The potential of integrating science with aquaculture for human health in Kenya

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Inspiring Innovation and Leadership

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Background

- Biotechnology based aquaculture not fully adopted

1. improvement of fish breeds for fast growth/high stocking density
2. biological improvement of fish food
3. accumulation of macro-nutrients
4. fish diseases

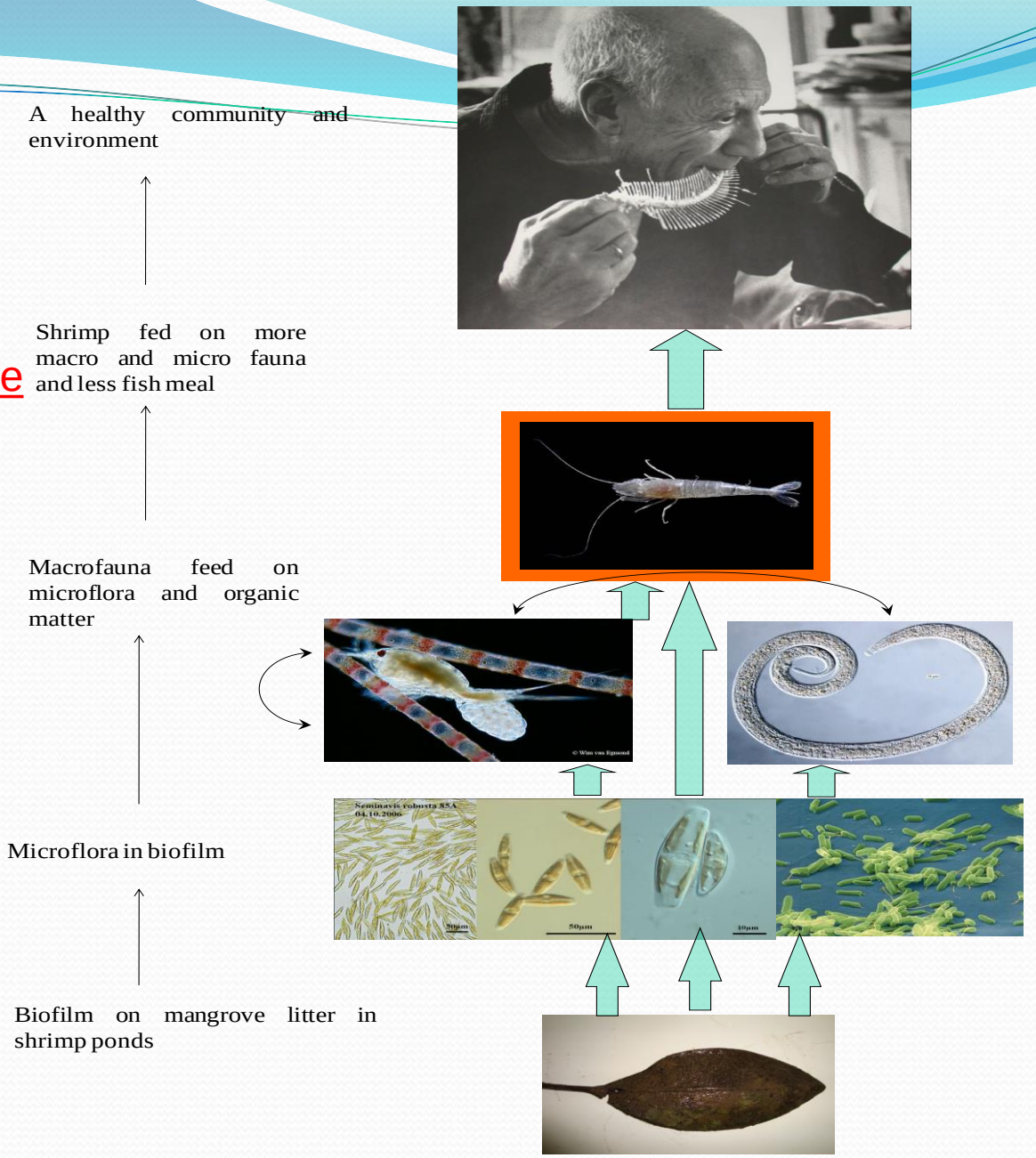
Researchable areas

1. Salinity/temperature tolerant fish breeds (estuaries and cold zones)
2. Bio-accumulate macro-nutrients in fish tissue for improved health and nutrition for consumers
3. Affordable and ecologically clean quality fish food,
4. Efficient fish production systems- high stocking density

