

# ROADMAP FOR SUSTAINABLE GROWTH IN NORWEGIAN AQUACULTURE

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*Federation of Norwegian Industries*

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**Making fish farming sustainable**  
**European Parliament 26<sup>th</sup> June 2018**



*Our vision:*

*Farmed Norwegian Salmon shall be the most efficient and eco-friendly production of protein in the world.*

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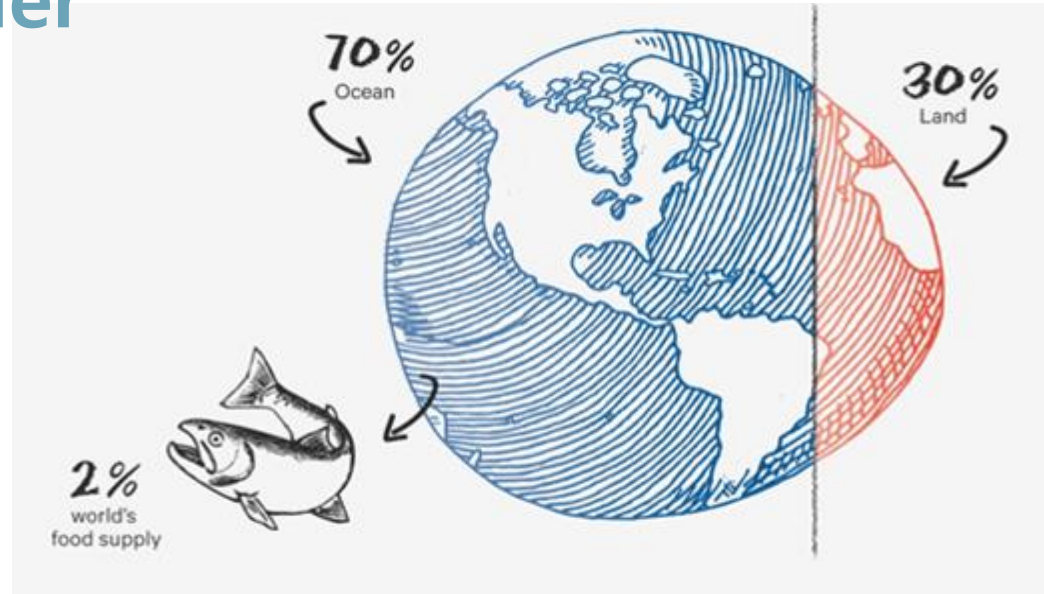
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From 7,5 bn € in 2017 to 20 bn € in 2030

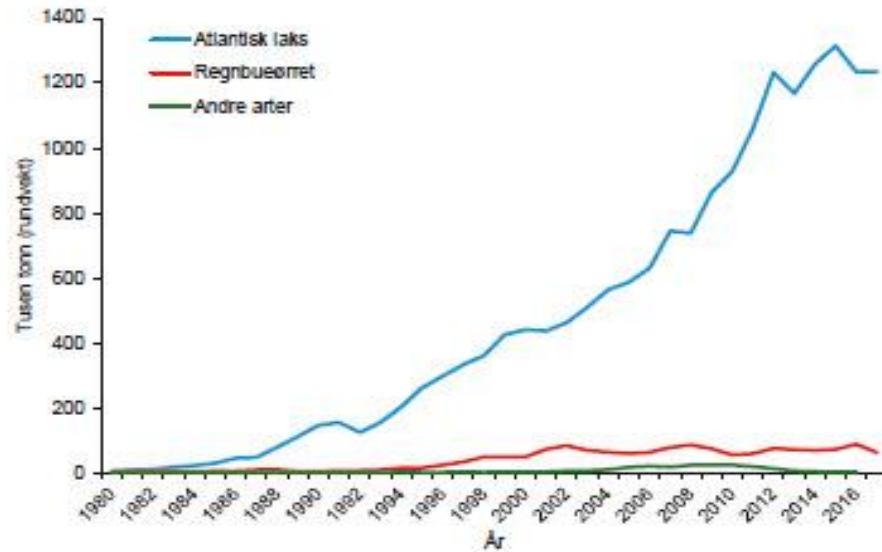


# The Ocean – a key solution provider

- 📍 3 billion more people to feed by 2050
- 📍 70% of the planet is covered by oceans
- 📍 2 % of global food production originates from the oceans



# Production in Norway



**Figur 1.1.**  
Mengde produsert atlantisk laks, regnbueørret og andre marine fiskearter i Norge i perioden 1980–2016. Tall for 2017 er foreløpige og basert på mengde laks og regnbueørret rapportert til slakt. Kilde: Fiskeridirektoratet.

