



Norwegian Ministry of Trade,
Industry and Fisheries

"Controlled Growth : Building a sustainable aquaculture industry"



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CV Johán H Williams

1959 – 1971	Child Laborer
1972 – 1977	M.Sc Norwegian College of Fisheries, Tromsø
1977 – 1979	Norwegian Ministry of Fisheries
1980 – 1988	Norwegian Agency for Dev. Cooperation (NORAD)
1989 – 1994	Nordic Council of Ministers, Copenhagen
1995 ---	Norwegian Ministry of Fisheries
1997 – 2011	Director General, Fisheries Management, Resources and Marine Environment Department
1998 – 2011	Chief Negotiator Coastal State agreements herring, blue whiting and mackerel, and Head Norwegian delegation to NEAFC (North East Atlantic Fisheries Commission)
2004 - 2012	Chief Adviser Vietnam Fisheries Law Program
2012 – 2014	Chair FAO Committee of Fisheries COFI
2010 – 2016	President NEAFC
2011 –	Chair, 5-Ministry Steering Committee MAREANO Seabed mapping Program
2013 – 2014	Member WorldBank GPO Blue Ribbon Panel
2017 –	Chair ISO Tech.Com 234 "Fisheries and Aquaculture"
1980 –	Job experiences from Kenya, India, SriLanka, Portugal, Tunis, Egypt, Tanzania, South-Africa, Egypt, Zimbabwe, Zambia, Mozambique, Malawi, China, Nicaragua, Mexico, Brasil, Namibia, Korea, CostaRica, Vietnam, Japan, Uruguay, Angola, Cambodia, Myanmar, UAEmirates, Uganda, Caribbean, Indonesia



