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AquaIMPACT
Nutrition and breeding

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AquaIMPACT - Genomic and Nutritional Innovations for Genetically Superior Farmed Fish

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Natural Resources Institute Finland (Luke)

at

AQUA FARM

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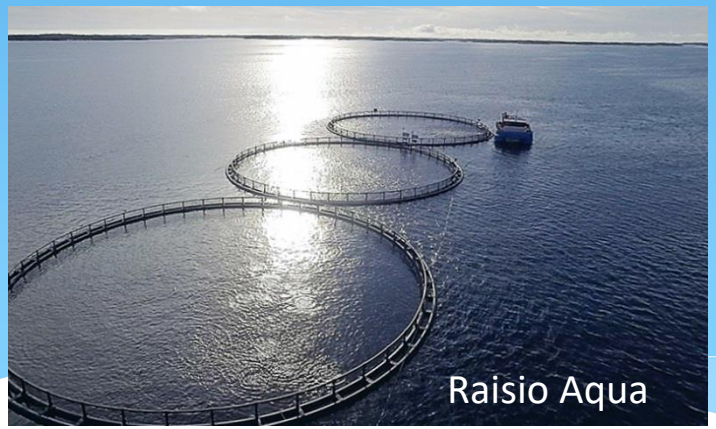
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818367 - AquaIMPACT.



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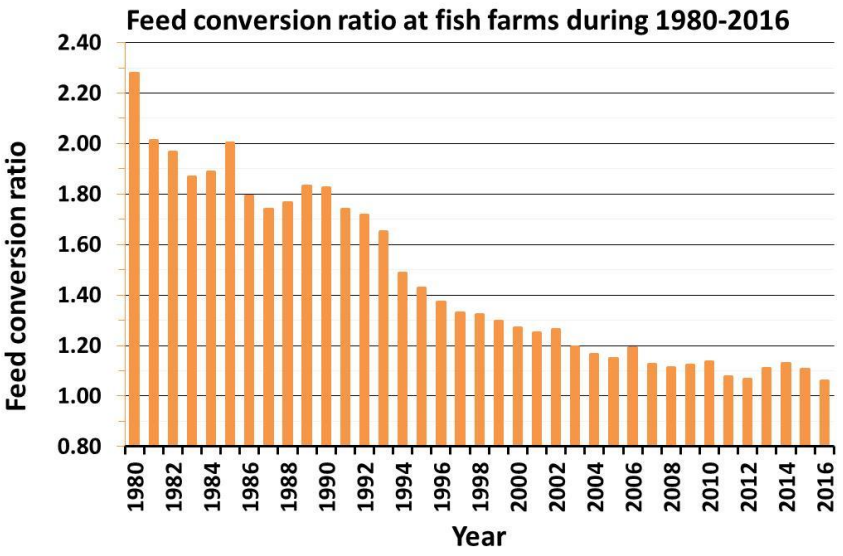
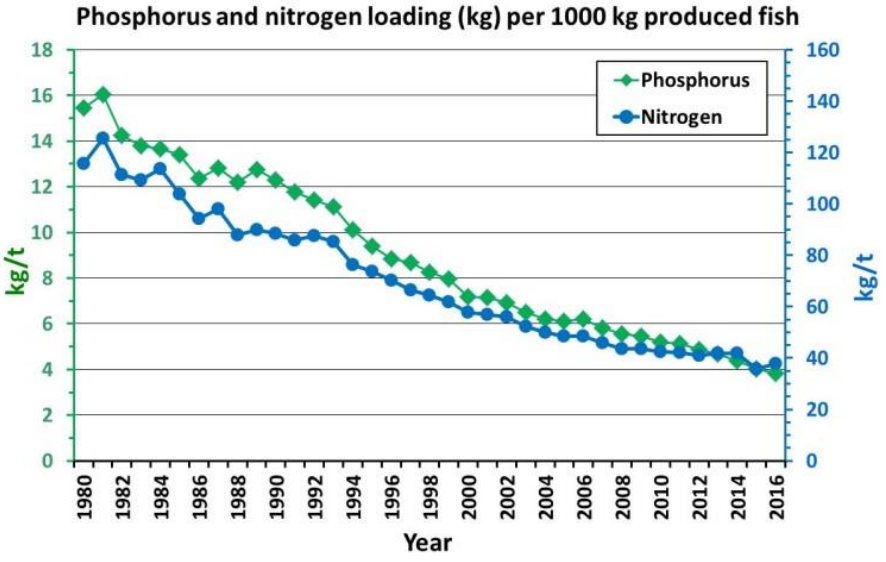
Increase in resource efficiency and reduction in nutrient loading from 1980 to 2016 in rainbow trout farming