concept

Cost effective/Ecological safe

Farming up the food chain, integrating with nature, Livestock & agriculture,

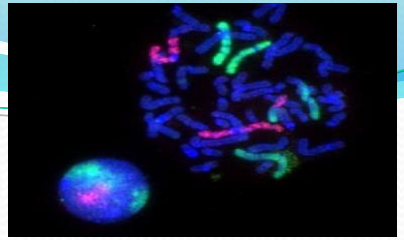


Concept of farming up the food chain in promoting biological shrimp aquaculture

Strategy

Bio-accumulation of macro-nutrients in young fish

Strategy



EPIFLOURESCENCE MICROSCOPY
Bacterial abundance

Shrimps foraging on decomposing mangrove litter and periphytic biofilm

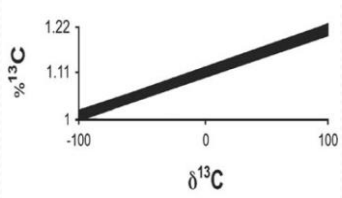
Mangrove litter

Periphytic biofilm

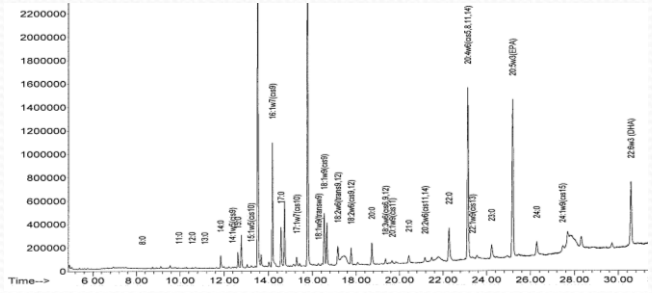
DNA:PCR - DGGE
Bacterial diversity

Shrimps foraging in the open sea

Shrimp tissue

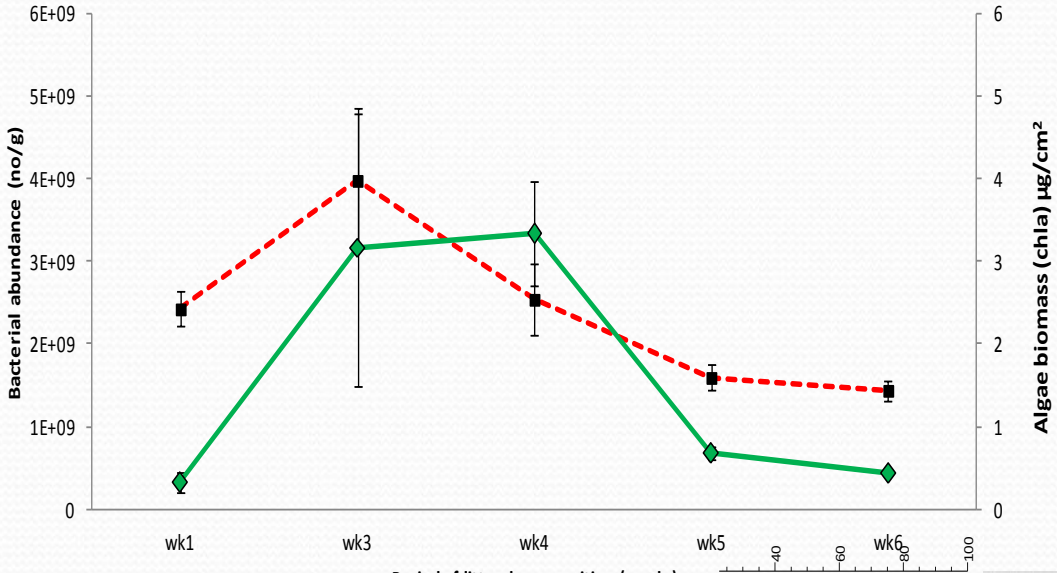


STABLE ISOTOPE
Possible natural feed sources



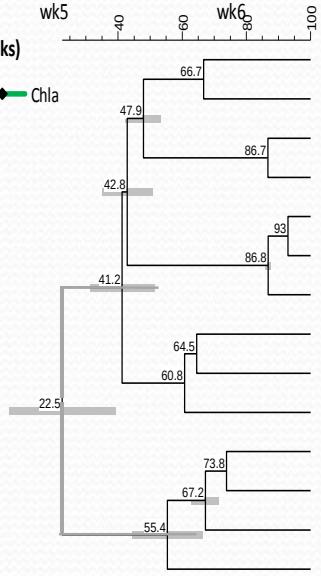
FATTY ACID PROFILE
PUFA, EPA, DHA , omega 3
Nutritive value of natural feed