The Norwegian Coast – Readymade for Fish Farming



Global Product Global Market

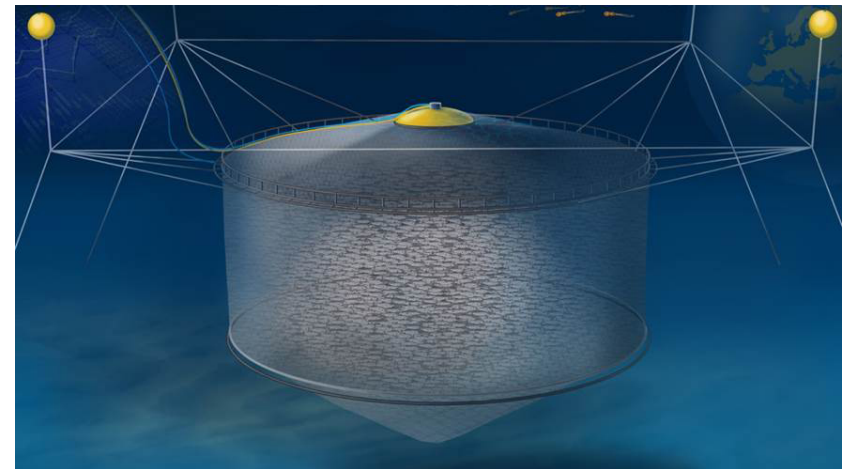


8 billion US\$ - 146 Countries

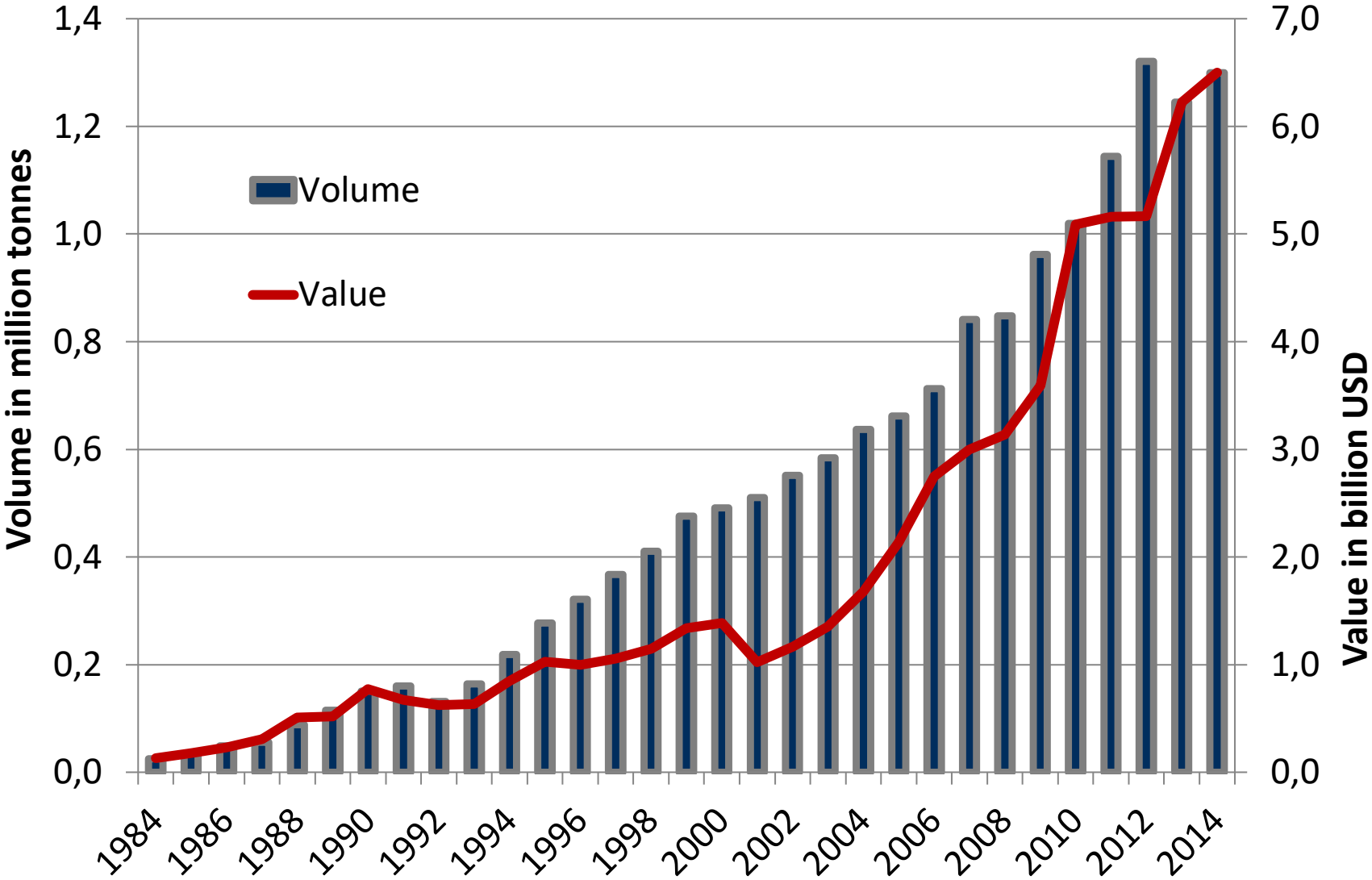


Norwegian Aquaculture 2018

- ✓ World dominant producer of farmed salmon
- ✓ *Total production ca. 1.3 million tonnes*
- ✓ Salmon well established in export markets
- ✓ *Focus on cost control and market expansion*
- ✓ *Growth by new-license-innovation*
- ✓ A leading aquaculture technology industry supplying the farming companies
- ✓ *Multinational companies listed on the stock exchange*



From Zero to a Billion



The Norwegian Coast – Readymade for Fish Farming



The Beginning



the early years

70-Milestones

- ✓ 1970: Norwegian Fish Farmers Association established
- ✓ 1971: Two aquaculture Research Stations establ.
- ✓ 1973: Temporary Law on Aquaculture
- ✓ 1974: Vocational training and farming operation education started
- ✓ 1974: Development of the world's first floating plastic cage by Helgeland Plast Co."
- ✓ 1978: Fish Farmers Sales Organization was established
- ✓ 1970 – 1979 : Government funding of research and education
- ✓ 1970 – 1979: Annual production increased from 1000 – 7000 tonnes



the early years

70ies : The Formative Years

Government Funding & fast facility respons

Two research stations established in 1971 - three main tasks:

- Research for a new industry
- Production of smolts for the industry
- Production of smolts for restocking
in rivers and lakes

Capacity building

- Research
- Education
- Vocational training



the expansion years

80-Milestones

1985: Partial liberalization of controls: free establishment of smolt production

1988: Norwegian Aquaculture Equipment Suppliers Association to started developing a technical equipment standard

1981 - 1988: Maximum volume/size per license increased stepwise from 3000 to 12000 m³

1980 – 1989: From 50 family farms to 800 companies

1980 – 1989 Production increased from 7.000 to 110.000 tons and exports to more than 100 countries



the expansion years

80ies : Building an Industry

THE FISH FARMERS SALES ORGANIZATION :

- ✓ Large scale marketing of Norwegian Salmon world-wide
- ✓ *Developing a Brand*
- ✓ Initiated good logistic systems together with the industry
- ✓ *Established Quality standards for the products*
- ✓ Initiated and financed R&D programs in fish-health, breeding and other vital business areas



the consolidation years

90-Milestones

1990: Production higher than demand. Prices dropped. Anti dumping measures from EU and USA

1991: New Aquaculture Law - liberalizes the industry

1991: The EU – Norway salmon agreement

1992: Government enacts production limiting measures (1992-2002 No new licenses and no increase in cage volume)

1990 – 1999 Production increase from 110.000 – 500.000 tons



the consolidation years

90ies : Growth, Crisis, Growth

THE INDUSTRY REACT AND ACT :

THE RESPONSES TO THE RESTRICTIONS :

Production costs reduced by half –

from 38kr/kg in 1992 to 18kr/kg in 2002

Productivity and Production - growth beyond imagination -

from 148.000 tons in 1992 to 546.000 tons in 2002

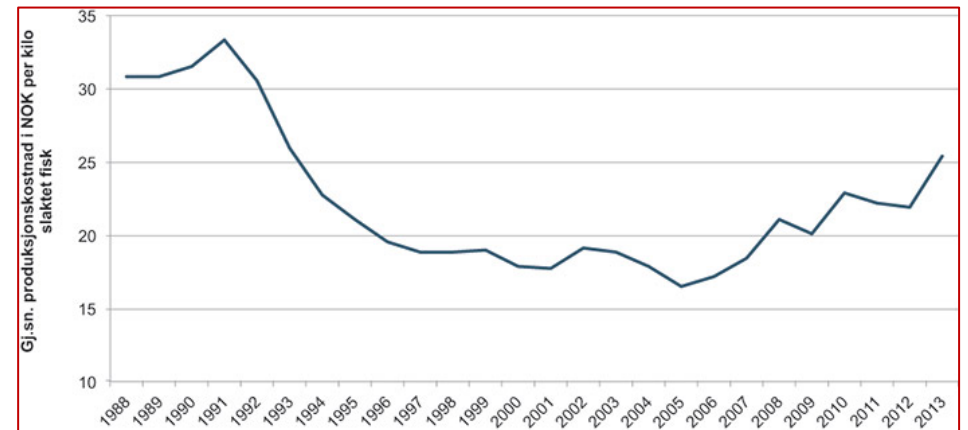
Profit invested abroad – growing abroad

BECOMING AN INDUSTRY

Focus on cost efficiency and productivity

Market access

Ownership liberalization



Controlled Growth

2000nds : Meeting the Challenges

Diseases

Feed

Escapees

Food Safety

Animal Welfare

Fish Health

Siting structure

Pollution

Emission



Controlled Growth

2000nds : Meeting the Challenges

WHY AN ENVIRONMENT STRATEGY FOR NORWEGIAN AQUACULTURE ?