For production of 1000 kg fish:	1980-81		2016	
Feed conversion ratio, FCR	2.28		1.06	-53%
Feed needed (kg):	2280		1060	-53 %
Phosphorus loading (kg/1000kg):	16.0		3.8	-76 %
Nitrogen loading (kg/1000kg):	125.6		37.8	-70 %





Source: Official data records of ELY Centre from mainland Finland, n=12-381 farms per year.

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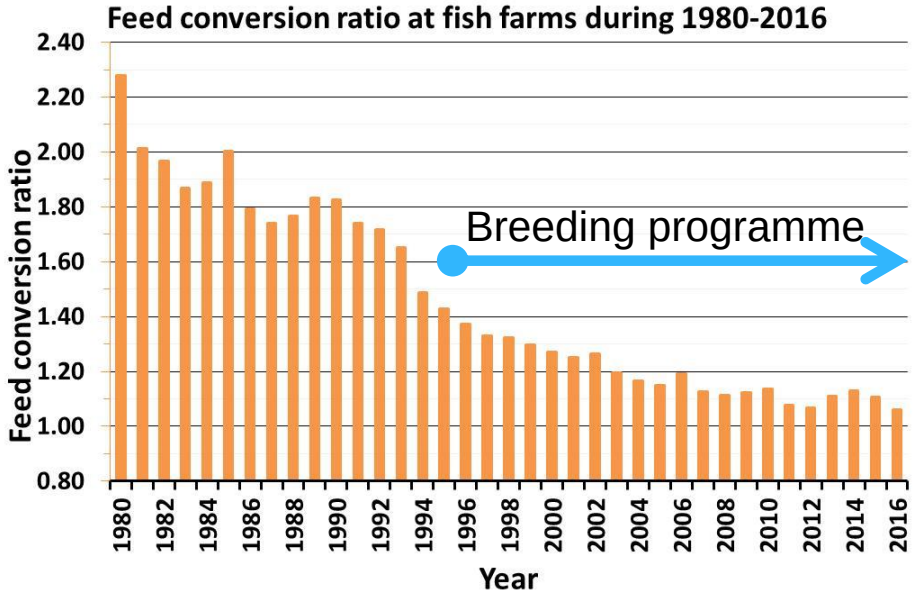
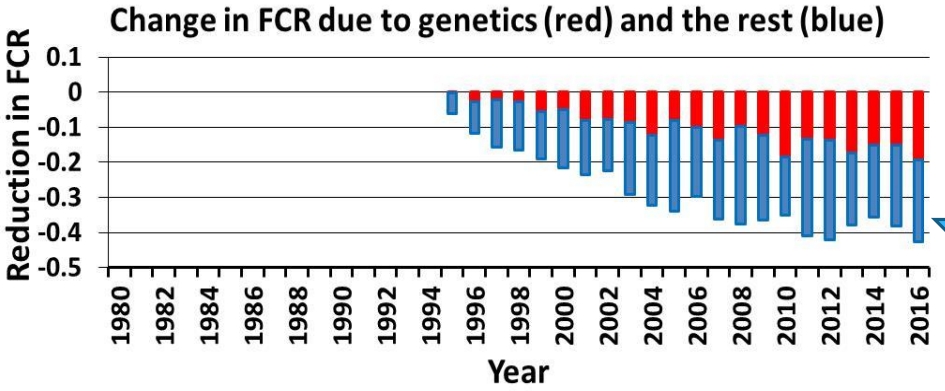
Genetic improvement in FCR in rainbow trout