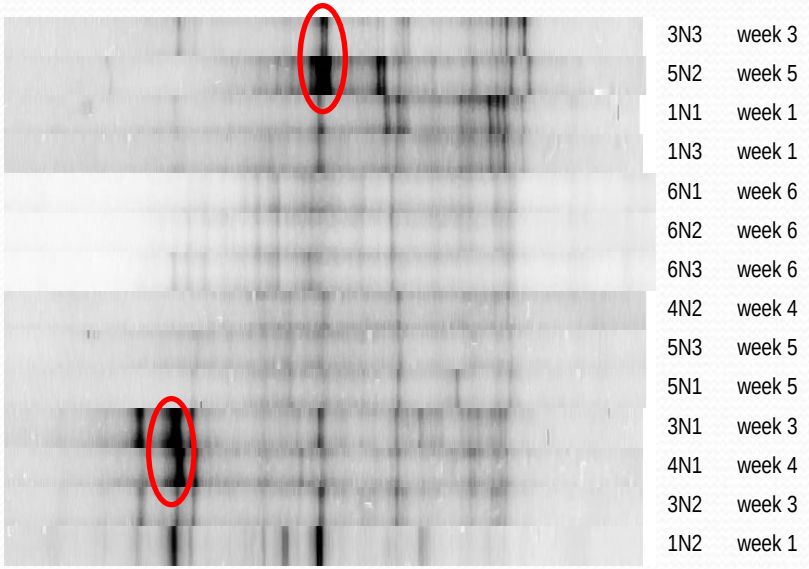
Strategy



Timeline setting

High Bacterial abundance / Distinct diversity btn wk3&5

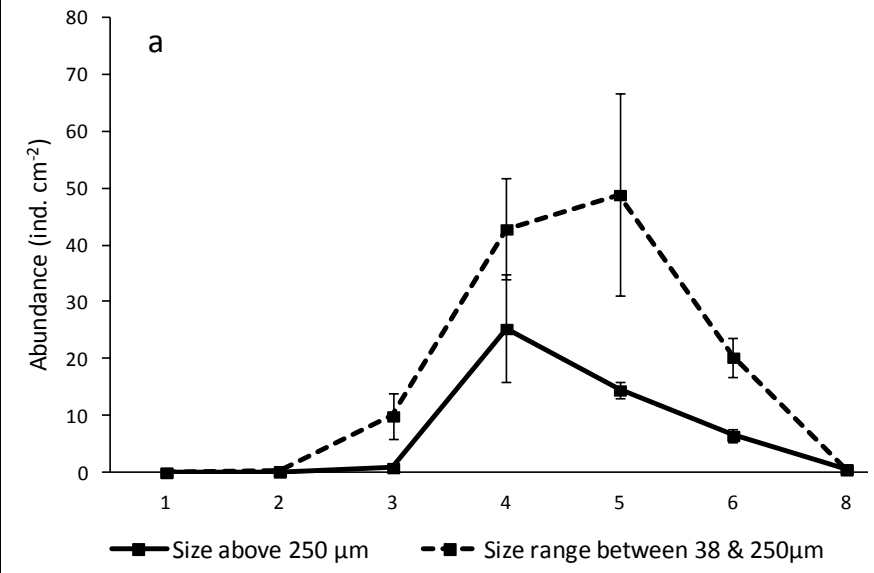


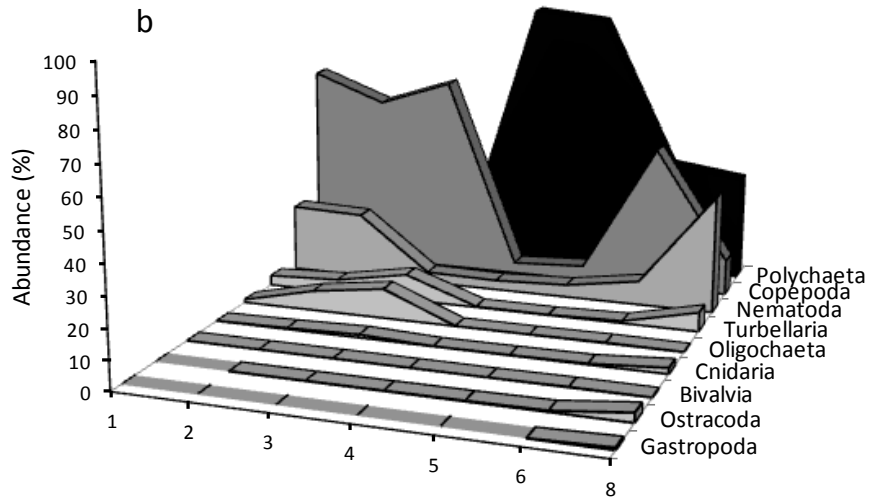


Strategy

Timeline setting

High abundance of epifauna (btn wk3&5)





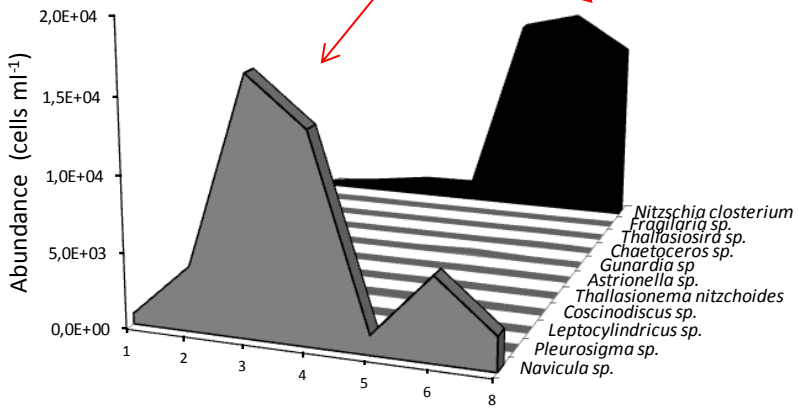
Duration of litter decomposition (weeks)

