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Research Article

EFFECTS OF FISH CATCH DECLINE ON LIVELIHOOD OF FISHERS' COMMUNITY OF THE KALNI RIVER

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Abstract

Over the last few decades, river ecosystems have been increasingly degraded by natural and human-induced pressures, leading to serious consequences for fish biodiversity and fishers' livelihoods. The Kalni River ecosystem has been severely affected by climate-related factors such as rainfall variability, temperature fluctuations, and flash floods, as well as anthropogenic activities including overfishing, destructive fishing gear, and water pollution. A six-month field survey (December 2023–May 2024) involving 100 randomly selected fishers was conducted using structured questionnaires and interviews. The results showed that 82% of fishers experienced livelihood losses due to declining fish diversity, with 65% reporting severe impacts. Daily fish catch declined across seasons, with most fishers catching only 1.0–2.0 kg during pre-monsoon, 3.0–4.0 kg in monsoon, and 2.0–3.0 kg in post-monsoon periods. Reduced income limited households' ability to support education; although primary school enrollment remained high (60% girls), dropout rates increased at higher levels due to financial constraints. Housing conditions improved for 47% of respondents, while 43% reported no change and 10% experienced deterioration. Sanitation facilities remained unchanged for 43% of fishers, improved for 36%, and declined for 10%. Health services deteriorated for 51% of households, and declining income forced 82% of fishers to depend on loans, compared to only 24% two decades ago. Overall, the decline in fish biodiversity has severely undermined the socioeconomic conditions and livelihood security of the Kalni River fishing community.

Introduction

Bangladesh is classified as a riverine country due to its extensive network of rivers flowing across the nation (MOFA, 2017), and it possesses numerous biologically diverse inland water bodies. Approximately 700 rivers, tributaries, and distributaries traverse the country, forming a waterway system of nearly 24,140 km that holds significant potential for fish biodiversity and production (Alam, 2021). Bangladesh is home to about 260 species of freshwater fish, including carps, catfish, eels, perch, minnows, gobies, clupeids, and snakeheads, with a total fish production of 47.59 lakh MT in 2021–2022 (DoF, 2022). Fish production and consumption play a crucial role in national income, food security, employment, and living standards of millions of people in Bangladesh (Sunny, 2017; Hridoy et al., 2021). In Bangladesh, the fisheries sector directly and indirectly supports the livelihoods of approximately 170 million people, or about 12% of the

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total population (DoF, 2021). However, fish production from freshwater ecosystems has declined to below 40%, and 64 freshwater fish species are currently threatened, including 9 critically endangered, 30 endangered, and 25 vulnerable species (IUCN Bangladesh, 2015). Major drivers of this decline include overfishing, unregulated extraction of fish seed and broodstock, pollution, introduction of exotic species, siltation-induced habitat destruction, dam construction, and other anthropogenic and natural factors. Declining fish biodiversity has had profound consequences for fishers' livelihoods, as documented in several rivers of Bangladesh (Hridoy et al., 2024). Such biodiversity loss leads not only to economic hardship but also to social and cultural disruptions within fishing communities, as reduced fish harvests negatively affect income and livelihood security (Masangameno & Mangora, 2016). Climate change further exacerbates these challenges through cyclones, floods, and long-term environmental shifts, making Bangladesh's fisheries sector particularly vulnerable by the mid-21st century (Hridoy et al., 2025a; Islam et al., 2014). Within this broader context, the Kalni River- formed by the confluence of the Khushiyara and Manu rivers and flowing through northeastern Bangladesh- is an important freshwater ecosystem. The Kalni River has been subjected to habitat degradation and overexploitation, resulting in declining fish biodiversity and worsening livelihood conditions for dependent fishing communities (Hridoy et al., 2025b; Rahman et al., 2012). Although numerous studies have examined fish biodiversity decline and its livelihood impacts in other river systems of Bangladesh, similar research has not yet been conducted for the fishing communities of the Kalni River in Ajmiriganj upazila, Habiganj. Therefore, the present study aims to assess the current status and causes of declining fish catch in the Kalni River and to evaluate the impacts of this decline on the livelihoods of the local fishers' community, with the ultimate goal of supporting sustainable fisheries management, biodiversity conservation, and improved socio-economic well-being.

Materials and Methods

Flowchart of the Methodology

The present investigation was executed and concluded in accordance with the following sequential methodology-

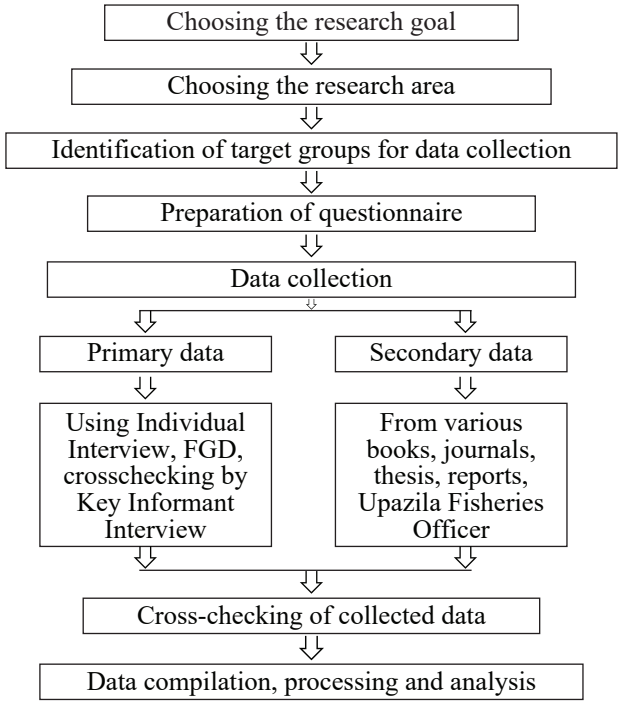

Figure 1. Flowchart of research methodology.