-0.427 unit phenotypic improvement
28.7% improvement in FCR



-0.427 unit phenotypic improvement

-0.192 FCR units: Genetics ~40%

-0.235 FCR units: Feeds, management ~60%

In 10 Mkg production, 2.4M€ cost saving

FCR genetically improved 1.96% per generation, **cumulatively by 13.0%,**
Growth genetically improved 6.7% per generation, cumulatively by 57.2%

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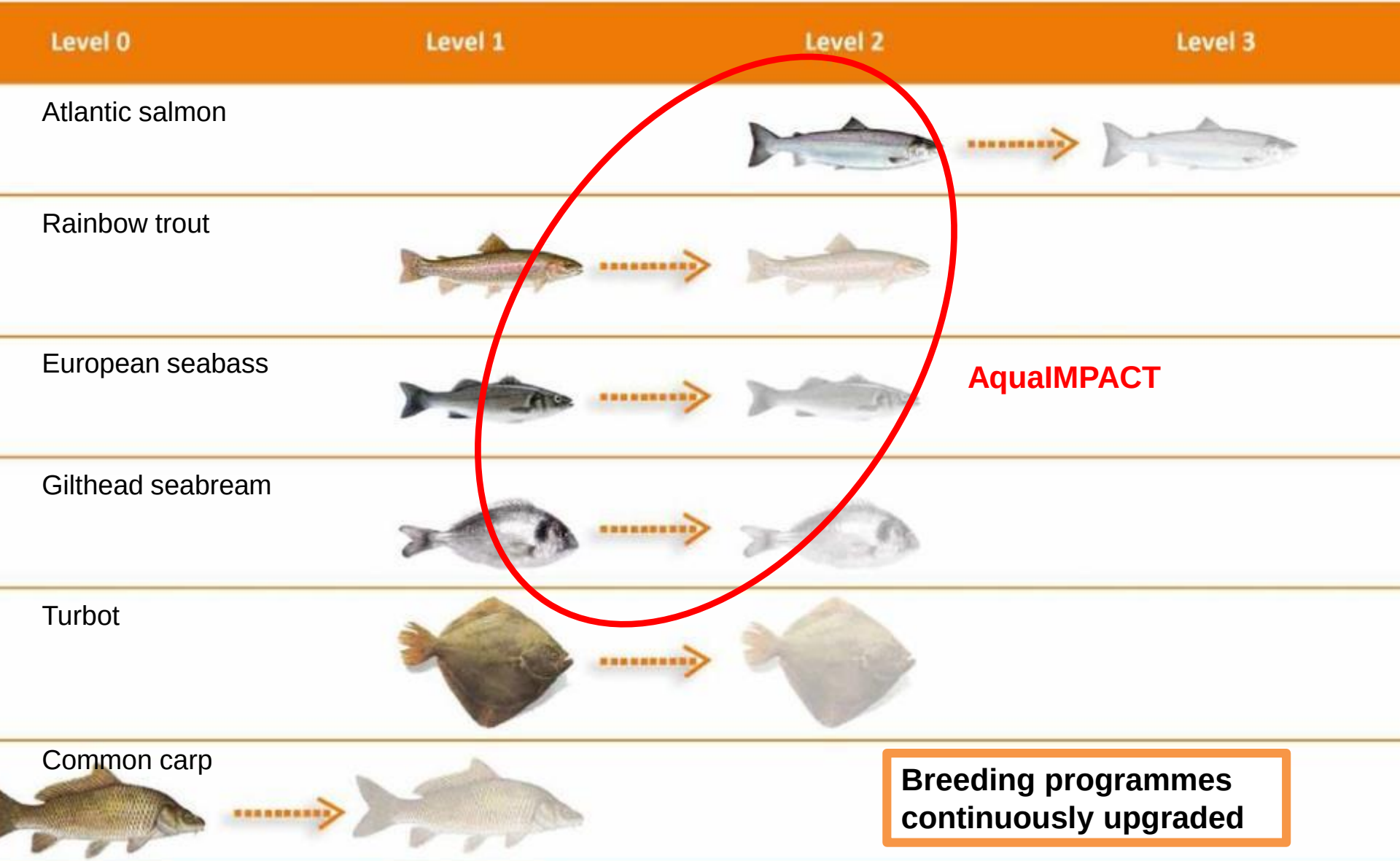
Mass selection for growth | **Id marking and family selection** | **DNA profiles Diseases, Fillet%...** | **Sequencing**



