



Ingrid Olesen

Forskingssjef Avl og genetikk, Professor II IHA, NMBU



**Nofimas erfaringer og muligheter  
for bidrag til Fisk for utvikling**



A photograph of a man and a woman in a meeting. The man, on the left, is wearing a light-colored checkered shirt and has his hand to his chin in a thoughtful pose. The woman, on the right, is wearing a white and red saree and glasses, looking towards the man. The background is a plain wall with a framed poster.

# Driving development of genetic improvement programs for aquaculture for > 40 yrs

- Salmonids
- Genetic Improvement in Farmed Tilapia (GIFT)
- Shrimp
- Carp
- Abalone
- Asian sea bass
- etc

# Akvakultur

## Avl og genetikk

- Utvikle metoder og verktøy for å avle fram dyr som er mer produktive, friske og ressurseffektive i akvakultur

## Produksjonsbiologi

- Optimalisere produksjonen og bidra til å utvide spekteret av arter til oppdrett

## Fiskehelse

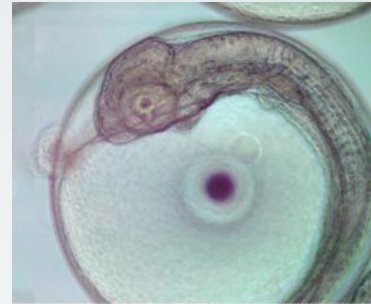
- Bidra med kunnskap om hvordan tap som følge av sykdom kan reduseres

## Ernæring og fôrteknologi

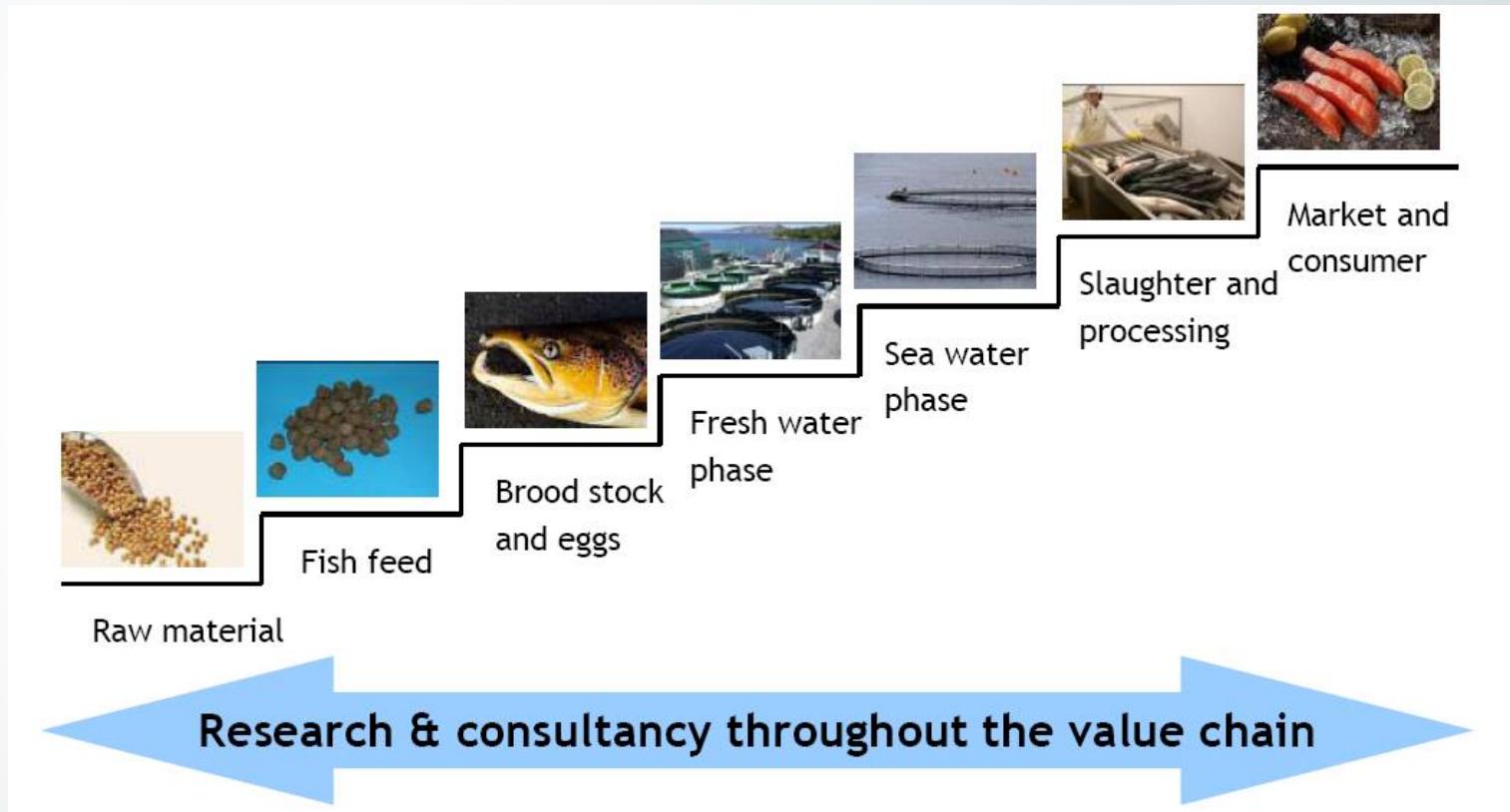
- Utvikle fôr som gir fisken god helse og velferd, og som utnytter fôrråvarer optimalt ut fra ernæringsmessige, teknologiske og økonomiske hensyn

