

# KAPALI DEVRE SİSTEMDE TÜRK SOMONU YETİŞTİRİCİLİĞİ

Doç. Dr. Türker BODUR  
Akdeniz Üniversitesi

## **KOMİSYON ÜYELERİ (Soyadı alfabetik)**

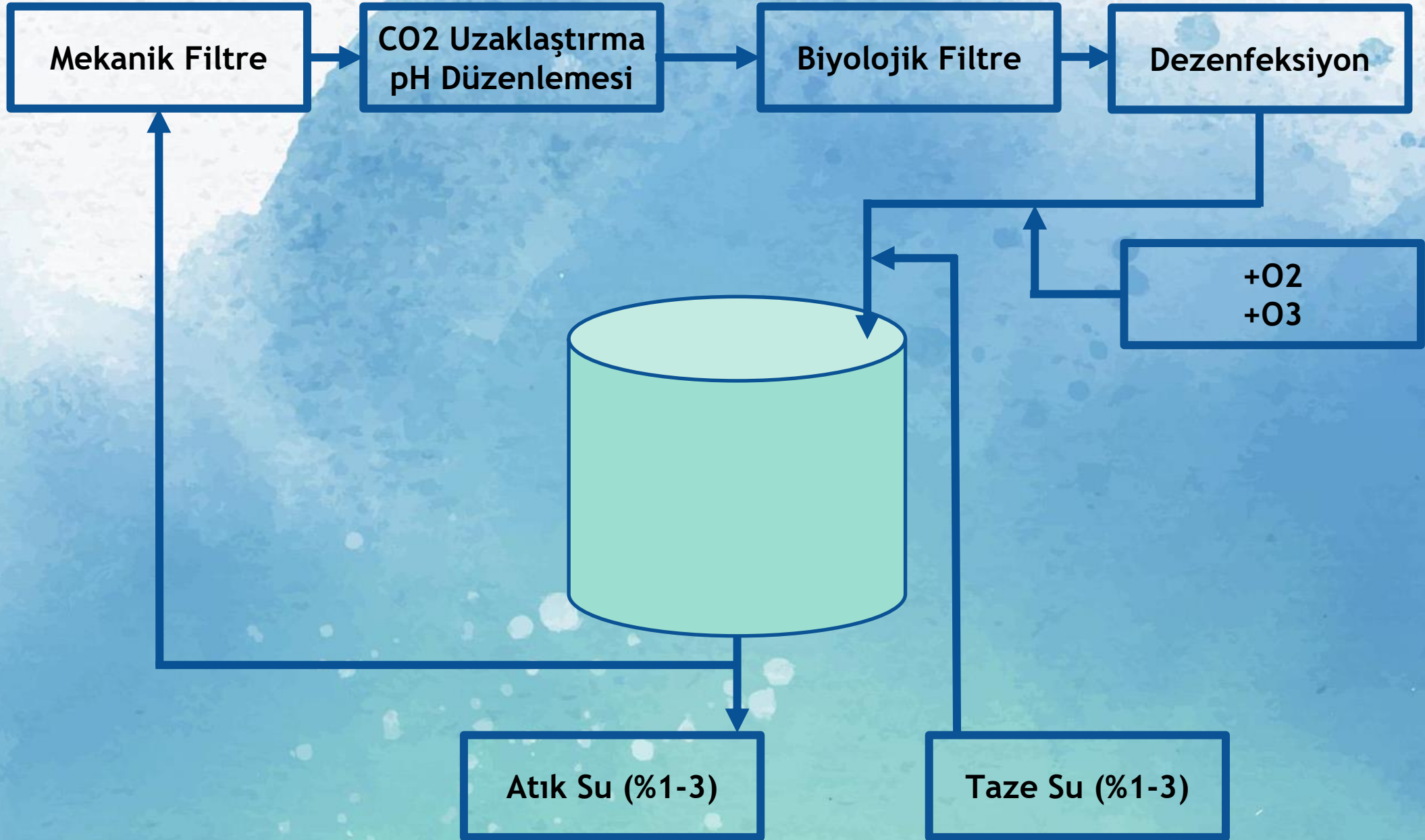
**Doç. Dr. Türker BODUR (Akdeniz Üniversitesi)**

