Journal of the Kalash Science
Volume-12, Number-1, 2024 : 5-8

Website: www.kalashj.com
E-mail: saajjjan@rediffmail.com
ISSN: 2321-7634

Fish farming activities and species composition of the Saharsa district, Bihar, India: A note

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Accepted : 27 April 2025

Fisheries sector provides the healthy source of animal protein with omega 3-fatty acid, food security, employment opportunities (Example mainly rural and poor people), socio-economic improvement and foreign incomes (Ali *et al.* 2014, Tiwari *et al.* 2016, Mayank *et al.* 2017, Tripathi *et al.* 2017, 2023, Kumar *et al.* 2023). The fish farming in the pond ecosystem can be summarized as a complex value, conserve and restore regional fish species, important for nature conservation, self employment, water management unit and socio-economic aspects (Dwivedi *et al.* 2014, Pal *et al.* 2023). The role of fisheries sector especially culture sector to the national economy has been constantly significant (Dwivedi *et al.* 2016, Mishra & Dwivedi 2020, Bhutti *et al.* 2022). The culture system in India day by day is growing condition and popular as a business. Freshwater resources (Example villages pond) are frequently declining due to humans activities, industrialization and urbanization (Jha *et al.* 2015, Dwivedi *et al*. 2018) although commercial ponds (for scientific fish farming) are regularly constructing by fish farmers on own lands/fields (Maurya *et al.* 2018).

Bihar state has enormous potential of aquatic bio-resources and offers considerable scope of inland fisheries development, composite fish farming and aquaculture. Most of the fish farmers involved in fish farming improved their socio-economic condition through pond fish farming activities (example production and marketing) in Saharsa district, Bihar. The present study was carry out in Saharsa district, Bihar, India during October 2023 to March 2024 in order to get fundamental information on the present scenario of fish farming system. The all required information and data were randomly collected from the fish farmers during study period. Overall, *Labeo rohita* (Rohu) is the most dominant fish species in culture system in Saharsa district due to consumer preference and market value. The Indian major carps (*Catla catla, Labeo rohita, Cirrhinus mrigala*) and few other important species namely *C. reba, Anabas testudineus, Heteropneustes fossilis, Clarius batrachus, Channa striatus, Wallago attu* and exotic carp were reported mostly cultured in pond ecosystem in Saharsa district, Bihar. The species combination was also considered by some fish farmers. Jha *et al*. (2015) and Bhutti *et al.* (2022) observed that the Indian aquaculture production mainly includes Indian major carps (*Catla catla, Labeo rohita* and *Cirrhinus mrigala*) and exotic major carps.

Fish farming practice is done with traditional system and in some cases on scientific line. The survival rate of fry and fingerlings were not found good condition (less than 80%). The fish farming of the district mostly performed by traditional technique in wild ponds/villages ponds (Example all ecological process depends, balanced and developed by natural cycle) and managed ponds, few farmers were used scientific technique. Scientific fish farming knowledge of fish farmers are regulating the production of fishes in the ponds (Dwivedi 2002, Pandey & Upadhayay 2012, Gautam *et al.* 2020, Kumar *et al.* 2023). Fish farmers can easily take up fish culture in village ponds, tanks or any new water body and can improve their financial position substantially.

Physico-chemical and biological parameters of pond water were not analyzed by fish farmers. In this

region, harvesting is done annually or biannually. In some cases harvesting is done according to the need of money and decreased level of water in the pond due to not availability of water supply. Prasad *et al.* (2023) was observed that the fluctuation in prices of live & fresh fish is very high in Purnea, North Eastern Bihar because of the uncertain nature of production, perishable in nature and variation in short run supply. However, in this region production was low due to the various reasons observed during survey. But many fish farmers in the Saharsa district, fish farming was done scientifically (Example proper manuring, proper stocking of fishes and proper feeding) and production was very high. Fish culture is not practiced on scientific lines, the reasons being that the most ponds have lost their shape, have become silted up due to negligence and heavy aquatic weeds infestation. In culture ponds, seasonal aquatic weeds are not controlled by fish farmers. The wild ponds were observed low production in compared to managed pond and difference was also significantly higher (Bhatnagar & Singh 2010, Ali *et al*. 2014, Islam *et al*. 2011, Verma *et al.* 2015).

The freshwater fisheries resources of Saharsa district exclusively consist of culture fishery from seasonal, perennial in the culture ponds. In this region, mostly three combinations of fishes were used in culture practices namely 3 species, 4 species and 6 species. Species composition or culture type is undertaken depending upon the availability of their seeds and status of fish farmers. Species combinations of fishers are similar as like using from the Faizabad, Chitrakoot and Allahabad districts (Dwivedi & Tewari 2006, Mishra *et al.* 2007, Dwivedi *et al.* 2004, Jha *et al.* 2015). Fish farming also maintains biodiversity and boost to especially river ecosystem and wetlands (Dwivedi 2009, Mayank & Dwivedi 2015, Kumar & Upadhyay 2023). The oil cakes and rice bran were applied as artificial fish feed in ponds by farmers. The traditional fish feed use widely in India and almost in all tropical countries (Dwivedi 2002, Bhatnagar & Singh 2010, Kumar & Upadhyay 2023).

It may be concluded that the fish culture is not practiced on scientific lines (Example pond shape, pond size, pond management and feeding nature) in Saharsa district, Bihar, India because technical knowledge is poor. Overall, the fish production of Saharsa district is not good. Most important factors for improving the production of ponds are by providing training to fish farmers and other financial help. The production of fishes in cultured pond fluctuated with quality and quantity of the feed. The production of fish also mainly depends on the stocking of fingerlings at a fixed number in different layers of the pond which make less competition for food, oxygen and space (Belton 2011, Jha *et al*. 2015, Upadhyay *et al.* 2015, Dwivedi *et al.* 2018). The condition of fish farmers in our state is poor. Biswas *et al.* (2018) reported that the farmer status is directly related to the fish production.

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