**Exploring the Potential of Inland Fisheries in Belagavi District, Karnataka, India: A Review of Status and Constraints**

**Abstract:**

Belagavi district is one of the finest in terms of availability of water resources and irrigational networks in Karnataka. The district also has higher population of stake holders in the fisheries sector and required governmental set up functioning the district. However, the growth of fisheries sector has stagnated due to over fishing in natural water bodies and no interest to utilize the existing resources for ‘fish farming’. Aquaculture activity is limited to fishing in natural water bodies and some leased tanks, leading to stagnation in production. Change in the perception about the sector among the rural youth, private investment and entrepreneurship efforts will boost the growth of the sector. This study compiles secondary data and institutional inputs to assess current status, bottlenecks, and future prospects. It’s an effort to explore the resources available, fish production pattern, limitations to achieve the growth and possible measures to be adapted in order to tap the complete potential of sector in the district.

Key Words: Fisheries, inland aquaculture, resource utilization, Belagavi

**Introduction**:

Belagavi district is geographically largest in Karnataka with an area of 13,415 sq.Kms. The district is known for its diverse agriculture and allied enterprises due to its larger irrigation facilities (Puneeth et al., 2024; Pal et al., 2019). Therefore, the district is one of the largest producers of field crops, commercial crops, horticulture crops and the land of very huge livestock population (Mujumdar et al., 2025).

However, the same is not true when it comes to fisheries and aquaculture. Despite greater water resources, the fisheries enterprise still in the infancy stage due to lack of farming efforts (HR et al., 2023). The enterprise is by and large limited to capture fisheries in natural water bodies and very little aquaculture interventions in pond fisheries (Kumuda, 2014). Therefore, even after decades of efforts from the government, no significant improvement witnessed in fish production. This article is an effort to investigate the status of fisheries and aquaculture of the district and what could be the way forward approaches to tap the potential.

**Water resources of Belagavi district:** Geographical location of Belagavi district is very congenial as western ghats runs through western part of district (Manjunatha et al., 2024). These ghats are the source of rivers and tributaries which flows eastwards that covers almost the entire Belagavi district (Kale and Bharadi, 2021). A total of 8 major rivers with a 475 Km of riverine stretch across the district allows the establishment of reservoirs and canal networks. This network of canals acts as life line of the district and provides not only irrigation but also supplies water to domestic and industrial purposes. Table No.1 gives extensive information on the water resources of the Belagavi district.

**Table No.1**. **Water resources of Belagavi district** *(Source: Department of Fisheries, Belagavi (2023)*

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Type of water resources** | **Details** |
| 1 | Rivers | Total 8 No.s and 475 Kms of river stretchThe rivers are Krishna, Ghataprabha, Malaprabha, Vedganga, Doodganga, Hiranyakeshi, Markandeya, Mahadayi |
| 2 | Reservoirs | 4 No.s and 22626 ha of Water spread areaHidkal, Naviltheertha, Rakkaskoppa, Markandeya |
| 3 | Natural tanks | 222 No.s (including large and small tanks) with total water spread area 3611ha) |
| 4 | Irrigated lands by canal | 41,952 ha |

**Source:** Dept. of Fisheries, Belagavi

Capture fisheries is a full fledge activity in rivers and reservoirs (Arthur et al., 2022). Only license holders can engage in fish catching activity in these water bodies. Despite strict regulations, a large number of people engage in unlicensed fishing. Illegal fishing is also causing damage to fish population due to use of smaller mesh sized fishing gears, use of lethal chemicals and electrification (Kumar et al., 2021).

Natural tanks are the major contributor of fish production in the district (Lalitha, 2021). These are the tanks categorized based on the water spread area. Table No. 2 provides comprehensive information on natural tanks existing in the district. On tender basis these tanks are leased to interested group/individual to carry out the fish farming operations. The lessee stocks the fish seed and allows them to grow with minimal management. Majority of the time there is no aquaculture intervention involved. By allowing 4-5 months, lessee will start catching fishes. This is the common practices of almost all 222 No.s of natural tanks in the district.