## BioLab

- Forsknings- og oppdragslaboratorium med spisskompetanse på marine ingredienser



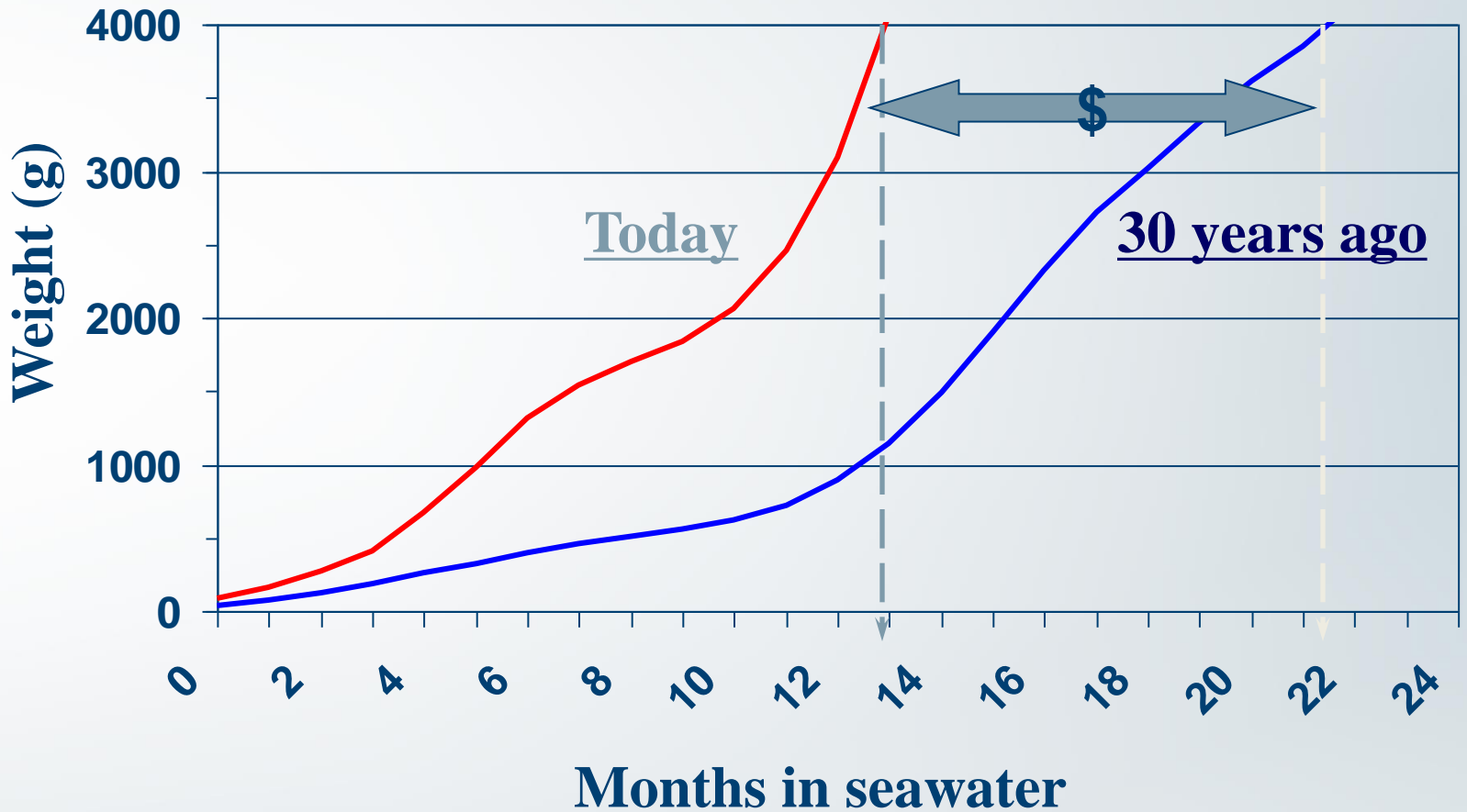
# Nofima → For the aquaculture industry



# Application & benefits



# Case 1: Rapid growth through selective breeding of salmon in Norway



# Selected (5th