***Short Research Article***

**Status and Prospects of Scampi Production in Reservoirs in Telangana**

**ABSTRACT**

The giant freshwater prawn *Macrobrachium rosenbergeii* (widely known as scampi in trade circles) has significant potential in Telangana due to the state’s abundant water resources, including rivers, ponds, tanks, and reservoirs. The [state has been actively promoting scampi farming with a fully funded state scheme of release of prawn juveniles into public water bodies like reservoirs](https://www.entomoljournal.com/archives/2018/vol6issue3/PartE/6-2-103-777.pdf) since 2017, and recorded a substantial increase in scampi production from 7,783 tonnes in 2017 to 14,142 tonnes in 2022-23. In the present study, an attempt was made to study the status of scampi production from selected reservoirs in Telangana. Data from 12 reservoirs in five districts, i.e. Khammam, Nalgonda, Mahaboobnagar, Janagaon and Narayanapet districts of Telangana, were collected. These reservoirs are being managed by co-operative societies. The data analysis revealed that a total of 97.59 lakhs scampi juveniles were stocked during 2021-22 in these 12 reservoirs. The average stocking density of scampi juveniles (~2g) was 725 nos./ha. After eight months of stocking, 26.98 t of scampi of about 50g average weight were harvested from these reservoirs. The yield from the reservoirs ranged from 0.8 to 150 t. The harvested scampi was sold at prices ranging from Rs. 150 to 350 per kg significantly enhancing the income of the society members. The present study revealed the potential of culture-based fisheries in reservoirs involving scampi in enhancing scampi production in the country.

*Key words: Freshwater Prawn (Scampi); Reservoirs; Production; Telangana*

1. **INTRODUCTION**

India's population is increasing at an average rate of 1.2% annually and is expected to reach 1.5 billion by 2030. This would exert enormous pressure on the already limited natural resources of the country in providing the much-needed protein and nutrition support to the teeming millions. While India has shown an increase in fish production, touching 17.45 million tonnes currently, the demand and supply deficit is still wide, despite the sector's growth at 10% per annum during the last decade (Annual Report, DOF, 2023). India has vast and varied aquatic resources for capture and culture fisheries. The fisheries and aquaculture sector plays an important role in socioeconomic development by employing around 28 million people (Annual Report, DOF, 2023). The marine water bodies are used mainly for capture fisheries, whereas inland water bodies are used for both culture and capture fisheries. Most of the inland water bodies are captive ecosystems where intensive processes are possible and hold enormous potential for a many-fold increase in fish production (Gupta, 2014). The fisheries sector aims both exploitation of natural resources and culture for increasing production through sustainable development. Reservoirs are important freshwater resources that have huge potential to increase the fish production through cage culture and culture-based capture fisheries. There are about 19,370 reservoirs in India with a total water spread area of 3.15 million ha (Kumar Varun and Kumar Kamad*,* 2013).

Telangana, the youngest state in India, has made significant progress in the fisheries and aquaculture sector and is blessed with huge and diverse water bodies, which are utilized by the rural people for their livelihood. The sector contributes 0.6 percent to the GDP and plays an important role in the overall socioeconomic development of fisher families in Telangana by providing nutrition and food security. Concerning inland water bodies in India, Telangana currently stands at 8th position in production. During 2017-18, the production of freshwater fish was 2,62,252 tonnes, which grew to 3,76,142 tonnes in 2021-22 (Dept. of fisheries, Telangana, 2022). The fish and prawn production showed an average of 12% growth rate in the last five years. A total of 26,970 tanks and reservoirs with a total water spread area of 6,81,215 ha are available in the state. The species composition of the reservoirs consists of Indian major carps, exotic carp, catfishes, and crustaceans such as *M. rosenbergeii* and *M. malcomsonii* (Suresh *et al.,* 2018). There are 77 reservoirs in Telangana, with a total water spread area of 1,67,914 ha. In addition to reservoirs, there are 24,112 perennial, long seasonal and short seasonal tanks having 4.04 lakh ha of water spread area in Telangana (Dept. of Fisheries, Telangana, 2023).

