

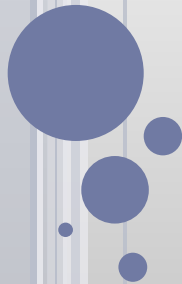
Cod Farming in Nordic Countries

Grand Hotel, Reykjavik
30. September - 1. October 2008



COD FARMING QUOTA PROJECT IN ICELAND

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Marine Research Institute



INTRODUCTION

- Cod farming quota project
- Cod farmers
- Capture
- On-growing
- Processing
- Export
- Status of capture based aquaculture of cod in Iceland



COD FARMERS IN ICELAND



COD FARMING QUOTA PROJECT

- From 2002 Ministry of Fisheries allocate annually **500 tons** of cod quotas
- The quotas have been used for experimental on-growing trials of cod in cooperation with the Marine Research Institute.
- The quotas allocated to about 10 farmers yearly



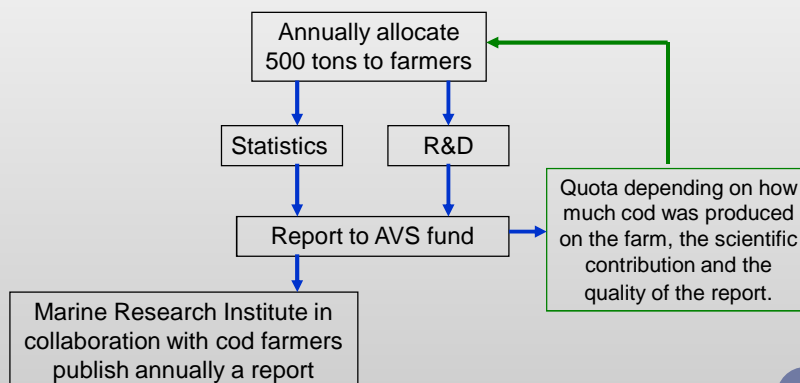
COD FARMING QUOTA PROJECT

○ The basic aims of the MRI work are to:

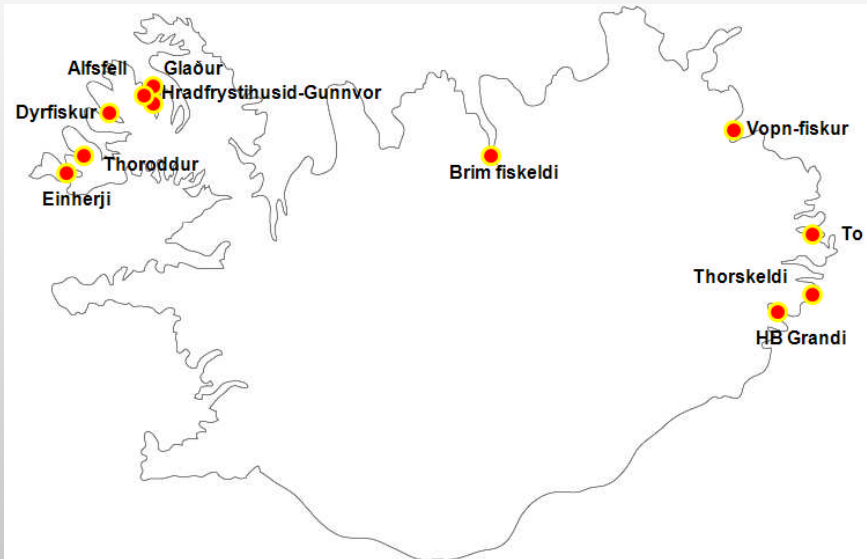
- supervise the data collection by cod farmers and analyze the data
- publish a yearly report to perpetuate the knowledge
- communicate the knowledge and experience between the cod farmers
- acquire recommendations from farmers about important R&D