gen) vs. wild salmon

Norw. salmon industry 2007  
Reduced feed cost:  
NOK 1,5 bill (>USD 250 mill)

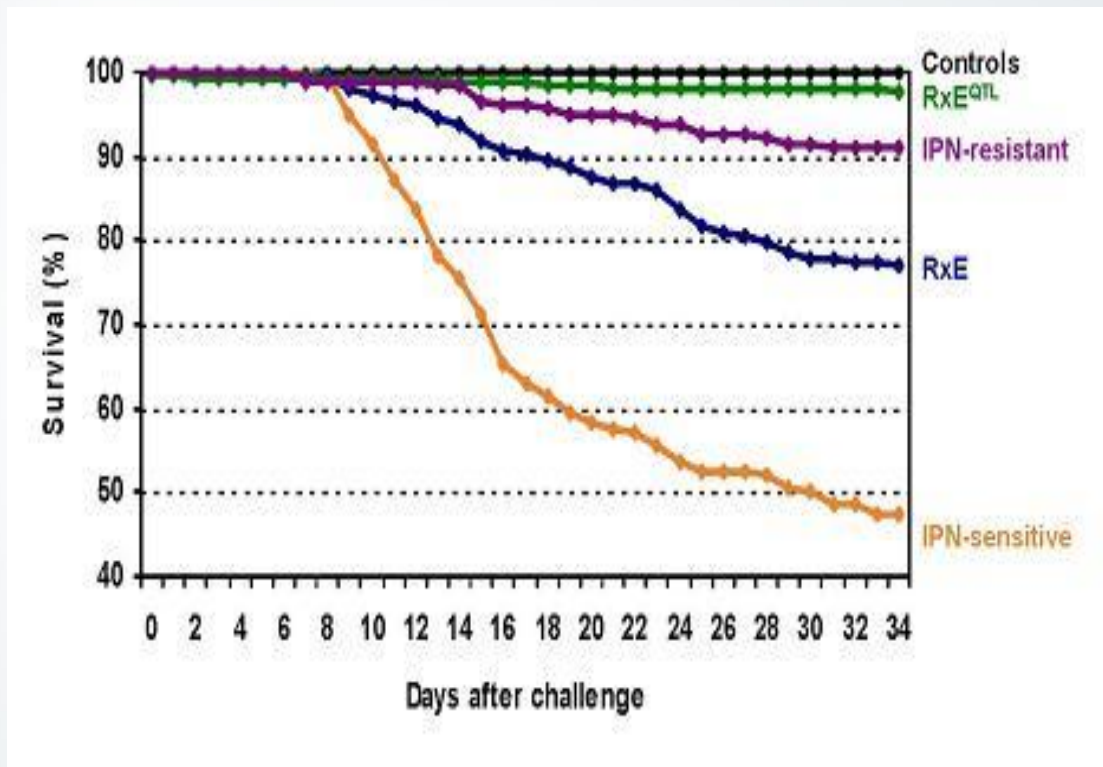
	<b>S - W, %</b>
<b>Growth</b>	+113
<b>Feed-uptake</b>	+40
<b>Protein utilization</b>	+9
<b>Energy utilization</b>	+14
<b>Feed conv. efficiency</b>	+20