The giant freshwater prawn, *M. rosenbergii* (scampi), is an indigenous species in the riverine system of India. It is naturally available in the major rivers in Telangana. It has a good market demand and fetches high price and has the potential to enhance the income of fishermen and fish farmers. The state has very good potential to increase scampi production due to abundant water resources, including ponds, tanks, and reservoirs. Scampi is traditionally cultured in reservoirs and community tanks in various districts of Telangana. Since 2017, scampi seeds have been stocked in most reservoirs in Telangana through the fully funded state scheme of the Department of Fisheries, Telangana. This stock enhancement program led to a substantial increase in scampi production from 7,783 tonnes in 2017 to 14,142 tonnes in 2022-23. Recently, scampi farming was also initiated on a pilot scale in a few selected areas in Telangana. The present study was carried out to obtain the status of scampi production in selected reservoirs in Telangana and to suggest strategies for the enhancement of scampi production through culture-based fishery of scampi in reservoirs in Telangana.

1. **MATERIALS AND METHODS**

The main objective of the study was to understand the present scenario of scampi production in reservoirs in Telangana and to develop future strategies to enhance scampi production in the state. A preliminary analysis was made before going on with the main investigation to get familiarized with the objective and location and also to get first hand insights. The primary data was obtained through interviews with the fishermen who depend on reservoir fishing. The study covered fish and prawn fishers in the fishermen's cooperative societies of the selected reservoirs in Telangana. The information about reservoirs and stocking details of fish and prawns was collected from fishermen's co-operative societies and the Department of Fisheries, Government of Telangana. The reservoirs were identified and selected for the present study based on the geographical demography, agro-climatic pattern, and stocking density of scampi in reservoirs. The five districts, namely Khammam, Nalgonda, Janagoan, Mahaboobnagar, and Narayanraopet districts of Telangana, were selected for the survey (Fig. 1). Twelve major reservoirs were selected from these five districts based on stocking details of fish and prawn during 2021-22. An interview schedule was prepared for the collection of information on scampi stocking and harvest.



Fig.1. Map of Telangana showing districts selected for reservoirs survey in Telangana

During this survey, information on reservoir area, depth, seasonal or perennial nature, stocking details, number and size of stocked fish/scampi, duration for culture and harvest, total production, productivity, and marketing details were collected. In addition, the basic details of fishermen, their household information, gender, education and livelihood options, and the number of fishermen involved in respective reservoir management were noted. Descriptive and comparative analysis was used to characterise and assess the production performance of reservoirs in Telangana.

1. **RESULTS AND DISCUSSION**

The details of the available freshwater resources in Telangana are presented in Table 1. There are 77 reservoirs of different sizes in Telangana; among them, 53 reservoirs have a water spread area of less than 1000 ha, while 17 reservoirs have 1000 to 5000 ha, and eight reservoirs have a water spread area of more than 5000 ha. All these reservoirs are suitable for the growth and survival of freshwater prawns. Scampi juveniles are stocked in the small and medium reservoirs.

**Table 1. Freshwater resources in Telangana**

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. No | Resources | Quantity (Nos.) | Water spread area(Hectares) |
| 1 | Tanks & Reservoirs | 26,970 | 6,81,215 |
| 2 | ˃100 Acres Tanks | 5,291 | 2,37,144 |
|  | ˂100 Acres Tanks | 21,590 | 2,56,973 |
| 3 | Reservoirs | 77 | 1,67,914 |

*Source: Department of Fisheries, 2023*

In Telangana, scampi is traditionally cultured in reservoirs and community tanks. Since 2017, scampi juveniles have been stocked in most of the reservoirs through the fully funded state scheme of seed stocking of the Department of Fisheries, Telangana. The details of freshwater prawn production in Telangana from 2014-15 to 2022-23 are provided in Table 2. The production shows a steady increase from 2017-18 onwards, most probably due to the annual seed stocking program of scampi going on since 2017.