COD FARMING QUOTA PROJECT

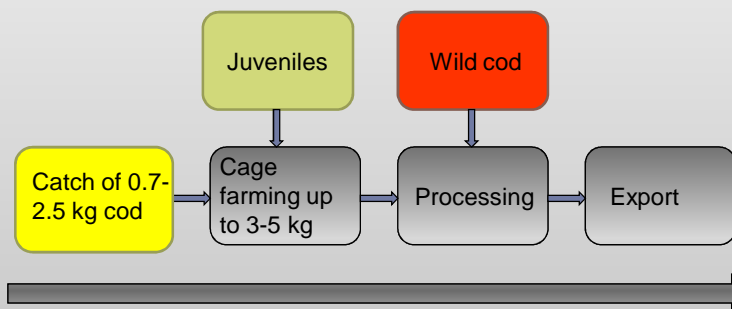


COD FARMS IN ICELAND

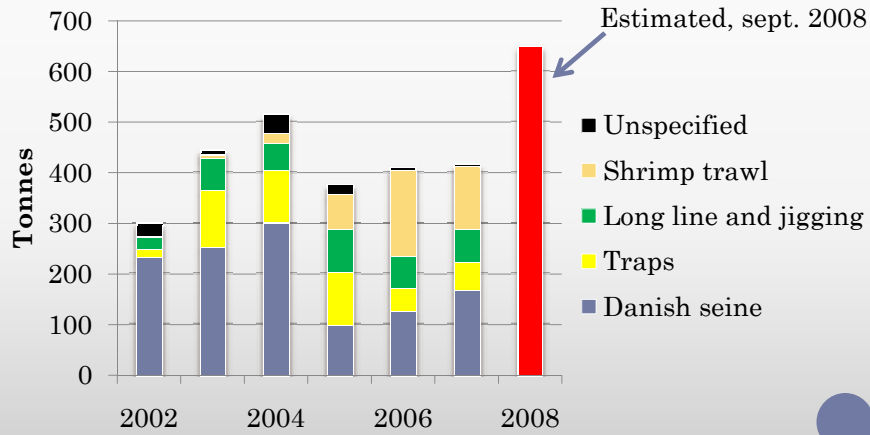


INTEGRATION OF COD FISHERIES AND COD FARMING IN ICELAND

Many of Icelandic cod farms do it all: Capture, aquaculture, processing and marketing.



CAPTURE: VOLUME ACCORDING TO GEAR



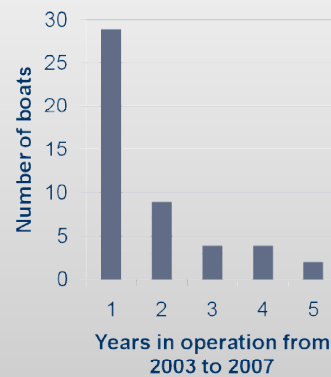
CAPTURE: MAIN REASON FOR UN-FISHED QUOTA

○ Un-fished quota

- At the beginning of the year 2008 un-fished quota was about **640 tons**

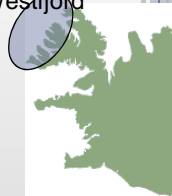
○ Main Reason

- Only a few vessels successful in capturing live cod
- Ineffective small vessels with small transportation capacity for live fish



CAPTURE: SUCCESS WITH DIFFERENT GEAR

Westfjord



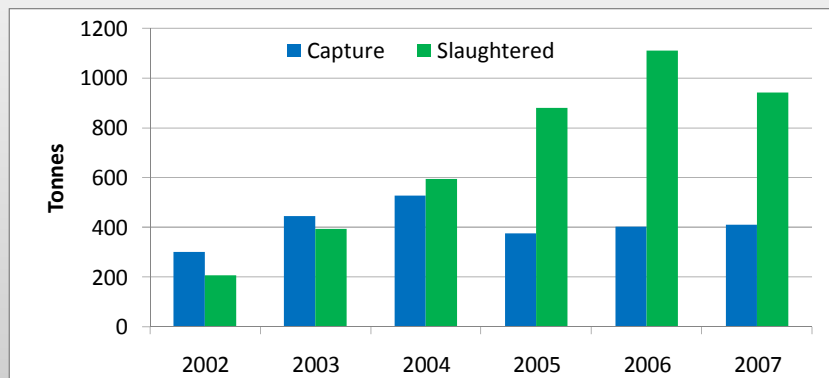
o Capture of cod

- About 70% of quota captured in Westfjord
- Size of fish generally 0.7-2.5 kg
- Success with capture of live cod in shrimp trawl, Danish seine, long line and jigging and in a Newfoundland trap.

