

AQUACULTURE FRONTIERS



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PART 4: Tilapia and Catfish



There will be huge shifts in global pangasius and tilapia markets in 2020. China's massive tilapia industry is becoming uncompetitive in the US, opening the doors to competitors. Meanwhile, demand for whitefish fillets is exploding in China, altering the pangasius market. We interviewed dozens of industry actors to provide a modern snapshot of the freshwater space.



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The Aquaculture Frontiers series of reports aims to give a contemporary view of the world's fastest-growing animal protein industry. Part 4, dedicated to freshwater species, documents one of aquaculture oldest, yet fastest-growing segments.

Carp farming has existed in China for 4,000 years. Tilapia and pangasius have become major exports markets. These two species can be grown to harvest weight in months, a huge opportunity for countries in Africa and Asia to build an affordable source of protein, with a low-carbon footprint.

Egypt already paved the way by developing a huge tilapia industry that feeds its 100 million-strong population. Countries like Nigeria, which imports billions of dollars of fish to feed 200 million people, could become the next hotspot.

China is strategizing over how to diversify its massive tilapia export business to new geographies in light of a 25% tariff on exports, and declining interest among US consumers. Farming is taking off in several countries where China could export. At the same time, China's domestic fish market is exploding.

The key to the development of these species will be advancements in genetics, management of freshwater resources and the availability of high-quality feed pellets in areas where the industry is growing.

The salmon industry has taken focus away from lower-value species such as tilapia. But major feed and genetics companies see the growth potential. Early movers, such as EW Group in genetics, and Skretting in feed, could be influential in boosting sector performance and winning an early mover advantage in freshwater species.

The development of pangasius and tilapia industries might reduce the tonnage produced by Asia's mighty carp industry, which still represents more than half of aquaculture output globally. Focus of resources in big monospecies could also reduce opportunities for growers of more exotic species such as paiche and Nile perch.

Like in other Aquaculture Frontiers reports, we have gone out and spoken to the industry's leading protagonists, visited farms and hatcheries in Bangladesh, Brazil, Vietnam and West Africa. Six experts from across the globe helped compile this report, providing a unique up-to-date snapshot of freshwater aquaculture industries.

COMPANIES AND ORGANIZATIONS

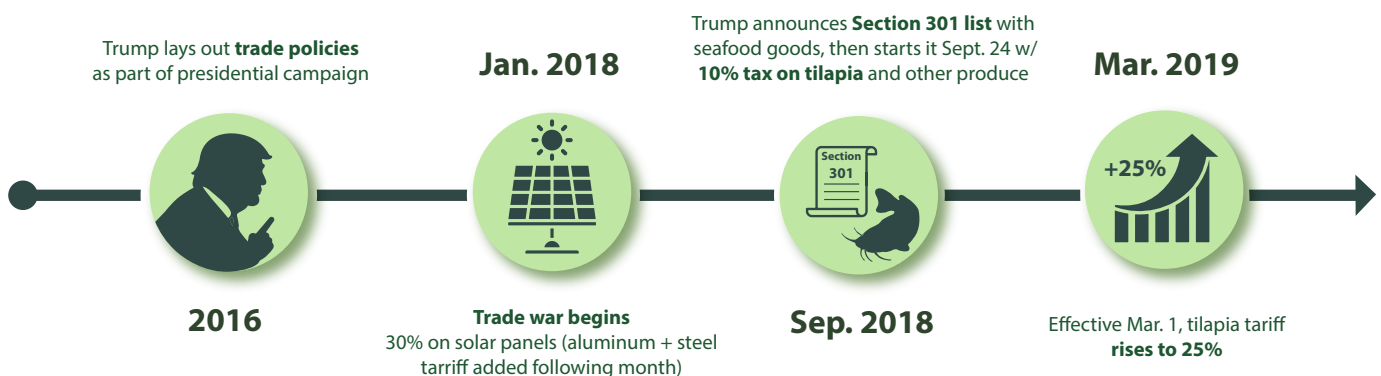
- Regal Springs
- The Fishin Co.
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- GeneSeas
- NTSF Seafoods
- PezCo
- Vinh Hoan
- Catfish Farmers of America
- Rainforest Aquafarms
- China Aquatic Products Processing & Marketing Alliance (CAPPMA)
- Skretting
- EW Group
- Copacol
- C. Vale
- Baiyang Investment Group
- Zhanjiang Guolian Aquatic Products
- Rabobank
- Guangdong Evergreen
- WorldFish
- Benchmark
- Bihar State Co-operative Fishers Federation
- FreshWave
- Agrosuper
- Cargill
- Navico
- Walmart
- Pesquera Santa Priscila
- Vietnam Association of Seafood Exporters and Producers
- Trident Seafoods
- Zoetis
- Hochschild Group