**Su Ürünleri Müh. İshak GENÇBAY (Özel Sektör)**

**Doç. Dr. Hüseyin SEVGİLİ (ISUBÜ)**

**Dr. Öğr. Ü. Deniz Devrim TOSUN (İstanbul Üniversitesi)**

**Su Ürünleri Y. Müh. B. Serdar YILDIRIM (Özel Sektör)**





Picture credit: akvgroup.com



Çok daha az su ihtiyacı



Üretim parametrelerinin  
tam kontrolü



Stabil ve öngörülebilir  
üretim



Doğaya balık kaçışına  
%100 engel



## AVANTAJLAR



Optimum sağlık kondisyonu  
(Hastalıktan arı)



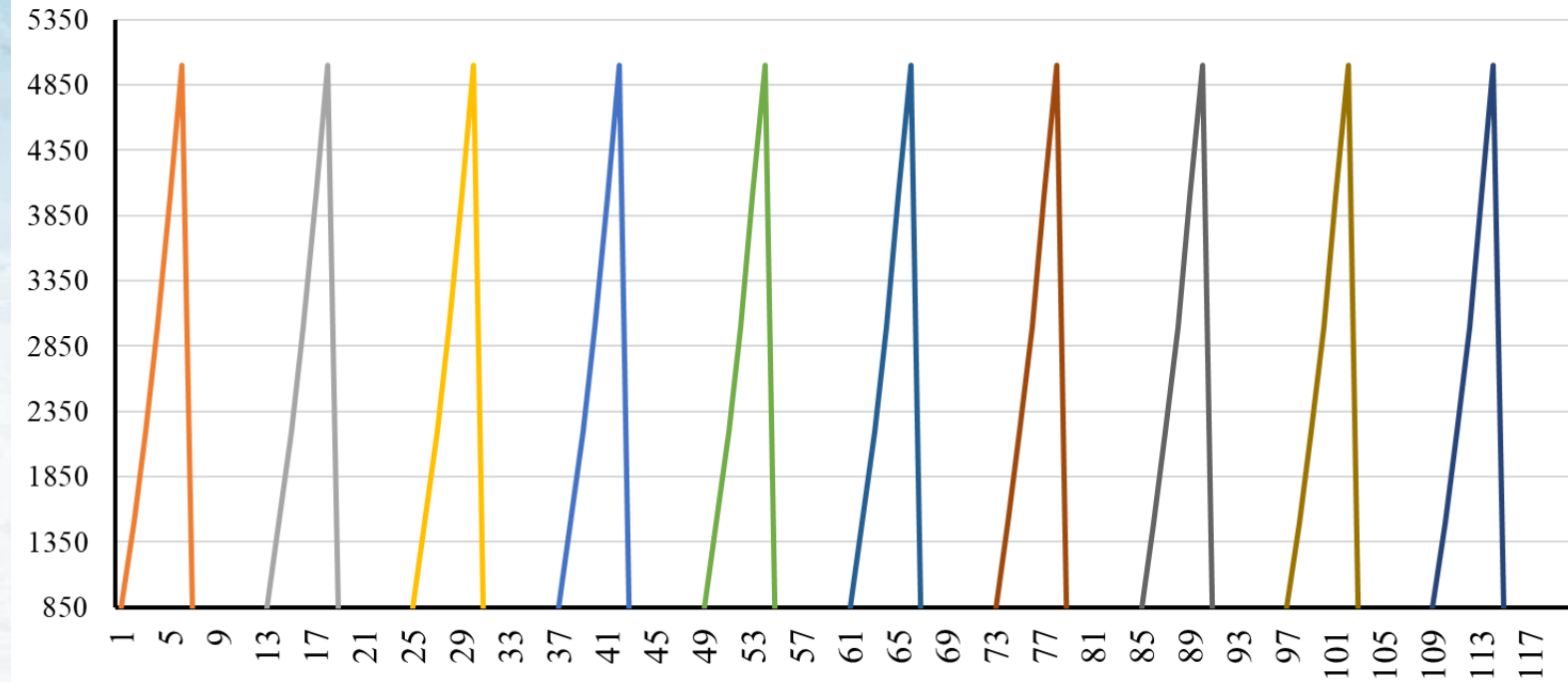
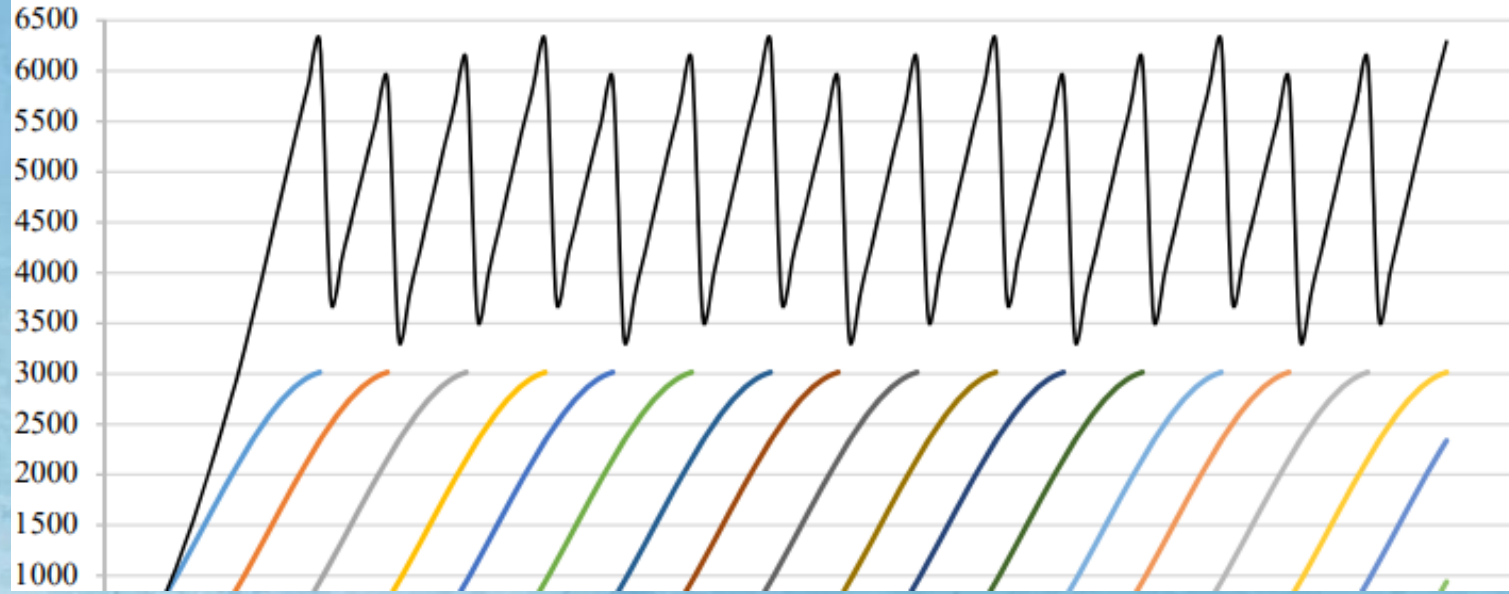
Çevre ve iklim  
faktörlerinden izolasyon