**Table 2. Freshwater prawn production in Telangana**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Production** **(t)** | **Growth rate (%)** | **Value** **(Rs. in lakhs)** |
| 2014-15 | 8,352 | - | 20,671.25 |
| 2015-16 | 8,567 | 2.91 | 24,877.40 |
| 2016-17 | 5,189 | -39.43 | 14,157.60 |
| 2017-18 | 7,783 | 49.99 | 19,805.00 |
| 2018-19 | 9,998 | 28.46 | 27,183.00 |
| 2019-20 | 10,453 | 4.55 | 33,826.00 |
| 2020-21 | 11,734 | 12.25 | 38,176.00 |
| 2021-22 | 13,827 | 17.84 | 44,899.00 |
| 2022-23 | 14,142 | 21.06 | 46,512.00 |

 *Source: Department of Fisheries, 2023*

Socio-economic issues were discussed with the fishermen from the 12 reservoirs through interview schedule. The primary data was collected based on well-structured questionnaire and personal interview to obtain information on the socio-economic characteristics of farmers. Different variables representing the personal and socio-economic characteristics like age, family size, educational status, experiences in fish farming and income levels were presented in Table 3. The collected primary data were tabulated and descriptive statistics for different socio-economic variables were calculated. Total 300 fishermen households participated in the survey, the majority of the fishermen (50.66%) in the present study were middle aged (30 to 60 years) group and mostly had small family (65%) followed by 34.0% farmers belonging to young age group and 15.33% in the older age groups. Age distribution of fish farmers provided good information about the interest of the younger generation in the fishery activity. It showed a shifting pattern from old age to young age which implies that fishing practices were attracting youngsters for their livelihood development. Education is an important socioeconomic factor that help fishermen in the adoption of new technologies and availing government subsidies. In this study, it was observed that majority of respondents (50.66%) were illiterate while 40.33 % farmers were educated up to primary level and only less than 1% of farmers were matriculates and graduates. It is well established that the experiences of fishermen in fishing have positive influence on fish harvesting for their day to day livelihood (Manasi *et al.*, 2009**)**. More than 62.66% of the respondents had long experience in fishing activities and fish culture (more than 10 years), while 21.66 % of the fishermen had shorter duration of experience (less than 5 years). Remaining 15.66 % respondents had medium level of experience (5 to 10 years) in fish harvesting and marketing.

**Table 3. Socio-economic profile of the fishermen involved reservoir surveyed in selected districts of Telangana**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency (n=300)** | **Percentage (%)** |
| **Age (Years)** Young age (≤30) Middle age (>30 to 60) Old age (>60) | 10215246 | 34.0050.6615.33 |
| **Family size** Small family (<5 members) Large family (>5 members) | 195105 | 65.0035.00 |
| **Education** Illiterate Primary MatriculationGraduates | 1521212403 | 50.6640.330.080.01 |
| **Income sources** FishingAgricultureLabourMisc. | 195167514 | 65.000.0525.000.04 |
| **Annual income** Low (< 1 lakh) Medium (1 to 2 lakh)High (>2 lakh) | 1658055 | 55.0026.6618.33 |
| **Experience in fishing/fish farming** Low (Up to 5 years) Medium (5 to 10 years) High (Above 10 years) | 6518847 | 21.6662.6615.66 |

The basic information regarding the water spread area, average depth, number of villages, and number of fishermen depending on the reservoir fishing in the selected 12 reservoirs is given in Table 4. The water spread area of the reservoirs ranged from 200 to 2250 ha. The average depth of the reservoirs ranged from 4.5 to 10.6 m. The reservoirs surveyed in Khammam and Nalgonda districts were relatively larger, with water spread area ranging from 1443 to 2250 ha, while those in Janagaon district were smaller, with water spread area ranging from 200 to 463 ha. The number of fishermen depending on the reservoir for their livelihood ranged from 150 to 2000.

