

Animal Health & Welfare

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- PRESENTER HAMISH RODGER | FISH VET GROUP
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GLOBAL OUTLOOK FOR AQUACULTURE LEADERSHIP

GUANGZHOU, CHINA | DAY 1

HEALTHY FISH | HEALTHY PEOPLE | HEALTHY PLANET

Dr. Hamish Rodger



- Dr. Hamish Rodger graduated from the University of Glasgow Veterinary School in 1984 and has worked as an aquatic animal veterinarian for more than 20 years, in addition to working in general land animal practice.
- He has a masters in aquatic veterinary medicine from the Institute of Aquaculture, University of Stirling, Scotland, and also completed his Ph.D. on the EBS virus of salmonids in 1997.
- He is founder and principal of the Ireland-based veterinary aquatic animal practice Vet-Aqua International and is a past president of the Fish Veterinary Society, a division of the British Veterinary Association.
- Rodger is registered with the Royal College of Veterinary Surgeons in the United Kingdom

PROGRESS ON SEA LICE CONTROL IN SALMON & STREPTOCOCCOSIS IN TILAPIA

Hamish Rodger

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www.fishvetgroup.com
www.benchmarkplc.com



Benchmark
Holdings

Outline

- Sea lice in salmon farming
- Progress on control
- Streptococcosis in tilapia
- Progress on control