- Factsheet with production statistics for tilapia and pangasius
- Key species facts - tilapia vs pangasius
- Chinese tilapia output
- Vietnam and USDA regulations
- US - China trade war timeline
- China: Tilapia trade flow in the global market
- AquaChile's pond density levels
- Pangasius global trade flow
- USDA regulations on the main pangasius producers
- Pangasius production estimates by GOAL
- Channel catfish industry in the US
- Tilapia and pangasius fingerlings industry
- Brazil boosting tilapia output: EW insights
- Tilapia growth potential in the African continent
- Carp in global aquaculture production
- Steady carp production in the EU
- A breakdown of the paiche market

Example of infographic found in the report:

China-US trade war timeline 🕒





PAGE 11 -- Chapter 1: The green protein machines

Pangasius and tilapia, provide a tremendous opportunity for the world to meet a growing protein shortage as the global population expands to 10 billion people by 2050. These fish eat a mostly plant-based diet, are robust when poorly farmed and grow to harvest weight in months. We examine the impact these species can have on world protein supply.

PAGE 15 -- Chapter 2: Tilapia: exports slow, local-to-local market explode

Tilapia has been disparaged as a low-quality fish in the US. Despite this reputation in the US market, tilapia aquaculture is expanding rapidly in the developing world. We examine where tilapia production is growing faster, and which countries are investing in future production capacity.

PAGE 22 -- Chapter 3: Pangasius and other catfish: Vietnam's competitors still far off

Pangasius is a bright star in the aquaculture industry. Vietnam has built a successful, multi-billion dollar pangasius export industry, gaining significant market share in China and the US. India and Indonesia have built sizeable pangasius industries to serve local demand, but could join the lucrative export market.

PAGE 29 -- Chapter 4: Freshwater fish lose luster in developed markets

We assess the strategies that producers of both pangasius and tilapia can formulate with changing tastes in North America. Both pangasius and tilapia producers are assessing a new marketing approach, as they lose customers to wild-catch industries such as Alaskan pollock.

PAGE 34 -- Chapter 5: High-tech breeding could lead to surge in supply

Brazil's tilapia industry could be set for a big expansion through the involvement of German animal genetics company EW Group. The opposite end of the spectrum is Indian pangasius industry, which relies on smaller hatcheries in West Bengal and Bangladesh. We analyze how modern genetics could increase supply and improve yield.

PAGE 41 -- Chapter 6: Africa: a tilapia explosion

There is huge traction in African aquaculture. Egypt has become the world's second-largest tilapia farmer after China, and can keep increasing supply through adopting new technology. Skretting, a major protagonist in Egypt's tilapia story, is targeting a similar growth outlook in Nigeria and West Africa, countries that import billions of dollars of whitefish every year.



PAGE 44 -- Chapter 7: Carp – aquaculture’s first twilight species?

China has been growing carp for thousands of years and it’s the most-grown fish in aquaculture. But with growth cycles that compare unfavorably with pangasius and tilapia, we ponder what the future holds for this species. We look at the role of carp in polyculture and how improved yields are maintaining the species’ overall share of global aquaculture supply.

PAGE 48 -- Chapter 8: The difficulty of scaling a new species

Paiche is the largest freshwater fish in the world and comes from the Amazon. Blessed with several attributes that make it an interesting candidate for aquaculture, we analyze the difficulties of going mainstream with a new species. We also see assess if walleye in North America or Nile Perch in Africa could become the next export play.

PAGE 51 -- 10 predictions

As we have done with previous Aquaculture Frontiers reports, we make some predictions about the future of the freshwater aquaculture industry.



One of the oldest food production systems in the world holds the key to meeting an expected protein shortage as the global population nudges up to 10 billion people.

China started carp farming 4,000 years ago, building ponds on silk farms and raising a bony fish that is still a favorite in most Asian countries. But it's pangasius and tilapia, two newer forms of aquaculture, that have massive potential to increase animal protein consumption in the world without significantly resulting in increased carbon emissions. That's because they have a superior feed conversion ratio to terrestrial animals, and can be grown in vast quantities, potentially reducing the overall impact of corn and soybean planting.

