



Research Note

'Tuka - Feka' Fishery- An Indigenous Fishing Practice to catch Indian Major Carps in Buxar-Balia Stretch of River Ganga, India

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Indian Major Carp (IMC) comprising of *Labeo rohita* (Hamilton, 1822), *Labeo catla* (Hamilton, 1822), *Cirrhinus mrigala* (Hamilton, 1822) and *Labeo calbasu* (Hamilton, 1822) are considered among the most valued fishes of river Ganga and therefore selectively targeted by fishers for high economic returns as observed lately through a unique hook and line technique termed as 'Tuka-feka' in Buxar stretch of River Ganga (25°35'05.75" N, 83°58'13.18" E). The existent fishing gear was undefined in earlier studies on fishing gears of river Ganga (Hornell, 1924; Ahmed, 1956; Jones, 1959 and Saxena, 1964) and hence described explicitly as many such traditional fishing methods are going into oblivion for diverse reasons. Information on 'Tuka-feka' fishery was gathered employing several participatory tools including interviewing, group discussions and on-field observations. Buxar-Balia stretch of Ganga river sustain varied fish species spectrum constituting of carps, featherbacks, catfishes and small indigenous fishes (SIFs). Decadal landing during 1970s (3.07 tonnes), 1980s (49.18 tonnes) and 1990s (13.33 tonnes) indicated notable contribution of Indian Major Carps in the stretch (Anon, 1970-1990). Fishing with 'Tuka-feka' has gained popularity owing to its simple methodology to capture prized IMCs. In local dialects, the term 'Tuka' means the 'Ball shaped bait' while 'feka' implies 'throwing the device by hand'.

The fishing gear consists of an 'H' shaped bamboo structure unit installed at the mid river channel when water level recedes during winter (Fig. 1). Two bamboo poles of about 1.5 m height (as per water depth) remain fixed vertically at river bottom at about 1.2 m distance in between connected by a horizontal bamboo. Miniature cylindrical bamboo shafts (3-4 nos.) of pipe shaped structure (about 0.2 m length each) are inserted which can rotate freely around long nails fixed on the horizontal bar. Wires or line are coiled over such pipe which are responsible for storing, retrieving and paying out the line during fishing operation (Fig. 2). 15-20 numbers of such fishing units are installed along 100 m river stretch. Number of installations gets reduced during end of June due to increase in water depth and flow of the river.



Fig. 1. Installed H-shaped bamboo structure of 'Tuka-Feka' in river Ganga

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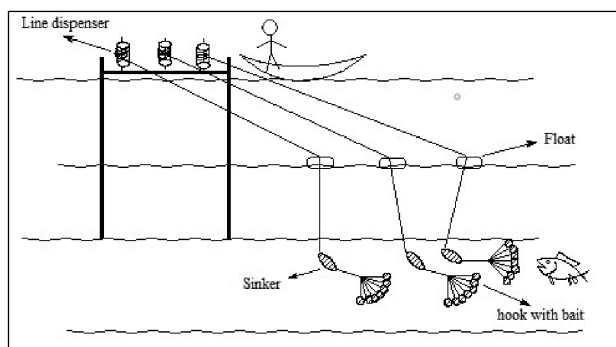


Fig. 2. Schematic diagram of 'Tuka-feka' operation

The gear consists of small sized hooks (15-20 mm, No. 4/0 and 5/0) which are tied with nylon threads (0.5-1.0 mm \varnothing). Lines containing seven numbers of such hooks are clubbed together and attached with a thicker nylon wire of about 1-2 mm \varnothing . All the seven hooks are engraved in hand-made bait balls separately or sometimes in a single bait ball also (Fig. 3a-3d.). Heavy loaded adhesive mud accumulated around the main single wire acts as sinkers to settle the hooks with bait on the river bed. The thicker nylon wire (length 50 m approx.) remains coiled over the cylindrical pipes. Thermocol floaters are fixed at an appropriate place of the line so that the hook with bait is comfortably placed on the river bottom.

Preparation of attractive bait from plant derived materials is the key in 'Tuka-feka' fishery. Locally available ingredients comprising of chickpea (*Cicer arietinum*), mustard (*Brassica juncea*) oil cake, jowar (*Sorghum bicolor*), mahua (*Madhuca longifolia*), fenugreek (*Trigonella foenum*) are blended with alluvial mud (Fig. 3a.). Attractants like cardamom (*Elettaria cardamomum*), camphor, locally made *Karpur-kachari* (made from cardamom) and *Sugandhabala* (made from the root of *Pavonia dorata*) are used for luring IMCs. Boiled rice (*Oryza sativa*) acts as a binder. The mixture is used as bait on the same day itself without any drying or decomposing. Usually, attractant dusts made up of bait ingredients are dispersed over the selected fishing area one-two days prior to the operation. This attracts the targeted fish species which congregate within a specific location. However, oil of Gangetic Dolphin is also seldom used in the mixture depending upon its availability as it is believed to be a strong attractant (Sinha, 2002).

