



# CREATE

## Senter for forskningsdrevet innovasjon i havbruksteknologi

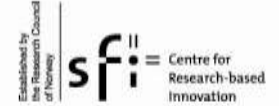
CREATE Merdmiljø workshop 4. november 2010

**CREATE**  
Centre for research-based innovation in aquaculture technology



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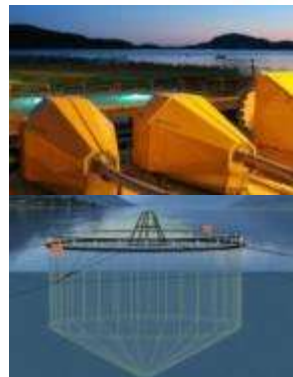
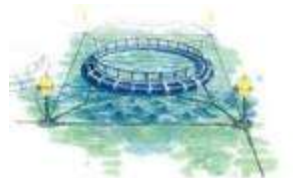
- Et senter for forskningsdrevet innovasjon i havbruksteknologi
- Tre industri og seks forskningspartnere jobber sammen
- SINTEF Fiskeri og havbruk er vertsinstitusjon
- Finansiering i åtte år fra 2007 til 2014
- Grunnleggende forskning og teknologiutvikling
- Vil utdanne 13 PhD'er og ha 14 år med Post doc. stipend.



# Senter for forskningsdrevet innovasjon (sfi)



- Et virkemiddel fra Norges Forskningsråd
  - *Forskningsintensive bedrifter og fremragende forskningsmiljø*
  - *Fremme bedriftenes evne til innovasjon*
  - *Langsiktig fokus*
- Et ”Senter for fremragende forskning” med industripartnere
  - *Forskningshøyde*
  - *Innovasjonspotensial*
  - *Internasjonal og nasjonal evaluering*
- Industri partnere
  - Innhold, beslutning og retning
  - Industri og forskningspartnere bidra med minst 50%
- 14 sfi etablert
  - innen alle næringsområder
  - 52 søkere



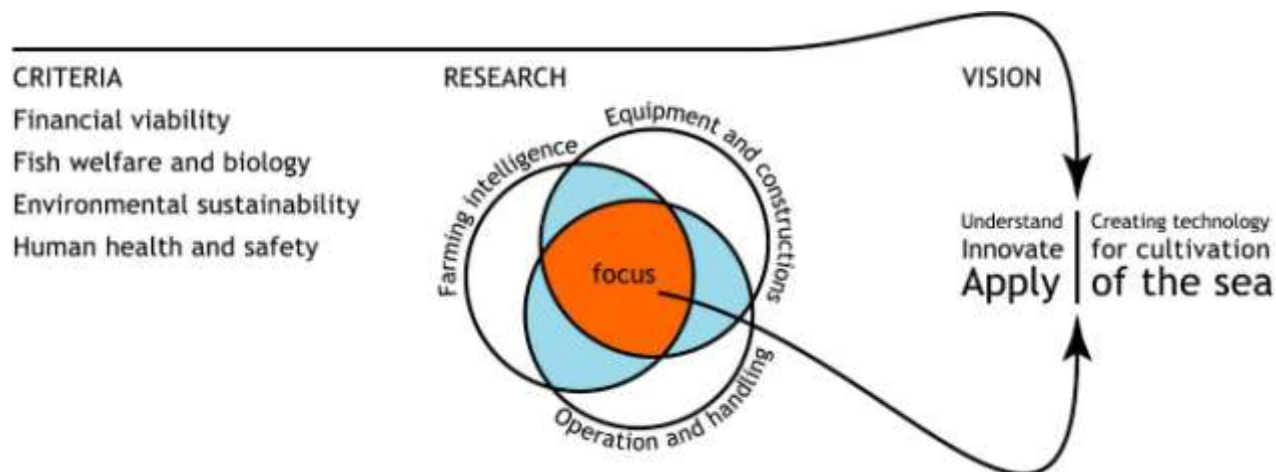
# CREATE



**Oppgave** FoU for å utvikle teknologi, produkter og løsninger for å forbedre påvekstfasen av oppdrett i sjø

**Kjerneidé** Kombinere teknologisk og biologisk forskning og forståelse

**Hvordan** Industry og vitenskapelige forskningsmiljø jobber sammen i et senter med felles fokus for å utvikle ny kunnskap og teknologi



