Local knowledge and practices in Asian seabass (*Lates calcarifer*) nursery to grow-out culture in Andhra Pradesh, India

Karthik Kumar Goud Palsam[1]*, Ankush L. Kamble[1] and Sai Krishna Veeranki[2]

1. ICAR-Central Institute of Fisheries Education, Mumbai, Maharashtra - 400061, India; 2. Department of Fisheries, Machilipatnam, Krishna District, Andhra Pradesh - 521001, India.Corresponding author: karthikpalsam@gmail.com

Harvested adult Asian seabass measuring approximately 67 cm in total length.

Asian seabass is quietly making waves along India's coast, especially in Andhra Pradesh. Internationally known as giant seaperch or barramundi, this sleek predator is called *pandugappa* in Andhra Pradesh. It is not just another fish: it is a culinary favourite, thanks to its firm white flesh, excellent taste and nutritional richness. Belonging to the family Latidae, this species has gained considerable attention in both domestic and international markets, and it is easy to see why. Seabass has everything an aquaculture farmer could hope for: fast growth, tolerance of a wide range of salinities and water conditions, and the capacity to thrive at high stocking densities. It is therefore no surprise that it is cultured worldwide in systems such as cages, ponds and recirculating aquaculture systems (RAS).

In India, the ponds and cages of coastal states have become the primary zones for seabass farming. Post-COVID, there has been a spike in pond-based culture, especially across Krishna, Eluru and West Godavari districts in Andhra Pradesh. With the uncertainties plaguing shrimp aquaculture, many farmers have shifted gears, attracted by the prospect of better returns from seabass. Naturally, this growing interest has also boosted the development of seabass seed and nursery systems near the farming hubs.

This article walks through the seabass farming journey in brackish-water environments - from sourcing eggs to nursery rearing and through to grow-out. It outlines culture duration, feeding, growth milestones and market prices.

Nursery phase I: where it all begins

The seabass production cycle begins with the transformation from egg to fry during the first nursery phase. These eggs are commonly compared to cumin seeds by local fishers due to their similar size and colour. They are primarily collected from brackish and marine waters between May and October. Coastal communities, particularly those residing near Mogalturu, Kruthivenu, Machilipatnam and other fishing villages in the Krishna and West Godavari districts, play an active role in this egg-collection process.

Following collection, the eggs are incubated and reared in nursery tanks for 20–30 days, during which they develop into 2.54-cm fry that visibly resemble adult seabass. During this period, the fry feed on naturally available food such as microflora, mosquito larvae, small aquatic insects and organic detritus present within the tank environment. Maintaining optimal tank hygiene and ecological balance is essential to ensure continuous availability of this natural diet.

In addition to wild-sourced fry, hatchery-based supply also contributes to nursery stocking. Notably, institutions such as the Rajiv Gandhi Centre for Aquaculture (RGCA) in Chennai provide hatchery-reared 2.54-cm fry to support farming operations. Market rates typically range from ₹1–1.5 per egg and ₹2–3 per fry, depending on quality and source.

Nursery phase II: growing into fingerlings

Once the fry reach a length of approximately 2.54 cm, they enter the second nursery phase, where they are further reared to fingerling size, typically around 7.5-10 cm in length. This stage generally spans 1-3 months, with growth rate largely influenced by the quality and frequency of feeding. Rearing continues in tanks situated near the backwater regions of the same coastal fishing villages mentioned for nursery phase I.

The primary feed used during this stage is locally known as royya pottu, referring to small shrimp (*Acetes* spp.), which provide a protein-rich diet essential for healthy development. Under optimal conditions, including proper tank management and consistent feeding, fingerlings may reach the desired size within a month, though in most cases the duration extends up to three months. These fingerlings are typically sold at market rates ranging from ₹25–30 per piece, based on their size and overall quality.

Pre-grow-out phase: getting them pond-ready

Before being introduced to the main grow-out phase, the fingerlings undergo an intermediate rearing stage in pre-grow-out ponds. During this phase, they are grown to juvenile size, typically weighing 100-200 g and measuring around 15-20 cm in length. This process usually takes 2-4 months and is carried out in smaller ponds located near established grow-out farms across the districts of Krishna, Eluru and West Godavari.

Some farmers choose to rear the fingerlings themselves during this stage, while others prefer to purchase juveniles already grown to the required size. The diet during this period consists primarily of *Acetes* shrimp and small fish of about 13 mm in length. The market price for juveniles at this stage typically ranges from ₹100–150 per piece, depending on their size and condition.

Seabass fry.

Seabass fingerlings.

Grow-out phase: the main event

The grow-out phase forms the core of seabass aquaculture. While individual farmers may introduce minor variations to suit specific needs, overall practices across farms remain largely uniform. Grow-out ponds generally range in size from 0.4-1.2 ha, aligning with the recommended 0.5-1.0 ha suggested by the Central Institute of Brackishwater Aquaculture (CIBA). Rectangular ponds are commonly preferred due to practical advantages such as ease of management and enhanced water circulation, which support uniform fish growth and efficient harvesting.

