

A vibrant scene of a pond with a waterfall in the background. The water is clear and greenish, filled with numerous goldfish of various sizes and colors, including bright yellow, orange, and some darker ones. The waterfall is small and cascades into the pond, surrounded by lush green vegetation. The overall atmosphere is peaceful and natural.

# DEVELOPING PAKISTAN'S BLUE AGRI-ECONOMY:

GARIBSONS &  
JAFFER BROTHERS;  
ALKARAM



## Developing Pakistan's blue agri-economy: AquaHatch International and Dhabeji Aqua Foods

Pakistan's blue agri-economy is seeing major investments in the development of high-quality fish and shrimp seed and in shrimp farming and processing. Two companies are at the cutting edge of this: AquaHatch International (invested by a consortium of Garibsons and Jaffer Brothers) and Dhabeji Aqua Foods (invested by AlKaram).

AquaHatch, focusing on high-quality seed production of Tilapia and Pangasius, exemplifies the potential for large-scale aquaculture to enhance domestic food security and boost exports. Dhabeji Aqua Foods is currently under construction and when completed will be one of the largest facilities that focuses on high yield production and exemplifies the potential for large-scale aquaculture to enhance domestic food security and boost exports. By addressing



*Fish ponds with brood stock*

challenges such as seed quality, disease management, and efficient farming techniques in addition to regulatory and taxation structures; these operations set a benchmark for future investments into the sector. Their combined efforts promise substantial economic benefits, job creation, and a strengthened position for Pakistan in the global aquaculture market.

### State of fisheries in Pakistan

From 2009 to 2015, the Government of Pakistan's Marine Fisheries Department collaborated with the Food and Agriculture Organization (FAO) to conduct comprehensive fish stock assessment surveys. It concluded that large fishing fleets and unsustainable fishing practices have led to what can be described as "fishing for catastrophe." The principal fish populations in Pakistani waters have been overfished, with their numbers decimated by an alarming 60-90 percent. Anecdotal evidence further supports these findings; for instance, in the late 1990s, Pakistan exported crabs weighing no less than 120 grams predominantly to markets in Japan, Korea, the USA, and Europe. Today, 90% of Pakistan's crabs are only 60 grams and are mostly exported to China, highlighting the drastic decline in size and quality of marine life.

The stark contrast between Pakistan's fishing industry and those of neighboring countries underscores the need for a shift towards sustainable aquaculture practices. While India exports around eight billion dollars' worth of shrimp annually and Ecuador ships shrimp worth approximately 12 billion dollars, Pakistan's shrimp exports languish at a mere 70 million dollars. Additionally, Pakistan's fish consumption per capita is just 2 kg per annum, compared to the global average of 30 kg. This low consumption rate suggests significant potential for growth in domestic fish farming to meet local nutritional needs. Species such as Tilapia and Pangasius offer a cheaper source of protein and can help in import substitution as well.

Good quality seed and feed are critical to the success and profitability of fish farming. Traditional fish farms in Pakistan typically produce around 1,500 kg of fish per acre. In contrast, Tilapia farms using high-quality seed and feed can yield up to 4,000 kg per acre, significantly offsetting the higher initial costs. However, Pakistan faces challenges in this area due to the lack of advancements in fish genetics within the country. Consequently, good quality seed often has to be imported to ensure higher yields and better returns. AquaHatch is a local hatchery working to provide high quality fish and shrimp seed. Dhabeji Aqua Foods is working towards a major corporate shrimp farm for export.

## **AquaHatch International**

As in Pakistan's crop and livestock sectors, the issue of good quality seed is a significant challenge in the country's aquaculture industry. High-quality seed is essential for fish farms to produce high yields and secure better returns on investment. Over a decade ago, Pakistan's Fisheries Development Board initiated the import of 50,000 Tilapia fish seed from Thailand, distributing them to 11 farmers and teaching them how to rear these fish. This initiative quickly expanded, and within two years, the import of Tilapia seed surged to 3 million. Today, Pakistan imports approximately 60 million Tilapia seeds annually, highlighting the rapid growth and acceptance of these species in the local market.

The AquaHatch hatchery is situated in Thatta district, between Gharo and Gujjo, on a 33-acre plot with an additional 164 acres available for future expansion. The hatchery is located in an area populated by numerous fish farms, where the subsoil water is brackish and the soil a little saline, making the land unsuitable for traditional farming. This geographic advantage, coupled with access to fresh water from a nearby main water course, has made AquaHatch an ideal location for aquaculture.

The primary focus of AquaHatch is the production of Tilapia and Pangasius seed. These species were chosen due to their ability to grow to a large size, aligning with the Pakistani market preference for heavier fish. Tilapia, which tends to breed a lot in captivity, is sold as monosex seed to prevent further breeding and to ensure that they grow to nearly 1 kg within about seven months with proper feeding practices. By administering testosterone, the female fish are prevented from developing functional ovaries, thus controlling reproduction. Pangasius, on the other hand, can reach a substantial weight of 2 to 2.5 kg within a year to eighteen months.