o Cost of capture live cod

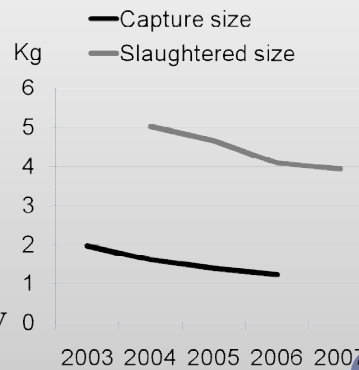
- Increased from about 100 ISK/kg in year 2003 up to 130 ISK/kg in 2007
- Lowest cost with a Newfoundland trap (Usually less than 50 ISK/kg)

ON-GROWING: PRODUCTION



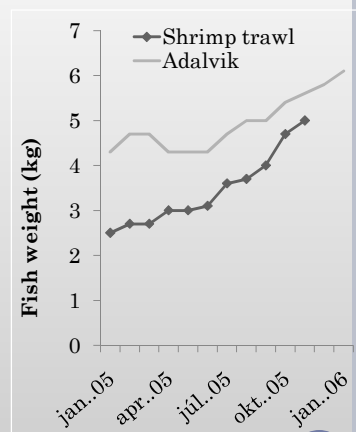
ON-GROWING: PRODUCTION CYCLE

- Capture, all year around, main activity in spring and summer months
- Production time usually 6-18 months
- Wild cod more than doubles the weight in culture
- Slaughtering time usually in November-Mars



ON-GROWING: GROWTH RATE AND MATURITY

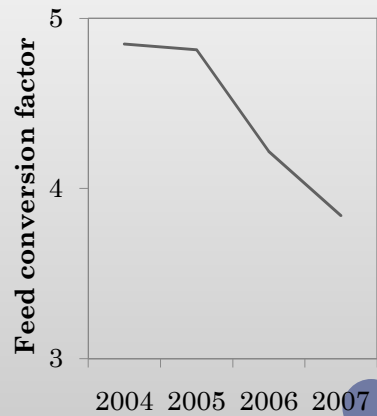
- **Growth, first year**
 - Growth period (June – December)
 - Size 1-4 kg
 - Daily growth rate: 0.45% (0.3%-0.6%)
- **Growth over a longer period**
 - 16-30 months in culture
 - Daily growth rate: 0.20% (0.18%-0.25%)
- **Maturity**
 - 1-2 kg cod captured in May - August about 100% maturity
 - Much less maturity on cod captured later in the year



Growth of wild farmed cod second year in sea cages

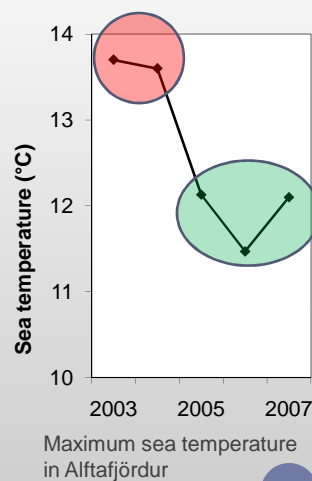
ON-GROWING: FEED

- **Feed**
 - Capelin, herring and other fishes
 - Experiments with dry feed without big success
- **Feed conversion factor**
 - Decreased from over 5 in the year 2004 to less than 4 in 2007
 - 33-36 MJ to produce 1 kg of cod (in 2006-2007)
- **Cost to increase fish weight**
 - Decreased from 160 ISK/kg in the year 2003 to 115 ISK/kg in 2007



ON-GROWING: MORTALITY

- **Main disease problems of wild farmed cod**
 - *Aeromonas salmonicida*
 - *Vibrio anguillarum*
- **Mortality**
 - Has decreased and is very low today
 - Mainly in warm summers first year in cage
 - Very few incidences of disease have been recognized in wild farmed cod last three years, possible reasons:
 - Lower temperatures
 - More knowledge about fish handling