**Siting structure reflected an earlier era
aquaculture production**

Significant growth over the past 20 years

Experienced challenges – New growth and new challenges

**The strategy identified 5 focus areas, where aquaculture
have impact on the environment**



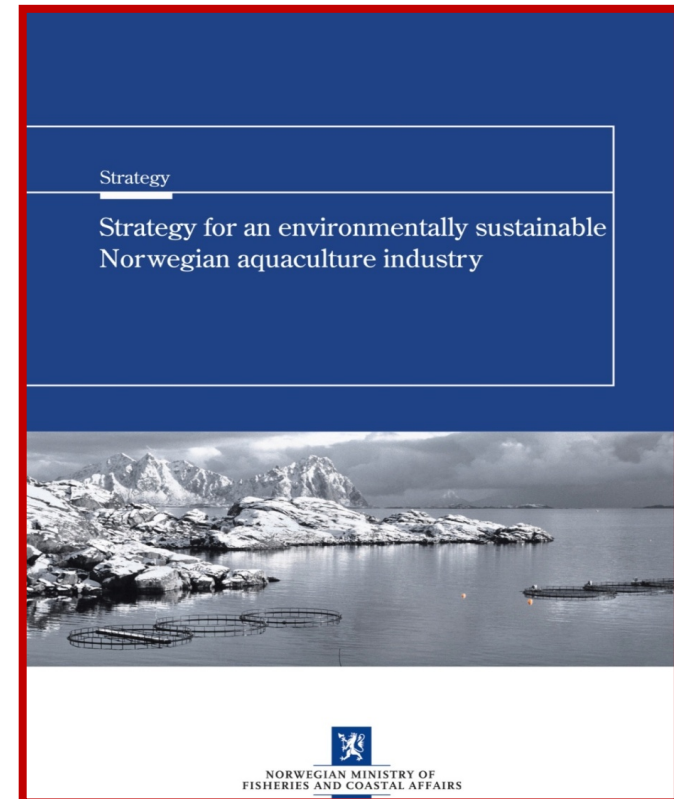
Controlled Growth

2000nds : Meeting the Challenges

THE 5 CHALLENGES

THE NORWEGIAN AQUACULTURE ENVIRONMENT STRATEGY

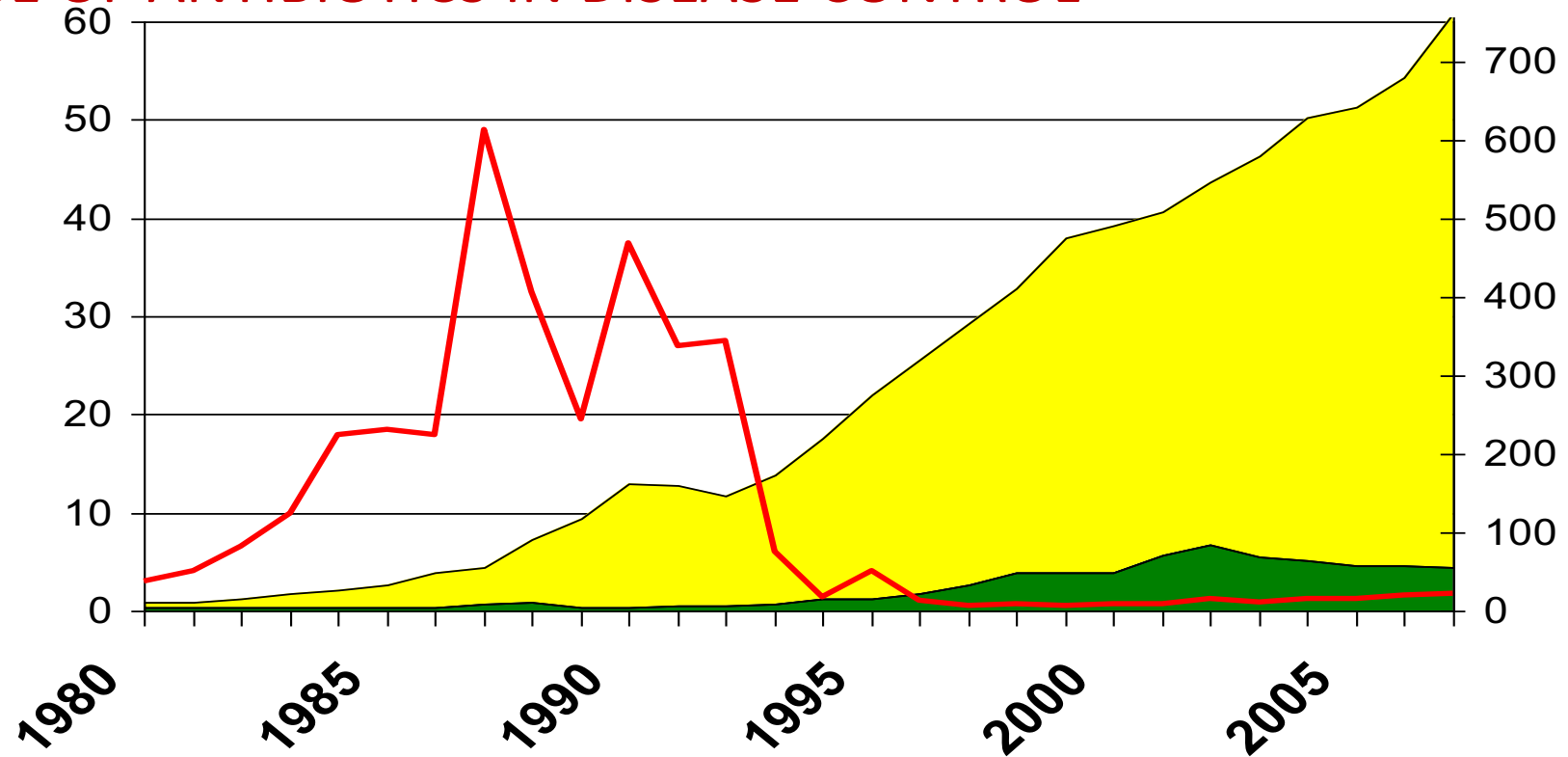
- ✓ **Genetic interaction and escapee**
- ✓ **Pollution and emissions**
- ✓ **Disease and lice**
- ✓ **Area utilisation**
- ✓ **Feed and feed resources**



