Smart Aquaculture Practicing Sustainability with Recirculating Aquaculture Systems (RAS) Technology

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Basic System Components

- Tanks
- Water Movement
- Solids Removal
- **Biological Filtration**
- Gas Control O₂, CO₂
- Disinfection
- **Temperature Control**

TANKS Round / Raceway Fiberglass / Polytanks / Cement / Plastic lined Drain design – single or dual Width to Height ratio

Water Movement

- Air lift
- Low head / high flow with programable VFD
- Submersible axial flow





Solids Removal

- Radial flow settlers / swirl separators
- Drum / sand / bead filters
- Protein skimmers











Biofiltration

- MBBR
- RBCs / Trickling towers
- Sand / Bead filters









Aeration / Oxygenation

CO^a Distribution

Marke

Removable Water Deflects

UHO Distributio Piote

> LHOS Overfic Sidebox

LHO Battle

- Aeration columns
- Diffusers
- Oxygen cones
- Low Head Oxygenators









Monitoring and Control

- Tank DO
- Tank water level and flow
- **Feeders**
- Filter backwashing
 - Ozonation



Solids capture, dewater, reclaim, and reuse













World population increase + Average living standard increase

= Increased demand for seafood











The data visualization is taken from OurWorldinData.org. There you find the raw data and more visualizations on this topic.

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What is Sustainable Development?

Sustainable Development is development that meets the needs of the present without compromising the ability of future generation to meet their own needs Brundland commission definition 1987









Is it the solution?

RAS AQUACULTURE

The Global Fish Farming Industy Is Booming

World fisheries and aquaculture production (in million tonnes)



Advancing aquaculture production Sustainable with RAS Technology

Increased control of system Minimal water use **Higher density Increased biosecurity** Year-round growing season Locate anywhere No limit on species selections



Fish becomes a more important food and efficient protein source

Aquaculture the only solution



RAS technology can Sustainably intensify SMART Aquaculture Production



Basic production constraints to overcome

- Develop alternatives to fish meal and oil in feeds
- Expand selective breeding efforts to improve FCR, growth rates, and reduce disease
- Advance diagnositics and develop vaccines to reduce risks of disease and antibiotic use
- Expansion of marine based systems.
- Increase investment in technological innovation and transfer

