

Opportunities and Economic Prospects of *Channa striata* Farming for Rural Entrepreneurship in Andhra Pradesh

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vijayasanthi.matha@gcrjy.ac.in **Abstract**

Aquaculture plays a pivotal role in the rural economy of Andhra Pradesh, providing livelihoods, food security, and an important source of income. Carp and shrimp dominate aquaculture, their markets are increasingly challenged by fluctuating prices, disease outbreaks, and oversupply. This has created scope for introducing alternative species. Among them, *Channa striata* (striped snakehead) has gained attention as a hardy and high-value freshwater fish well suited to rural entrepreneurship. Its ability to thrive in low-oxygen environments and diverse culture systems, along with high consumer preference, makes it a commercially attractive option for farmers. Increased market demand has added value, as its flesh is rich in bioactive compounds, omega-3 fatty acids, and essential amino acids with wound-healing, anti-inflammatory, and therapeutic properties. Extracts from its skin are used in the preparation of ointments that aid wound healing and tissue regeneration, linking aquaculture to pharmaceutical and medical applications. Despite challenges such as seed availability, high feed costs, and price fluctuations, murrel culture holds promise if supported by farmer cooperatives, value addition, and sustainable practices. This paper highlights the opportunities, challenges, and economic prospects of *Channa striata* farming for rural entrepreneurship in Andhra Pradesh.

Keywords: *Channa striata*, Entrepreneurship, Economics, Opportunities, Andhra Pradesh.

Aquaculture is a vital part of the rural economy in Andhra Pradesh, providing livelihoods, food security, and an important source of income (1). The state is a leading in India's inland fish production, with over 2.12 lakh hectares under cultivation. Traditionally, carps and shrimp have dominated fish farming, but farmers increasingly face challenges such as fluctuating prices, disease outbreaks, and oversupply. After severe losses in shrimp farming, many farmers turned to murrel, attracted by high retail prices (2).

Channa striata (striped snakehead or murrel) has gained prominence as a hardy, high-value freshwater fish suitable for rural entrepreneurship (3-6). Belonging to the family Channidae, murrel is an indigenous air-breathing fish with a suprabranchial accessory respiratory organ, allowing survival in low-oxygen conditions (7). It can be grown in small area with limited resources. *C. striata* is highly favoured in Andhra Pradesh, Telangana, Tamil Nadu, Punjab, Haryana, Bihar, and the North Eastern region due to live availability, tasty flesh with few intramuscular bones (8-11)

Despite this, *C. striata* holds strong potential due to its high-quality flesh, rich nutritional profile, and medicinal and therapeutic properties (12-13). Skin extracts are used in wound healing ointments, creating opportunities in pharmaceutical and nutraceutical markets (14-17).

By producing value-added products such as fillets, ready-to-cook items, and therapeutic extracts, and by setting up hatcheries under initiatives like PMMSY, farmers can receive technical support, seed supply, and training. Integrating student participation and farmers through research, training, and capacity-building initiatives, along with sustainable farming practices, value addition, and institutional support, can significantly improve murrel culture. This approach has the potential to strengthen rural entrepreneurship, enhance livelihoods, and align with the national vision of Viksit Bharat.

Materials and Methods

This review paper draws on published literature, government reports, and market data to

analyze *Channa striata* (murrel) aquaculture and rural entrepreneurship in Andhra Pradesh. Research articles and case studies from databases (Google Scholar, ResearchGate, Scopus, PubMed) were reviewed, focusing on murrel biology, culture practices, economics, and market trends. Key terms included “*Channa striata* aquaculture,” “murrel farming economics Andhra Pradesh,” “value-added fish products,” and “PMMSY.” Reports from NFDB, the Ministry of

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Fisheries, and state fisheries departments provided production and scheme-related data. Secondary sources such as newspapers (e.g., *Times of India*), industry publications, and trade reports were used for pricing, demand-supply, and market viability. Case examples of rural entrepreneurship from Telangana related to *C.striata* culture from “rythunestam” and “TV10 videos and value-added products illustrated practical applications. Data were synthesized to assess production trends, profitability, challenges, and opportunities in murrel culture for rural entrepreneurship.

1. Biological and Aquaculture potentiality

Channa striata (murrel), a hardy freshwater fish of the family Channidae, is widely valued for its adaptability and resilience, making it a promising species for small-scale aquaculture (18). Its suprabranchial accessory respiratory organ enables air-breathing, allowing survival in low oxygen, stagnant, or shallow waters where carp and shrimp cannot thrive. This unique trait makes murrel particularly suitable for regions prone to seasonal water fluctuations and dissolved oxygen stress (7).

