

An aerial photograph of a large-scale aquaculture operation, likely salmon farming, set against a dramatic sunset sky. The water is a deep blue, and the sky transitions from a bright orange near the horizon to a darker, cloudy blue at the top. Several long, parallel wooden piers extend across the water, each supporting a series of large, arched metal cages. A larger, more complex structure with lights is visible on the left side of the frame.

PHARMAQ part of Zoetis

Improving sustainability, food safety and profit by the use of fish vaccines

About PHARMAQ part of Zoetis

PHARMAQ is the global leader in fish health and vaccines, dedicated to support sustainable growth in the global aquaculture industry. PHARMAQ is part of Zoetis, the world leader in animal health. Our innovative fish health solutions include PHARMAQ fish vaccines and therapeutics, PHARMAQ Fishteq vaccination machines and service, and PHARMAQ Analytiq research and analysis.

PHARMAQ part of Zoetis



PHARMAQ's research and production facilities are based in Norway, with global operations in commercial fish farming markets.

300

Dedicated employees



More than

30

years of



R&D on fish health and vaccines

Globally

7 of 10


Farmed salmon are vaccinated with a PHARMAQ product

We provide

Vaccines
Therapeutics
Biodevices
Diagnostics
Training
Services

Continuum of Care

-Supporting those who raise and care for fish



PHARMAQ Analytiq

Focused research, targeted analysis and innovative fish health solutions



PHARMAQ

Research, development and manufacturing of vaccines and therapeutics for aquaculture



PHARMAQ Fishteq

High quality vaccination machinery and vaccination services



Research, development and manufacturing of vaccines and therapeutics for fish

Norway, Nordic, Chile, UK, Canada, Faroes



Atlantic Salmon
Rainbow trout
Coho Salmon
Cleaner fish

Mediterranean



Sea Bass
Sea Bream

Vietnam



Pangasius

Brazil, China, Indonesia, Latin America



Tilapia

 = Developed markets

 = Emerging markets

~30
larger players



thousands of smaller farms

We have
25

antigens



in our portfolio

Supporting

8

species



innovating to support
new species and
markets

Our

35

fish vaccines



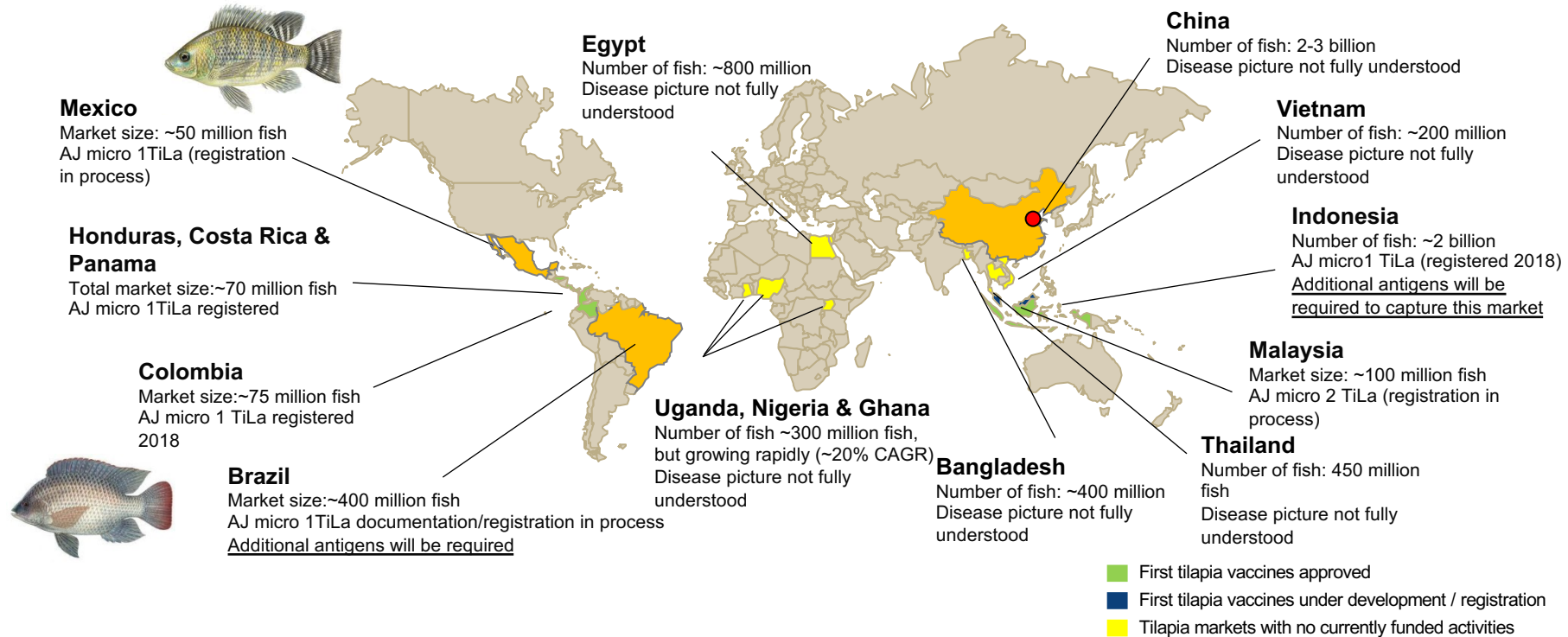
are custom made
with local strains
and local antigens



Our approach:
Hands-on problem
solving knowledge
and expertise

Tilapia vaccine program

- Key strategic objective to take **leadership** in tilapia vaccines
- Some tilapia disease are **global**
- Addressable market much smaller than total production and varies greatly between countries
- Indicative dose price tolerance \$0.02 - \$0.04 (for export market fish)