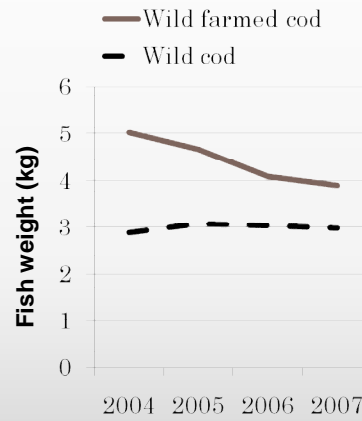
SLAUGHTERING AND PROCESSING

o Slaughtering

- Average size decreased from 5 kg in the year 2004 to 4 kg in 2007.
- Slaughtering time usually in November-Mars

o Processing

- Most of the wild farmed cod are filleted
- Cod are filleted before rigor mortis
- Processing fresh loins and other part of fillet mainly frozen



Average size of captured cod and slaughtering size of wild farmed cod

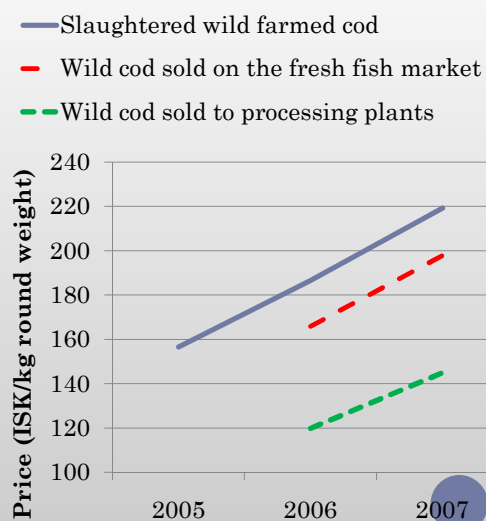
SLAUGHTERING AND PROCESSING

o Higher price for wild farmed

- o Bigger fish
- o Sold on time when markets price is high

o By-products

- Good utilization, head, back bone, cut-off...
- Viscera, good utilization of liver and roe – Aim to improve yield of milt and stomach



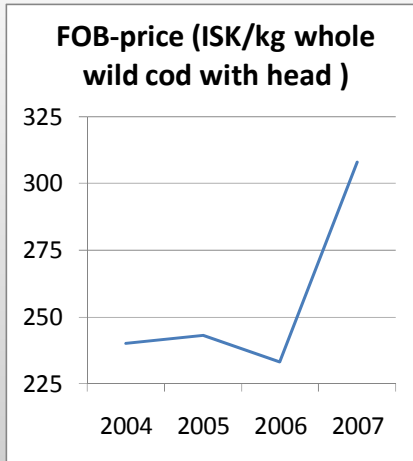
EXPORT

○ **Export, whole**

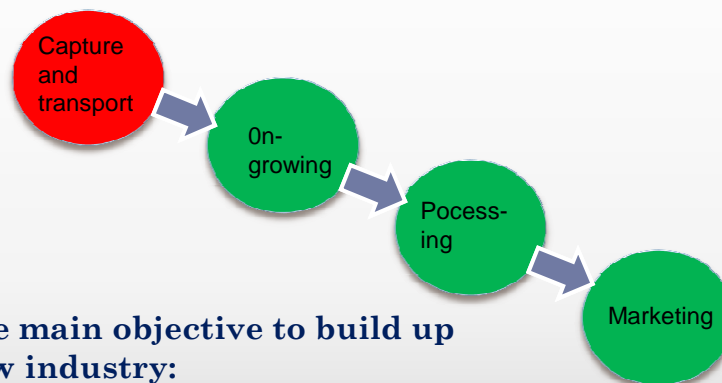
- Mainly exported, whole with head on
- Volume, 200-300 tons per year in 2005-2007
- Main market, UK

• **Export, fillets**

- Fresh loins, markets UK etc.
- Other part of fillet mainly frozen, European Union, USA etc.



WHERE ARE WE NOW?



○ **The main objective to build up new industry:**

- Invest in bigger vessels with more transport capacity (well boats)
- Teach fishermen to capture cod for on-growing