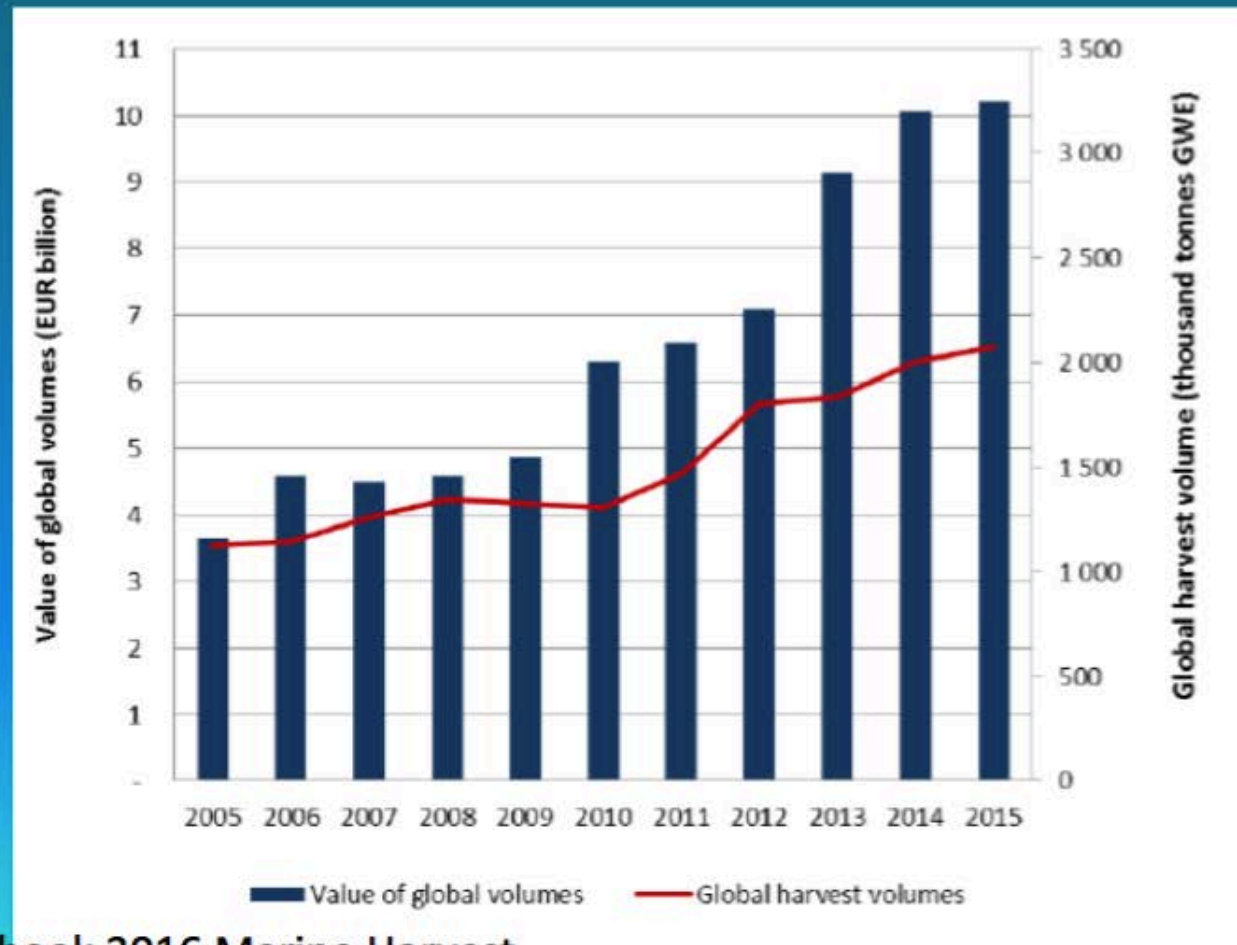
BENCHMARK & FISH VET GROUP

Our Locations



Global salmon farming production & value

- 2.2 million tonnes (2015)
- 10.2 billion euro (2015) (USD \$11.4 billion)



Nauplii of *L. salmonis*

Sea lice remain the most serious threat to salmon farms in majority of Northern hemisphere

Sea lice (*L. salmonis* & *Caligus* spp.)

- Highly successful parasite
- Skin damage, osmoregulatory failure, mortality
- Increased susceptibility to other disease
- Egg to adult (4 to 6 weeks)
- One adult female (1000 eggs/batch & 6 to 11 batches in 7 months)