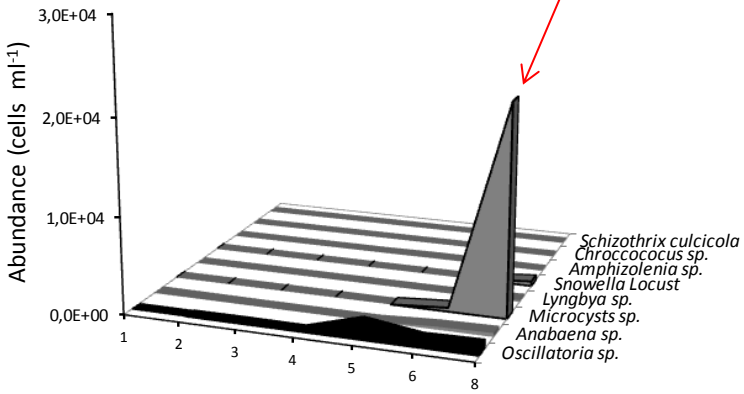
Strategy

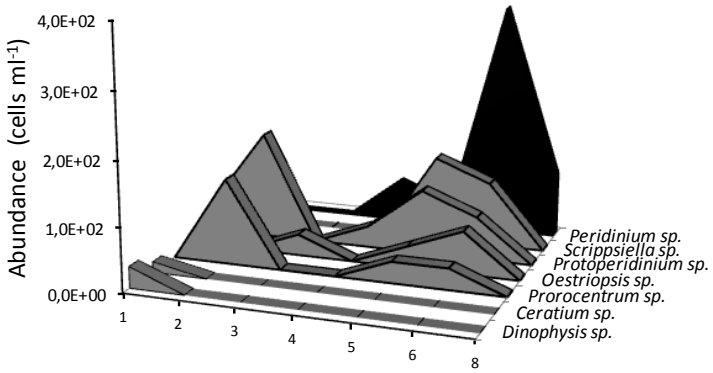
Timeline setting

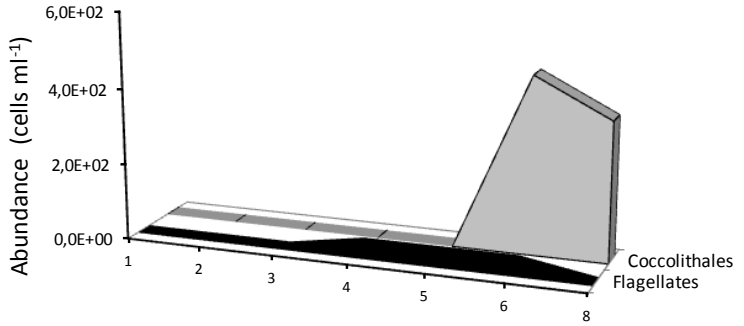
High abundance of fish diet quality micro-algae (diatoms) (btn wk3&5)

