

# Norwegian Aquaculture 2020 – a Foresight Study

Lars Horn, Director  
The Research Council of Norway  
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# Aquaculture 2020 – Why and how?

- Establish basis for research planning, as well as for recommendations for actions by the industry and the authorities
- Engaged the stakeholders – farmers, industry, R&D, governmental bodies, NGO
- 60 persons, in 4 meetings, created 150 mini scenarios / 5 complete scenarios
- Foresight provides food for thought and a wide background for making priorities, but no authoritative description of the future!



# Aquaculture at a crossroads

## – Five different scenarios

- Markets without boundaries
- Feed and food for all
- Sustainable Aquaculture
- The Aquacultural University
- A non-sectorial innovation policy

Some examples....

# Markets without boundaries

- Aquaculture provides more food globally
- Seafood – safe and healthy food
- Documentation needed
  - Health effects
  - Freedom from harmful contaminations
  - Traceable origin, production, logistics
  - Ethical production



# Feed and food for all – long term ecological sustainability

- Not obvious to feed farmed fish with fish
- Nevertheless enough feed

## Need for alternatives:

- Zoo-plankton, phyto-plankton, plants, bio-proteins from natural gas
- Scientific and ethical challenges
  - Acceptable to harvest at lower trophical levels?
  - To use genetic modification (GM) to design new feed?
- Will consumers accept this?



# Sustainable aquaculture

- Climate and ocean changes under way
- Aquaculture production has increased
- Coastal zones under siege

## **Need:**

- New offshore production technology
- New transportation methods and logistics
- New surveillance and management systems for both areas and activities

# Generic biotechnology and functional genomics – with or without GM

- Breeding
- Medicinal, therapeutical and industrial processes and purposes

## Need:

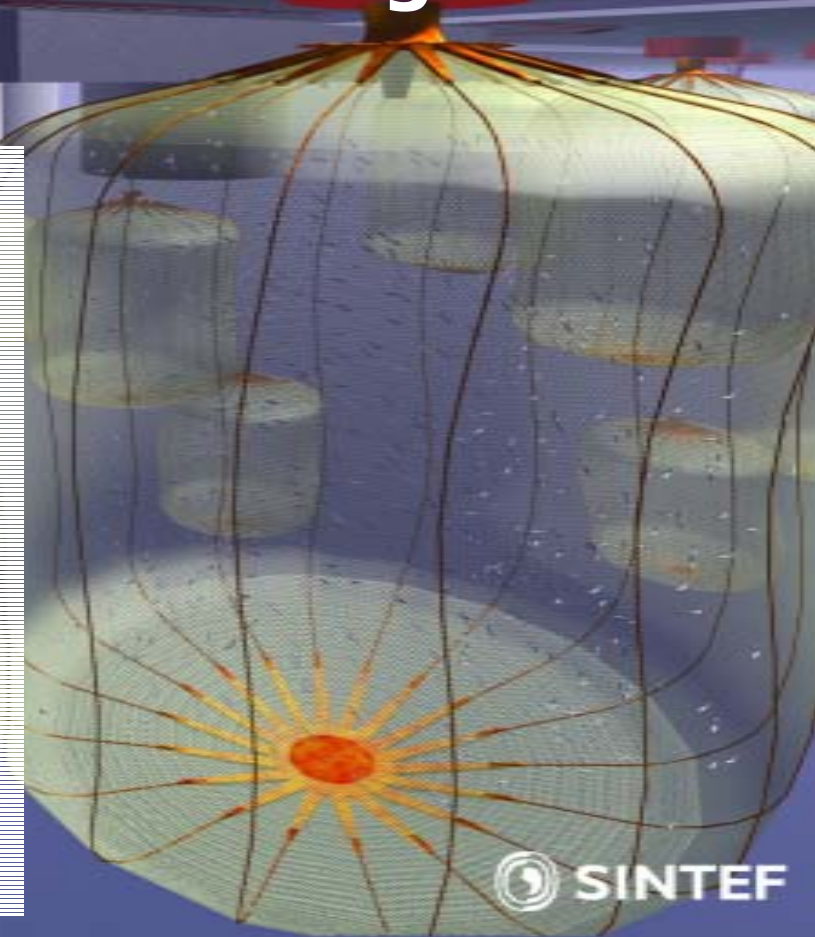
- Mapping and studying of genomes – functional properties
- GM basic knowledge – ethical, biological and environmental consequences of GM



# Common to all scenarios

## - bringing European aquaculture together

- Aquaculture needs new generic knowledge and converging technologies: *Biotechnology, materials, ICT, surveillance, computing, etc.*
- Basic science – European networks
- Applied research in the countries and/or between the countries in networks



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