Caligus elongatus

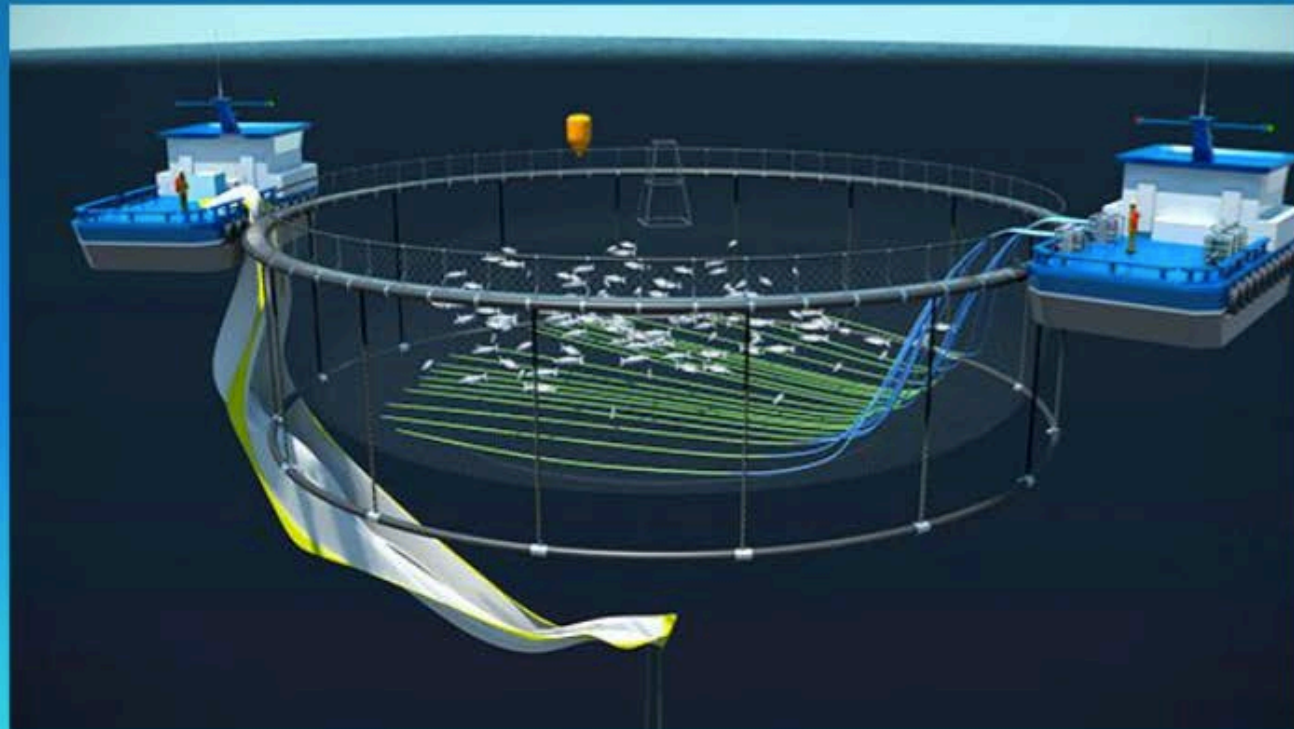
Current sea lice control

- Chemotherapy
- Management (fallowing, single year class/bay, monitoring, trigger levels & pen level action) (Codes of Good Practice)
- Cleaner fish (25 million fish 2015)
- Non-medicinal treatments (pressure, temperature, freshwater, etc.)
- Others (depth, fine mesh, lasers, etc.)
- Functional feed
- Genetic selection
- Combinations of the above



Chemotherapy challenges

- Multiresistant lice in some regions (treatment selects for resistance)
- Bath treatment related mortalities
- Discharge consents
- Residues



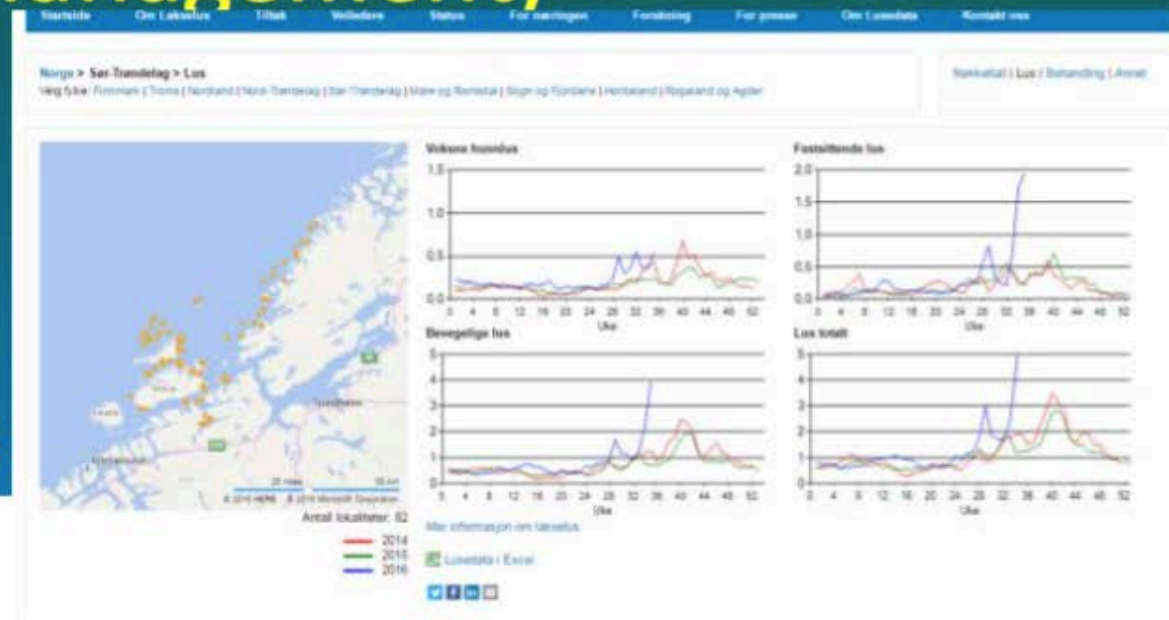
Management (area based management)

Norway

www.lusedata.no

Scotland

www.scottishsalmon.co.uk



However lice management not just about health management: also public, media, political and retail expectations and communication.