Controlled Growth

2000nds : Meeting the Challenges

USE OF ANTIBIOTICS IN DISEASE CONTROL



Controlled Growth

2000nds : Meeting the Challenges

DISEASES

Good fish health with low incident of disease is a requirement for a sustainable fish farming

Diseases are one of the most serious challenges facing the growth of a industrialized fish farming sector

The ability to handle diseases needs improvements

The industry must move from re-active (antibiotics) to preventive (vaccine) treatment



Controlled Growth

2000nds : Meeting the Challenges

DISEASES

Disease and health management are closely linked.

Poor rearing conditions, over-stocking, careless and inadequate nutrition can act as stressors and make infection and losses by disease more likely.

With severe economic losses

Preventing disease should therefore be a priority in aquaculture production.

The regulatory authority as well as the aquaculture industry must focus fish health in policies and regulations



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2000nds : Meeting the Challenges

FEED

	1960	1970	1980	1990	2000	2010
Feed Conversion Factor	n.a	2,5-3	2,2	2,2	1,7	1,3

The diagram illustrates the progression of feed technologies over time, corresponding to the data in the table above. The feed types are represented by boxes of varying widths and positions, indicating their use over time:

- Pelleted feed for juveniles** (Yellow box, 1960-1970)
- Trash fish feed** (Yellow box, 1960-1980)
- Pelleted feed** (Blue box, 1970-1990)
- Extruded feed for juveniles** (White box, 1970-2000)
- Extruded feed** (Yellow box, 1980-2000)
- High fat Extruded feed** (Yellow box, 1990-2010)



Controlled Growth

Policy Coherence

INDUSTRY, RESEARCH AND GOVERNMENT

Norwegian Authorities have had an active management policy with clear objectives.

- **Rural development: Use the entire coast.**

Has probably had enormous significance in reduced spread of viral diseases and parasites.

- **Market-driven growth:**

Has been of great importance to the industry's environmental impact. Feed quotas led to development of high energy feed with low emissions.