The research leading to these results has received funding from the European Union's Seventh Framework Programme (KBBE.2013.1.2-10) under grant agreement no. 613611 FISHBOOST.

FISHBOOST
The next level of aquaculture breeding

Breeding programmes change fish traits that are related to nutritional requirements

	Fish traits	Genetic or family variation[2]	Documented genetic change in response to selection
X	Growth rate	+++	Yes
X	Feed conversion ratio	+(+)	Yes
X	Lipid%	+++	Yes
X	Lipid%, when body weight constant	+++	Yes
X	Fillet%	+(+)	Yes
X	Protein retention	+	Yes
	Energy retention	+	Yes
	Fatty acid synthesis	+	
	N-3 LC-PUFA deposition	+	

[1] Sources: Gjedrem and Rye (2018); Kause et al. (2016); Knap and Kause (2018); Nguyen et al. (2010); Prchal et al. (2018), Horn et al (2018). and references therein.
[2] Amount of genetic variation indicated by + signs.

D. Montero, S. Torrecillas, D.R. Tocher, M. Vandeputte, R. Fontanillas, G. Rosenlund, P. Haffray, B. Ruyter, A. Sonesson, J. Bastiaansen, A. Kause. (2019). EA2019.

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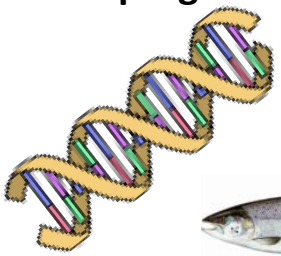
AquaIMPACT - A major effort to integrate fish breeding and nutrition

To develop selective breeding programmes



To support the genetic potential

To support feed development

Nutrition, feeds and feeding:

Nutritional requirements

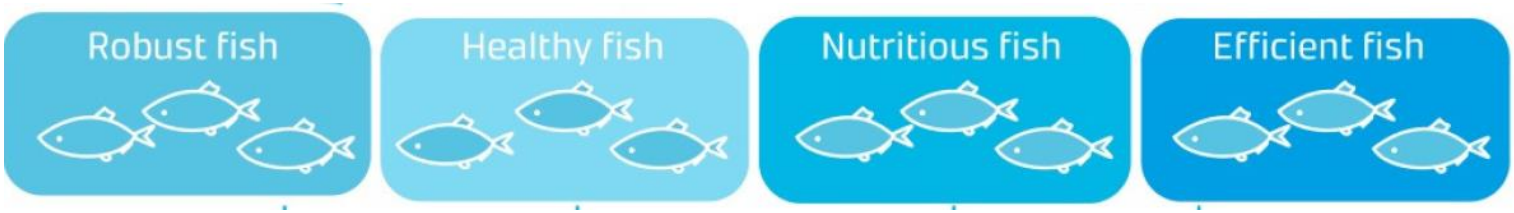
Emerging feed raw material, products and additives

Gut health and its microbiota

Fish welfare

Product quality

Digitalisation
Smart-software
Machine learning
Internet-of-things
More cost-effective operations



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SYSAAF

SKRETTING
a Nutreco company

MOWI

Ferme Marine du Douhet

sparos
I&D nutrition in aquaculture

Benchmark Genetics Norway

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UNIVERSITY & RESEARCH

INRA
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Ifremer

Nofima

UNIVERSITAS STUDIORUM INSUBRIAE

Stakeholder Group

eas european aquaculture society

FEAP
FEDERATION OF EUROPEAN AQUACULTURE PRODUCERS

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