Cleaner fish - wrasse

- Wrasse
 - Wild capture
 - Farming
 - Juvenile survival rates
 - Diseases
 - Welfare



Cleaner fish - lumpfish

- Lumpfish
 - Survival rates in pens
 - Diseases
 - Farming
 - Welfare



Non-medicinal treatment

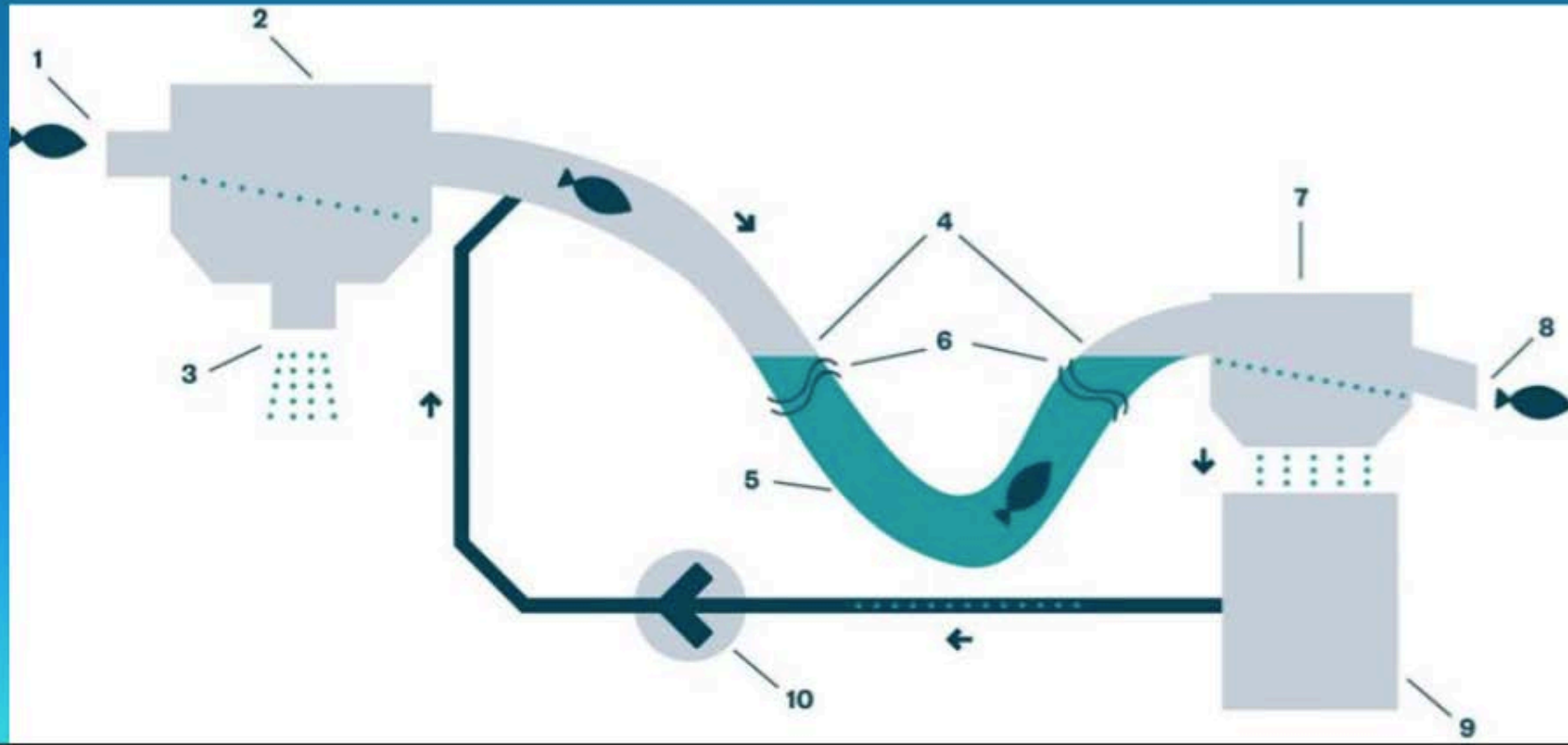
Pressure (water e.g. Skamik, Hydrolicer)