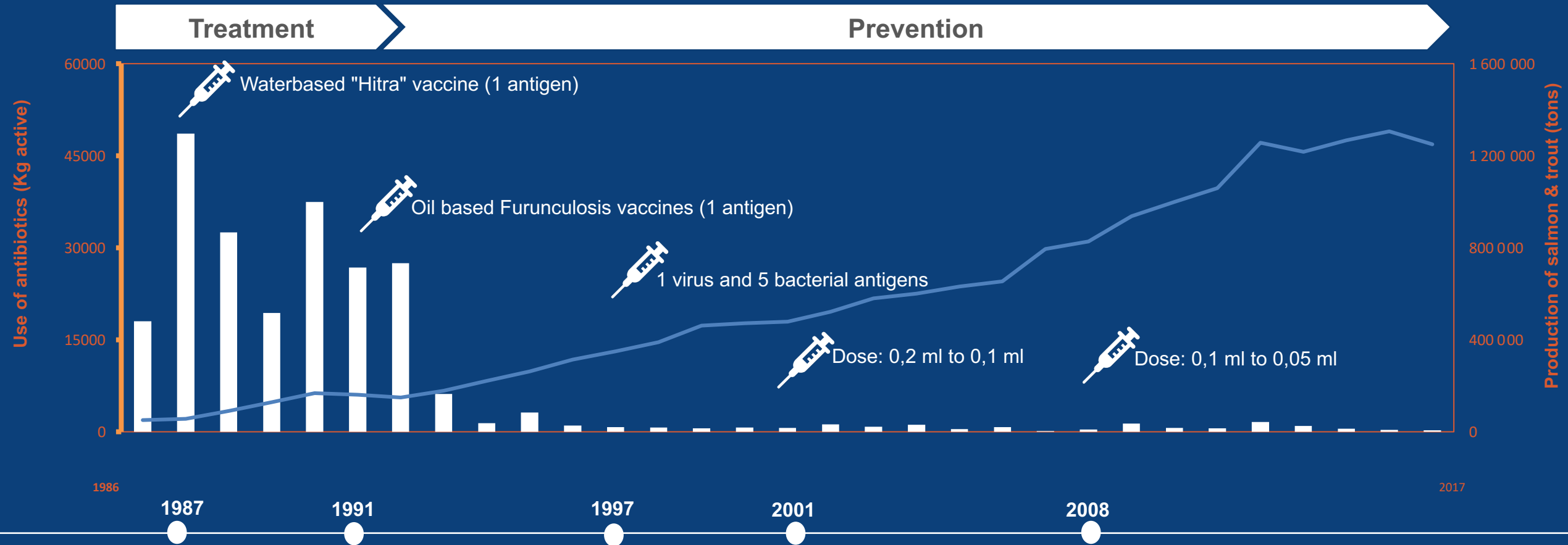


Tilapia Lake Virus (TiLV)

- TiLV is a transboundary emerging disease, now identified in most of the major tilapia producing countries
- Ongoing research activities and IP secured for live attenuated vaccine concept
- Providing a solution to TiLV will be key to securing global leadership in tilapia vaccines

We started with salmon in Norway

- Good fish health and vaccines has been important to develop a sustainable salmon farming



PHARMAQ in Colombia

- **Start our interest in Colombia for some years ago (7)**
- **Close and valuable cooperation with fish farmers, authorities and academia**
- **ALPHA JECT micro 1 TiLa vaccine was introduced to the tilapia industry 2018**



Current status

- Start of commercial vaccination in major producers
- Vaccination training of farmers
- Strategic partnership project with Caritas awarded funding from Norad (Norwegian Agency for Development Cooperation) - *Improving productivity and sustainability in the tilapia value chain*
- Proposal of cooperation with ICA
- Research on new relevant vaccines ongoing

Improving productivity and sustainability in the tilapia value chain

- **Project has 4 main outcomes:**

- O1: Fish health management and Best Aquaculture Practices.
- O2: Improvement of livelihood and youth participation.
- O3: Research and Development focused on tilapia.
- O4: Access to markets and networks.



01. Fish health management and BAP's.

- Focused on improving fish management, vaccination techniques and Best Practices of aquaculture production
- Training on FHM and vaccination; theoretical and practical, with a distribution of participants according to the needs and skills
- Following “demo ponds” of vaccinated fish (Piscicola Botero)
- Providing equipment for vaccination teams
- Providing a total of up to 2 million doses of subsidised vaccine for use in demo ponds



Challenges of introducing vaccination to warm water aquaculture species

Success factors:

- Understanding the market and identifying right partners
- Strategic partnerships with other stakeholders
- Establishing the correct criteria for success for vaccination e.g. diagnostics, fish quality, training, planning and follow-up of vaccination
- Commitment to invest beyond registration of 1st products
- A long term commitment to each aquaculture species in each market is required to achieve success
- Securing funding can de-risk investment in new markets and accelerate market uptake of vaccination



Activities performed until december 2019

TRAINING

Pharmaq seminar

Vaccination training. Theory and practice.

Planification, vaccination procedure. Biosecurity. Theory and practice.

Diagnostics training workshop. Theory and practice.

150 participants

• DISEASE SURVEILLANCE

Visit and sampling at 17 farms

158 people trained in tilapia diseases and sampling for diagnostics

447 fish sampled for bacteriological examination, histopathology and PCR

VACCINATION AND FOLLOWING UP

524 655 fish vaccinated in 7 units

5 units as demo-ponds

Thank you!

WE MAKE AQUACULTURE PROGRESS



Leading innovators



At the technological forefront



+30 years of heritage



Always accountable



Broad range of solutions and services



Dedicated experts & hands-on approach

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