# Industripartnere

## Ledende leverandører av oppdrettsutstyr



**AKVA GROUP - facts**

- The leading aquaculture technology supplier
- Only supplier with global presence
- Offices in 12 countries and staff of around 600
- The largest supplier to the aquaculture industry
- High growth company
- Profitable
- Industry consolidator

**CAGES** **SOFTWARE SYSTEMS**

**FEED BARGES** **RECIRCULATION**

**SENSORS&CAMERAS** **FEED SYSTEMS**

**EGERSUND NET - facts**

- Leading supplier for the fish farming industry
- Nets and bird nets
- Antifouling
- Service Equipment
- Quality products and experienced staff
- Profitable

**ERLING HAUG - facts**

- Quality mooring components
- Dynamic analysis of mooring systems
- Flexible engineered mooring solutions
- Provides lifting- and HSE products, ice-skirts and LED marking buoys



# Forskningspartnere

## Flerfaglig tilnærming til forskning



**NOFIMA MARIN - facts**  
 R&D, innovation and knowledge transfer for fisheries and aquaculture  
 Breeding and genetics  
 Feed and nutrition  
 Fish health  
 Efficient and sustainable production  
 Seafood processing and product development  
 Marine bioprospecting



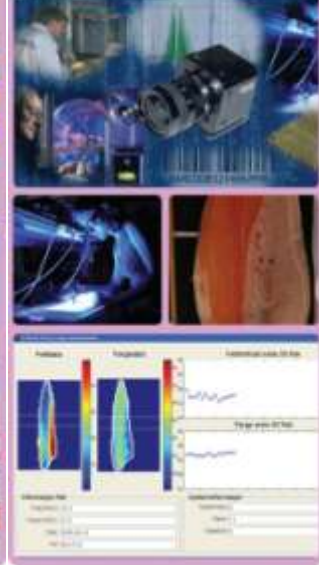
**INSTITUTE OF MARINE RESEARCH - facts**  
 Owner: Ministry of Fisheries and Coastal Affairs  
 Norway's largest marine research institute  
 Marine biology and population dynamics  
 Physical and biological oceanography  
 Experimental biology and population genetics  
 Welfare friendly and sustainable aquaculture  
 Research and advice for sustainable use of oceanic and coastal environments and resources



**CeSOS - facts**  
 Centre of Excellence initiated by RCN in 2003  
 Internationally recognised research on ships and ocean structures  
 Highly interdisciplinary approach  
 World-class testing facilities  
 About 80 affiliated PhD candidates and researchers  
 Above 100 scientific publications per year



**SINTEF ICT - facts**  
 Information and Communication Technology (ICT) provides research-based expertise, services and products ranging from microtechnology, communication and software technology, computational software, information systems and security and safety. Work ranges from simple technical analysis to complete systems



**Department of Engineering Cybernetics - NTNU - facts**  
 Engineering Cybernetics is the science of control and communications in dynamic systems.  
 Vision to be one of Europe's most renowned research and education communities in the department's main areas.  
 27 permanent employees and about 40 PhD students and temporary academic staff.  
 Educate about 75 MSc and 10 PhD students per year (average last 3 years).  
 Cybernetics is a science with a very wide range of applications



**SINTEF Fisheries and Aquaculture - facts**  
 Vision: Technology for a better society  
 Perform basic and applied research for commercial customers as well as governmental institutions and bodies  
 Contributes to solutions along the whole value chain