**Table No. 2: Details of the tanks of Belagavi district**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl. No.** | **Taluk** | **Department tanks (more than 25ha water spread area)** | **Z.P. tanks (10 to 25 ha W.S.A.)** | **Fish Farmers Development Agency tanks (less than 10ha W.S.A.)** | **Total** |
| 1. |  Belgaum | - | 4 | 23 | 27 |
| 2. | Khanapur | 5 | 8 | 25 | 38 |
| 3. | Bailhongal | 4 | 7 | 25 | 36 |
| 4. | Hukkeri | 2 | 4 | 13 | 19 |
| 5. | Gokak | 3 | 2 | 1 | 6 |
| 6. | Saudatti | 8 | 3 | 5 | 16 |
| 7. | Ramdurg | 3 | 13 | 1 | 17 |
| 8. | Athani | 9 | 14 | 12 | 35 |
| 9. | Chikodi | - | 9 | 5 | 14 |
| 10. | Raibag | 3 | 6 | 5 | 14 |
|  | **Total** | **37** | **70** | **115** | **222** |

**Source:** Dept. of Fisheries, Belagavi

Dept. of Fisheries, Belagavi has provided subsidies to establishment of fish ponds and biofloc units under various schemes like Blue revolution and Pradhan Mantri Matsya Sampada Yojane (PMMSY). These are provisioned to individual farmers where aquaculture is being practiced. The district also witnessed the establishment of more than 20000 numbers of farm ponds since last decade for the purpose of facilitation of irrigation to the crops. These ponds are ranging from 200sqm to 2 acres. Majority of the tanks are about 400 to 500sqm as they were established under schemes like Krishi Bhagya Yojane from Dept. of Agriculture, National Horticulture Mission from Dept. of Horticulture. These farm ponds are completely owned by individual farmer and hence, intensive aquaculture practices can be taken up.

**Fish fauna of the District:** The natural waterbodies of the district have rich indigenous fish verities which are preferred delicacy for local population (Ramachandra et al., 2023). Table No.3. Provides the list of fish species of Belagavi district with their local names. These fishes are captured using fishing crafts like floats and coracles with the help of gears such as gillnets, cast nets and also through bait fishing (angling).

**Table No. 3: Fish species available in natural resources of Belagavi district**

|  |  |
| --- | --- |
| **Species** | **Local name** |
| *Wallago attu*  | Javari Bale meenu |
| *Ompok bimaculatus* | Gojale meenu |
| *Channa marulius* | Awalu meenu |
| *Channa striatus* | Mattu meenu |
| *Mastacembalus* species | Havu menu |
| *Puntius kolus* | Kolase |
| *Puntius ticto* | Sanna parke |
| *Puntius sophore* | Parke |
| *Labeo fimbriatus*  | Thamri/kemmeenu |
| *Cirrhinus cirrosa* | Arju meenu |
| *Mystus malabaricus* | Meesegirlu |
| *Mystus carasius* | Girlu |
| *Chela buccailia* | Bilachi |
| *Rasbora sp.* | Saslu |
| *Catla catla* | Catla |
| *Labeo rohita* | Rohu |
| *Cirrhinus mrigala* | Mrigal |
| *Cyprinus carpio* | Kannadi |

Among the above listed fishes, commercially important fishes are Predatory fishes like *Wallago attu, Ompok bimaculatus, Channa marulius, Channa striatus*, *Mystus* species, *Mastacembalus* sp. – which fetches higher price in local market. Whereas others fishes such as Catla, rohu, mrigal, common carp, *L*. *fimbriates, Puntius kolus, Cirrhinus cirrosa* are also having good commercial values.

**Set up and functioning of Dept. of Fisheries in Belagavi District:**

Department of Fisheries is functioning as the competent authority of State Government. The Joint Director office at Belagavi which covers four neighbouring districts and Deputy Director of Fisheries is the head of Belagavi district Dept. of Fisheries. Out of 14 Taluks of the district Bailhongal, Raibag, Chikodi, Khanapur and Belagavi Taluks has Asst. Director of Fisheries posts. The department of fisheries is the nodal body for implementation of schemes in fisheries and aquaculture. Additionally, providing the license for fishing, conducting training programmes, monitoring the fishermen cooperatives and other related developmental work are part of the responsibilities of the department (Prasad et al., 2014). Hidkal, Malaprabha and Rakkasakoppa are the fish seed production and rearing centres in the district. Table No.4 illustrates the fish seed production infrastructure in Belagavi district.

