Shrimp farm biosecurity in Saudi Arabia: A journey from past practices to future vision

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Shrimp Aquaculture in Saudi Arabia

Saudi Arabia has a coastline of 7,572 km, with the Red Sea to the west and the Arabian Gulf to the east. Approximately 2,400 km of undeveloped coastline can be used for aquacultural development in the pollution-free coastal environment. Due to limited freshwater resources and regulatory restrictions, the conditions for mariculture development are more favourable than those for freshwater aquaculture.

Saudi Arabia started the development of its aquaculture industry in the 1970s, with a first emphasis on freshwater fish species, like many other developing countries. During the 1970s and 1980s, the primary focus was farming tilapia (Oreochromis niloticus). However, in the mid-1990s, driven by policy planning, market demand, and favourable environmental conditions, the shrimp farming industry began to develop and eventually surpassed freshwater aquaculture production.

Since the 1990s, shrimp farming has become increasingly prosperous in Saudi Arabia due to economic development, market demand, and environmental factors. Initially, the primary species cultured was the Indian prawn (Fenneropenaeus indicus). However, the white spot syndrome virus, which emerged in the early 2000s, decimated this species. Since then, aquaculture industries in Saudi Arabia have started farming Pacific white shrimp (Penaeus vannamei) to cover the shortage of Indian prawns.

In 2023, Saudi Arabian aquaculture production reached approximately 139,949 tonnes, while mariculture production (including marine shrimp and finfish) was recorded at 92,491 tonnes. Pacific white shrimp farming has accounted for more than 70% of the total mariculture production since 2010. Shrimp farming is widespread in Saudi Arabia to meet local and global demand.

Notably, while a few mega-companies dominate the shrimp farming industry, most freshwater fish farms are operated by small-scale farmers and scattered across the country. Nine licensed mariculture companies exist, while around 350 freshwater fish farms exist.

Issues of shrimp farm biosecurity in Saudi Arabia

Disease prevention has been a significant issue in Saudi shrimp aquaculture. It has even changed the direction of the country's shrimp farming industry development and primary cultured species.

However, in the early stages, the Ministry of Environment, Water & Agriculture (MEWA) struggled to understand the operations and needs of most aquaculture farms due to a lack of guidance policies and measures. Ineffective farm management resulted in inconsistent product quality, difficulties estimating production, and difficulties preventing disease.

First, as most shrimp broodstock and larvae were imported from abroad and few local hatcheries existed, the risk of introducing pathogens was high. Furthermore, traceability issues arose as certain companies did not document the origins of broodstock and larvae.

Additionally, MEWA had difficulty monitoring farm operations because of the enormous differences in farm operating models and facilities and their scattered distribution before the 2000s. This also hindered the implementation of effective measures during disease outbreaks.

Environmental constraints and higher-cost production facilities were common in Saudi Arabia. Additionally, on the coastline of the Red Sea, the seawater salinity is approximately 42‰–45‰ during the producing period. The high cost of freshwater is also an essential factor that influences aquaculture production costs in Saudi Arabia.

Due to the short development history of the aquaculture industry, Saudi Arabia also lacked experienced shrimp farm management personnel in the 1990s and 2000s, making recruitment and training of local personnel a significant challenge. The absence of vocational training organisations was also one of the key issues.

Solution and improvement of shrimp farm biosecurity

Since 2018, MEWA has promoted aquaculture development under Vision 2030, the new national development program in Saudi Arabia, which aims to set up sustainability strategies for the country's environment and agriculture sectors.

The new national development program has integrated government, private, and academic resources into the shrimp farming industry. It aims to improve and strengthen technology transfer, farm management and operations, workforce training, and disease prevention.

On disease prevention and biosecurity, MEWA regularly meets leading aquaculture companies to hold biosecurity workshops to understand the current operating status of the industry. They also compile annual statistics on aquatic animal disease types and accumulated cases for year-to-year tracking. The import of live shrimp is strictly regulated to prevent disease outbreaks. Only licensed operators can import live shrimp; a list of approved companies is maintained for import and biosecurity purposes. MEWA also provided shrimp farmers with free disease prevention and biosecurity manuals and regularly monitored farm operations to prevent disease outbreaks.

Moreover, MEWA has collaborated with local universities, international organisations, and national research centres to improve technology transfer and farm management. National research centres and multiple semi-official organisations offer assistance and consultation. Additionally, MEWA has actively joined international animal health organizations to enhance its disease prevention capabilities and knowledge. They also encourage its personnel to attend training programs to expand their ability further.

MEWA requires biosecurity personnel to have on-site practical experience for biosecurity operations. They must also regularly inspect shrimp farms, compile monthly reports, and send them to the office. MEWA has established aquatic disease centres in major aquaculture-producing regions to help prompt diagnosis and monitoring. Mmost leading Saudi aquaculture companies have set up biosecurity departments and relevant measures, such as the National Aquaculture Group (NAQUA). MEWA has been training national-related biosecurity staff members whose responsibilities cover the entire country.

Future development of shrimp farm biosecurity in Saudi Arabia

MEWA actively supports the growth and development of the shrimp industry. It helps in the search for suitable farming locations, provides technical consultations, and offers vocational training. Moreover, it continues to cooperate internationally to import high-quality shrimp broodstock and larvae, assisting industry operators in producing quality products.

There is still a need to recruit more experienced biosecurity personnel. Currently, internships and on-the-job training programs are being utilised to enhance the quantity and competency of relevant personnel. Moreover, MEWA currently monitors shrimp diseases using PCR technology. In the future, real-time monitoring equipment could be considered to improve detection efficiency.

Overall, stability is crucial for shrimp aquaculture's sustainable development. Hence, it is imperative to prioritize broodstock. Given the limited availability of local hatcheries supplying broodstock and larvae, expanding larvae production and establishing more hatcheries is necessary.

Current policies aim to prevent disease and ensure biosecurity. MEWA has been developing sustainability strategies for the aquaculture sector, including a national aquaculture centre for private enterprises, enhancing production from hatcheries and farms, and commercializing native shrimp species.

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