Heat e.g. Thermolicer, Optilicer



Thermolicer:
30 to 33.5°C for 25
to 30 seconds



Desalination vessels and units (for freshwater treatments)



One hour freshwater kills lice copepodite stage.



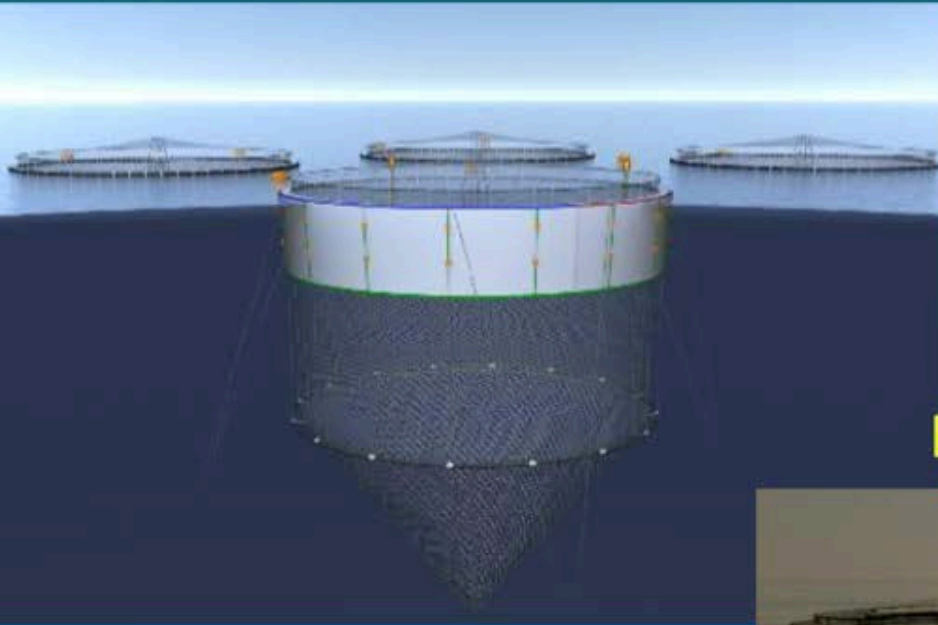
Non-medicinal lice therapy challenges

- Stress and trauma
- Robustness of fish?
- Sub-clinical gill disease, myopathies give rise to mortality during treatment



Other engineering solutions

Fine mesh skirt for surface 5 to 10m



Electrical mesh, lasers, Helixer, etc.

