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Enhancing Income of Small Scale Tribal Fishers of Charan Beel, Assam through Culture-Based Fisheries and Pen Culture: A Participatory Approach

Simanku Borah¹, Pronob Das^{1*}, Anil Kumar Yadav¹, Birendra Kumar Bhattacharjya¹ and Basanta Kumar Das²

¹ICAR-Central Inland Fisheries Research Institute, Regional Centre, Guwahati, Assam (781 006), India

²ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata, West Bengal (700 120), India

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Corresponding Author

Pronob Das

e-mail: pronobjaan80@gmail.com

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Name of the Farmer(s) and Address: Dhulabari Charanpur Janajati Unnayan Samity, Deulkuchi, Baksa district, Assam (781 354), India

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Abstract

Charan beel is a closed floodplain wetland located in Baksa district, Assam. Culture-based fisheries (CBF) and pen culture demonstrated in the beel to enhance fish production and income of tribal fishers in a participatory mode. For CBF, advanced carp fingerlings @ 3,000 no. ha⁻¹ were stocked in the beel in December, 2020. CIFRI-HDPE pens were also installed in the marginal areas (4,500 m² area) of the beel and stocked with carp fingerlings @ 3-9 no. m² during February-March, 2021 and reared for 6 months. A total of 5.22 tonnes of fishes were harvested from the beel during 2021-22, resulting 64% increase in total fish production and 106% increase in net income of 133 fisher families compared to that in 2018-19. The outcome of Charan beel is an example to emulate in other parts of the regions for betterment of small scale beel fishers.

Background Information

Floodplain wetlands in Assam are locally known as *beels* and associated with the Brahmaputra and Barak River systems. These resources constitute one of the major fisheries resources in the state, encompassing an area of 1,00,815 ha (Das *et al.*, 2009) with production potential of 1,500-2,000 kg ha⁻¹yr⁻¹ (Das *et al.*, 2018). The present average fish production from these resources is significantly lower than the annual potential. Yadav *et al.* (2021) reported fish production of 206.4 kg ha⁻¹yr⁻¹ from beels without supplementary stocking regime and 455.2 kg ha⁻¹yr⁻¹ with supplementary stocking. Das *et al.* (2017) reported that fish stock enhancement by supplementary stocking of carp fingerlings in Mer beel of Assam resulted an increase in fish production of 507 kg ha⁻¹yr⁻¹ (2007-11) to 1326 kg ha⁻¹yr⁻¹ (2011-16), which further increased to 1,465 kg ha⁻¹yr⁻¹ (2016-17) by stocking stunted carp fingerlings produced in pens as a stocking material. This leads to 188.95% increase in fish production during 2016-17 as compared to 2007-11 (intermittent stocking practice). Das *et al.* (2018) suggested Culture-based fisheries (CBF) and enclosure culture (pen and cage) are important production enhancement options for floodplain wetlands of Assam to increase fish production of the state. Successful demonstration of CBF and pen culture in Bamuni beel of Assam reported an increase of 117% in total fish production and 153% in net income of 65 tribal fisher families during 2021-22 compared to 2019-20 (Das *et al.*, 2022). With this backdrop, we have demonstrated CBF and pen culture in Charan beel, Assam to increase fish production and income of local tribal fishers.

Charan beel (N 26°28'29" and E 91°40'13") is a closed floodplain wetland located in Dhulabari, Deulkuchi, Baksa district, Assam. It is a small beel (11 ha) having water depth

of 1.2-3.9 m, thereby making it suitable for CBF and pen culture. A total of 133 plain tribal fisher families belonging to Bodo community depend on the beel for meeting their nutritional and livelihood needs. Prior to 2020-21, little or no supplementary stocking was practiced in the beel, due to which fish production was not at desirable level. During 2018-19, total fish production from the beel was reported to be 3.18 tonnes and net annual income per fisher family from the beel was a meager amount of Rs. 3,652.00.

Institutional Intervention

Charan beel was selected after a baseline survey to demonstrate CBF and pen culture (Figure 1) through participatory approach (community participation). For CBF, advance fingerlings of Indian major carps (IMCs) and medium and minor carps comprising *Labeo gonius* and *Labeo bata* were stocked in the beel during December, 2020 (Figure 2). As per guidelines formulated for CBF in closed beels (having no riverine connectivity) of Assam, advanced fingerlings (> 10 cm) were stocked at the rate of 3,000 no. ha⁻¹ (Das et al., 2018). A total of 33,000 advance fingerlings were stocked in the beel. Further, pen culture using CIFRI HDPE Pen was also carried out in the beel. CIFRI HDPE Pens (4,500 m² area) installed in the beel were stocked with carp fingerlings (@ 3-9 no. m⁻²) and fed with CIFRI-CAGEGROW floating feed (28% crude protein). Prior to stocking, awareness programmes were conducted at demonstration site to sensitize the tribal beel fishers on importance of CBF and pen culture in beels. Fishes were stocked in pens during February-March, 2021 and harvested during 1st week of September, 2021 after rearing for a period of six months (Figure 3 and 4). Fishes harvested from pens were then released in the beel proper for production enhancement. Final harvest of fish from the beel was carried out during January-March, 2022 (Figure 5). All activities were carried out in the beel through participatory mode involving local tribal fisher community.

Success Points

Post demonstration of CBF and pen culture in Charan beel, fish production increased more than 1.5 times to 5.22 tonnes during 2021-22. Annual net income per fisher family also increased to Rs. 7,519.00 during the period. Per capita fish production (kg fisher-family⁻¹yr⁻¹) increased from 23.89 kg in 2018-19 to 39.23 kg during 2021-22, while fish production per unit area increased more than 1.5 times from 288.91 kg ha⁻¹yr⁻¹ to 474.27 kg ha⁻¹yr⁻¹ over the period.

Outcomes

During 2021-22, successful implementation of CBF in Charan beel led to 64% increase in total fish production and 106% increase in net income of local tribal fishers compared to 2018-19. The demonstration programme improved income and livelihood of 133 tribal fisher families dependent on the beel.



Figure 1: Demonstration of pen culture and CBF in Charan beel



Figure 2: Stocking of fish seed in beel proper for CBF in Charan beel



Figure 3: Harvesting of fishes from pens in Charan beel



Figure 4: Field day on the occasion of fish harvests from pens in Charan beel



Figure 5: Fishers with harvest of fishes from Charan beel

Conclusion

Successful adoption of culture-based fisheries and pen culture in Charan beel, Baksa district, Assam enhanced income and livelihood of tribal fishers. Per capita fish production (kg fisher- family⁻¹) and fish production per unit area (kg ha⁻¹yr⁻¹) in the beel increased more than 1.5 times. Stocking of advanced fish fingerling (> 10 cm) in the beel for CBF resulted in better survival and production. The local tribal community expressed their happiness with the outcome of the demonstration programme and promised to continue the same to enhance their income and livelihood. The success story of Charan beel can be replicated in other beels of North-east India with similar technological interventions.

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