**Table No.4 Fish seed rearing centres in Belagavi under Dept. of Fisheries**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of the farm** | **Area (ha)** | **W.S.A (ha)** | **Ponds (no.)** |
| Hidkal | 12.00 | 1.48 | 130\* |
| Malaprabha | 2.00 | 1.00 | 50\* |
| Rakkasakoppa1 | 8.00 | 1.23 | 40 |
| **Total** | **22.00** | **3.714** | **221** |

It is projected that Belagavi district needs 45 lakh advanced fingerlings which is otherwise approximately 85 lakhs fingerlings per season. However, most of the fish seed production units are non-functional due to poor maintenance. Therefore, fish seed production is not matching the district demand. As a result, 90% of fish seeds are brought from Bhadra Reservoir Project fish seed production centre (Shivamogga) and Hospet (Bellary) in form of spawns and reared in the rearing centres mentioned in above table. These spawns are reared for a period of 20 days to 1 month and sold to fish farmers. Major quantity of the fish seeds are bought by the fish farmers who leased the tanks on tender basis.

Additionally, ICAR-BIRDS Krishi Vigyan Kendra, Tukkanatti, Belagavi-1 has exclusive post of Scientist in Fisheries and functioning since three decades. The ICAR-KVK, Belagavi is conducting location specific on field extension researches in fisheries that include introduction new species, performance evaluation and demonstration of new technologies in fisheries. Additionally, capacity building for fish farmers and other stake holders of the district. Education, advisory services, and awareness through various extension activities are being conducted in order to facilitate development of the sector.

**Fisheries Societies in the district:**

The district has well-structured cooperatives functioning. Totally16 cooperatives with total of 1884 members working effectively in the district. These members are involved in fishing activities in rivers stretches across the district and tendered tanks (Basavakumar et al., 2012). Additionally, total of 4161 numbers of full-time fishermen (Male-3782 and Female-379) functioning in the district. These are the registered members who have the license for fishing in natural waterbodies and fish. In recent years, there are three Fish Farmers Producer Organizations established and they are, Doodganga FFPO in Chikodi Taluk and Malaprabha FFPO at Kittur and Ramadurg FFPO at Sureban of Ramadurg Taluk with an average membership of 400 stakeholders. The fisheries sector is largely informal, with many individuals operating outside of organized cooperatives or licensing systems. Therefore, actual data on number of people involved and a precise fish landing data is very difficult to gather.Considering the above-mentioned information, Belagavi district is very resourceful for fisheries and aquaculture production (Kulkarni et al., 2017). The district has abundant natural water resources, huge population of fisheries stake holders and required government set up to facilitate the development of the sector. Now it is time to look for production aspects which gives the insights on whether the resources are effectively utilized for the fish production.

**Fish production status of the district:** As mentioned, most of the fish production comes from capture fisheries at natural waterbodies. Major tanks also contribute fish production to an extent where aquaculture practice is restricted to seed stocking and capture after a few months. The productivity of the different water bodies are provided in the Table No.5.

**Table No.5:** **Productivity of different water bodies in Belagavi district**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No** | **Water bodies** |  **Productivity** | **Aquaculture practice followed** |
| 1 | Reservoirs | 5kg/ha/yr | - |
| 2 | Major tanks | 700-800 kg/ha | Fish seed stocking |
| 3 | FFDA tanks | <2t/ha/yr | Fish seed stocking and manuring, fertilization and feeding |

 Overall fish production in the district is directly correlated to rain fall. Higher the rainfall, better the fish production recorded in the district. The fish production during good rainfall year is around 6000MT and during less rainfall years the average fish production is around 4200MT. The Fig 1 gives an illustration of fish production trend in the last fifteen years.

**Fig 1:** Fish production of Belagavi district since last 15 years (Source: Dept. Of Fisheries, Belagavi)

In spite of having huge water resources of the district, Belagavi stands 15th rank among the districts of Karnataka (*Source: Handbook of Fisheries Statistics, Karnataka*). The district has the potential to produce 15,000MT. Nevertheless, the overall fish production since last one and half decades oscillates between 4000MT to 6500MT. Despite government efforts to increase the production through schemes and provisions, condition has not improved. Blue revolution and Pradhan Mantri Matsya Sampada Schemes have provided different incentives to fishermen and fish farmer communities since last one decade. Fishing gears to license holders, Matsyshraya- provision for building homes for fishing communities, fish fingerling stockings in reservoirs, subsidies to establish fish seed rearing ponds, grow out ponds, fish seeds, fish feeds and bioflocs are the major provisions from government. However, stagnation in production indicates that resistance among the stakeholder to take up the profession into next level.