Optimal bölgede  
üretim imkanı



Üretimde oluşan katı atık  
materyalinin %90 oranında  
tutulması



KAPALI DEVRE SİSTEMDE HASAT

KARADENİZDE KAFES  
ORTAMINDA HASAT

Giderler Listesi	Yatırım Maliyetleri	Maliyet Yüzdesi	Maliyet Yüzdesi (Arazisiz)
Arazi ve Hafriyat (30.000 m2)	84.000.000,00	48,82%	-
Su Temini (500L/min/tank)	500.000,00	0,29%	0,57%
Bina	13.305.600,00	7,73%	15,11%
Beton İşleri	10.048.800,00	5,84%	11,41%
Yemleme Sistemi	2.500.000,00	1,45%	2,84%
Borulama Sistemi	4.985.900,00	2,90%	5,66%
Elektrik İşleri	5.560.000,00	3,23%	6,31%
Teknik Ekipmanlar	14.938.244,00	8,68%	16,96%
Balık Tankları (20.000 m3)	14.369.722,00	8,35%	16,31%
Su kalitesi düzenleme ekipmanları			
CO2 Uzaklaştırma	725.000,00	0,42%	0,82%
Dezenfeksiyon (UV)	1.600.000,00	0,93%	1,82%
Oksijenlendirme	2.030.000,00	1,18%	2,30%
Atık uzaklaştırma	807.500,00	0,47%	0,92%
Isıtma - Soğutma	880.000,00	0,51%	1,00%
Beklenmeyen Gider	15.625.076,60	9,08%	17,74%
Toplam	172.077.203,00	100,00%	
Toplam (Arazisiz)	88.077.203,00		100,00%

Giderler Listesi	Yatırım Maliyetleri	Maliyet Yüzdesi
Barge	6.000.000,00	16,57%
Yemleme Sistemi	1.400.000,00	3,87%
Teknik Ekipman	1.000.000,00	2,76%
Beklenmeyen Gider	2.000.000,00	5,52%
Kafes (8 adet)	5.200.000,00	14,36%
İkinci Ünite	15.600.000,00	43,09%
Yasal İzin Maaliyetleri	5.000.000,00	13,81%
Toplam	36.200.000,00	100,00%



Table 11. Costs per production per kg of fish.

Item	Net pen		RAS	
	NOK	%	NOK	%
Feed	13.40	67.8	8.94	49.5
Harvesting	2.37	12.0	2.51	13.9
Smolts	1.80	9.1	1.01	5.6
Labour	0.80	4.0	1.25	6.9
Depreciation	0.40	2.0	0.91	5.1
Maintenance	0.30	1.5	0.54	3.0
Insurance	0.26	1.3	0.65	3.6
Interest on capital	0.43	2.2	0.73	4.0
Electricity	0.00	0.0	1.51	8.3
Total	19.76	100.0	18.05	100.0

Table 6. Net pen cash flow analysis (Unit: mil NOK, Prod: 1000 tonnes).

	Investment year	Years										Total	
		1	2	3	4	5	6	7	8	9	10		
<b>Invest</b>	36.2												36.2
<b>Revenue</b>	0.0	0.0	76.5	153.0	153.0	153.0	153.0	153.0	153.0	153.0	153.0	153.0	1 300.4
<b>OC</b>	0.0	28.0	80.2	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	855.8
<b>Net CF</b>	0.0	-28.0	-3.7	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	444.7
<b>PV</b>	0.0	-25.9	-3.2	47.3	43.8	40.5	37.5	34.7	32.2	29.8	27.6	27.6	264.3
<b>Production</b>	0.0	0.0	2.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	42.5
<b>NPV</b>	228.1												
<b>IRR</b>	46.4%												

Table 7. RAS cash flow analysis (Unit: mil NOK, Prod: 1000 tonnes).