Controlled Growth

Regulatory Framework

INDUSTRY, RESEARCH AND GOVERNMENT



FOOD LAW (2004)

Safe food	A viable food production industry and market access
Ensure health, quality and consumers interests throughout the production chain	Good plant- and animal health

AQUACULTURE LAW (2006)

Profitability and competitive power	Sustainability
Simplification of legislation and administration	Access to coastal areas - production facilities



Controlled Growth

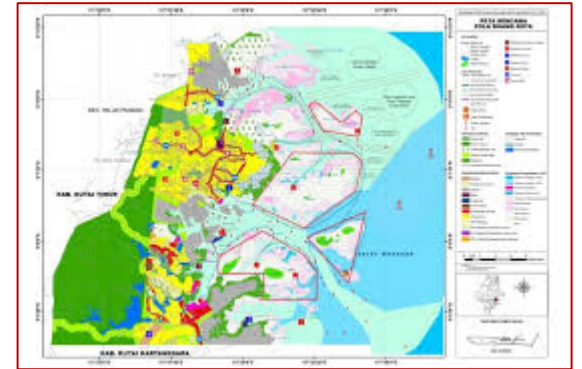
Regulatory Framework

CHANGE OF PERSPECIVE

**From *who* til *how* in the 2006 Aquaculture Law.
Regulations – of production and number of licenses.
Aquaculture licenses can be transferred and mortgaged.
Asset Register established.**

Increase in reporting duties - Surveillance of production

**Spatial Planning Aquaculture siting :
Size/production capacity of the site is set based
on assessments of the sites carrying capacity.**



International Obligations – Blue Growth – Sustainable Development



Controlled Growth

Innovation

INDUSTRY, RESEARCH AND GOVERNMENT

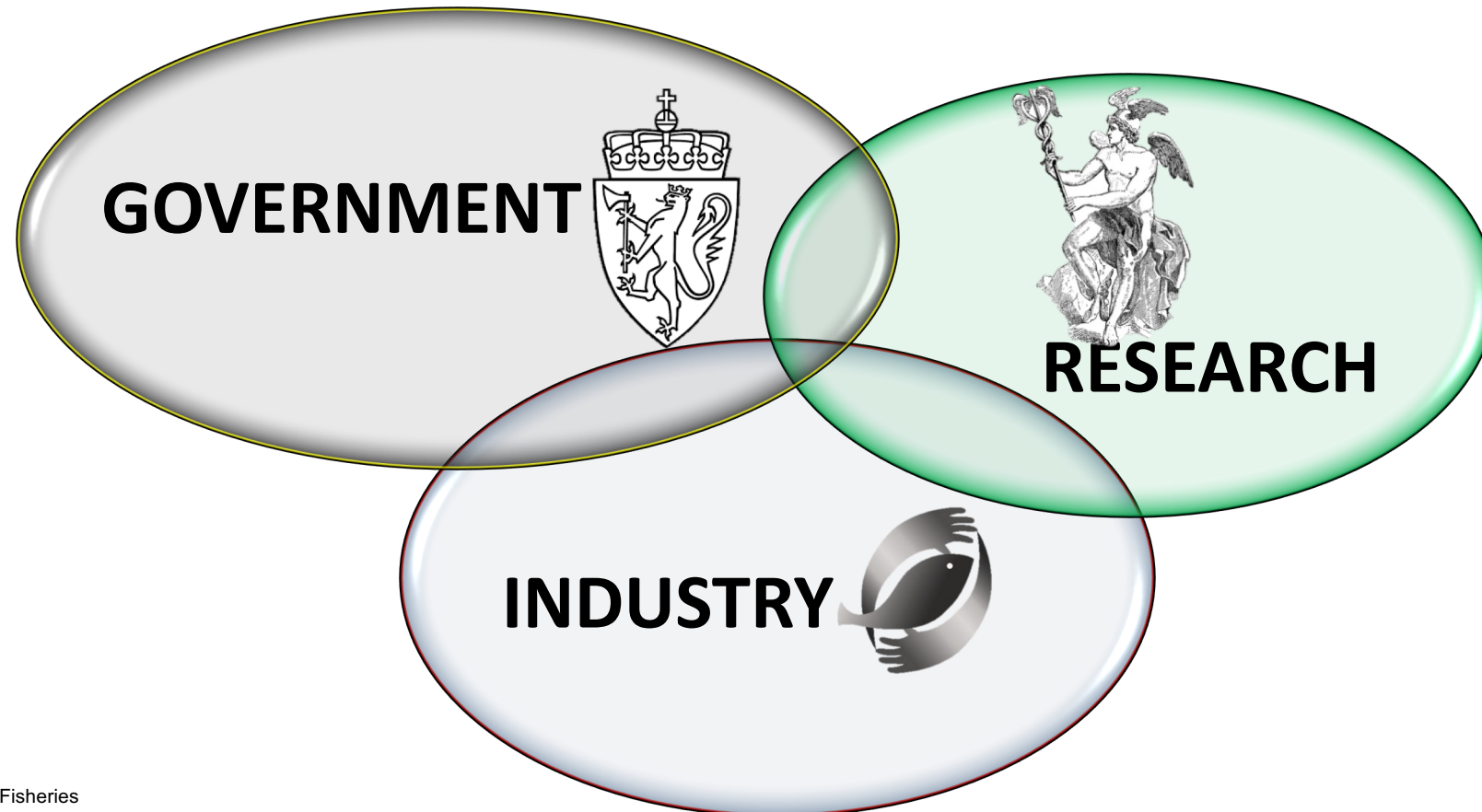
- ✓ **2015 STOP NEW ISSUING LICENCES**
 - Environmental concerns
- ✓ **INNOVATION LICENCES**
 - With new Approaches
 - ✓ *New technological approach*
 - ✓ *New production methods*
 - ✓ *Addressing Environmental challenges*