Cyanobacteria bloom >wk5





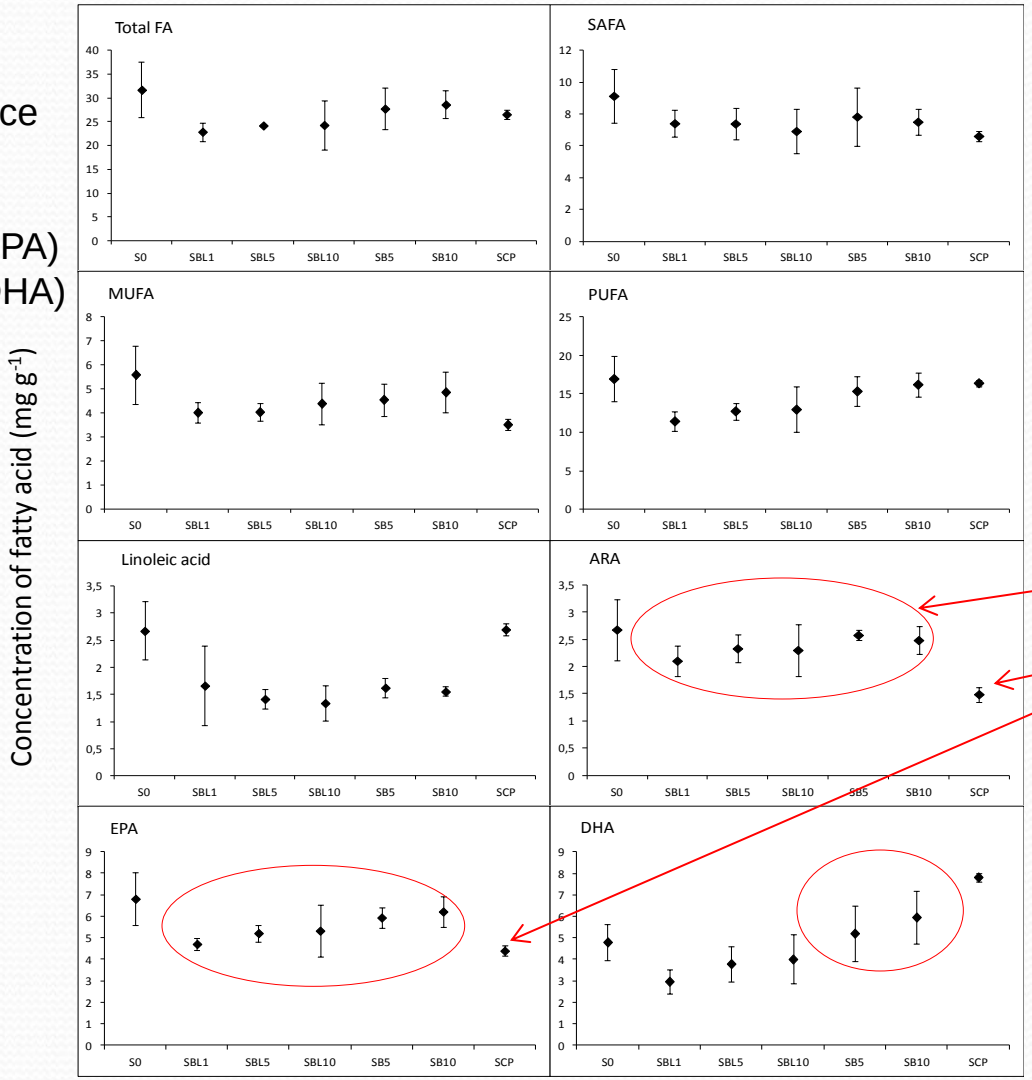




Duration of leaf litter decomposition in weeks

Bio-accumulation of macro-nutrients in young fish

Biofilm is a potential source of essential FA