	Investment year	Year										Total	
		1	2	3	4	5	6	7	8	9	10		
<b>Invest</b>	171.9												171.9
<b>Revenue</b>	0.0	0	92.1	184.2	184.2	184.2	92.1	184.2	184.2	184.2	184.2	184.2	1 473.6
<b>OC</b>	0.0	44.6	81.3	89.6	88.7	87.3	81.8	89.3	89.6	88.7	87.3	87.3	828.2
<b>Net CF</b>	0.0	-44.6	10.8	94.6	95.4	96.9	10.3	94.9	94.6	95.4	96.9	96.9	645.2
<b>PV</b>	0.0	-41.3	9.2	75.1	70.1	65.9	6.5	55.3	51.1	47.7	44.9	44.9	384.5
<b>Production</b>	0.0	0	3.0	6.0	6.0	6.0	3.0	6.0	6.0	6.0	6.0	6.0	48.0
<b>NPV</b>	212.6												
<b>IRR</b>	22.02%												



News &amp; Views &gt;

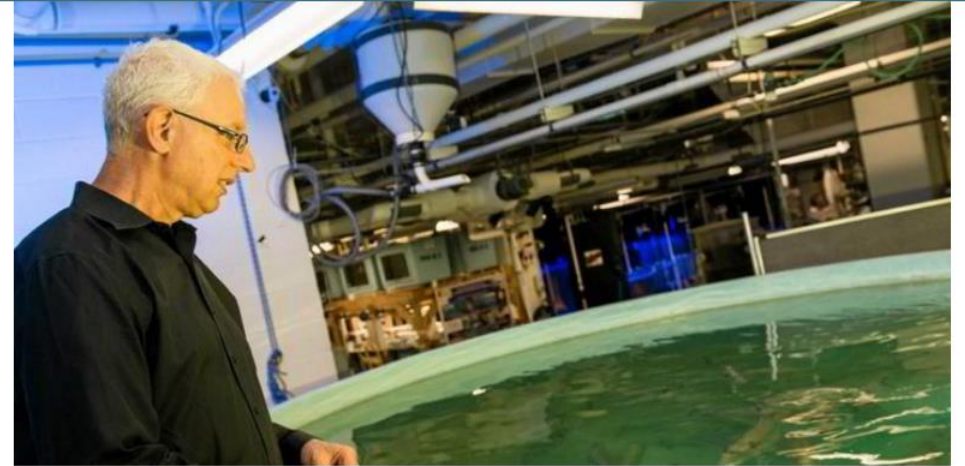
## EU announces crisis funding for fisheries and aquaculture

March 29, 2022 By Hatchery International staff

The European Commission is providing crisis financial support for the fisheries and aquaculture sectors in response to the Russia-Ukraine conflict.

This emergency funding is being enacted according to Article 26 of [European Maritime Fisheries and Aquaculture Fund \(EMFAF\)](#) regulation. The “crisis measures” defined in the regulation, according to the press release, are still in the hands of member states.

“The military aggression of Russia against Ukraine since 24 February 2022 is impacting the whole seafood value chain – fishers, aquaculture farmers, processing and marketing companies – in the European Union,” the European Commission said in a press release.



## US government funding to help land-based salmon industry tackle off flavor and other major challenges

Ten million dollars in grants will be spread out over a set of projects addressing a specific challenges to the large-scale implementation of land-based salmon farming.

19 October 2021 5:00 GMT *UPDATED 19 October 2021 14:50 GMT*By [Rachel Sapin](#) 🔔

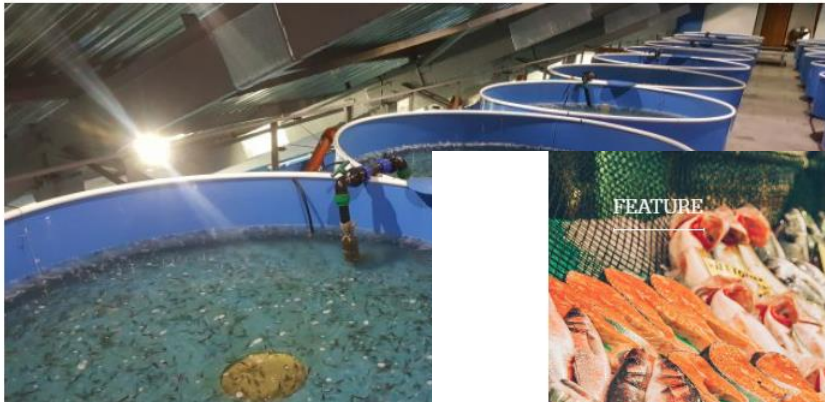
Land-based aquaculture in the United States is getting another boost thanks to recent funding from the US government.