Controlled Growth

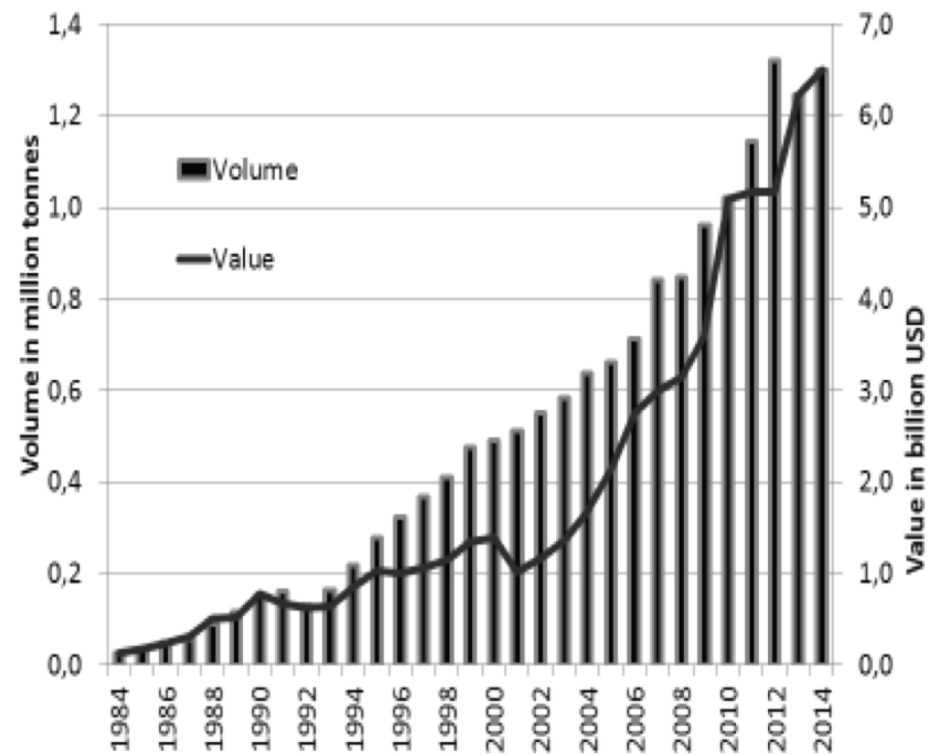
The Trinity of Success: Concerted Action;