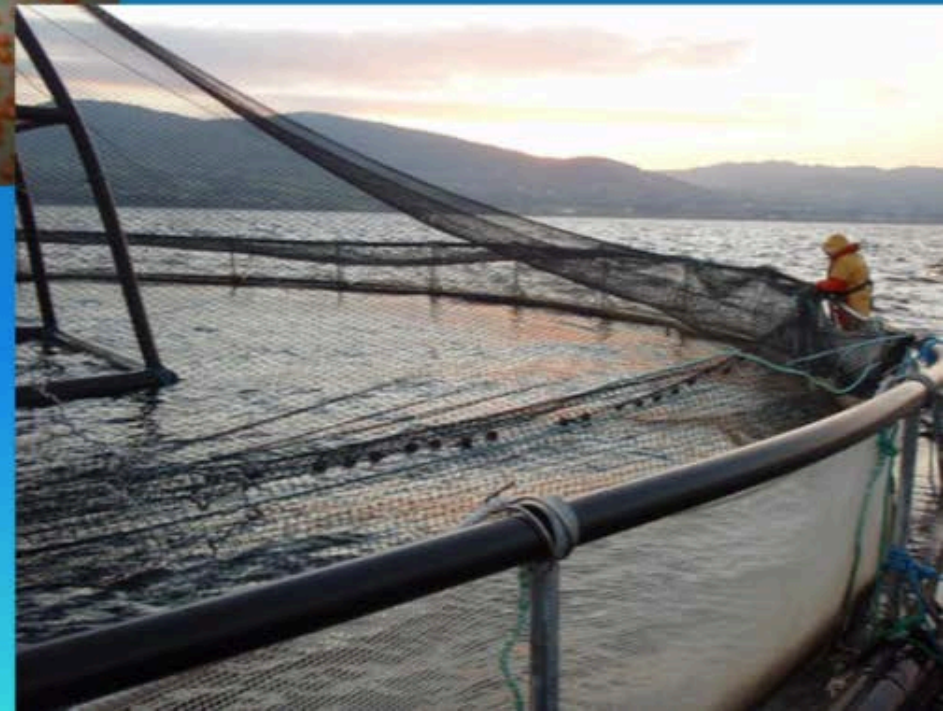


Breeding, genetics & nutrition

Genomic selection (coupled with family performance)



Functional feed (to reduce attachment of juveniles)



Modification of behaviour/environment

- Swimming depth
- Swimming speed
(current speeds)
- Jumping behaviour
- Feeding depth
(snorkel pen, IMR,
Bergen)



Streptococcosis in tilapia

- Tilapia farming \$5 billion global value
- Bacterial infection with *Streptococcus* sp. major challenge
- *S. iniae*
- *S. agalactiae*
(biotypes I & II)



Control of streptococcosis - historical

- Medical (antibiotics)
- Vaccines (injection)
- Management (reduce stress, reduce feed, stable environment [oxygen, temperature], reduce stocking density)
- All of above have challenges



Control of streptococcosis - progress

- Probiotics (*Bacillus* spp.) & nutrition
- Genetic selection (tolerance)
- Biosecurity (SPF broodstock)
- Improved vaccines (best practice)

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Controlled challenge experiment demonstrates substantial additive genetic variation in resistance of Nile tilapia (*Oreochromis niloticus*) to *Streptococcus iniae*