The scampi seed stocking and harvesting details of the selected reservoirs are given in Table 5. A total of 97.59 lakhs scampi juveniles were stocked during 2021-22 in the 12 reservoirs. The total area of the surveyed reservoirs is 13,422 ha. The stocking density of scampi juveniles ranged from 2 to 30 lakh/reservoir, depending on the size of the reservoir. The average stocking density was recorded as 725 nos./ha. Harvest started after eight months of stocking. A total of 26.98 t of scampi of about 50 g were harvested. The yield from the reservoirs ranged from 0.80 to 150 t. The average productivity was estimated at 21.71 kg/ha. The harvested scampi was sold at prices ranging from Rs. 150 to 350 per kg, depending on the size (larger scampi fetches a higher price).

There are very few reports on the production of scampi from reservoirs in India. Kutty *et al.* (2008) reported one success story of a culture-based scampi fishery at Malampuzha Dam (reservoir) in Kerala. The Department of Fisheries, Kerala stocked 6,00,000 post larvae of scampi in the 2320 ha Malampuzha reservoir at 259 nos./ha during September to November 2005. The harvest started in April 2006 and by September 2006, the fishermen harvested a total of 6370 kg of scampi, ranging from 100 to 350 g. The stocking of scampi resulted in an increase in the average productivity of the reservoir from 3.76 kg/ha to 23.14 kg/ha, indicating the significance of such a culture-based fishery approach in enhancing productivity of reservoir as well as scampi production. Laxmappa and Krishna (2015) also reported on the extensive polyculture practiced in the Koilsagar reservoir in Telangana since 2002, where carp species like catla and rohu are stocked at very low densities along with juveniles of

 **Table 4. Basic information of the reservoirs surveyed in selected districts of Telangana**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. no.** | **Name of the District** | **Name of the Reservoir** | **GPS Co-ordinates****(Latitude and Longitudes)** | **Water spread area (ha)** | **Average****Depth** **(meters)** | **Number of Villages depending on the reservoir** | **The number of fishermen depends on reservoir** |
| 1 | Khammam | Palair  | 17°10'24.5"N80°42'39.9"E | 1600  | 6.2  | 18  | 1600  |
| Wyra  | 17**°**17**'**34**.**7"N80**°**71**'**10**.**9"E | 2000 | 6.0 | 15 | 1050 |
| Lanka Sagar  | 17**°**17**'**34**.**7"N80**°**71**'**10**.**9"E | 1750  | 4.5 | 7  | 430  |
| 2 | Narayanapeta  | Sangam Manda  | 16**°**53**'**09**.**0"N77**°**47**'**42**.**1"E | 620  | 10.6 | 6  | 2000 |
| 3 | Mahaboobnagar | Bhoothpoor  | 16**°**46**'**90**.**2"N77**°**59**'**43**.**1"E | 620 | 9.0 | 6  | 2000 |
| 4 | Janagaon | Station Ghanpur  | 17**°**84**'**64**.**1"N79**°**35**'**91**.**5"E | 463 | 5.3 | 2 | 400 |
| Aswaravupalli  | 17**°**82**'**57**.**5"N79**°**26**'**85**.**5"E | 200 | 7.2 | 2 | 230 |
| Rajavaram  | 17**°**89**'**43**.**1"N79**°**37**'**23**.**1"E | 286  | 6.5 | 2 | 380 |
| Jai Chukkarao  | 17**°**84**'**35**.**8"N79**°**28**'**36**.**9"E | 285 | 5.3 | 1 | 230  |
| 5 | Nalgonda | Gundlapalli  | 16**°**78**'**54**.**1"N78**°**95**'**63**.**2"E | 1453 | 6.8 | 1 | 150 |
| Chityala  | 16**°**54**'**25.1"N78**°**68**'**26.2"E | 2250 | 5.3 | 1 | 400 |
| Moosi  | 17**°**23**'**18**.**3"N79**°**50**'**02**.**1"E | 1895 | 10 | 1 | 250 |