Earlier this month, the US Department of Agriculture (USDA) awarded \$10 million (€8.6

Features > [Business Management](#)

## Russian government improves aquaculture access to state aid

July 24, 2020 By Vladislav Vorotnikov



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### Editor's Picks

▶ [Anaerobic digestion of sludge from RAS: Challenges and](#)



As a world leader in salmon production, Chile has devised a national plan that gives RAS a decisive role.

Recirculating aquaculture systems technology is at the centre of Chile's research and development programs to grow its economy.



Showcase



## Japan's Marubeni to start selling Proximar RAS salmon in 2024

Marubeni Corp. will begin providing to Japanese consumers Atlantic salmon grown in a recirculating aquaculture system (RAS) by 2024.

Earlier this year, the Tokyo-based conglomerate has signed an agreement with Norway's Proximar Seafood that will allow Marubeni to exclusively distribute in Japan fish grown in Proximar's RAS facility at the foot of Mount Fuji, in Oyama.

The agreement covers sales of all volumes produced by Proximar for the Japanese market and has an initial term of 10 years. Both parties will be actively involved in the marketing efforts, with the aim to build a strong premium sustainable seafood brand.

Proximar reported that it just completed a crucial stage in building the RAS facility and that more than 95 per cent of funding for the construction has been assured.

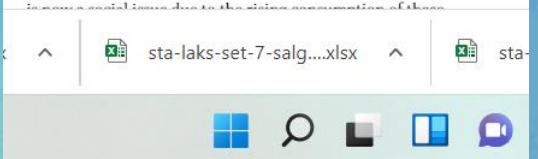
The facility is expected to be completed in 2023. The hatchery will start operation from Q3 2022 and harvest will begin mid-2024. The expected harvested volume is around 2,500 tons (head-on-gutted weight), increasing to targeted 5,300 tons when operating at full capacity in 2027.

The partnership with Marubeni will help Proximar cut business risks.

"The agreement with Marubeni provides Proximar significant resources in terms of sales and marketing, and we share the same views in terms of our products' attractiveness," said Joachim Nielsen, chief executive officer of Proximar.

The annual demand for Atlantic salmon in Japan is approximately 60,000 tons.

"Japan's self-sufficiency rate for fisheries products is only 57 per cent, and securing a stable supply of these products



## Mitsubishi partners with seafood firm in RAS salmon project

Japanese conglomerate Mitsubishi Corp. and seafood company Maruha Nichiro Corporation are working together on a venture to develop a land-based, salmon production facility using recirculating aquaculture systems (RAS) technology in the coastal city of Toyoma, in Japan's main island Honshu.

The aim of the project is to create a "local production for local consumption" business model in Japan's salmon industry.

A recent agreement between the two corporations resulted in the creation of a joint venture company named ATLAND Corporation. The new company

aims to establish a presence in Nyuzen town of Toyama prefecture by October 2022.

The planned land-based aquaculture facility will have a capacity of 2,500 tons (live weight equivalent). Operations in the facility is expected to begin in 2025 and the facility's first delivery will be in 2027.

Mitsubishi and Maruha Nichiro have been discussing the joint promotion of this project since March 2021. This project is expected to help develop a sustainable and stable land-based production system, efficient digital-tech-based operations, local production for local consumption, and progress in



Masaru Ikemi,  
president CEO  
Maruha

decarbonization.