During fishing, hooks with baits are hurled to the bottom of the river with the help of clay-made

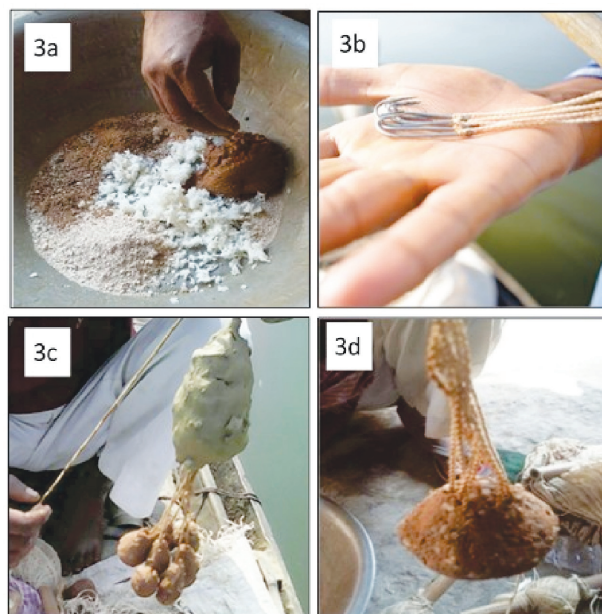


Fig. 3. Bait, a key for successful operation of 'Tuka-Feka'; Fig. 3a. Preparation using local ingredients; Fig. 3b. A collage of seven hooks ready for use; Fig. 3c. Hooks attached to the bait separately; Fig. 3d. All seven hooks engraved into a single bait

sinker. Soon after gulping the hook, fish starts rushing to strip the line off. The bamboo pipe starts clattering due to hurried stripping attracting the attention of the fishers. Hearing the clatter, fishers rush to the spot of the drifting float along with the line it is attached and slowly start retrieving the line resulting in harvesting of the fish. The entire procedure requires a minimum of 4 to 5 h. Generally, fishes are harvested during early morning hours. The fishes (*L. rohita*: length 31.4-55.0 cm, average 43.8 cm; *L. catla*: length 44.8-57.6 cm, average 50.3 cm; *C. mrigala*: length 20.1-28.3 cm, average 24.8 cm and *L. calbasu*: length 33.4-48.0 cm, average 40.8 cm) examined indicated significant variations in the size range. Catch per unit effort (CPUE) has been found to vary widely in the range of 2.5-20.0 kg gear⁻¹ day⁻¹. As estimated, 'Tuka-feka' fishery solely contributes about 0.25 tonnes of IMC landing at Buxar in a single operating season (February to May). However, the mean landing of Major carp and exotics has been estimated around 0.37 and 0.88 tonnes respectively from the river stretch annually.

Prior to the onset of monsoon, IMCs undergo gonadal preparatory phase resulting in spawning during monsoon peak flooding conditions (Jhingran

& Pullin, 1985). Gonadal maturity stage (I-III) develops during December-February and more rapid oogenesis occurs from March onwards (Chondar, 1995). Unfortunately, fishes during such accelerated stages of maturation are targeted by the 'Tuka-feka' fishers. This results in growth overfishing of IMC in River Ganga. Moreover, oil extracted from blubber of Gangetic Dolphin (*Platanista gangetica*) is often used with the 'Tuka-feka' bait as a fish attractant (Sinha, 2002), which is highly detrimental to the conservation efforts of our National Aquatic Animal.

Extensive anthropogenic stress and other problems have been reported as cause for the decline in overall fish production especially Major carps and Hilsa shad from river Ganga (Jhingran & Ghosh, 1978; Payne & Temple, 1996; Vass et al., 2010). Increased exotic fish landing in the middle stretch of the river has also created an added pressure in overall yield of IMCs (Vass et al., 2010). Though, 'Tuka-feka' fishery mostly target IMCs, increased abundance of common carp (*Cyprinus carpio*) in the river often lead to change the catch spectrum of the fishing gear. As the price of common carp is much lower (Rs. 60-80 kg⁻¹) as compared to riverine IMCs (Rs. 300-350 kg⁻¹), fishers are losing interest in 'Tuka-feka' fishery. Due to these constraints, daily catches of IMCs in 'Tuka-feka' is declining gradually. This uncertainty of catch has resulted in bringing down the interest in 'Tuka-feka' fishery among the upcoming generation.

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References

- Ahmed, N. (1956) Fishing gear of East Pakistan, Govt. of East Pakistan, Directorate of fisheries, 35 p
- Anon (1970-1990) Annual Report- ICAR- Central Inland Fisheries Research Institute, Barrackpore, Kolkata-700120
- Chondar, S. L. (1999) Biology of finfish and shellfish. SCSC Publishers, New Delhi, India 514 p
- Hornel, J. (1924) Fishing methods of the Ganges. Mem. Asiatic Soc. of Bengal. 8: 201-237
- Jhingran, A. G. and Ghosh, K. K. (1978) The fisheries of the Ganga River System in the context of Indian aquaculture. Aquac. 14: 141-162
- Jhingran, V. G. and Pullin, R. S. (1985) A hatchery manual for the common, Chinese, and Indian Major Carps (No. 252). World Fish, Penang, Malaysia, 191 p
- Jones, S (1959) Fishing methods for the Hilsa shad [*Hilsha ilisha* (Hamilton)] in the Indian region, Part - I. J. Bombay Nat. Hist. Soc. 56 (2): 250-270
- Payne, A.L. and Temple, S.A. (1996) River and Flood plain Fisheries in the Ganges River. Final Report. DFID Fisheries Management Sciences Programme R 5485, London, MRAG Ltd
- Saxena, R. K (1964) The fishing nets and traps in a session of the middle reaches of Ganga river system of India, I.P.F.C. 11th Session Section (II), FAO, Kualalumpur, Malaysia, pp 250-271
- Sinha, R. K. (2002) An alternative to dolphin oil as a fish attractant in the Ganges River system: conservation of the Ganges River dolphin. Biol. Conserv. 107: 253-257
- Vass, K. K., Mondal, S. K., Samanta, S., Suresh, V. R. and Katiha, P. K. (2010) The environment and fishery status of the River Ganges. Aquat Ecosyst Health Manag. 13: 385-394