arachidonic acid (ARA),
eicosapentaenoic acid (EPA)
docosahexaenoic acid (DHA)



Marine Biofilm

Commercial food

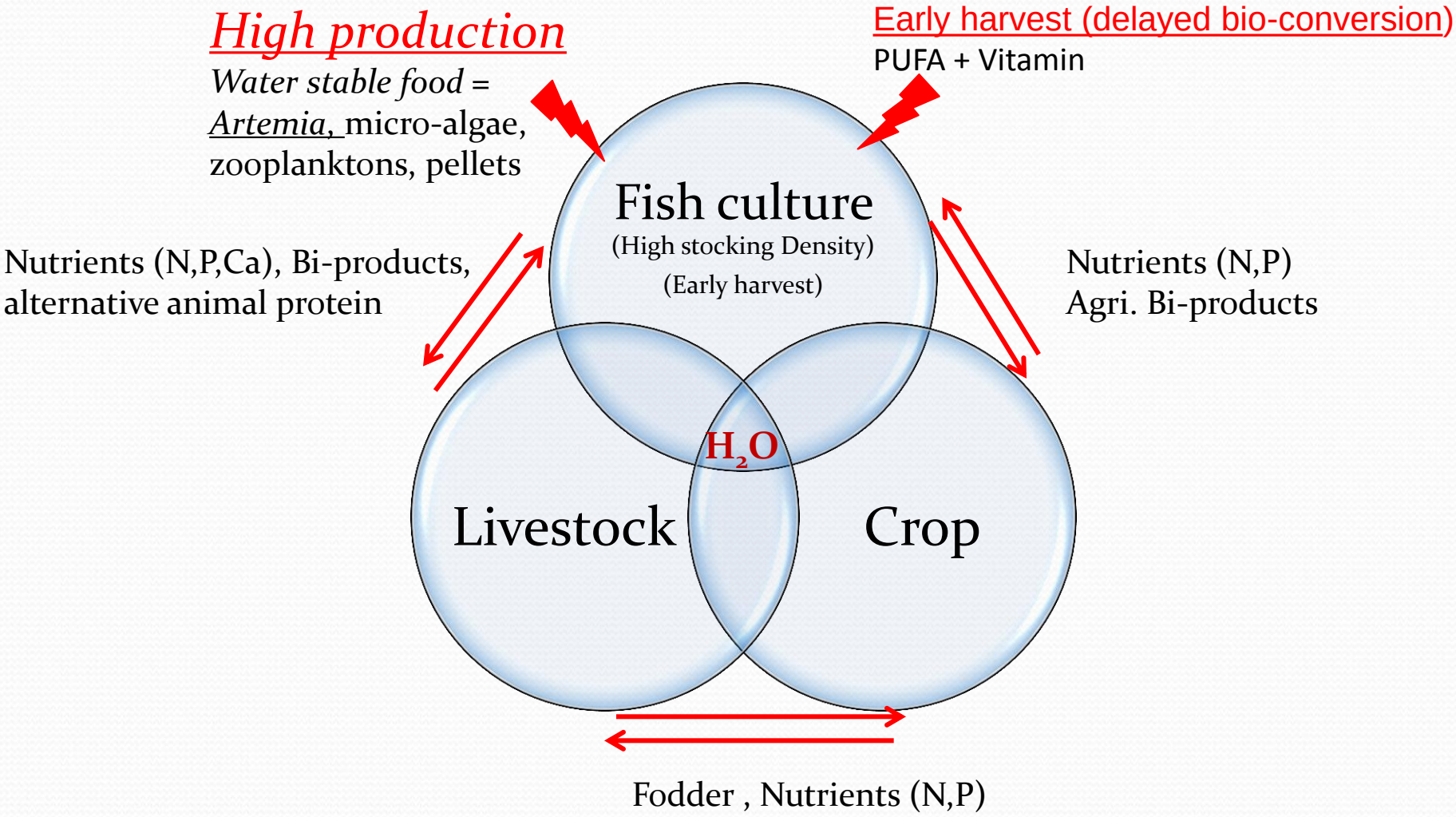
Bio-accumulation of macro-nutrients in young fish

