

FINANCING AQUACULTURE

Investment Opportunities in Farmed Seafood

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Aquaculture: The highest growth source of animal protein in the world

Aquaculture accounts for about half of the world's seafood. The sector will continue to grow exponentially given the dwindling supply of wild fish and the mushrooming demand in the developing world for animal protein.

Under the status quo, fish are farmed in either man-made tanks or ponds on the land, or in enclosed or open pens in lakes and oceans. There is potential for ecological damage when fish escape, breed with local fish and spread disease, risks that are heightened when open pens or nets are used. Currently, the sector attracts less institutional capital than other protein sectors.

There are now a growing number of relatively small, early-stage firms that use innovative - often clean – technologies to resolve many of the existing issues. These advancements represent a unique opportunity for impact investors.

This paper focuses on opportunities in the aquaculture industry, highlighting five characteristics that make the sector appealing to investors:

- The industry is currently highly fragmented, creating great opportunity for vertical integration.
- It is a good fit for patient investors since biomass in production facilities takes time to build, but can produce steady returns over time when operations are at scale.
- There is a high potential for social impact due to job creation.
- Like all early stage emerging technologies, aquaculture companies benefit from the networks and experience of impact investors.
- There is high potential for positive--or even restorative--environmental impact through implementation of a new generation of low-impact, clean technologies.

A flourishing & dynamic marketplace creates opportunity

- **The aquaculture market is worth about \$120 billion per year at the farm level, producing 60 million tons of seafood.** That's about 41% of the world's seafood in 2012. At current consumption rates, an additional 23 million tons of seafood per year will be needed worldwide by 2030.¹
- **Asian production dominates.** China accounts for 62% of global production. Demand for seafood produced locally, safely and sustainably creates opportunities for other countries to capture market share.
- **New markets development is thriving.** Masked by total global production figures, there are many new niche markets and emerging innovative technologies. These range from the growth in the market for mollusks (where clams and cockles have displaced oysters) to the sophisticated, high-tech production of caviar from sturgeon.²
- **Production is smaller-scale and more fragmented than in other protein sectors.** Whereas beef and poultry producers typically each have revenues of \$10 billion per year, most of the aquaculture sector is populated by producers with revenues under \$100 million. The exceptions are shrimp and some salmon producers.³ Great opportunity exists for vertical integration or consolidation in the sector.
- **Clean technology businesses are developing solutions to some of the sector's notorious issues,** including environmental impacts, inefficient feed ratios and contamination.
- **Potential to provide employment and livelihoods for 16.5 million people worldwide.** Employment in this sector has been growing an average 5% per year, compared to 1% per year in the wild capture sector.⁴



Opportunities in Aquaculture

As in all changing markets, investors will find opportunities where inventors and entrepreneurs have found solutions to the current problems and risks of the status quo.

Status Quo Issues, Creating Opportunity	Investment Opportunities Exist in Solution-Oriented Businesses that:
Unstable global prices for commodity species	<ul style="list-style-type: none"> - Develop new markets for differentiated products and new species. - Reduce production and feed costs to remain profitable despite price volatility.
Increasing feed costs	<ul style="list-style-type: none"> - Optimize diets by season, minimizing required use of fishmeal/oil. - Work with feed companies to identify and incorporate alternative sources of protein. Use technologies that reduce feed usage.
Sustainability concerns related to inputs, including: <ul style="list-style-type: none"> - inefficient farming of carnivorous fish - the use of antibiotics in the feed 	<ul style="list-style-type: none"> - Reduce fishmeal/oil components of diets. - Source fishmeal/oil from by-products rather than from whole fish captured and used only to create feeds. - Refine diets and use supplements to improve health and minimize the needs for antibiotics .
High mortality of fish	<ul style="list-style-type: none"> - Minimize predation risk by protecting cages with nets, using land based closed containment systems, ocean pod systems, etc. - Improve biosecurity practices and have appropriate density levels to minimize disease.
Environmental concerns from contamination	<ul style="list-style-type: none"> - Minimize or capture and utilize waste. - Reduce use of copper and other metals on cages.
High capital costs	<ul style="list-style-type: none"> - Capture strong market positions and high margins, given the high barriers to entry and growth potential.