 **Table 5. Stocking and harvesting details of selected reservoirs in Telangana**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl.no.** | **Name of** **Reservoir** | **Seed stocking (Nos.in lakhs)** | **Mean size at stocking (g)** | **Price per piece (Rs.)** | **Quantity****Harvested (t)** | **Productivity****(kg/ha)** | **Price (Rs./kg)** |
| 1 | Palair | 6.555 | Juvenile(2-5 g) | 2.00 | 150 | 93.75 | 200 |
| 2 | Wyra | 21.68 | Juvenile(2-5 g) | 2.00 | 50 | 25.00 | 200 |
| 3 | Lanka Sagar | \* | \* | \* | 5 | 2.85 | 150 |
| 4 | Sangam Manda | 30.00 | Juvenile(2-5 g) | 1.50 | 30 | 48.38 | 350 |
| 5 | Boothpur | 5.00 | Juvenile | 2.00 | 1 | 1.61 | 350 |
| 6 | Station Ghanpur | 4.63 | PL-15-20 | 2.00 | 6 | 12.95 | 280 |
| 7 | Aswaravupalli | 2.60 | Pl-15-20 | 2.00 | 0.8 | 4.00 | 280 |
| 8 | Rajavaram | 2.86 | PL-15-20 | 2.00 | 3.6 | 12.58 | 290 |
| 9 | Jaichukka Rao | 2.00 | PL-15-20 | 2.00 | 12 | 42.10 | 300 |
| 10 | Gundlapalli  | 7.05 | Juvenile(2-5 g) | 2.00 | 10 | 6.88 | 220 |
| 11 | Chityala  | 11.02 | Juvenile(2-5 g) | 2.00 | 5 | 2.22 | 280 |
| 12 | Moosi  | 9.22 | Juvenile(2-5 g) | 2.00 | 30 | 15.83 | 230 |

\*Information not available

freshwater prawn species like *M. rosenbergii* (hatchery produced) and *M. malcolmsonii* (collected from the wild). Scampi production ranged from 10 to 12 kg/ha/year, while fish production ranged from 75 to 90 kg/ha/year. In 2013-2014, the scampi production from the Koilsagar reservoir was 9.68 t. The average yield of scampi reported in the present study (21.71 kg/ha/year) is higher than that reported for the Koilasagar reservoir, probably due to a higher stocking rate, but similar to that reported in Malampuzha reservoir in Kerala. Helcio et al. (2016) observed that the integrated prawn farming system in reservoirs is a viable option to enhance the scampi production in the inland water bodies.

The fishermen's community faced problems in harvesting scampi from reservoirs due to a shortage of nets and boats. Also, fishermen were of the opinion that low quality seed resulted in poor productivity of the reservoirs. In Telangana, there is a gap between the fish production and resource availability, even though the state has an excellent sub-tropical climate and varied types of water bodies for development of freshwater aquaculture. One of the major constraints is the lack of skilled persons and lack of knowledge of the farmers on the scientific management of culture-based fishery. Proper management of stocked species in the culture-based fishery operations in reservoirs will ensure sustainable use of these water bodies and provide a constant flow of income to the families.

The present study revealed wide variations in scampi production from different reservoirs studied. These differences in production may be due to the wide variations in the size of the reservoir, variations in water quality, and harvest methods practiced in each of the reservoirs. There was no clear trend observed in production. Similar results were reported in reservoir fish and prawn production in North Telangana districts (Narashima and Benarjee, 2015).

**3.1 Future potential of scampi production in Telangana**

Freshwater prawns (scampi) are a good option for integrated systems, since they are omnivorous and detritivorous and have a benthic habit. Thus, they can take advantage of a wide range of feed wastes, either from aquatic or terrestrial species, which fall through the water column by gravity and settle at the bottom of the rearing systems. Furthermore, they have a well-defined spatial distribution in the environment, and occupy a slender layer at the bottom of the three-dimensional space of aquatic systems. This avoids competition with various species of fish and even allows association with plants.

There is a good prospect for the expansion of culture-based fishery of scampi in reservoirs in India. Apart from the high market value of scampi and the increasing interest in scampi production and government support through various schemes, other factors that may lead to this expansion are as follows:

1. There is a worldwide trend among consumers in selecting products cultured sustainably. Integrated systems are recognized as being more efficient in using natural resources, especially space, feed, and water, thus being more sustainable. The popularization of these qualities may be a good marketing strategy that leads to obtaining a premium price for products from integrated systems.