Beyond this biological resilience, murrel demonstrates rapid growth and carnivorous feeding habits, consuming insects, crustaceans, and fish fry naturally available in ponds (19). Unlike carp and shrimp, which often depend heavily on formulated feed, murrel’s ability to utilize natural food lowers production costs if natural food is available. Supplementary pellet feeding further accelerates growth and improves body condition, supporting semi-intensive culture in ponds, reservoirs, and backyard systems (20).

Another advantage over carp and shrimp is murrel’s space efficiency and tolerance to water quality variations. It can be reared in ponds as small as 0.05–0.1 hectares and withstands moderate fluctuations in pH and temperature without major culture risks (21). This adaptability makes it accessible to marginal and resource-limited farmers, where carp or shrimp farming may not be feasible.

Combined, these traits air-breathing ability, dietary flexibility, space efficiency, and resilience to adverse conditions *C. striata* as a superior option for rural aquaculture in Andhra Pradesh, offering small and marginal farmers a reliable, profitable, and low-risk alternative compared to conventional carp and shrimp culture.

2. Entrepreneur potentiality

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Channa striata (murrel) has emerged as a high-value freshwater fish species in India, particularly in Andhra Pradesh and Telangana, due to its adaptability, nutritional benefits, and market demand. According to the NFDB, murrel is considered one of the most economical freshwater fish species to culture, making it an attractive option for small-scale farmers and entrepreneurs (22).

Murrel commands a premium in the market due to its taste, texture, and nutritional profile. In Andhra Pradesh, live murrel can fetch prices ranging from ₹300–450 per kg depending on the region and market conditions (2). This high market value provides farmers with a lucrative opportunity to diversify their aquaculture practices and enhance their income. NFDB guidelines also highlight that murrel farming in ponds is cost-effective compared to other aquaculture species because of its biological resilience and feeding flexibility.

For a 0.1 ha pond stocked with 3,000 fry/ha, typical production yields can reach 400–500 kg of marketable fish in 8–10 months. Assuming an average price of ₹450/kg and total production of 450 kg, the gross income would be approximately ₹2,02,500. With production costs, including feed, seed, and pond maintenance, estimated at ₹80,000–1,00,000, farmers can expect a net profit of ₹1,00,000–1,20,000 per cycle. Proper pond management, high survival rates (80–90%), and value addition can further enhance profitability (22).

Seed economics provide another entrepreneurial opportunity. Murrel seed currently costs ₹7–12 per piece, which is considerably higher than carp seed. This makes hatchery enterprises especially profitable, as demand for quality murrel fry is rising across Andhra Pradesh and Telangana. For young and enthusiastic entrepreneurs, establishing murrel hatcheries offers a reliable income source, often yielding better margins than carp hatcheries, while also meeting the growing seed requirement for expansion of culture practices (22).

Model Technical Specifications for Murrel Pond Culture(23)

1. Pond Size: 0.05–0.1 ha (scalable)
2. Water Depth: 1–1.5 m
3. Stocking Density: 2,000–5,000 fry/ha
4. Culture System: Semi-intensive; natural food + supplemental feed
5. Feeding: 3–5% of body weight/day, adjusted for growth stage
6. Water Quality: Temp 25–32°C; pH 6.5–8.5; DO $\geq$ 3 mg/L
8–10 months (marketable size 500–700 g)

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Technology and Engineering Sciences 7. Growth Period:

8. Management Practices: Pond fertilization, weed removal, aeration if needed, disease monitoring

9. Harvesting: Partial harvesting possible from 6 months; full harvesting at marketable size

These technical specifications, combined with institutional support from government agencies, research institutions, cooperatives, and financial bodies, along with value-added products and high market demand, make murrel farming a profitable and sustainable option for rural aquaculture in Andhra Pradesh and Telangana. The potential net profits can exceed ₹1 lakh per cycle per 0.1 ha pond. Beyond live fish sales, murrel also offers opportunities for value-added products such as fillets, ready-to-cook items, and therapeutic extracts. Its skin, known for wound-healing properties, creates additional potential in pharmaceutical and nutraceutical markets. By integrating farming, hatchery operations, and value addition, murrel culture not only reduces dependency on fluctuating live fish prices but also strengthens rural entrepreneurship and diversified income generation.

3. State and Central Government Schemes & Support

To sustain growth and reduce risk in murrel aquaculture, both central and state governments in India have introduced schemes aimed at infrastructure, seed support, training, and market

linkage. These interventions are critical for scaling murrel farming among small and marginal farmers, and for fostering entrepreneurial hatchery operations.

3.1 Central Schemes & Institutional Backing

PMMSY (Pradhan Mantri Matsya Sampada Yojana): This flagship fisheries scheme provides end-to-end support subsidies for infrastructure, seed production, feed mills, cold-chain facilities, and insurance cover for fish farmers. It includes support for building modern hatcheries (23).

