What is Aquaculture?

Aquaculture is raising, growing, and harvesting fish, shellfish, aquatic plants (like limu), produce, and other organisms in all types of managed water environments. Aquaculture is a type of agriculture. Basically, it's farming in water! See this 35-second video from NOAA.[1]

What is Hawai'i aquaculture?

Hawai'i 2019 aquaculture sales reached a record high of $83.2M, up 9% from 2017.[2] In 2020, sales were down 15%,[3] likely due to COVID-19; however, sales are rebounding with strong increased demand for local seafood from residents and visitors. The Hawai'i aquaculture industry has several subsectors, united in their commitment to sustainable practices:

- **Loko I'a** are fishpond systems unique to Hawai'i, including natural ponds and built seawall enclosures where freshwater streams meet the ocean within ahupua'a (land management systems that extend from the mountains to the sea).[4] Hui Mālama Loko I'a is a network of fishpond practitioners and stewardship organizations revitalizing the role of loko i'a in our communities and working to restore and preserve approximately 40 fishpond sites throughout Hawai'i.

- **Land-Based Freshwater Producers** raise freshwater fish, shrimp, algae, and produce in ponds or tank systems. See this video for how shrimp are raised in Kahuku. Other examples include spirulina and Bioastin (Cyanotech), tilapia (e.g., Hawai'i Fish Company), and lettuce (e.g., Kunia Country Farms).

- **Land-Based Sea Water Producers** raise seafood, algae, and other organisms in salt water. Examples include Kona Bay Shrimp on Kauai, Big Island Abalone, seed oysters at Hawaiian Shellfish, and seaweed to reduce methane gas in cattle at Blue Ocean Barns and Symbrosia. Also, Hawai'i is the birthplace of SPF (specific pathogen free) shrimp broodstock (used for breeding), which has played a critical role in supporting the global shrimp industry.[5]

- **Open Ocean Producers** raise fish, seafood, and aquatic plants and organisms offshore in submersible sea pens. Hawaiian kanpachi from Blue Ocean Mariculture is an example of this.

(Mention of a company name or product is not a recommendation of that company or product to the exclusion of others that may also be suitable.) See the diverse members of the Hawai'i Aquaculture Collaborative for more examples.

How can aquaculture benefit Hawaiʻi?

Supporting aquaculture in Hawaiʻi addresses five key areas:

1. **Tradition, Culture, & Innovation**
   Hawaiʻi has a rich history of aquaculture, dating back to the 1400s, as a center for innovation with loko iʻa as place-based technology for food production. The innovation that makes loko iʻa sustainable systems is its relationship to everything mauka and makai. Pre-contact Hawaiians were incredible stonemasons, expert fishermen, and botanists; understanding tidal flows, oceanography, the concept of watersheds, and how nutrients in streams fed the growth of algae in fishponds, which then fed the fish. Fishpond practitioners today are blending modern science with traditional culture and knowledge to develop fishpond practices that are adaptable to today's sustainability challenges.[6] See Heʻeia National Estuarine Research Reserve as an example. Today's contemporary aquaculture strives to uphold sustainable values to inform the way we maintain relationships with our resources and communities and embraces innovation to move the industry forward. Additionally, partnerships between loko iʻa and contemporary aquaculture are emerging and present exciting opportunities for collaboration.

2. **Food Security**
   COVID-19 underscored Hawaiʻi's fragility, reliance on imports, and lack of food security as supply chain disruptions and consumer panic purchasing resulted in empty grocery shelves during the pandemic's early months. Public sentiment is shifting towards a more food secure Hawaiʻi and aquaculture can align with agriculture to contribute to this important effort. Further, supporting aquaculture can help meet the State of Hawaiʻi's Department of Education's goal of at least 30% of food served in public schools consists of locally sourced products by 2030.[7]

3. **Economic Diversification & Jobs**
   Hawaiʻi's pristine waters, conditions, and infrastructure (e.g., Natural Energy Laboratory of Hawaiʻi Authority, Pacific Aquaculture & Coastal Resources Center, and Oceanic Institute) make us uniquely positioned for success. With 63% of seafood consumed in Hawaiʻi imported[8], there is ample opportunity to increase Hawaiʻi's production capacity and leverage locals' and visitors' preference for locally produced seafood and produce. Increasing aquaculture will create jobs to address the technical and innovation skills needed in production and processing, and support ancillary industries such as retail, restaurants, hospitality; and spur growth in energy, sustainability, and climate-related R&D. Aquaculture companies are experiencing exponential growth and would like to hire locally.