SOURCE: adapted from Presser, M. Paine & Partners ⁵

Recirculating Aquaculture Systems: An Example of Technology Solution to the Above Issues

Recirculating Aquaculture Systems (RAS) seek to isolate fish farming from the local environment. To do this, they first remove the waste products, uneaten feed, and bacteria from the tank where the fish live and then recycle the water back into the system. Since they are largely self-contained, they can be inland or coastal, indoor or outdoor, and used to raise marine or freshwater species. Current commercial operations include tilapia, sturgeon, and trout.

The systems offer many advantages:

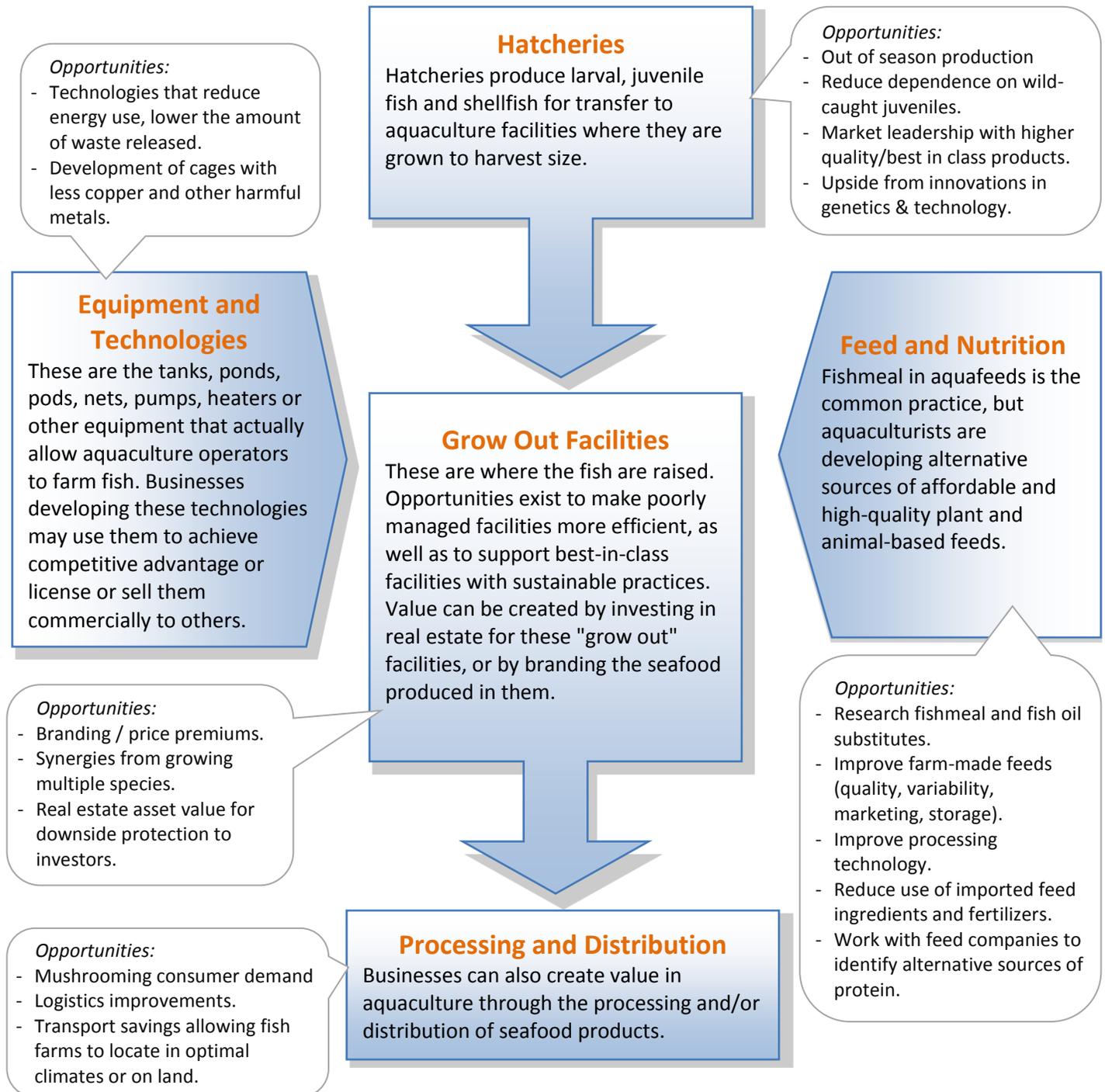
- They mitigate business risk by increasing biosecurity. The minimal interaction with the external environment means less disease, fewer escapes and lower levels of antibiotics, resulting in more a controlled, higher density, year-round production.
- The systems are less location-dependent and have minimal impact on local ecosystems. They can be set up on cheaper, marginal lands closer to markets.
- They capture and use nutrient laden waste streams which can add to profit potential.
- They can tap into the pent up market demand for high quality seafood, assuring higher food safety and sustainability.
- Other benefits include the production of useful, valuable by-products and fertilizers.

