

# Status and prospects of ornamental fish and fish feed industry in Southern India

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## Abstract

Ornamental fish culture, fish feed production and trade presents promising prospects for farmers and entrepreneurs, given the growing demand, and a renewed policy thrust in the sector. This article presents an overview of the dynamics of the ornamental fish and fish feed industry in Southern India based on a primary field survey focusing on the culture potential, demand for fish feeds, marketing systems and trade prospects.

*Key words:* Ornamental fish culture; ornamental fish feed; demand estimation; trade; Southern India

## Introduction

The global ornamental fish trade is estimated at US\$ 18-20 billion which is supported by about 100 million hobbyists around the world enterprise and has been expanding at a rapid pace in recent years. India has considerable potential in production and trade of ornamental fish due to the rich biodiversity of species hailing from diverse aquatic ecosystems, a favourable climate and the availability of a huge pool of low-cost labour. There are about 5,000 ornamental fish producing units spread across the country, wherein about 80% are freshwater-based while the rest form brackishwater and marine. Despite these endowments, India still continues to be a marginal player in the global ornamental fish trade. A recent estimate of the Marine Products Export Development Authority of India (MPEDA) shows that there are one million fish hobbyists in India. The domestic ornamental fish trade is estimated to be about ₹500 crores while the export is close to US\$ 1.4 million (2017-18). Presently, the industry grows at an average annual rate of 11-12 per cent. The *Pradhan Mantri Matsya Sampada Yojana* (PMMSY) has an allocation of ₹576 crores for catalysing the growth of ornamental fish industry.

West Bengal, Tamil Nadu and Kerala are the major hubs of ornamental fish production in India respectively constituting 55%, 30% and 5% of all units in the country. A large number of villages in the districts of 24 Parganas, Howrah, Hooghly and Nadia are major centres of ornamental fish culture in the state of West Bengal. In Tamil Nadu, ornamental fish business is mostly concentrated in Kolathur region near Chennai. This hub supports a plethora of economic activities ranging from large and small scale production of ornamental fishes, their distribution to domestic and international markets, related logistical activities, production and distribution of aquarium and its accessories, live and formulated ornamental fish feed, etc. together constituting an elaborate business network.

Feed has a prominent role to play in ornamental fish business as the fishes require balanced nutrition constituted by vitamins, micro nutrients, and other dietary components for good health, fast growth and for developing attractive colours. Though the industry thrived mainly on live feeds conventionally, formulated feeds have emerged in a big way in recent times. A variety of formulated feeds viz., flakes, tablets, granules and pellets prepared from a wide variety of agro-based raw materials constitute the

modern fish feed business. This study is mainly focused on understanding the dynamics of ornamental fish industry based in South India with particular focus on fish feed production and trade, intended to draw valuable insights for prospective entrepreneurs in the field.

## Objectives and approach

The specific objectives of this study include understanding the business dynamics associated with the ornamental fish production and fish feed industry based in Kolathur, Tamil Nadu; to estimate the approximate demand for prepared/formulated ornamental fish feed emanating from Kolathur based fish industry; and to assess the present status of ornamental fish distribution and imports. The study is based on primary data collected from Kolathur, Athur and Devanpumedu regions near Chennai in Tamil Nadu during March 2021. The data was collected through structured interviews and focus group discussions by involving the operators engaged in large scale

culture of ornamental fish in leased-in fields/water bodies in Athur and Devanpumedu villages of Tamil Nadu; small scale ornamental fish farming units based in Kolathur; fish marketing units; aquarium and accessories dealers; fish feed producing units; wholesale and retail sellers of ornamental fish feed and a few hobbyists. Together, the data collection covered a total of 75 respondents belonging to various categories as mentioned above and was carried out during a 10-day period between 10<sup>th</sup> to 20<sup>th</sup> March, 2021 with the help of a qualified and experienced researcher.

## Ornamental Fish Production System based in Kolathur, Chennai

There are close to 1,850 ornamental fish producing units operating in Kolathur and adjacent regions of Athur and Devanpumedu, which supply ornamental fish to the Kolathur based wholesale market. Ornamental fish production system in this region involves three



Fig. 1. Ornamental fish tanks in a small-scale unit in Kolathur



Fig.2 . Packed red worms for feeding fish



Fig.3. Ornamental fishes for sale in plastic bags

major categories of stakeholders, one: hatchery units engaged in producing ornamental fish fries, two; small scale units engaged in grow-out using small tanks and glassware, and large scale ornamental fish farms growing saleable fishes in huge quantities. The next section elaborates each of these enterprises in more detail.