4. **Restorative Environmental Impacts & Sustainability**
   Hawaiʻi's aquaculture has positive ecological impacts:

   - Limu and oysters process and filter impurities, restoring clean water to the ocean. The release of sea urchins into the ocean can address invasive algae. Examples include coral restoration and DAR's sea urchin project.

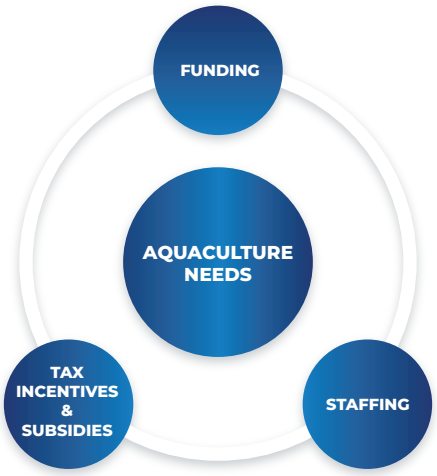
   - Aquaculture practices are highly regulated and monitored to ensure that waste and excess nutrients are limited and properly managed.

   - Aquaculture can reduce pressures on our state's wild fishery resources.

   - Producing more of our own seafood and produce can reduce the carbon footprint of imports.

5. **Health**
   Seafood and produce from Hawaiʻi spends less time from harvest to plate, maintaining freshness and nutritional value, and are important to Hawaiʻi's health. While imported foods are necessary to supplement Hawaiʻi's diet, we can renew focus on what can be grown locally to nourish our community, local economy, and environment.

What does the Hawaiʻi aquaculture industry need from policymakers and government partners?



Ultimately more support in the form of funding, resources, staffing with expertise, and tax incentives and subsidies are needed for aquaculture.

Streamline and Facilitate Permitting & Leasing
Challenge: Confusing technical language and long delays for approvals within and across multiple agencies in aquaculture permitting and leasing processes cause initiatives, projects, and businesses to languish and terminate.
Solution: Increase aquaculture staff, resources, and funding; streamline agency review; and require agency collaboration. Re-establish the Governor's Aquaculture Advisory Council and the Aquaculture Development Program for the state. Add permitting and leasing to the responsibilities of the Hawaiʻi State Ombudsman to ensure principles of sound, fair, and reasonable administrative practice.

Support for Energy and Sustainability Innovation
Challenge: Aquaculture is energy intensive.
Solution: Create tax subsidies/incentives for solar farming and other energy- and climate/environment-saving technologies. Allocate funding to support R&D and demonstration projects.

Loko iʻa Need Access and Resources for Restoration & Preservation
Challenge: Loko iʻa access is often on state or private lands. Technical language throughout the processes and permitting for preservation and restoration is difficult to understand.
Solution: Allocate funds for nonprofits focused on stewardship of loko iʻa. Fund a position who can help loko iʻa practitioners gain access and navigate the legal processes to mālama and preserve fishponds.

Support for Processing, Feed, & Shipping

Challenge: Processing equipment is needed to efficiently filet smaller aquaculture-raised fish, as hand-processing used for larger ocean-caught fish is not economically viable. Additionally, the highest cost input into aquaculture is feed and the cost of shipping the feed, which has more than doubled over this past year.
Solution: Grants or government guarantees on loans are needed for capital for processing and feed machinery and to create local feed using local inputs. Subsidized shipping is also needed.

Support Local Production and Consumption

Challenge: Increase supply and demand of local aquaculture products.
Solution: Require bills related to local food purchasing by state agencies to specify that a percentage consist of aquaculture products. Provide resources for a generic marketing program for local aquaculture and agriculture products. Facilitate industry participation in local and out-of-state food shows and other relevant events.

Workforce Development

Challenge: We need to increase awareness and interest in aquaculture careers and be strategic about how we leverage, develop, and ramp up training programs that align with industry needs. Companies like Blue Ocean Barns and Kunia Country Farms are experiencing exponential growth and would like to hire locally. Housing is unaffordable in Kona, near NELHA.
Solution: The Hawai'i Aquaculture Collaborative is bringing together industry and education partners to develop workforce and talent pipeline strategies. Legislative support will be requested in the future and issues like workforce housing will be raised.

Other ways Hawai'i can support aquaculture: 2022 Year of the Limu

Contact the Hawai'i Aquaculture Collaborative to connect with the 50+ aquaculture industry partners and stakeholders.

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