**Figure 1.1.**  
Production of Atlantic salmon, rainbow trout and other marine fish species in Norway in the period 1980-2016 (metric tons round weight). Data for 2017 are preliminary and based on tons of salmon and rainbow trout reported for slaughter. Source Directorate of Fisheries.



# Salmon industry growth restricted by

- Salmon lice



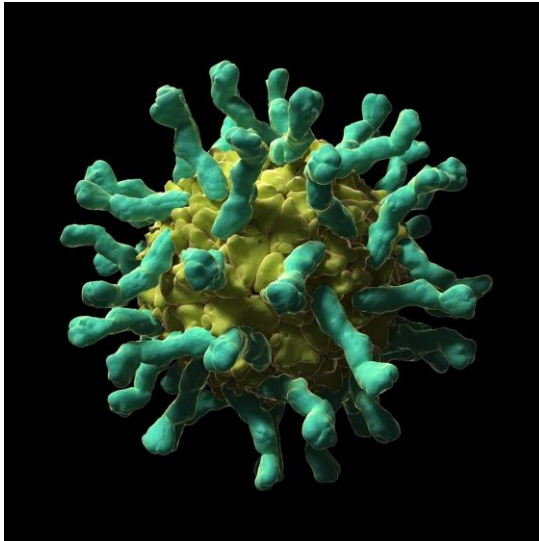
- Escapees



# ....and in the future possibly restricted by

Viral diseases

>need effective vaccines



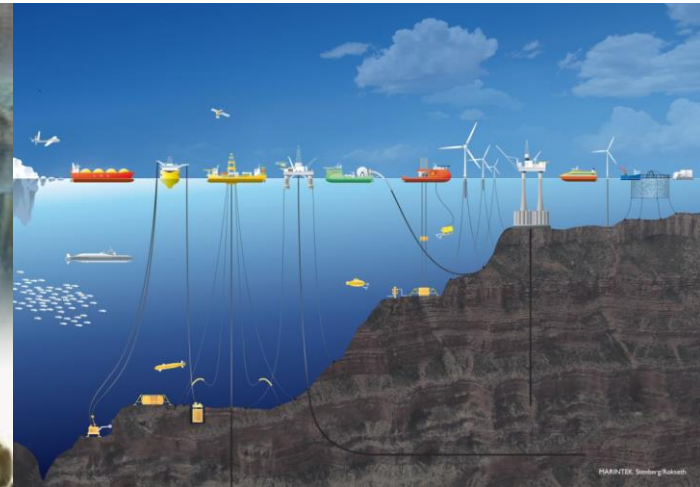
Feed raw materials

>need to develop new sources



Ocean space

>need new farm sites

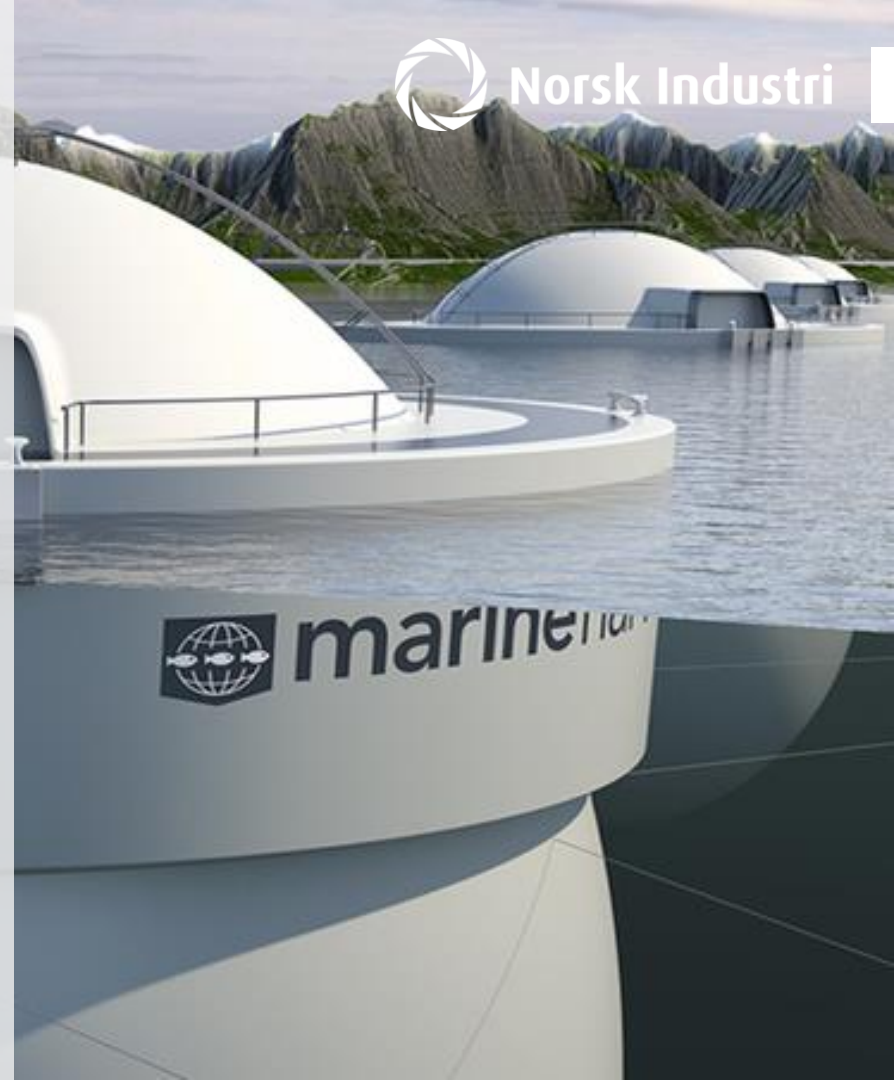


# Increased production requires increased industrialization

- Growth cannot come at the expense of the environment.
- Hence, the demand for an industrial roadmap.



Norsk Industri





# What does industrialization mean?

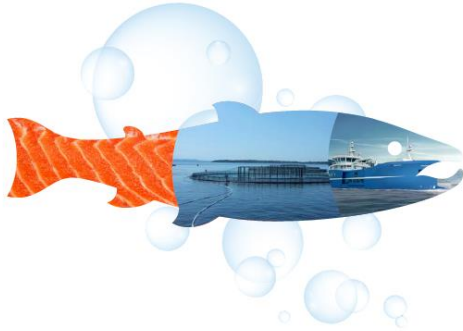







A word cloud illustrating key concepts of industrialization. The words are arranged in a roughly cross-like shape. The most prominent words are 'STANDARDISATION' (yellow-green), 'EFFECTIVENESS' (green), 'INNOVATION' (dark purple), and 'COST EFFICIENCY' (dark green). Other words