Tilapia and pangasius are green protein machines. They can grow from egg to harvest size in months and withstand poor water quality. They can feed on natural pond ingredients, as well as manufactured feed with low fishmeal and fish oil content. They also handle diseases better than higher value species such as salmon and shrimp.

Consider Bihar, India's poorest state. Bihar, which neighbors Nepal. The state is densely packed with 99 million people and is one of India's smaller states in comparison with Rajasthan or Andhra Pradesh. But Bihar, split in two by the River Ganges, is endowed with massive freshwater resources for pangasius pond culture. Rishikesh Kashyap, head of the Cooperative of Fisheries Federation of Bihar, predicts pangasius farming could rise tenfold within two years.

"Pangasius is the cheapest source of protein, it will reduce the hunger problem in the world," Kashyap said. "The population is growing more and more, and food scarcity is getting worse."

Vast areas of India and Bangladesh are suitable for freshwater aquaculture. Countries like Indonesia and vast areas of Africa and Latin America have a similar opportunity.

The United Nations's Food & Agriculture Organization (FAO)

is acutely aware of the capability of freshwater species to solve global hunger. Non-profit organization WorldFish has been working since the 1980s to promote tilapia genetics and foster cooperation among producing countries to build the industry.

Wider pangasius and tilapia cultivation would result from a bigger investment in feed and genetics. The companies that could make a big difference have for now by chasing profits in the billion dollar salmon and shrimp industries. But they are now turning their focus to pangasius and tilapia.

Just like in salmon and shrimp, the accumulation of knowledge in tilapia and pangasius has occurred in specific farming hubs that have carved out access to the most lucrative markets. China has built its tilapia industry over decades, selling millions of pounds of fish to the likes of Walmart and Kroger. Vietnam dominates over 90% of the pangasius market and the country's adroitness in meeting tough US inspections criteria means it will probably lead the industry for some time to come.

Demand has been falling for these cheap whitefish products both in Europe and the US. Now, China's tilapia industry has become embroiled in the China-US trade war. With a 25% tariff slapped on Chinese tilapia and no end in sight to the conflict, it's likely that Walmart and others might start to look for an alternative supply of cheap fish. As lower value species, pangasius and tilapia are highly sensitive to tariffs. While the liberalization of tariffs across the world in the past decade facilitated an export business, a reversal of free trade could shut markets down.

The China-US trade war is not the only dynamic at play. US and European consumers have been falling out of love with tilapia, in part because of scare stories about Asian farming practices. China and Vietnam in the pangasius business have not helped themselves by failing to disclose key data. Farmers from both countries are working to reverse their poor



perception. But they are challenged by the lack of resources that smaller farmers have to improve.

Latin American producers have struggled to capture higher prices for flying freshly farmed tilapia into the US market. They might struggle to fully capitalize on the disruption in the China-to-US trade, since they still do not compete on cost.

But there is an awakening in the freshwater aquaculture industry and it's in the so-called local-to-local market. In the past decade, Egypt's tilapia industry as surged in volume to become the world's second-largest after China. What is remarkable about Egypt's industry is that only supplies the domestic market, ensuring that everyone who lives in the country from Alexandria to Cairo can buy affordable fish.

Skretting, the feed company which has been involved in Egypt's remarkable growth story, is using North Africa as a model to expand in West Africa, which imports billions of dollars of whitefish and pelagic fish every year. The local-to-local movement has given a new glow to the freshwater industry, according to Rabobank analyst Gorjan Nikolic. Demand for locally-grown fish tempted Germany's EW Group, a giant in chicken and salmon genetics, to build a massive new tilapia hatchery business in Brazil, with plans to expand across Latin America.

Despite the massive growth in the salmon and shrimp industries, carp farming has remarkably maintained a 35% share of total aquaculture production in the world over more than a decade, according to the FAO. Improvements in feed, aquaculture know-how and optimized polyculture ensures the ancient industry has a future. Freshwater aquaculture is predicted to represent over half of global aquaculture in a decade's time.

The pooling of resources from globally-focused genetics and feed companies into the most efficient breeders – pangasius and tilapia – may make it harder for other freshwater species to break through as the next big species. Peruvian growers of paiche, for instance, have struggled to move beyond being an exotic after thought in the seafood industry. That said, with hundreds of species in existence and the rapid advance of science, it's difficult to rule out the potential for a major species to challenge the dominance of pangasius and tilapia. Indoor farming systems allow aquaculture scientists to grow any species in virtually any geographic location.