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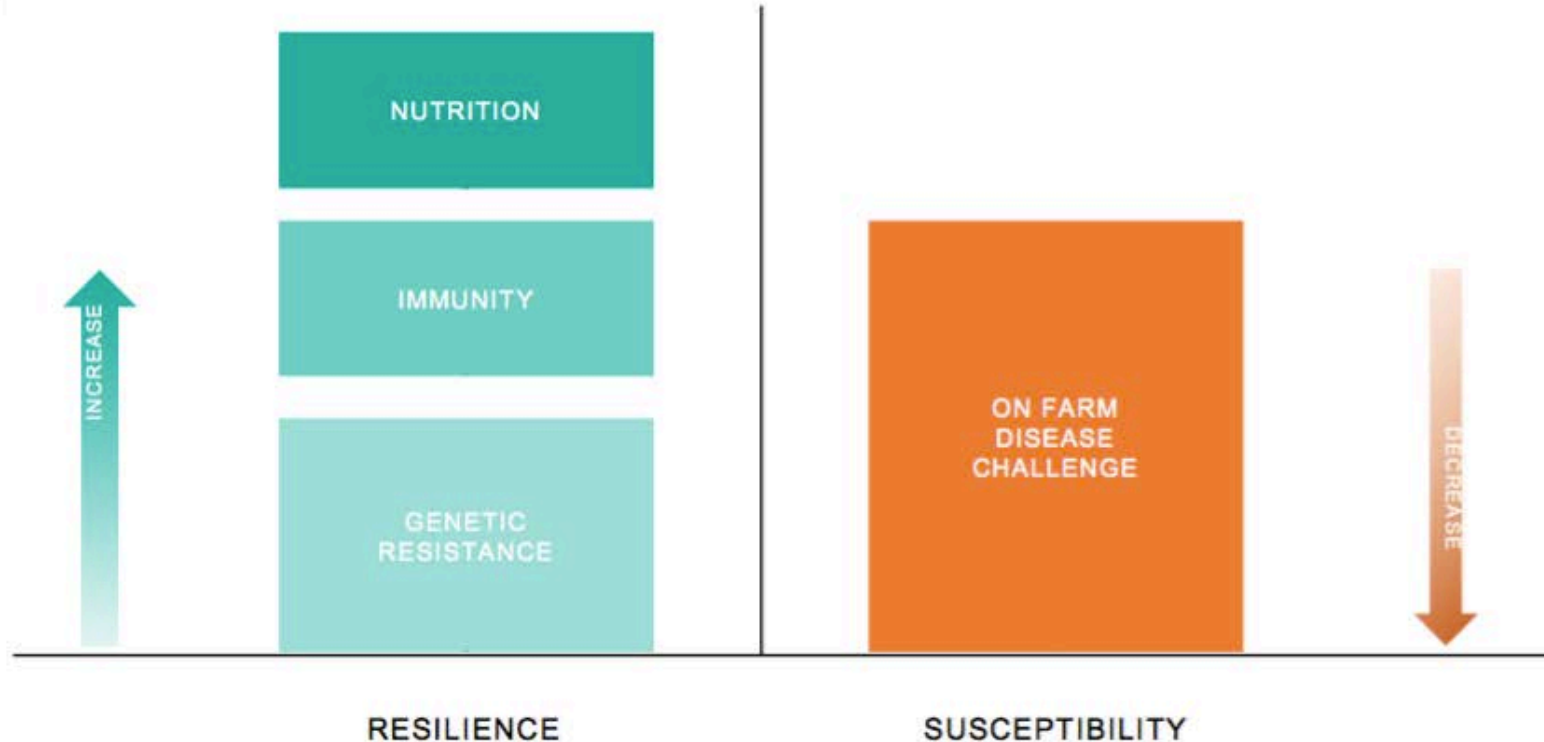
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BALANCED HEALTH: BENCHMARK'S APPROACH



Building immunity

- Natural immunity through optimal environment and stress management
- Concurrent disease management
- Vaccine research and development programmes

Building resilience

- Specific genetic programmes to establish disease resistance
- Genetic programmes to improve robustness
- Optimising animal husbandry and management
- Life stage optimal nutrition

Reducing disease challenge

- Clinical and diagnostic services
- Disease specific pharmaceutical treatments
- Biological disease control measures
- Biosecurity, management and husbandry programmes
- Monitoring and data analysis

Knowledge gaps & challenges

- Sea lice
 - How to improve fish robustness?
 - Improved welfare of fish at crowding, movement
 - Cleaner fish health & welfare
- Streptococcosis in tilapia
 - Best practice for different systems (RAS, flow-through, extensive)
 - Vertical transmission (Pradeep et al. 2016)
 - Functional feed

Summary

- Sea lice continues to be a major challenge
- Engineering, genetic and biological control methods work
- Management and integrated sea lice management required on area and site basis
- Streptococcosis significant challenge to tilapia farming
- Improved biosecurity, genetics, nutrition and management coupled with vaccination will be successful

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