

AQUAOPTIMA

Optimal water quality - ideal fish health





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The use of recirculation systems for land based fish farming

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About us



Working together

Through our long and successful experience in creating profitable values within aquaculture, we will contribute to growth in industrial aquaculture









About AquaOptima

- Offices located at Solsiden, Trondheim, Norway
- Agents/operation partners world vide
- As a part of Scale, we are represented in the largest markets in our industry
- Based on comprehensive research activities in SINTEF in the period 1985-1993

Increase in land-based production in Norway



Challenges in the traditional production

- High salmon mortality in the sea phase of the production, in average 16%
- Escapees
- Sea lice

The trend in Norway is

- 1. to keep the salmon longer in closed systems on land
 - Less time in sea, less lice, less diseases
 - Better control of the production
 - Higher densities
- 2. to produce the salmon in **RAS**











- 1. Not enough water for expanded production
- 2. Advantage of steady and optimal temperature for growth throughout the year
 - Reduced total production time
 - Better utilization of the concessions in sea



- 3. Minimal water discharge and collection of waste for further utilisation
- 4. Controlling the rearing environment and increasing the production
 - Independent of the surrounding environment

International aquaculture is in growth and development











FIGURE 1 WORLD CAPTURE FISHERIES AND AQUACULTURE PRODUCTION



NOTE: Excludes aquatic mammals, crocodiles, alligators and caimans, seaweeds and other aquatic plants





	TOTAL FISH SUPPLY		FOOD FISH CONSUMPTION	
	DATA 2008	PROJECTION 2030	DATA 2006	PROJECTION 2030
Capture	89,443	93,229	64,533	58,159
Aquaculture	52,843	93,612	47,164	93,612
Global total	142,285	186,842	111,697	151,771
Total broken down by ree	gion as follows	•	•	·
ECA	14,564	15,796	16,290	16,735
NAM	6,064	6,472	8,151	10,674
LAC	17,427	21,829	5,246	5,200
EAP	3,724	3,956	3,866	2,943
CHN	49,224	68,950	35,291	57,361
JAP	4,912	4,702	7,485	7,447
SEA	20,009	29,092	14,623	19,327
SAR	6,815	9,975	4,940	9,331
IND	7,589	12,731	5,887	10,054
MNA	3,518	4,680	3,604	4,730
AFR	5,654	5,936	5,947	7,759
ROW	2,786	2,724	367	208

TABLE E.1: Summary Results under Baseline Scenario (000 tons)

Source: IMPACT model projections.

Note: ECA = Europe and Central Asia; NAM = North America; LAC = Latin America and Caribbean; CHN = China; JAP = Japan; EAP = other East Asia and the Pacific; SEA = Southeast Asia; IND = India; SAR = other South Asia; MNA = Middle East and North Africa; AFR = Sub-Saharan Africa; ROW = rest of the world.



OptiFarm

We build turnkey systems that ensure optimal water quality. The OptiFarm system offers effective self-cleaning tanks, optimal circulation speed and excellent water quality. This promotes thriving fish, ideal fish production and an even distribution of fish throughout the tank volume.





Parameter	Safe levels (salmonids)	
TSS	< 15 mg/L	
TAN (NH ₄ +-N plus NH ₃ -N)	< 2 mg/L	
$NH_3 - N$	< 0.012 – 0.025 mg/L	
$NO_{2}^{-} - N$	< 0.1 mg/L	
NO ₃ ⁻ - N	< 100 mg/L	
Dissolved O ₂	80 - 100% saturation	
CO ₂	< 15 mg/L	
рН	7-7.5	
Density	< 80 kg/m ³	
Temperature	12-14 °C for Atlantic salmon, 15-17 °C for rainbow trout**	

Ref: Timmons and Ebeling (2007), Thorarensen & Farrell (2011), *Terjesen et al. (2012), **Pers.com. DTU

Accumulation of particles leads to

✓ increased amount of organic material✓ reduced water quality



ΑΟυλορτιμα

OptiFarm







Intake water control

- 1. Pathogenic microorganisms
- 2. Particles and organic material
- 3. Humus

Waste control

- 1. Further utilisation
- 2. Sludge dewatering/concentration
- 3. Wastewater disinfection









Turnkey technology

- Intake water treatment
- Water treatment RAS
- Fish production units
- Monitoring and control
- Sludge treatment
- Training, startup and service

Installation supervision – Starting up











Program for training and operating support first year of operation

Training of operating personnel will be given both during start-up and in the first year of operation. This is done as a two-part training (biology, water quality and process engineering)

Biology / water quality / fish health	Process Technical Operation	
1. Before start-up	1. Before start-up	
COURSES/TRAINING There will be training in measuring and analyzing the various water quality parameters that are essential for RAS, as well as fish welfare, fish health, microbial monitoring and smoltification	TECHNICAL TRAINING Technical review of all critical components (pumps, mechanical filters etc.)	
2. First year of operation	2. First year of operation	
MONTHLY REPORTING FROM THE FACILITY Monitoring of operation and water quality MONTHLY SITE VISITS	MONTHLY VISIT FROM AQUAOPTIMA Review of operation/facility POSSIBILITY OF REMOTE MONITORING OF THE PROCESS	







Kharp, Russia – Sturgeon and Whitefish





Sturgeon meat 10 tons/y and caviar production 2,5 tons/y Hatchery for Whitefish: 10 mill/y á 1.5 g, 1 mill/y á 30 g and 0,4 mill/y á 100 g









Smolt department (50 m³ tanks)

MBBR[™] Bioreactor

FindFresh, Portugal – European eel 500 tons/y







Glass eel department

Grow-out department

Smolt and post smolt, Vikan Frøya











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