Finally, tilapia can truly become the "aquatic chicken" and the most important aquaculture species of the 21st century that University of Arizona Professor Kevin Fitzsimmons predicted in a 2000 paper.





Matt Craze



Matt Craze started Spheric Research in 2017 to provide analysis and business solutions to the seafood and food industries. Matt is a regular contributor of global seafood topics to Undercurrent News. Previously, Matt was part of a

team that started Bloomberg's commodities news coverage in Europe, the Middle East, Africa, and Latin America. Matt also works with management consultancy firm 10EQS, and earned an MBA from Cornell University.

Efua Konyim Okai



Efua studied economics at Kwame Nkrumah University of Science and Technology in Ghana. She has a MBA in finance from Cape Coast University. She got interested in livestock issues through her father, who has been promoting investments in

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Oriana Aguillon



Oriana studied law at Universidad de Falcon in Venezuela. She specialized in marketing management and international commerce. She works in research and market analysis of the seafood industry with Spheric Research, and

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Maaike Tiersma



Maaike earned an undergraduate degree from Brown University and is studying the intersection of business and the environment at Imperial College London. Maaike conducted a study with the Interdisciplinary

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Bonnie Waycott



Bonnie writes about seafood for several publications and holds a masters degree on sustainable aquaculture from University of St. Andrews. She is an expert on Japan's seafood industry and worked for the country's national

broadcasting organization for 11 years. She covers topics on hatcheries and larval rearing, fish health, technology and feed research.

Farid Uz Zaman



Farid Uz Zaman completed a masters in aquaculture and a B.Sc in fisheries from the Bangladesh Agricultural University and the Jessore University of Science and Technology. He has worked in several projects. both in

academia and the private sector.



SPHERIC RESEARCH

Spheric Research provides research and consultancy services to the global seafood industry. The company is currently publishing a series of reports, Aquaculture Frontiers, that provide a comprehensive snapshot of the industry in 2019. The reports have been created in partnership with Undercurrent News.

UNDERCURRENT NEWS



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Undercurrent News was started by Eva Tallaksen and Tom Seaman in 2012 and has become an authoritative voice in the seafood industry. Undercurrent places an emphasis on high-quality journalism and sends reporters to key trade shows and industry seminars around the world.


Aquaculture Frontiers Part 4: Freshwater fish, the hunger killers, was first published on Sept. 5, 2019

Cover photo and image on Page 7 are hatcheries owned by EW Group's Aquabel in Brazil. The company supplied both photos



AQUACULTURE FRONTIER SERIES

Aquaculture Frontiers is a series of 6 reports that fully examines the current state of this \$250 billion, fast-evolving industry. Most aquaculture companies are family-owned and little understood by outsiders. Through our privileged access to industry actors, we provide a complete and up-to-date profile of this sector that provides actionable insights for industry newcomers and veterans alike.

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Salmon demand is escalating in most parts of the world, and the farming industry in its current form can't keep up. We ask where new supply where will come from and who will bring disruption.



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Shrimp farmers are in crisis due to an oversupplied market. Despite the slump, several top producers are optimistic that the shrimp industry has a promising future and are building high-tech farms and finding solutions to major health challenges.




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PART 4: Tilapia and Catfish



There will be huge shifts in global pangasius and tilapia markets in 2020. China's massive tilapia industry is becoming uncompetitive in the US, opening the doors to competitors. Meanwhile, demand for whitefish filets is exploding in China, altering the pangasius market. We interviewed dozens of industry actors to provide a modern snapshot of the freshwater space.



AQUACULTURE FRONTIERS Tilapia and Catfish

AQUACULTURE FRONTIERS
PART 5: Financing aquaculture's potential



Aquaculture is on the doorstep of a Blue Revolution, poised to take a bigger share of global protein production. For this revolution to occur, the industry needs to get more institutional lenders and private equity on board. We ask: can it be done?



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AQUACULTURE FRONTIERS
PART 6: Mariculture, the new promise



Mariculture, or marine aquaculture, is a fast-growing frontier in the seafood industry. We study efforts led by Norway to build cages sturdy enough to house fish in open seas, and emerging species that could become the 'tropical' salmon. We track Japan's progress in farming tuna, and blue ocean opportunities in bivalves and seaweed.



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