**G8: +30%**

*Thodesen et al. (2001)*



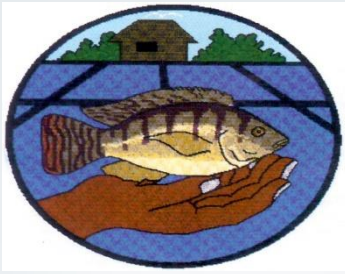
## Case 2: QTL and marker assisted selection - resistance to IPN in salmon



Fiskehelse rapporten,  
2014:

- Tal tilfeller av IPN redusert til 1/3
- Halvering av tap av laks i sjø

AquaGen, 2010

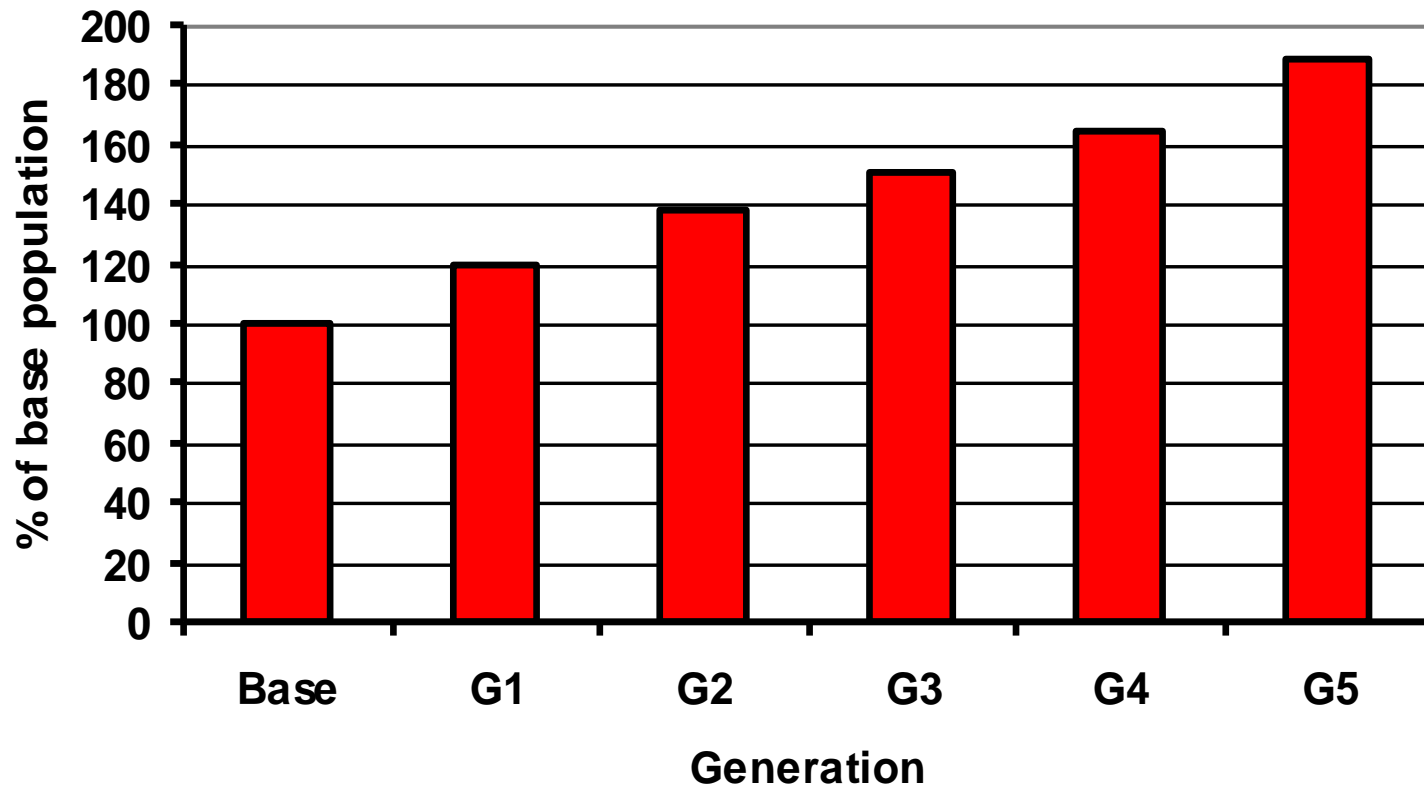


# Case 3. Nile tilapia

## Genetic gain for harvest body weight (% of base population)

Bentsen et al. (2003)

# GIFT



# Avlsprogram for tilapia i Morogoro (SUA)

## Objective:

Improve the productivity of tilapias in ponds of small-scale farmers through selective breeding, culture of all-male population and mass production of fingerlings.