## Agri-transport challenge

Shrimp farming also holds significant potential in Pakistan. Currently, there are estimated to be approximately 250,000 acres under fish farming in Punjab, though official figures report lower numbers. Converting just 10% of fish farms in Punjab to shrimp farms could boost Pakistan's shrimp exports to a billion dollars. In a 2014 project, importing 10 million shrimp seeds worth almost 10 million rupees took 20 hours to reach the farm, close to the maximum limit for safe transport. Delays could have led to high mortality rates (and high loss), emphasizing the need for a local source.

AquaHatch is actively developing shrimp seed as well to overcome the logistical challenges of importing shrimp. AquaHatch's shrimp seed is adaptable to various water salinity levels, from 28 ppt to 5 ppt (parts per thousand), ensuring survivability. The facility also maintains sea water ponds and brackish underground water reserves to mix and adjust the salt levels as needed.

## Building the eco-system

In Southern Punjab, where water is brackish and the land is underutilized, shrimp farming could transform these areas into highly productive zones. Typically, a modern shrimp farmer using 45 shrimp seeds per square meter can yield around 8,000 kg per acre which far exceeds Pakistan's average of 1,450-1,500 kg of shrimp per acre. Typically, 45 shrimp seeds per square meter can yield around 8,000 kg per acre. While initially, high-quality seed and feed were imported, the establishment of AquaHatch and the entry of companies like AMG Thai Union Feed Mill have made these resources available locally. However, more hatcheries, feed mills, processing units, and progressive farmers are needed to support a fish and shrimp farming eco-system in the region.

The demand for shrimp in Lahore alone, driven by high-end restaurants, is worth an estimated \$24 million annually. Marine-caught shrimp often suffer from quality issues due to extended periods at sea, leading to a smell that farmed shrimp does not have. This freshness gives farmed shrimp a significant market advantage.

## Water availability

Each shrimp farm should ideally be no larger than 2 acres due to the intensive management required. Water quality is crucial, with parameters like dissolved oxygen, pH, and salinity needing constant monitoring and adjustment. Given the uncertainty of water availability in southern Sindh, AquaHatch has built an 8-foot deep, 3-acre pond as a water reservoir to maintain optimal conditions, changing 10% of the water of fish ponds daily to increase survival rates.

The hatchery ponds at AquaHatch are all 6 feet deep, which is more effective than the 3-foot deep ponds at neighboring farms that struggle with water retention and temperature control. The company ensures that the ponds receive feed exclusively from AquaHatch to maintain quality control. Additionally, AquaHatch collaborates with the Dutch Fund for Climate and Development (DFCD) for technical support.

For its shrimp seed production, AquaHatch imports eggs that hatch into nauplii. There is a phytoplankton lab on-site to support the early stages of shrimp development. Currently, they produce 12 million baby shrimp per month, which grow to 22-25 grams (harvest weight) in about three months meaning that two crops can be taken in a year from these baby shrimp/seeds.

## Key challenges and solutions

The absence of a local feed factory providing high-quality feed suitable for shrimp farming was a significant challenge for AquaHatch and other shrimp farmers in Pakistan. This gap was addressed when AMG Thai Union, a joint venture between a Thai company and a local group AMG, established operations to supply high-quality feed for aquaculture farming. The availability of this feed has significantly improved the prospects for successful fish and shrimp farming in the region.

Another major challenge is of bacterial and fungal diseases prevalent among fish, with their incidence largely dependent on water quality, the rate of water change, and the stocking density of fish per unit area. These factors necessitate careful management to prevent disease outbreaks and ensure the health of the fish. Some attention from the government and research centers is also required to work on diseases common in aquaculture.

Transportation of seed also presents unique challenges. Once, AquaHatch had to send 300,000 fish seed from District Thatta to a location farther than Lahore, using a reefer container. However, due to a protest, the container was delayed near Hyderabad for over ten hours, resulting in more than 50% seed mortality. To mitigate such risks, AquaHatch started to use vans with ice boxes installed (after removing the seats), which can travel at high speeds on motorways and have ensured zero-mortality during transport. Although transportation is typically the buyer's responsibility, AquaHatch guides the buyer on exactly how to transport the seed and also plans to develop its own transport solutions to reduce risks further.

Currently, there is no robust insurance product available for aquaculture either. AquaHatch is working with Habib Insurance to develop an insurance product specifically for fish farming, addressing the significant risk factors associated with the industry. The current scale of AquaHatch's operations can provide seed for around 600 acres, but there is a need to replicate this model to meet the demand. Other players must enter the market to provide good quality seed to ensure the industry's growth. A processing facility becomes feasible if it processes around 25 tons per day, highlighting the need for scaling up operations to achieve economies of scale.