include 'MAJOR INVESTMENTS' (orange), 'CONOLIDATION' (yellow-green), 'R&D' (dark purple), 'HEALTHY GROWTH' (vertical, grey), 'INTERNATIONALISATION' (grey), 'PRODUCTION METHODS' (grey), and 'VALUE CHAIN' (grey).

MAJOR INVESTMENTS  
CONOLIDATION  
EFFECTIVENESS  
R&D  
HEALTHY GROWTH  
INTERNATIONALISATION  
STANDARDISATION  
COST EFFICIENCY  
INNOVATION  
PRODUCTION METHODS  
VALUE CHAIN

# Roadmap for sustainable growth

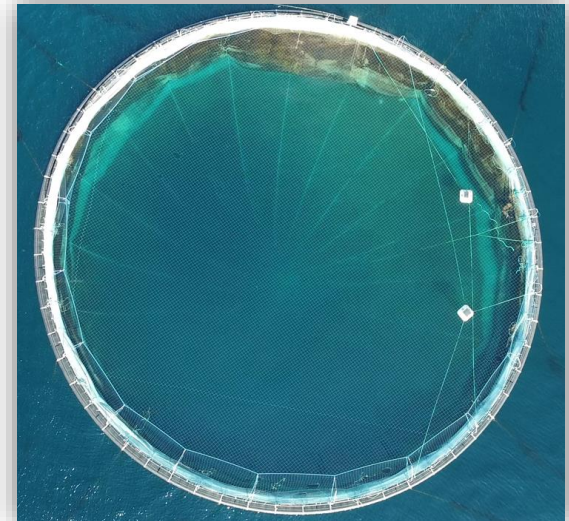
 Norsk Industri



-  Healthy salmon
-  Healthy food
-  Healthy environment
-  Sound production
-  Sound economy

## Our zero vision

- 📍 No salmon lice
- 📍 No escapes from pens
- 📍 No resources wasted





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*The sector must accept that further growth cannot take place before the challenges of salmon lice are solved and brought under control*

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# Roadmap



# Existing production methods must change

- 13 % average mortality (2017)
- Strategy for combating salmon lice has not been effective. Treatment cost approx. 0.6 €/kg salmon.
- Increased production costs by 40% between 2012 and 2016.
- No production increase in the same period.