PUFA fortified Caridina, polychaete, diatom rich biofilm derived food – hatchery/nursery culture of shrimp/fish

PUFA, Biofilm

Bio-accumulation of macro-nutrients in young fish

- Application (Climate change resilient Macro-nutrient fortified fish)



Color enhancers in Trout and Ornamental fish (NRS/SPAS)

Present use

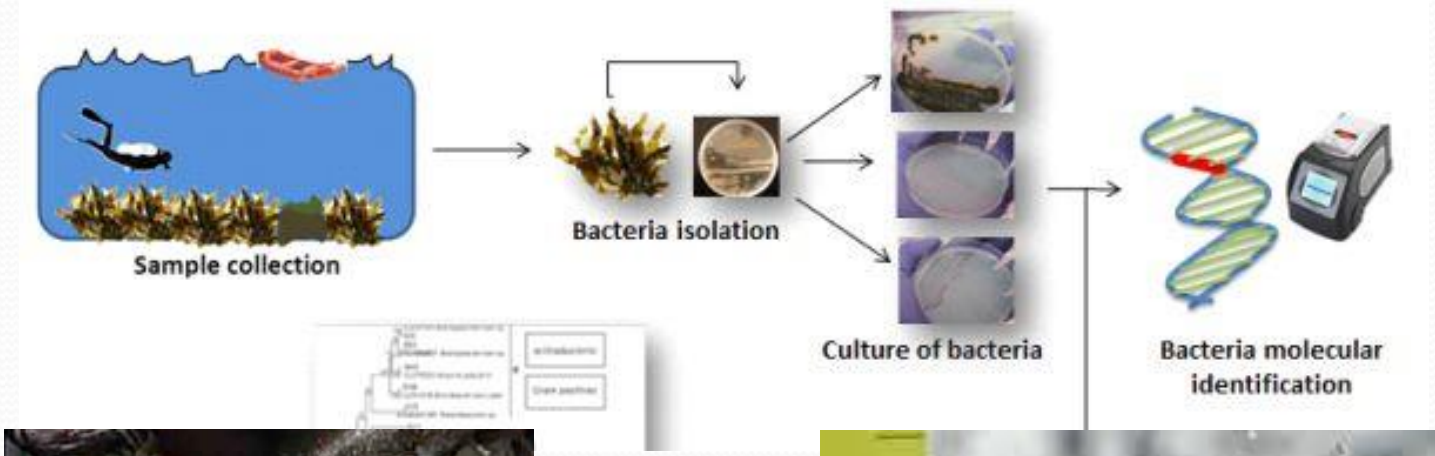
Potential

Phycocyanin/phycoerythrin