INDUSTRY, RESEARCH AND GOVERNMENT



Controlled vs Uncontrolled

From Zero to a Billion



Norwegian Ministry of Trade, Industry and Fisheries

The Salmon Disease Crisis in Chile



Norwegian Ministry of Trade, Industry and Fisheries



Controlled Growth

The Trinity of Success : Concerted Action

BEYOND ANY EXPECTATIONS

✓ 1970ies



1000 to 7000

✓ 1980ies



1000 to 110.000

✓ 1990ies



10.000 to 500.000

✓ 2000ies



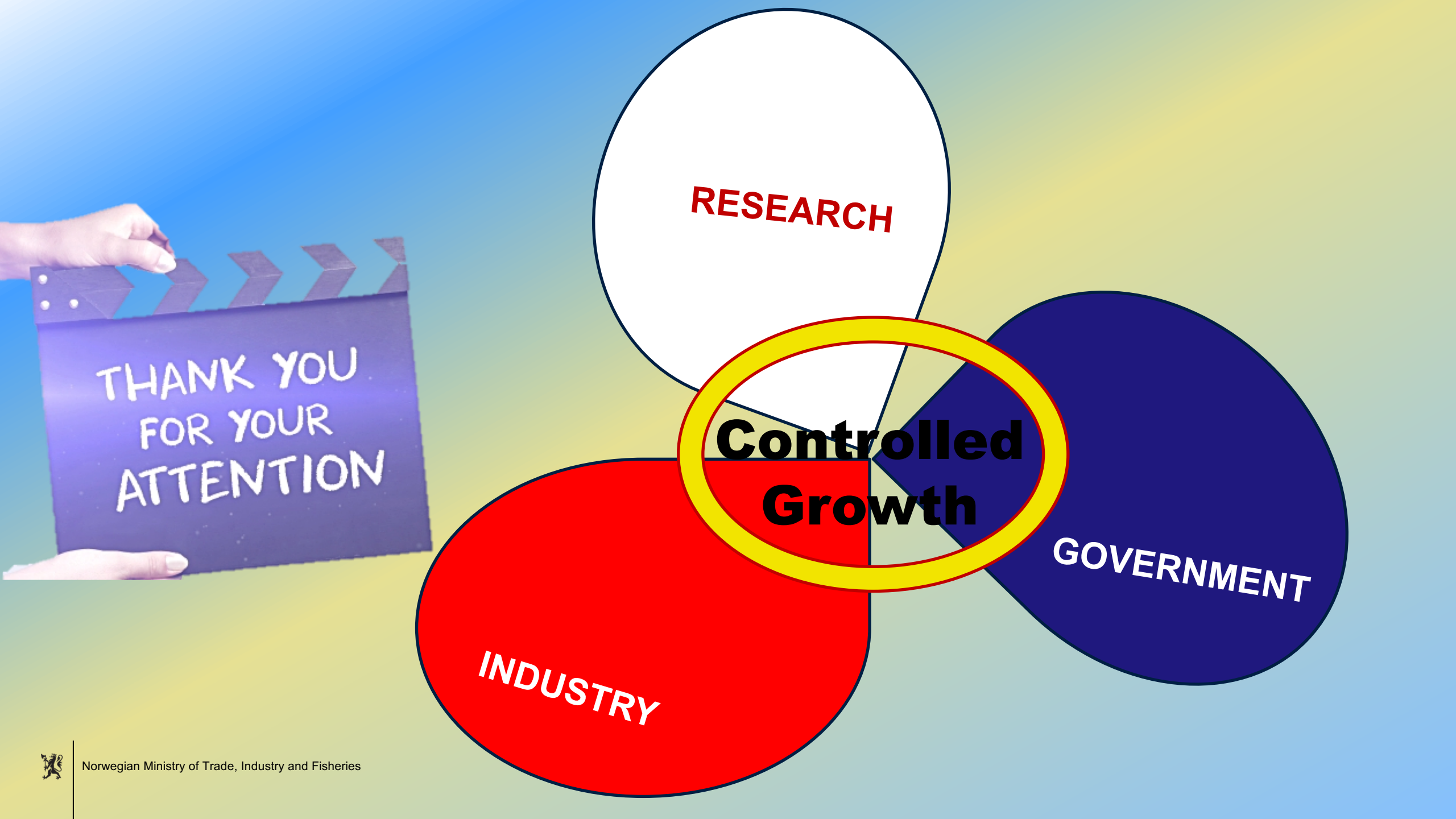
100.000 to 950.000

✓ 2010-2017



from 950.000 to 1.400.000





RESEARCH

INDUSTRY

GOVERNMENT

Controlled Growth

THANK YOU
FOR YOUR
ATTENTION





Norwegian Ministry of Trade,
Industry and Fisheries