**Issues in the fish production of the Belagavi district**

1. **Under- utilization of resources:** Under-utilization of water resources such as farm ponds, alkaline and saline waterbodies for fish farming leading to wastage of existing resources. Hence, expansion of fish farming is not taking place in the district.
2. **Compromised sustainability:** Exploitation of natural fish stock is a predominant activity which poses threat to the sustainability. People having no license to fishing are in huge number who practices illegal fishing like use of small mesh sized fishing gears, use of chemicals and some places use of electrical power to catch the fishes are leading to deterioration of fish stock.
3. **No private investment in aquaculture sector:** Raichur, Bellary and Yadgir districts have witnessed surge in aquaculture production due to private investment. However, same is not true in aquaculture sector of Belagavi region. As a result, professionalism and expansion of aquaculture is not evident in Belagavi.
4. **Less interest in youth about aquaculture**: Youth belongs to fishing communities are not showing interest in fisheries and aquaculture profession. They are not understanding the potential of the sector and hence, adaption of fish farming techniques and technologies are poor in the district.
5. **Limited skilled manpower in government set up**: Although, the district has 16 taluks, the Dept. of Fisheries have been facing continuous shortage of manpower to carry out the duties and responsibilities. Frequent transfers and additional administrative duties affecting the sector negatively.
6. **Discontinuation of fish farming after availing subsidies:** The district has witnessed the discontinuation of aquaculture after availing the schemes and subsidies. Despite repeated warning, many ponds are closed and re-used for agriculture crops.
7. **Access to fishes from neighbouring districts:** Belagavi has good access to marine fishes from Karwar, Goa, Malwan and Ratnagiri. Also, inland fishes have been supplied from Andhra Pradesh and Telangana. Hence, district demand is met comfortably; leading to indirect discourage for farming.
8. **Menace of cat fish in natural waterbodies:** The proliferation of invasive species such as African catfish (Clarias gariepinus) poses significant ecological threats to native biodiversity. Also, presence of Tilapia in huge quantity is also major threat to spawns and seeds of indigenous fish fauna. Negligible market value for Tilapia and African Cat fish leading to poor profitability.
9. **Poor retail and cold chain infrastructure:** Fish farmers are facing severe price pressure from middlemen. The retail infrastructure in the district is also very poor leading to unhygienic handling and unpleasant fish buying experiences for consumers. Cold chain is also primitive stage causing early spoilage and damage.

These are the major problems hindering the growth of the sector. Some of the problems are societal and some of them are behavioural in nature which needs to be addressed holistically. It is evident that since last few decades, the government’s financial aid alone did not create much progress in the sector. Way forward, following changes in approaches required in order to achieve the breakthrough in the fisheries sector of the Belagavi district.

1. **Change in perception about the fisheries related profession:** Stakeholders, especially youngsters must believe in the profession that fisheries and aquaculture is an evergreen sector where fish is an important commodity for human kind as long as his existence. This basic shift in perception, brings confident to take up the venture seriously with long vision.
2. **Private investment:** Any enterprise flourishes when private participation, investment and persuasion takes place. The districts like Bellary, Yadgir and Raichur are examples where private investment transformed the sector in Tunga Bhadra riverine belt. Similar geographical conditions and resources prevail in the Belagavi district too which makes lucrative opportunities in fisheries related enterprises.
3. **Upgrading the monitoring mechanism:** Strict adherence to the government rules and laws is very much required for bringing the required changes in utilization of government financial aids. Beneficiaries should be monitored from time to time in order to ensure the financial aids are continued to be used for the purpose it was offered. Also, upgrading the mechanism to curb illegal fishing and fishing without licensing is a need of the hour to ensure sustainability.
4. **Sensitization of youth for entrepreneurship opportunities:** The young generation need to be oriented to entrepreneurship as inland aquaculture offers various avenues such as farming, fish seed, feed, chemicals, fishing gears, logistics services, fish retailing, cold chain, and value-added fish products. Youths needed to be sensitized to different avenues through capacity building and exposure visits. There are ample opportunities for establishment enterprises in fisheries.
5. **Farm pond aquaculture to be encouraged:** More than 20,000 farm ponds in the district provides unique opportunity to earn the additional income though fish farming. These farmers are basically agriculturist having little know how of fish farming. These farmers to be encouraged for high density fish farming.

**Conclusion:**

A combination of policy reform, stakeholder engagement, and scientific extension is necessary to unlock the full fisheries potential of Belagavi district. The District is very resourceful for fisheries and aquaculture. However, the sector is stagnating in terms of production due to lack of interest to adapt proper aquaculture practices. Capture fisheries at natural waterbodies is leading deterioration of fish population due to over exploitation and illegal fishing. To avoid this and to enhance the production, perception on inland aquaculture and related enterprises to be shifted. This will help to increase the private investment and participation which automatically supports the growth of the sector.

**Disclaimer (Artificial intelligence)**

**Option 1:**

**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.**

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