Rainbow Trout

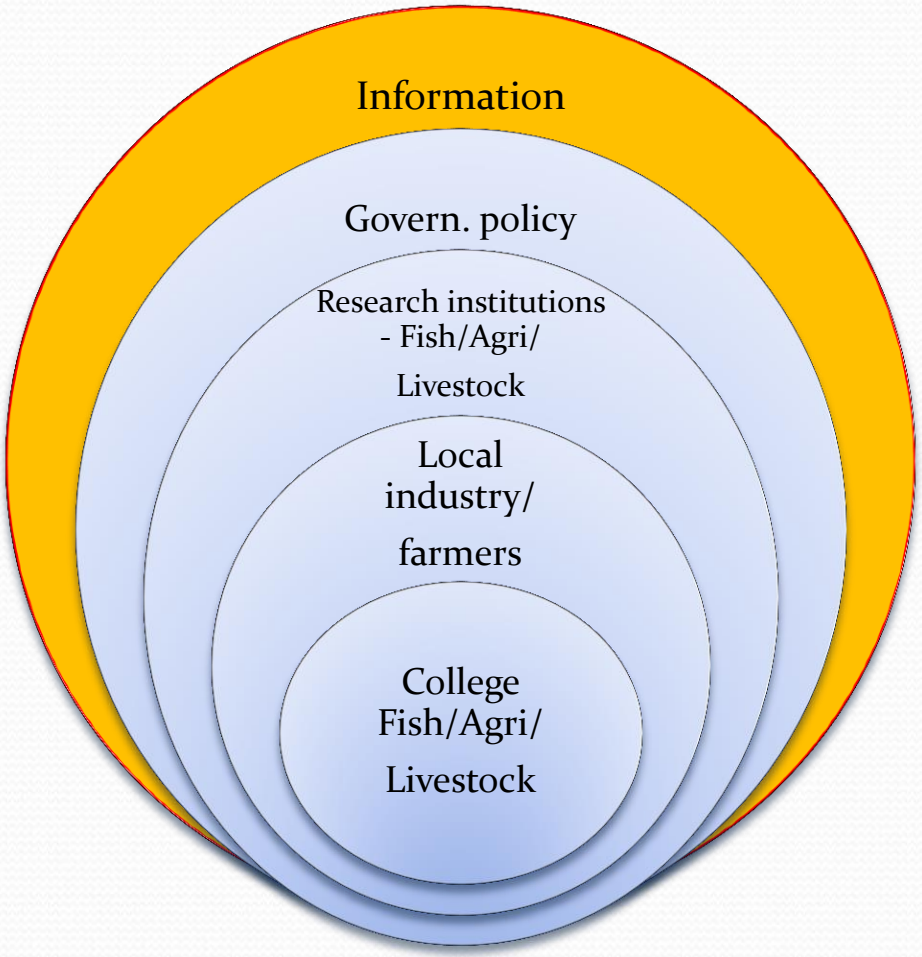
Goldfish/koi carps

Anti-bacteria/fungal compounds from algae/herbs – hatcheries – avoid use of antibiotics (NRS/SPAS)



Strategy

Technology and capacity building



Thank you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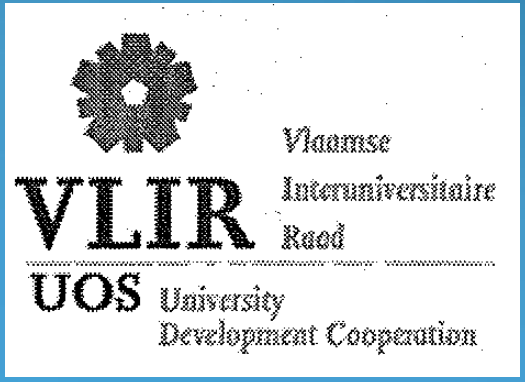
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