- To **improve the growth rate and mature size of Nile tilapia through selective breeding.**
- To design a protocol for **production of all-male fingerlings** for grow-out in ponds of fish farmers.
- To **assess the efficiency of hapa and egg artificial incubation technologies in production of tilapia fingerlings.**
- To **build capacity of students and farmers** in fish breeding and mass fingerling production technologies.





# Nofimas samarbeid og kontakter i akvakultur og avl i hovudsamarbeidsland for Noreg

- **Tanzania:** Sokoine University of Agriculture (EPINAV Nile tilapia breeding), Eden Agri-Aqua Ltd (klekkeri, fórfabrikk)?, Kimbiji Investment Holding company Ltd/Gjendemsjø fisk AS/Klaring ANS (tilapia farming, education, RAS)
- **Malawi:** Bunda College. Local tilapia breeding program established. NORHED søknad
- **Uganda:** Red Fish, Ugandas ambassade (DK)
- **Mozambique:** AquaPesca? (shrimp farmer/breeder) and Moz. Gov. Fact finding trip.
- **Bangladesh, India, Myanmar:** Hilsa breeding and farming. Networking projects 2012-2013. Application rejected Indian Embassy. Myanmar?
- **Indonesia:** Innovasjon Norge, Asian seabass

## India, Bangladesh and Myanmar Lay out Road Map for a Management Plan for Hilsa Fisheries



Edition | Monday, January 14, 2013 |

Front Page > KnowHOW > Story

[f Like](#) 2 
 [t Tweet](#) 1 
 [g +1](#) 0 
 [✉](#)
[🖨](#)
[f](#)
[t](#)
[+](#)

### Hilsa story

Indian scientists are studying the hilsa to see whether the prized fish can be farmed. T.V. Jayan reports

Delegates from Bangladesh, India and Myanmar have laid out a road map for a management plan for hilsa fisheries. This was done at a regional consultation organized by the BOBP-IGO on March 14-15, 2008, at the Central Inland Fisheries



[Mysore](#)
[Nagpur](#)
[Nashik](#)
[Noida](#)
[Patna](#)
[Pune](#)
[Raipur](#)
[Rajkot](#)
[R](#)

[Shvoong Home](#) > 
 [Society & News](#) > 
 [New Threats on Hilsa Fishery of Bangladesh Summary](#)

## New Threats on Hilsa Fishery of Bangladesh

Article Summary by: [EmdadulHaque](#) Original Author: [Md. Emdadul Haque](#) Not yet rated [👁](#) Visits: 16 [AB](#) words:600

More About: [hilsa fisheries in india](#)

[t Tweet](#) 0 
 [f Like](#) 0 
 [g +1](#) 0

A report published by Mr. M Jasim Uddin from Barguna in a famous bangla daily newspaper "Prothom Alo" on 12.07.2011 titled as "Indian fishermen art driving operation in Bangladeshi water"

In his report Mr. Jasim highlighted the threats of Bangladeshi Hilsa fisheries by Indian fishermen. I believe Mr. Jasim reported this news not only to perform a professional job assigned on him. There might be some patriotism and grievance or our poor forehead from his heart that comes truly through his pen. Thanks Prothom alo for publishing this report. Being a fisheries



There may be some good news missed their quota of hilsa due because of the exorbitant price the best quality hilsa could see market.

## The case of the disappearing Hilsa

Sunday, Oct 28, 2012, 11:06 IST | Agency: DNA

Sankar Ray

In West Bengal, the aggregate Hilsa yield between 2001 and 2011 declined from 80,000 tonnes to 20,000 tonnes.