As with all new innovations and technologies, there are risks and challenges associated with the relatively capital-intensive RAS systems, but success stories of profitable companies exist.⁶

SOURCE: Adapted from Klinger, D & Naylor, R.

Aquaculture Value Chain Segments

Investors in aquaculture traditionally limit their scope to just one part of the value chain--each with particular characteristics, including specific opportunities and risks. Investors should consider linking opportunities across the value chain to gain cost and market advantages.



When analyzing opportunities, investors will need to consider risks and challenges throughout the value chain, including: i) how disease risk is managed; ii) feed sources and costs; iii) environmental impacts, especially how waste is managed; and iv) water and energy usage.

How Investors Can Get Started in the Aquaculture Sector

Investors looking to enter the market can consider either direct investments in a deal or working through aquaculture-specific funds. While we cannot recommend specific funds, examples of funds an investor could explore include:

- Oceanis Partners**, founded in 2010, asserts that it is the first global private equity firm to be dedicated exclusively to the seafood and aquatic resource sectors. David Tze is a co-founder and managing director of Oceanis. Previously, David co-founded Aquacopia, the world's first aquaculture venture capital fund. Aquacopia invested in the cleantech aquaculture value chain and is now fully committed. Interested institutional and family office investors may contact David or Justin Willmott for more information on Oceanis. www.oceanispartners.com
- A-Spark Good Ventures** is a Dutch investment company that invests in entrepreneurs worldwide. It seeks innovative projects and ideas that are commercially interesting, innovative and preferably good for the planet, for communities and future generations. A-Spark, in association with the WorldFish Center, has established a new investment facility: Aqua-Spark. This fund addresses the challenges of improving food security, reducing poverty and addressing environmental concerns through investments in aquaculture businesses worldwide. www.a-spark.nl
- Watershed Capital Group** advises companies and fund managers committed to generating solid financial returns and positive environmental and social outcomes. The group has a specific interest and experience in aquaculture. The firm works with clients focused on the following areas: clean technologies, sustainable business models and social impact enterprises. The Watershed Capital Group assists these clients in raising private growth capital, executing mergers and acquisitions, raising institutional capital for investment funds and undertaking other strategic transactions. Investors seeking more information may contact Aaron Enz. www.watershedcapital.com
- Fish 2.0 – Where Seafood Businesses and Investors Connect** is a business competition that brings together seafood businesses and investors. Over 80 emerging businesses from across the globe have entered the competition, with about half of these in the aquaculture sector. To learn more about these opportunities, investors can sign up to connect at on the website or contact Monica Jain. www.fish20.org



We welcome additional investors with interests in aquaculture or wild fisheries to contact us so that we may reference your work in future publications.

The next in this series of briefing papers will be released in the summer of 2013.

For more information and resources on fisheries financing, please visit www.mantaconsultinginc.com or www.fish20.org

¹ FAO, *The State of the World's Fisheries and Aquaculture*, 2012. P.9, 172

² FAO 2012, p.36

³ Larkin, Travis. *Aquaculture Global Outlook and Sustainability*. Seafood Exchange. Raleigh, NC.

⁴ FAO 2012, p. 10

⁵ Presser, Mitchel. *Can Aquaculture Find the Capital to Double in a Decade*. Presentation to Global Outlook for Aquaculture Leadership. Santiago, 2011.

⁶ Klinger, D & Naylor, R. *Searching for Solutions in Aquaculture: Charting a Sustainable Course*. *Annu. Rev. Environ. Resour.* 2012. 37:247–76 (2012)