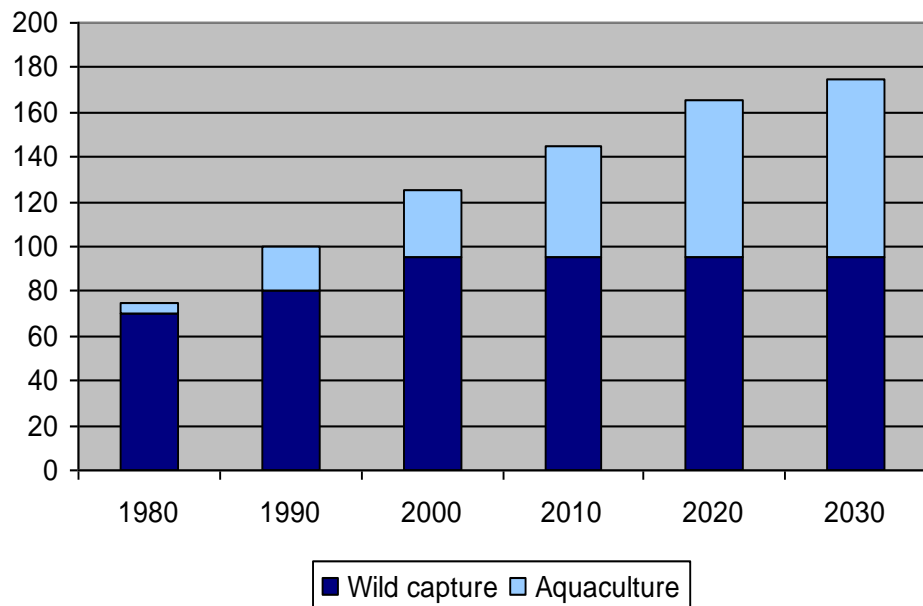


# Hvorfor – Verden trenger sjømat

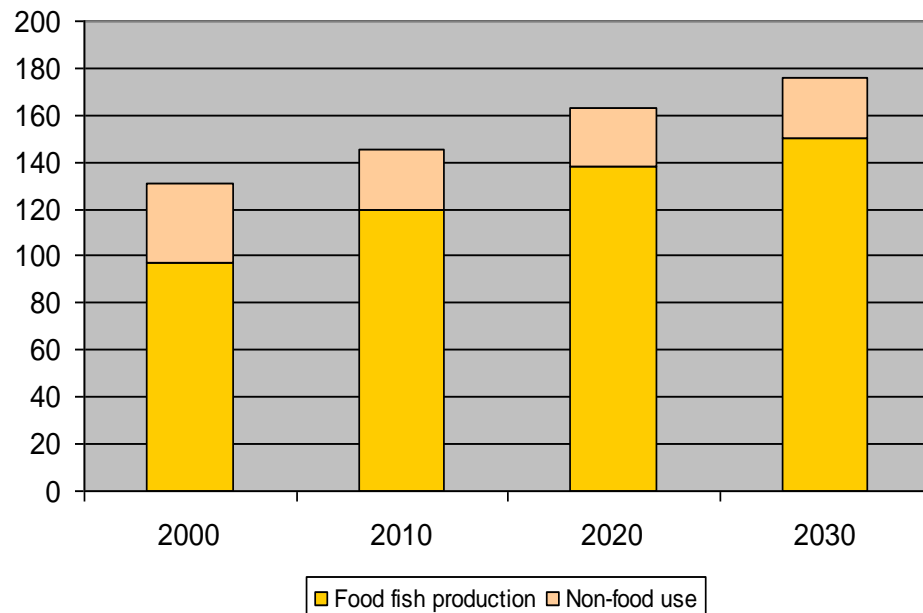
*”From resource to knowledge intensive”*