Fisheries' which revealed that the massive migration of the Hilsa is a consequence

In West Bengal, the aggregate Hilsa yield between 2001 and 2011 declined from 80,000 tonnes to 20,000 tonnes. statistics quintessence and Ban existence Parineet New Del Rivers a the ess; Fisherie

**THE TIMES OF INDIA** | Kolkata [🔍](#)

[Home](#)
[City](#)
[India](#)
[World](#)
[Business](#)
[Tech](#)
[Sports](#)
[Entertainment](#)
[Life & Style](#)
[Women](#)
[Hot on the Web](#)
[Spirituality](#)
[NRI](#)
[IPL 2](#)

[Mumbai](#)
[Delhi](#)
[Bangalore](#)
[Hyderabad](#)
[Chennai](#)
[Ahmedabad](#)
[Allahabad](#)
[Aurangabad](#)
[Bhubaneswar](#)
[Bhopal](#)
[Chandigarh](#)
[Coimbatore](#)
[Goa](#)

[Jaipur](#)
[Kanpur](#)
[Kolkata](#)
[Kochi](#)
[Kozhikode](#)
[Lucknow](#)
[Ludhiana](#)
[Madurai](#)
[Mangalore](#)
[Mysore](#)
[Nagpur](#)
[Nashik](#)
[Noida](#)
[Patna](#)
[Pune](#)
[Raipur](#)

[Thiruvananthapuram](#)
[Vadodara](#)
[Varanasi](#)
[Visakhapatnam](#)

You are here: [Home](#) > [Collections](#) > [Scientists](#)

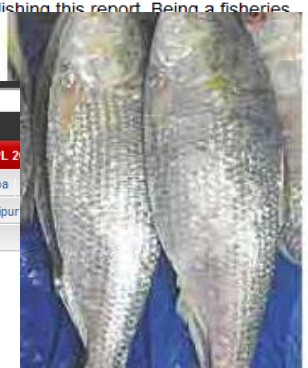
### RELATED ARTICLES

- [Pollution may wipe out 'machher jhol'](#)  
 January 21, 2005
- [Ganga sees fall in catch of fishes like Rohu, Hilsa](#)  
 September 19, 2011
- [Rampant shark fishing upsets biologists](#)  
 May 7, 2011

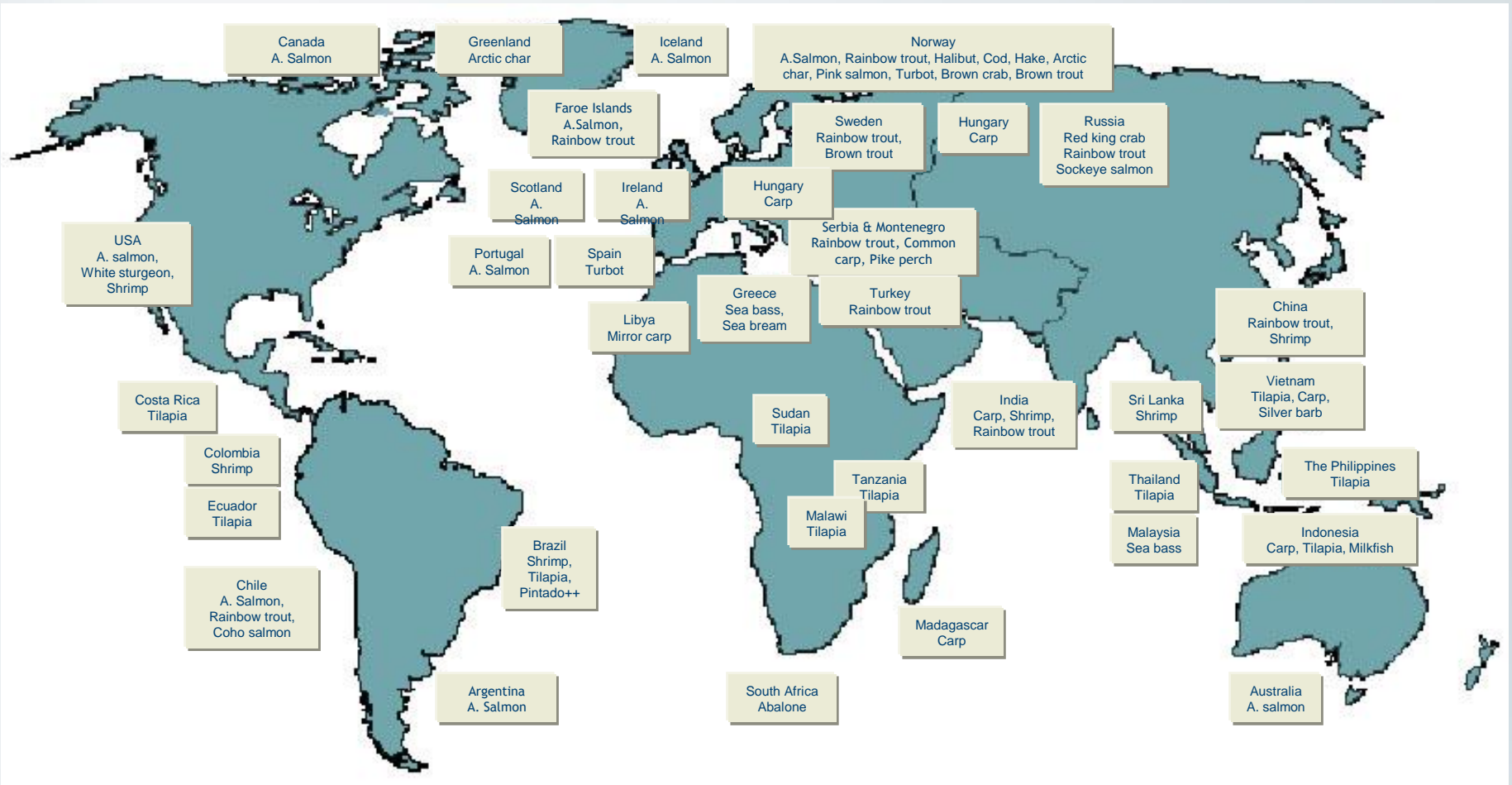
## Hilsa may soon become endangered: Experts