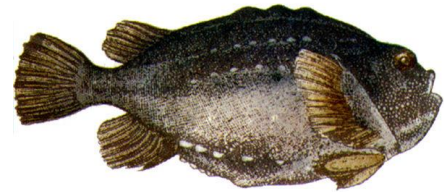
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*The sector needs a pro-active approach to emerging challenges, rather than spending resources on solving problems after they have occurred.*

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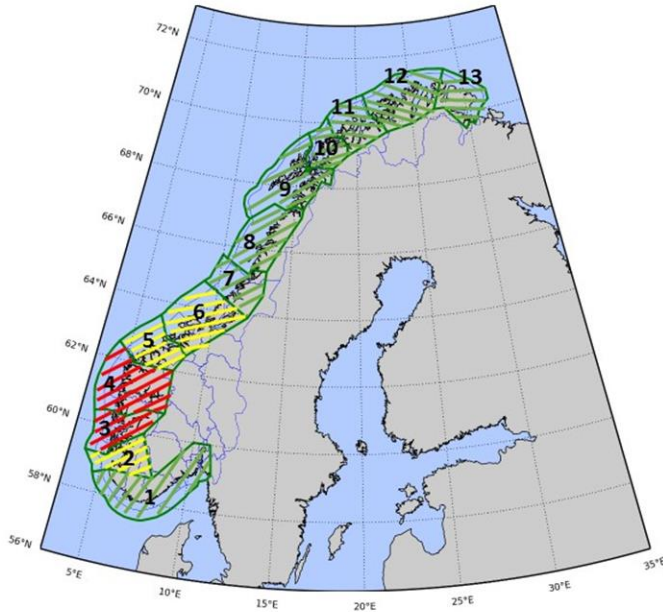
## Cleaner fish (2017)

- 28 million wild-caught cleaner fish used by the industry. Mainly wrasses
- 30 million cleaner fish produced in 30 farms in 2017 (10 % of the smolt production). Mainly lumpfish





# Production regions- The Traffic Light System



 Production growth

 Status quo

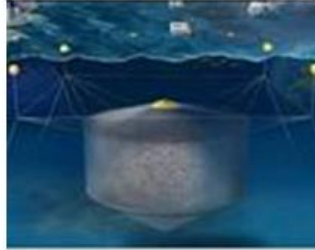
 Production reduction

Development licenses spur new technological concepts to tackle the industry's acreage and environmental challenges . Among them ocean farms, sub-sea and closed containment systems

NRS/Aker



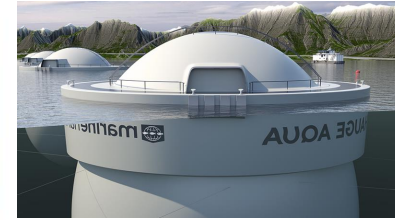
Atlantis Subsea Farming



Aqualine



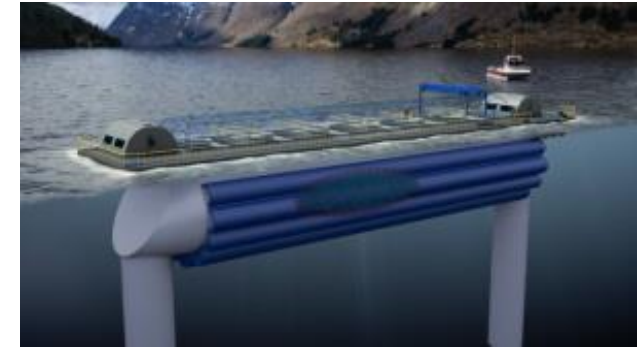
The Egg/Hauge Aqua/Marine Harvest



Havfarm/Nordlaks



Ocean Farm I /Salmar



Pipe Farm/Lerøy

**Thank you for your attention!**

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