### Production



### Use

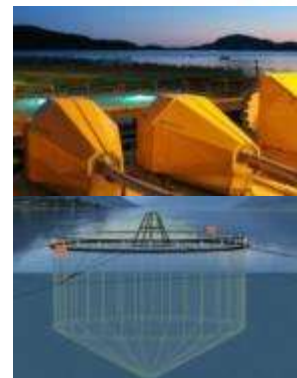


- The global production of fish has to be increased from 120 mill. tons in 2005 to 180 mill. tons in 2030. *The increase will come through marine aquaculture (FAO)*
- Nearly half the fish consumed as food worldwide are raised on fish farms rather than caught in the wild (FAO 2006)

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## Teknologiutvikling er og vil bli viktig

- **Teknologisk utvikling** vil ha stor betydning i den videre ekspansjon i følge FAO
- Norge har lange tradisjoner innen den **marine og maritime industri**
- Norges sjømatindustri **kan og bør være verdensledende**
  - Høy “cluster-index” for den Norske sjømatindustrien (Reve & Jakobsen, 2001)
- Havbruk er ansett som en **industri med et stort potensial**
  - Identifisert som en av de fremtidige Norske industripilarer (Engesland et al. 2000, Norges Forskningsråd 2004)
- Muligheter for **eksport av norsk ekspertise**
  - Exploitation of Marine Living Resources - Global Opportunities for Norwegian Expertise (DKNVS, NTVA 2006)





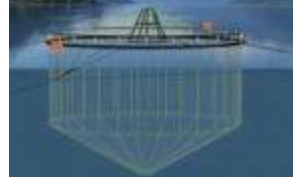
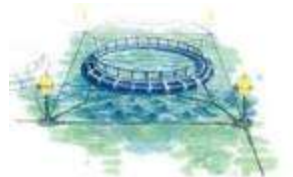
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# FoU tema og fokus i CREATE



Tre forskningspilarer – søker løsninger i rommet mellom dem

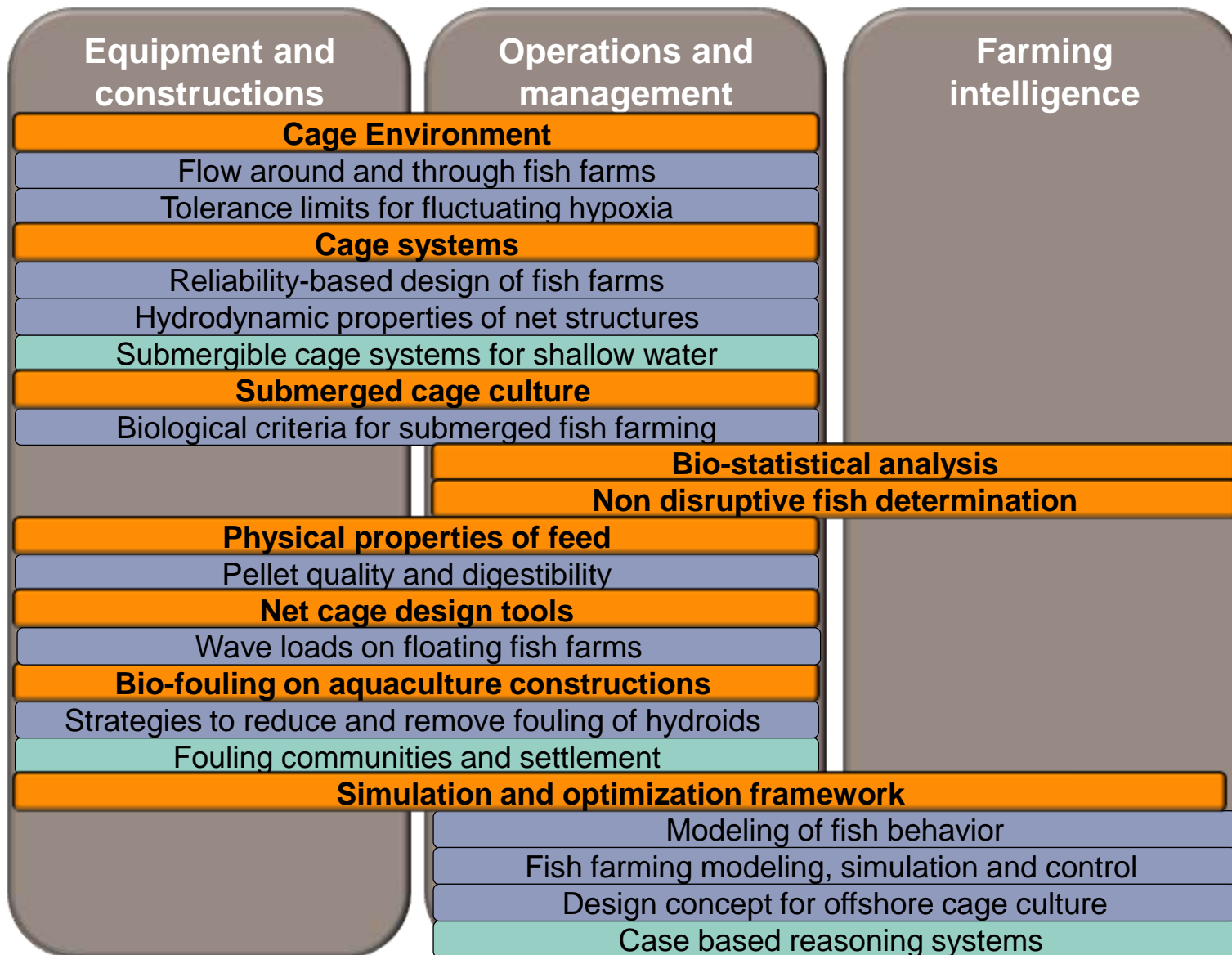
- **Utstyr og konstruksjoner**
- **Drift og operasjon**
- **Farming Intelligence**