Kalyan Moitra, TNN Jul 4, 2002, 12:58am IST

KOLKATA: Hilsa, the quintessential Bengali delicacy, may soon become endangered for Bengalis unless the government stops indiscriminate fishing of the fish, scientists.



# Internasjonale prosjekt i Nofima



Note: In addition to this, we have several confidential projects on different species



# Betterfish - konklusjon (Olesen et al., 2015)

Den globale bruken av genetisk forbetra fisk i akvakultur kan aukast i større grad dersom:

- Kapasitetsbygging, utdanning og utvikling av seleksjonsavl og genetik er styrka
- Offentleg støtte til etablering og drift av avlsprogram fyrste 5-10 generasjonar for artar med store volum som ikkje blir finansiert/prioritert av private næringsaktørar.
- Behov for alternative forretningsmodellar for sikring av ein rettferdig del av verdiskapinga til private avlsaktørar, spesielt i område med små og fattige oppdrettarar (for eksempel kooperativ)



# Biofag Evaluation panel NFR 2011 about Breeding and Genetics in Nofima

Overall, the research panel ranked the research performed at the unit "Breeding and genetics" as Very Good.  
Grade: Very Good.

## *Societal impact*

The Breeding and genetics unit is in a unique position in Norway and its research has great societal impact and addresses economically important issues. There is a close link between basic and applied research and the unit's contributions are of very high economic importance for Norway.



# Nettbasert kurstilbud akvakultur (avl) for etter/vidareutdanning på B.Sc nivå

- Nofima (i samarbeid med SEVU, NMBU) starta pilotprosjekt for internasjonalt nettbasert kurs innan akvakulturavl på grunnleggande vidare/etterutdanning og BSc nivå.
- Kan/bør utvidast til andre akvakulturfag (fôring, fiskehelse, teknologi, ledelse)
- Innspel til Kompetanseplattform: Massive Open Online Course on Aquaculture utviklast stegvis på ulike nivå frå fagarbeidar til MSc. Skolering av klekkeri-ledere, oppdrettere, veiledere, gov. officers, fagskolelærar, forskarar, academia
- Samkøyrast med NORGHATI ++



**Takk for merksemda!**

[www.nofima.no](http://www.nofima.no)

[Ingrid.olesen@nofima.no](mailto:Ingrid.olesen@nofima.no)