According to ATLAND, its business model is expected to produce fewer greenhouse gas emissions compared to the practice of importing fresh salmon to Japan by air from salmon-farming countries.

The planned facility will use ground water originating from the Kurobe River and deep seawater from the Toyama Bay. Deep seawater is characterized by its cleanliness and low, stable temperature, which makes it possible to operate the facility by reducing the amount of energy required to create a water environment suitable for land-based production, the company said.



## RAS is key to New Zealand's blue economy

**C**awthron Institute is New Zealand's largest independent science organisation. It focuses on world-class science aimed at restoring and protecting the environment and supporting the sustainable development of New Zealand's blue economy.



Aerial view of the Cawthron Institute in Nelson, New Zealand.

The Cawthron Aquaculture Park is situated just outside of Nelson, and acts as a research and technology hub for the aquaculture sector. The Park houses multiple research laboratories and culture systems including micro and macro algae culture facilities, shellfish nurseries, commercial shellfish hatcheries and

terms, the industry produces more king salmon than anywhere else in the world, and is home to the world's only freshwater farmed king salmon. These unique industry attributes mean that global research and industry advancement is not always

3,000-litre tanks which can be combined or separated into two recirculating systems.

Cawthron's systems were designed and constructed with the assistance of Australian-based Fresh by Design. Standard RAS technology

can handle feed rates of three per cent body weight per day at a biomass of up to 35 kg/m<sup>3</sup>.

Culture tanks incorporate a dual drain system and tank side swirl separators for uneaten pellet collection. Uneaten feed recovery allows us

# ÜLKEMİZDE NASIL BAŞLAYABİLİRİZ?



**İLK ADIM**



# PİLOT KAPALI DEVRE TESİSİ

KALİFİYE ELEMAN YETİŞTİRME

VERİ TOPLAMA

İŞLETME DENEYİMİ KAZANMA

İLERİ AŞAMAYA HAZIRLIK

AR-GE ÇALIŞMALARI

# **SENARYO I**

## **(İLERİ AŞAMA)**

# HASTALIKTAN ARİ JUVENİL KAPALI DEVRE TESİSİ

HASTALIKLTAN ARİ SERTİFİKALI YUMURTA İLE  
BAŞLANGIÇ

HAVUZ - BARAJ - DENİZ ve TÜRK SOMONU RAS İÇİN YIL  
BOYUNCA YAVRU TEMİNİ (JUVENİL)  
BÖLGESEL KULUÇKAHANELER

# **SENARYO II**

## **(İLERİ AŞAMA)**

# TÜRK SOMONU (DENİZ) KAPALI DEVRE SİSTEM TESİSİ

HASTALIKLTAN ARİ SERTİFİKALI 300-500 gr ALABALIĞIN  
BÜYÜTMEMEYE ALINMASI  
YIL BOYU HASAT (2-4 ay arası stoklama)

# **SENARYO III**

## **(İLERİ AŞAMA)**

# **TÜRK SOMONU (TATLISU) KAPALI DEVRE SİSTEM TESİSİ**

**YIL BOYUNCA HER BOY 250 gr - 4000 gr HASATLIK  
BALIK TEMİNİ**

# **İHTİYAÇLAR**



HASTALIKTAN ARİ BALIK  
KALİFİYE PERSONEL  
REKABET ANALİZİ  
DEVLET DESTEĐİ  
YENİ PAZARLARIN YARATILMASI  
ÜRÜNE KATMA DEĐER  
AKADEMİ İLE GÜÇLÜ İŐBİRLİĐİ

# DEVLET DESTEĞİ

ARAZİ

ENERJİ

PERSONEL - EĞİTİM

KREDİ DESTEĞİ

HİBE (KALKINMA AJANSLARI - TKDK vb)

AR-GE ÇALIŞMALARI FONLAMASI

# TEŞEKKÜRLER