## Delmål

1. Forstå **grunnleggende biologiske biologiske preferanser og adferd** for fisk som betingelser for teknologisk utvikling
2. Utvikle **forbedrede systemer og løsninger for drift og operasjon** basert på fiskens behov
3. Utvikle **utstyr og systemer for å forbedre ytelsen og sikkerheten** ved fiskeoppdrett
4. Utvikle et **rammeverk for simulering, kontroll og overvåking** av alle aspekt ved fiskeoppdrett i sjø

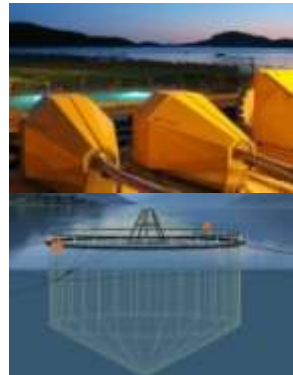
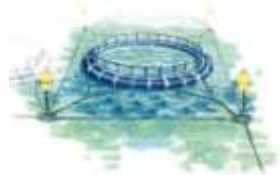
# Forskningspilarer, prosjekter, PhD's og post-doc's



# CREATE

## Some industry relevant results

- Physical properties of feed
  - minimize breakage and maximize feed intake (digestibility of feed)
- Tolerance limits for oxygen levels
  - fish welfare and optimal feeding/growth
  - optimal site selection and
- Tolerance limits for submerging and elevating fish
  - Operational protocols and control of offshore farms
- Long term planning tools
  - case based reasoning and expert systems for planning and to guide farmers
- Equipment design tools
  - Development of next generation nets and cages
- Biofouling
  - Understanding of settling mechanism and physiology
  - Development of new systems and methods for removal





## Formidling og mere informasjon

- CREATE nettside [www.sintef.no/create](http://www.sintef.no/create)
- Arbeidsmøter, konferanser, publisering, nyhetsoppslag
- Årsrapporter (kan lastes ned fra nettside)







**ERLING HAUG**

**AKVA** GROUP