## Ornamental fish hatchery units

Majority of the ornamental fish hatchery units in the study area are located in New Lakshmipuram and Vinayagapuram villages in Kolathur, Chennai. These units mainly deal with fish species such as Gold fish, Guppy, Angel, etc. Each hatchery unit operates in an average plot area of 20 cents, with around 16 to 20 tanks of 12x5 feet size. Some tanks are set apart exclusively for conditioning breeding activities and others for stocking. Almost all these units use own propagated artemia for feeding the fries. The fish fries are sold at a price range of ₹10 to 30 paise per piece.

## Small scale grow-out units

The small-scale grow-out units procure fish fries from nearby hatcheries and maintain them for about two months before selling them to wholesalers. The production units function in land area of about 20-30 cents with elaborate arrangements for grow-out. The fish fries procured are stocked in cement tanks which have attached facilities for water filtering and aeration. Each unit stocks about 25,000-30,000 numbers of fish fries per cycle in tanks, depending on the species grown. A small-scale grow-out unit

on average employs two full time workers. Many of these units are operated by families, wherein women constitute a major workforce. The fries are fed twice daily (early morning and evening) with locally available red worms. Red worms (larvae of *Chironemus* spp.) are high protein-rich feed sourced from local water bodies using scoop nets. They are said to be an excellent source of nutrition that aid in fast growth and development of attractive colour for the stocked young ones of ornamental fish species. The red worms are sold in small packets priced at ₹50 (Fig.2). After attaining saleable size, the fishes are shifted to Kolathur wholesale market, where they fetch an average price of ₹5-10 per piece (Fig.3).

## Large scale ornamental fish farms

Majority of the large scale ornamental fish farms operate in Athur village, which is located at about 9 km from Red Hills in Chennai, close to Chennai-Hyderabad high way. Around 100 acres of paddy cultivating land was converted to large scale ornamental fish farms by a group of farmers / entrepreneurs who realized the promising potential of ornamental fish business. Borewell is the main source of water farming purposes in this region. Commonly sought after ornamental fish species such as Gold fish, Shubunkin goldfish (SK), Angel, Tetra, etc. are cultured here in large scale. The average size of a pond in Athur is about 30 cents and 6 feet deep. Around 300 such ponds operate presently for ornamental aquaculture and each pond stocks about 10,000 to 30,000 ornamental fish fries, depending on the species, during a culture cycle (Table 1).

Table 1. Estimates of Kolathur-based ornamental fish production per annum

Particulars	Small scale units (Kolathur)	Large scale farms	
		Athur	Devanpumedu
Total number of fish producing units	150	300	1400
Commonly raised species	Goldfish, Guppy, Angel	Goldfish, SK, Tiger fish, Angel, Tetra	
Average number of fish stocked/unit/cycle ('000)	25	15	15
Total number of fish stocked in the region/cycle ('000)	3750	4500	21000
Survival rate (%)	70%	60%	50%
Total number of fish harvested /cycle ('000)	2625	2700	10500
Total number of fish harvested /year ('000)	15750	16200	63000
Grand total production/year ('000)	94,950		
Wholesale price in Kolathur market (₹)	5-10		
Total value of fish transacted /year (₹ crores)	47-95		

Source: Field survey

Another hub of large scale ornamental fish production that caters to the Kolathur wholesale market is the Devanpumedu village located in Gummidipoondi town of Tiruvallur District near Tamil Nadu-Andhra Pradesh border. Around 500 acres of ponds, which were previously used for Vannamei shrimp aquaculture, have been converted to commercial ornamental fish farms. Majority of the fish grown here finds market in Kolathur itself. The water in the ponds in Devanpumedu is relatively more saline compared to that of Athur and therefore culture practices differ slightly. Each pond is stocked with 10,000 to 20,000 fishes per cycle which are harvested in about 60 days' time. The ponds are of similar dimension as in Athur and require about 225-250 kg of the locally produced 'kali' feed per pond per month. At this rate, the overall monthly feed requirement in Devanpumedu farms would be around 350-375 tonnes.

The fishes grown in the ponds are harvested after a period of two months. Depending on the size of the fish and the species, each fish fetches a price ranging from ₹3-6 per piece at the farm gate. They are packed in plastic containers filled with water and are transported to Kolathur wholesale market as well as various other locations in south India.

In all these large farms, the fish feed is prepared locally and known as 'kali', which is a mix of dried fish, ragi, rice, corn bran dust, and related products. The exact specification of the feed mix is often kept a secret by individual farmers and is believed to play a significant role in determining the quality of

the fish raised. The feed is dispensed in a container fixed inside the pond every morning and evening. The cost of production of such feed is estimated to range between ₹32-40 per kilogram. On an average, about 225 kilogram of feed will be used in a pond for a month period. At this rate, about 70 tonnes of feed is required by all the farms in the region spread in an area of 100 acres.