NFDB & Department of Fisheries: The National Fisheries Development Board (NFDB) actively promotes murrel culture through training, demonstration projects, and subsidy programs. For instance, NFDB's "Murrel Culture in Ponds" guidelines document technical and financial support pathways (11)

Commercial Murrel Culture Project (CARE / DST): The Centre for Aquaculture Research and Extension (CARE), supported by the Department of Science & Technology, runs a commercial

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murrel culture and training initiative (technology package, seed production, brood stock management) to empower youths and fish farmers (24).

3.2 State-Level Actions & Illustrative Examples

Telangana – Seed Farm Development & Convergence: The Telangana state government has leveraged convergence with MGNREGS to excavate and deepen rearing ponds (47 acres) and strengthened government fish seed farms—reportedly producing seed stock worth ₹10 crores. (25). The state also increased insurance coverage (from ₹2 lakh to ₹5 lakh for accident death) under PMMSY for active fishermen (26)

Andhra Pradesh – Successful Hatchery under PMMSY: In Andhra Pradesh, an *AquaNest Murrel Hatchery* started in 2020 under PMMSY has been maintaining brooders and producing fry to supply local farmers. (27) This case shows how government backing helps stabilize supply of quality seed, reduces dependence on wild collection, and supports entrepreneurial seed enterprises.

Cautionary Case – Price Volatility Risks: A recent *Times of India* article reports that many Andhra Pradesh farmers shifted from shrimp to murrel farming after severe shrimp losses. But a drop in murrel market prices from ₹650 to ₹300 per kg led to financial distress for some

farmers.

This underscores the role of government schemes not just in support, but in helping stabilize markets, extension services, and risk mitigation (2).

5. Challenges

Despite its potential, murrel aquaculture faces several challenges:

1. Limited availability of high-quality fry can restrict scaling of production. Hatcheries supported by PMMSY and local cooperatives are crucial to meet demand.
2. Although murrel feeds on natural prey, supplemental formulated feed is necessary for optimal growth, contributing to production costs.
3. Market oversupply or seasonal demand changes can lead to price drops, impacting profitability.
4. Competition from other freshwater fish species and imported products can reduce margins.

These challenges can be mitigated through farmer cooperatives, promotion of value-added products, efficient marketing, training programs, and institutional support.

Technology and Engineering Sciences Conclusion

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Channa striata (murrel) emerges as a highly promising species for rural aquaculture in Andhra Pradesh and Telangana, owing to its unique biological traits such as air-breathing capacity, tolerance to adverse water conditions, fast growth, and adaptability to small-scale systems. Compared to traditional species like carp and shrimp, murrel demonstrates superior resilience to water quality fluctuations and requires less space, making it particularly attractive to marginal and resource-limited farmers.

The relatively high seed cost (₹7–12 per piece) creates opportunities for entrepreneurial ventures in hatchery establishment. Young and dynamic individuals can leverage murrel hatcheries supported under PMMSY and NFDB initiatives to generate higher income compared to carp hatcheries, while also ensuring local seed security. Case studies from Andhra Pradesh and Telangana demonstrate how government-backed interventions—through

infrastructure support, training, and subsidies—have facilitated successful murrel culture, although challenges like market volatility persist.

Beyond live fish sales, murrel offers significant avenues for value addition, including fillets, ready-to-cook items, pickles (e.g., Koramenu pickles), and medicinal extracts from skin. Developing small-scale processing units and regional branding can diversify income, stabilize revenue, and reduce dependence on fluctuating live fish prices.

To maximize productivity and profitability, continuous training on semi-intensive culture, pond management, water quality monitoring, and disease control is essential. Extension services should integrate modern aquaculture practices with traditional knowledge to improve growth rates and survival. Investment in selective breeding, feed formulation, and sustainable culture systems, in collaboration with universities and research institutions, can further enhance growth performance, disease resistance, and technology transfer.

Price volatility remains a key risk. Strengthening market linkages, promoting cooperative models, and ensuring timely government support—including insurance and subsidies can protect farmers and encourage long-term adoption of murrel farming. Continued prioritization of murrel under state and central schemes, aligning seed production, culture practices, and market access, will foster a robust aquaculture ecosystem.

Altogether, murrel aquaculture provides a sustainable pathway for enhancing rural livelihoods, diversifying farmer incomes, and strengthening food and nutritional security. By integrating

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biological advantages, entrepreneurial hatchery ventures, value addition, and supportive policies, *C. striata* farming can play a pivotal role in advancing the goals of Viksit Bharat and building resilient, aquaculture-based rural economies.

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