The social impact of AquaHatch's operations has been substantial. The farm manager, a young local from the community educated at the University of Sindh, Jamshoro, exemplifies how sophisticated fish farming can provide employment opportunities for educated locals. AquaHatch has also fostered community engagement through intra-community sports, provision of jobs to locals, the construction of a school for local children, complete with hired teachers, and stipends for students. They plan to integrate local boys and girls as interns in their operations, furthering educational and employment opportunities. Additionally, AquaHatch hosts visitors every Saturday, including university students and entrepreneurs, eager to learn about their operations.

## Looking to the future

AquaHatch plans to scale up its operations by opening service centers across Pakistan, complete with cold storages. These centers will facilitate buyback arrangements with farmers, with the ultimate aim of exporting the fish. This expansion strategy not only promises to enhance AquaHatch's business prospects but also aims to significantly boost Pakistan's fish and shrimp farming industry and increase farmer income while contributing to the country's economic growth and sustainability.

## Dhabeji Aqua Foods

Shrimp farming in Pakistan holds massive potential for exports, particularly with the country's extensive 1,300 km coastline along Sindh and Balochistan. Recognizing this opportunity, Al-Karam, a renowned name in textiles, decided to make a significant entry into the aquaculture industry by forming Dhabeji Aqua Foods. This venture represents a bold step towards harnessing the potential of shrimp farming to boost Pakistan's economy.



*Shrimp pond*

## From farming to processing

Dhabeji Aqua Foods is developing a shrimp farm on 400 acres, which will feature 300 half-acre ponds. When completed, it will be one of the largest shrimp farms in the region. The farm is strategically located by the creek in the Dhabeji area. The primary goal of this large-scale operation is to increase Pakistan's shrimp exports and pave the way for others to invest in the sector. Al-Karam aims to produce enough high-quality shrimp to partially support its own processing operations and to inspire confidence in potential investors by demonstrating the viability of large-scale shrimp farming in Pakistan. The group has put in extensive efforts to improve the taxation structure around the industry in addition to working on regulatory challenges that hindered the development of the industry; including addressing bans on shrimp imports from Pakistan by other countries.

The location is ideal for shrimp farming as it allows for the extraction of seawater, which contains 97% of the minerals required by shrimp. Dhabeji Aqua Foods employs an intensive shrimp farming model, stocking 150 pieces of shrimp per square meter, with the potential to increase to 250 to 300 pieces (as compared to the traditional average of 45 pieces per square meter). This intensive farming approach necessitates a higher investment, with the cost of developing each half-acre pond being more than three times that of a typical one-acre shrimp pond. Currently, the farm has 20 operational ponds, with plans to expand to 100 ponds by February, 2025, and to continue to add 100 ponds each season till it reaches its maximum capacity of 300 ponds.

Al-Karam is exploring options for establishing its shrimp processing operations. Given the seasonal nature of shrimp farming in Pakistan, which is not viable during the winter months due to low temperatures, the processing facility will need to import shrimp for the remaining two months to maintain year-round operations. A typical processing facility has an output of around one ton of shrimp per hour, requiring 1.5 tons of unprocessed shrimp every hour. The fresh shrimp undergoes de-heading, grading by size, peeling, and de-veining, before being prepared for various forms of sale such as frozen, glazed, cooked, or breaded.

## Building the eco-system

It is essential to establish other high-quality shrimp farms to meet the processing facility's demand, either through local sourcing or imports and encouragingly other entities have begun to explore the farming space. The processing operations will create approximately 400 jobs, while the farm operations are expected to generate around 750 jobs on the 400-acre site. This development will require significant training for human resources involved in both farming and processing both of which the group can draw on through its local and international partners. The group has previously seen success in helping set up crab processing and upskilling local women workers through training sessions with its foreign partners.

Intensive shrimp farming is susceptible to diseases, requiring meticulous attention to disease management. To address these challenges, Dhabeji Aqua Foods is receiving guidance from international experts to ensure effective disease control and management practices in addition to putting in place the best-in-class biosecurity infrastructure and protocols, thereby safeguarding the health of the shrimp and the success of the operation.

## Conclusion

The development of advanced aquaculture operations such as AquaHatch and Dhabeji Aqua Foods marks a significant step forward for Pakistan's fishing and shrimp farming industries. These ventures highlight the immense potential for both domestic consumption and export, addressing critical issues such as high-quality seed production, disease management, and efficient farming techniques. By leveraging modern practices and international expertise, these operations demonstrate the viability and profitability of large-scale aquaculture in Pakistan, showing the path for future investments in the sector.

The economic and social impacts of these projects are also substantial. AquaHatch's commitment to expand its operations along with Dhabeji Aqua Foods' ambitious plans to boost shrimp exports and create employment opportunities, underscore the transformative potential of aquaculture. As Pakistan continues to navigate its economic challenges, the success of these pioneering efforts can serve as a catalyst for broader industry growth. These initiatives promise not only to enhance food security and generate significant revenue but also to position Pakistan as a competitive player in the global aquaculture market.