Given their expertise in cheap production of traditional fish feeds, the large fish farmers in Athur and Devanpumedu or those small holders based in Kolathur do not show any inclination towards formulated feeds. This is because, any such shift would completely alter the economics of fish production, thereby adversely affecting their market prospects. Rather than fish farms, the demand for formulated feeds mainly arises from those of the retail shops and hobbyists spread across all over the country. Most of the ornamental fish sold in the Kolathur market find their destination in major South Indian cities, from where they are further distributed to smaller towns and rural areas. Bangalore and Salem are the major markets for Kolathur fish, followed by other cities in Kerala, Karnataka, Tamil Nadu and Andhra Pradesh.

## Demand for formulated feeds

Most of the fish sold from the Kolathur wholesale market goes to small scale retailers and thereafter to home-based hobbyists through varying number of intermediaries. These market intermediaries and hobbyists mostly depend on formulated feeds to meet

the nutritional requirements of the fishes. Considering a post-sale mortality rate of 30% and that most of the surviving fishes are fed on formulated feeds, the total annual potential demand for ornamental fish feed arising from Kolathur-based production system is estimated to be about 13,200 tonnes (at an approximate rate of 200 gms/fish/annum). Taken evenly, this translates to a monthly demand of 1,100 tonnes and a daily demand of 36 tonnes. However, it is to be noted that, this estimate of feed demand is not limited to Kolathur/ Chennai region alone, but emanates from different parts of southern India where these fishes finally reach. Therefore, a significant part of this demand is met either by locally produced feeds or imported feeds. A large variety of formulated fish feeds with wide ranging price differentials are available in the market. Even though the quality of fish feed is utmost important to maintain the health, growth rate and attractiveness of the fishes, most of the small scale hobbyists remain oblivious to it, making them dependent on low quality imported feed. Still, there are a few major local feed manufacturing companies and small-scale units that produce quality feed thereby catering to the growing market demand.

## Ornamental fish producers and sellers based in Chennai

Taiyo feed mill Pvt. Ltd. established in 2002, is a certified manufacturer, supplier and exporter of ornamental fish feed and also the largest ornamental fish feed producing company in South India. The company also deals with food products for other pets such as birds, dogs, turtles, cats and other small animals and birds. Besides catering to local demand, Taiyo feed mill Pvt. Ltd. currently generates 30 percent of its total annual revenue from export sales, to destination countries in Asia, Middle East, Singapore, Africa, Caribbean countries and many more. Taiyo has been rated by CRISIL, certified by ISO 9001: 2015 plant approved by CAPEXIL and permitted to sell and export its products. The total turnover of the company is about 100 crores, average production per year is 1500 tonnes worth about 33 crores rupees per annum. The company has 24 distributors in India selling a wide variety of Taiyo feed products and imported Aquarium items. Apart from the retail distributors of Taiyo feed mill Pvt. Ltd., several other fish feed suppliers and distributors operate from Chennai. The major ones include Aqua Star, Best Aquarium, Southern India Aquaculture and

Aqua World who sell both domestically produced and imported products.

## Ornamental fish feed import

Available estimates show that there is a huge gap in demand and supply of ornamental fish feed in the country. A part of the demand is being met by the import of feed ingredients as well as finished formulated feeds from countries such as Thailand, China, Singapore and others. The Chennai based dealers such as Aqua Star, Best Aquarium, Southern India Aquaculture and Aqua World import about 100-150 tonnes of ornamental fish feeds every year. On average, these companies import more than 20 variants of ornamental fish feed incurring expense about ₹ 40-50 per kg. The retail prices of these products after repacking and branding starts from ₹150 and goes as high as ₹1,500 per kg depending on the product quality. Besides, there are a number of local small scale units who blend imported feed ingredients to develop their own brand of feed products. The annual imports of finished ornamental fish feed by all importers across India ranges between 4000-9000 tonnes in recent years. It is however, not clearly known how much of this quantity is being sold in southern states.

## Future prospects

Given the growing global demand and the government's policy focus to develop the sector with greater investments, the ornamental fish and fish feed industry in the India is poised for a rapid growth in the near future. ICAR-CMFRI is presently undertaking a number of research initiatives on brood stock development and standardization, breeding as well as larval rearing of marine ornamental fish species, apart from efforts to develop entrepreneurship among smallholders. Realizing the market prospects for formulated feeds, two new fish feed formulations namely, *Cadalmin Varna* and *Cadalmin Varsha* were developed by the institute. These research outputs are presently being promoted for commercialization and scale-up, wider adoption, and to gain popular acceptance so that the emerging opportunities in this promising sector can be harnessed to the extent possible. In this regard, technology incubation, skill up-gradation, promotion of start-ups and infrastructure development are certain domains where more emphasis is required in future.