automatic** feeders **refilling system**.
- **Water quality sensors linked** to acoustic software.



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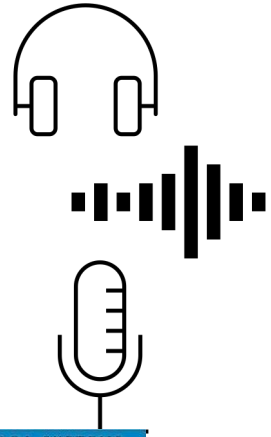
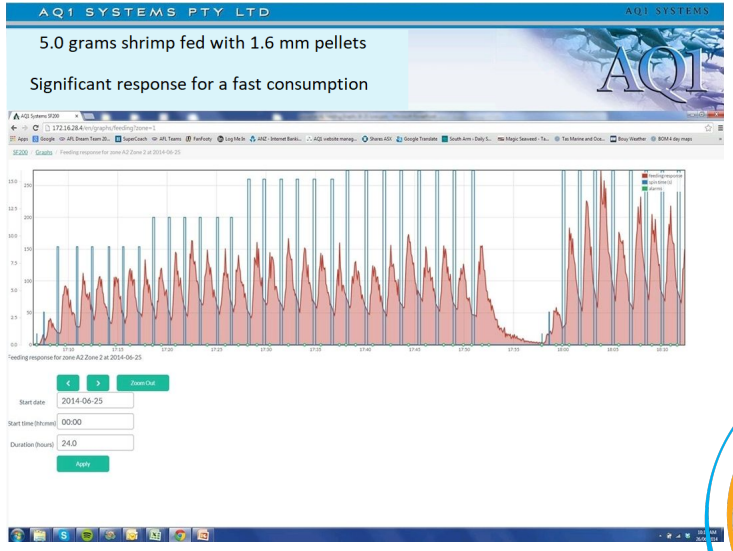
SHRIMP

- So far, the major **GAME CHANGER** has been the **passive acoustic** feeding system developed by **AQ1 Systems**
- **Developed & real-size tested in the 2012-13 years**
- **Booming development from 2014-15**



Smart solutions:

- **Automatic feeders.**
- **Passive acoustic system** and **software** to spread feed only when shrimp is capable & willing to eat feed, which can be 24 hours.
- **Water quality sensors linked** to acoustic software.
- **Automatic aerator management**



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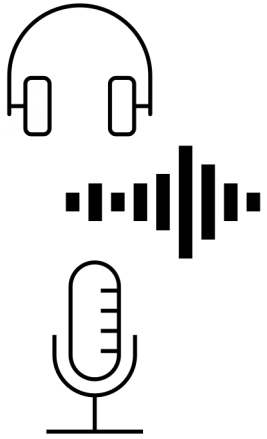
SHRIMP

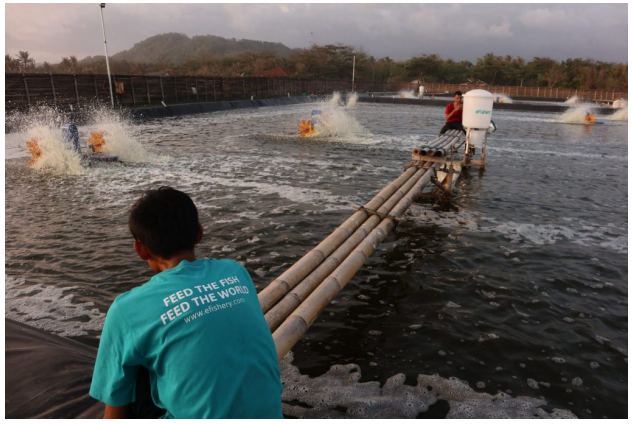
- So far, the major **GAME CHANGER** has been the **passive acoustic** feeding system developed by **AQ1 Systems**
- **Developed & real-size tested in the 2012-14 years**
- **Booming development from 2015**
- **Multiple competitors** have been struggling **to emerge but do…**



Smart solutions:

- **Automatic feeders.**
- **Passive acoustic system** and **software**.
- **Automatic** feeders **refilling system**.
- **Water quality sensors**
- Automatic **aerator management**

Mobile app, etc…



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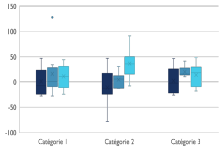
Nowadays, those smart solutions may look **insufficient** and **new developments are booming**:

- Smart **linkage** of feed spreading **to water quality variations,**
- Smart data analysis to **model feeding behavior** and anticipate needs,
- Smart **adaptivity of feed spreading** to independent parameters:

  - **Fish** live **behavior video analysis,**
  - **Fish size measurement** through live **video analysis,**
  - **Shrimp biomass estimation** through passive or active **acoustic monitoring,**
  - **Multiple** water quality **connected sensors,**
  - **Satellite** image analysis,
  - **Artificial Intelligence**,
  - ***etc...***



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Who will be the next GAME CHANGER(S)?

Let's listen to the coming Speakers & debate afterwards

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