Stocking densities typically range between 1,000-1,500 juveniles per 0.4 ha, with some farmers going up to 2,000 per 0.4 ha based on management capacity. Feeding is generally carried out once daily, predominantly before 2 pm. Live feed is used throughout the culture period. Initially, *Acetes* shrimp and juvenile tilapia (2.54-7.62 cm) are provided. As the seabass grow, the feed gradually shifts to larger tilapia (7.62-10.16 cm). The entire culture cycle spans approximately 14-16 months.

A typical month-wise feeding and growth pattern followed for every 1,000 juveniles stocked in grow-out ponds is as follows:

- Month 1: Approximately 1 tonne of live feed, comprising small tilapia and shrimp, is administered.
- Month 2: Feed quantity increases to around 1.5 tonnes.
- Month 3: Feeding volume rises to 2 tonnes.

Harvested adult Asian seabass weighing approximately 4 kg.

Seabass juvenile.

- Month 4: An additional 2 tonnes of tilapia (2.54-7.62 cm) is provided. Cumulatively, around 6 tonnes of live feed will be used by the end of this month, with the estimated fish biomass reaching 1 tonne. This stage corresponds to a feed conversion ratio (FCR) of 6.
- Months 5-6: A further 2-3 tonnes of tilapia are fed during this period. By the end of the sixth month, individual fish typically weigh around 1 kg.
- Months 7-8: Daily feeding increases to approximately 70 kg of live tilapia (2.54-7.62 cm).
- Months 9-10: Daily feed input reaches 100 kg.
- Months 11-12: Feeding rates further rise to 120-140 kg per day. By the end of this period, the average fish weight reaches approximately 2.5 kg.
- Months 13-14: Daily feeding continues at 120-140 kg. By this stage, it is estimated that each fish consumes around 25 kg of live tilapia throughout the culture cycle. Final weights typically range between 3-4 kg per fish, reflecting healthy growth and efficient culture practices.

Use of chemicals and treatments in the grow-out phase

Maintaining optimal water quality in grow-out ponds is a fundamental aspect of successful seabass aquaculture. Farmers routinely implement a series of measures to ensure that the aquatic environment remains conducive to fish health

and growth. A combination of zeolite and Gasonex is typically applied every one to two months to regulate pH and adsorb harmful substances such as ammonia (NH_4) and hydrogen sulphide (H_2S), which can otherwise compromise fish health. Additionally, agricultural lime and dissolved oxygen-enhancing powders are applied monthly, commonly mixed with sand, to stabilise water quality and improve oxygen availability within the ponds.

Disinfection protocols are followed diligently throughout the production cycle. Iodine-based disinfectants are primarily used: iodine 20% is applied during the first three months to ensure effective sanitisation during the early, more vulnerable stages of fish development. From the fourth month onwards, a less concentrated iodine 2% solution is employed to maintain hygiene without causing undue stress to the maturing fish.

Preventive measures against parasitic infections are also routinely practised. To address common ectoparasites such as *Dactylogyrus* and *Gyrodactylus*, farmers administer treatments of potassium permanganate (potash) and common salt at scheduled intervals. These applications help control parasite loads and ensure the overall health of the fish stock.

Key challenges

Seabass aquaculture faces several pressing challenges that hinder its sustainability and profitability. One major concern is fluctuating market prices, often driven by unpredictable export disruptions and external factors such as regional instability. These fluctuations make it difficult for farmers to plan harvests effectively.

At the same time, the rising cost of feed, particularly live tilapia, has significantly increased production expenses. As growing numbers of farmers culture seabass, demand for tilapia has pushed up prices substantially. Compounding these issues are disease outbreaks such as gill infections like columnaris and fluke infestations, largely resulting from intensified farming and poor management practices.

What exacerbates the situation is the lack of species-specific therapeutics for seabass, leaving farmers dependent on generic or off-label treatments originally developed for other fish species or even livestock.

Conclusion

Asian seabass aquaculture in Andhra Pradesh has evolved into a structured, multi-phase practice driven by local knowledge, adaptive feeding strategies and region-specific management inputs. Each stage from egg collection to grow-out reflects a blend of traditional methods and science-based recommendations that together ensure steady growth and productivity.

Currently, harvested seabass is primarily routed to the Kolkata export market, with some volume channelled through Chennai, mainly exported in raw, whole form. However, there is a growing global demand for value-added seabass products. Strengthening efforts in processing and marketing such products could significantly enhance profitability and provide greater income stability for farmers.

Live tilapia for seabass feed transported in aerated containers.

Harvest output from a seabass grow-out pond.

Moreover, seabass remains a highly regarded culinary favourite, especially in tourist destinations across India, signalling potential for domestic market expansion. By boosting both domestic consumption and export-oriented value addition, the industry can cushion itself against market volatility while ensuring long-term sustainability and improved livelihoods for those involved.