2. The frequent stocking of fish and prawns in reservoirs increases economic viability, especially for small-scale fishermen who capture the stock with viable netting methods for their livelihood.

4. Further, the production of fish and prawn from reservoirs can be categorised under organic or chemical free product thus these small-scale enterprise may get premium prices in the market.

5. Necessity of increase the scampi farming in rural areas and village tanks to boost the fish production in Telangana

6. Promotion of CIFA-GI Scampi culture in inland water bodies for higher production

7. Promotion of polyculture of GI Scampi along with Indian Major carps.

8. Entrepreneurship development mong fishermen community through scamp farming either in mono or polyculture method

**CONCLUSION**

In conclusion, there is great potential for rearing scampi in seasonal or perennial water bodies in India. This provides an opportunity for fish farmers and fishermen to increase production and profit in minor irrigation tanks with minimum investment. Furthermore, the increased fish production and profit are attained without any additional land use, saving the environment. Therefore, stocking scampi in reservoir systems has a great potential to increase food security, improve the rural economy, create employment and increase the social, economic and environmental sustainability of aquaculture systems. However, fishermen faces several difficulties while engaged in culture-based scampi farming. It is necessary to arrange need-based training programme, demonstrations, exposure visit on scampi farming. Finally, marketing, value addition and export promotion of farmed product is the need of the hour. Nevertheless, a significant research effort is also needed to provide science-based knowledge in order to improve the efficiency of culture-based scampi farming in reservoirs and to take full advantage of the potential of reservoirs.

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

**REFERENCES**

Annual Report (2023). Annual Report – 2022-23. Published by Department of Fisheries, Government of India.

Department of Fisheries, Telangana. (2022). Commissioner of fisheries, Telangana, Hyderabad-2021-22.

Gupta, S. (2016). *Pangasius pangasius* (Hamilton, 1822), A Threatened Fish of Indian Subcontinent. *Journal of Aquaculture Research Development*, 7,400.

Helcio L. A. Marques, Michael B. New, Marcello Villar Boock, Helenice Pereira Barros, Margarete Mallasen & Wagner C. Valenti (2016). Integrated Freshwater Prawn Farming: State-of-the-Art and Future Potential. *Reviews in Fisheries Science & Aquaculture*, 24:3, 264-293

Kumar Varun, Kumar Kamad. (2013). Icthyofaunal Diversity of Dhaura Reservoir, Kichha, Uttarkhand, *Indian Research Journal of Animal, Veterinary and Fishery Science*, 1(5),1-4.

Kutty, M.N., Mohanakumaran Nair C., Salin, K.R. (2008). Reservoir fisheries of freshwater prawn – success story of an emerging culture-based giant freshwater prawn fishery at Malampuzha Dam in Kerala, India, *Aquaculture Asia Magazine*, April-June 2008, pp.40-41.

Laxmappa, B., Krishna, S.M. (2015). Polyculture of the freshwater prawn *Macrobrachium malcolmsonii* (H.M. Edwards) in Koilsagar reservoir of Mahabubnagar district (TS), India. *International Journal of Fisheries and Aquatic studies*, 2(4), 147–152.

Manasi, S., Latha, N., and Raju, K. V. (2009).Fsheries and livelihoods in Tungabhadra basin, India current status and future possibilities.In:*Institute for Social and Economic Change.(ISEC),* pp.1-20.

Narasimha, R.K., Benarjee, G. (2015). Fish Production Trends in Certain Reservoirs - A Study in the North Telangana Districts of Telangana State, *International Journal of Science and Research*. 2015;4(1):2609-2612.

Suresh Kummari, Bhanu Prakash C.H., Shyam Prasad Mamidala, Narshivudu Daggula and Suresh, G. (2018). Opportunities and prospects of inland freshwater aquaculture in Telangana: A step towards blue revolution. *Journal of Entomology and Zoology studies*, 6(3),314-319.