Selection of the Study Site

The study was carried out in the Kalni River of Ajmiriganj upazila in Habiganj district, approximately 145 km long and 6,412 registered fishermen. For details data collection from the fishers', the current research was conducted in three villages surrounding the Kalni River. The name of these villages is:

Site-1: Paharpur

Site-2: Sunampur

Site-3: Katakhali

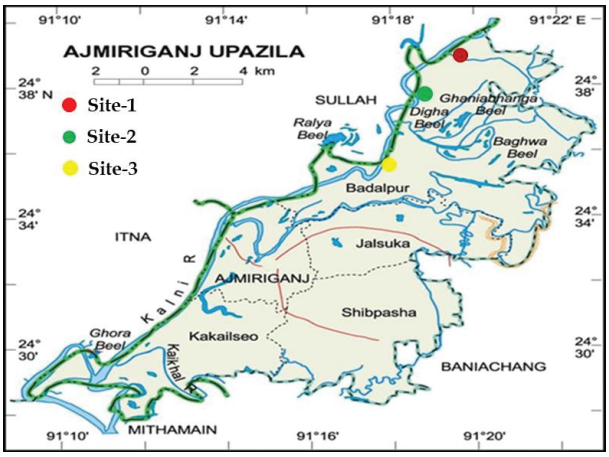

Figure 2: Map showing the study area (Banglapedia, 2010).

Duration of the Study

The study was conducted over the course of six months starting from December 2023 to May 2024 captured seasonal variations in fishing, environmental conditions, and livelihoods, ensuring comprehensive and reliable data on the challenges faced by the Kalni River fishing community.

Preparation of Questionnaire

A structured and carefully pretested questionnaire was developed to examine how biodiversity loss affects the livelihoods of fishing communities along the Kalni River. It focused on several key areas: personal information, fishing information, environmental and ecological factors and socio-economic conditions.

Identification of Target Fishers' and Data Collection

We used a strong, inclusive sampling approach, selecting 100 fishermen through random sampling to ensure community representation, along with randomly chosen family members for broader perspectives. Primary data were collected using individual interviews, FGDs, and KIIs with fishermen and fish suppliers, while secondary data came from DoF offices, books, journals, online sources, theses, and publications.

Data Interpretation and Analysis

Data collected from the field survey were carefully checked, coded, and organized prior to analysis. Microsoft Excel 2021 was used for data entry, cleaning, tabulation, and graphical presentation. Statistical Package for the Social Sciences (SPSS, version 27) was employed for statistical analysis, including descriptive statistics such as frequencies, percentages, means, and standard deviations to summarize

socioeconomic conditions, fish catch variation, and livelihood indicators of fishers. The analyzed results were interpreted in relation to seasonal patterns, biodiversity decline, and livelihood impacts, and were presented using tables and figures for clarity.

Results

Fish Biodiversity Status

In the present research, 63 species belonging to 23 families and 13 order recorded fishes including vulnerable (VU), least concern (LC), endangered (EN), critically endangered (CR), near threatened (NT) and not threatened (NO) based on the IUCN red list data (IUCN Bangladesh, 2015). Based on the interview and recording of the fishermen, the fishes were further characterized and evaluated as commonly available (CA), moderately available (MA), rarely available (RA) and not available (NA) according to their availability.

Sl. No	Order	Family	Local Name	English Name	Scientific Name	IUCN Status	Present Status
1.	Anguilliformes	Moringguidae	Rata boura, ceu mach	Purple spaghetti-eel	*Moringua raitaborua*	NT	NA
2.	Beloniformes	Beloniidae	Kakila, kaikka	Freshwater garfish	*Xenentodon cancila*	LC	MA
3.		Hemiramphidae	Ektotha	Congaturi halfbeak	*Hyporamphus limbatus*	LC	NA
4.	Clupeiformes	Clupeidae	Keski	Ganges river sprat	*Corica soborna*	LC	CA
5.			Ilish	Hilsa shad	*Tenualosa ilisha*	LC	CA
6.			Chapila	Indian river shad	*Gudusia chapra*	VU	CA
7.	Channiformes	Channidae	Taki, lati	Spotted snakehead	*Channa punctatus*	LC	NA
8.			Cheng, ukol	Asiatic snakehead	*Channa orientalis*	LC	NA
9.			Shol, houl	Snakehead murrel	*Channa striatus*	LC	RA
10.			Gozar	Giant snakehead	*Channa marulius*	EN	NA
11.	Cypriniformes	Cobitidae	Rani mach	Necktie loach	*Botia dario*	EN	RA
12.			Gutum	Guntea loach	*Lepidocephalus guntea*	LC	MA
13.		Cyprinidae	Rui, rou bagra	Indian major carp	*Labeo rohita*	LC	CA
14.			Goinna, bagra	Kuria labeo	*Labeo gonius*	NT	CA
15.			Mirka, mrigel	Indian major carp	*Cirrhinus cirrhosus*	NT	RA
16.			Kaila, kalbaush	Black rohu	*Labeo calbasu*	LC	CA
17.			Catla	Indian major carp	*Labeo catla*	LC	MA
18.			Lacho	Reba carp	*Cirrhinus reba*	NT	RA
19.			Bata	Bata	*Labeo bata*	LC	MA
20.			Mola	Mola carplet	*Amblypharyngodon mola*	LC	CA
21.			Dhela	Cotio	*Osteobrama cotio*	NT	RA

22.			Jat puti	Spotfin swamp barb	*Puntius sophore*	LC	CA
23.			Tit puti	Ticto barb	*Puntius ticto*	VU	RA
24.			Sarputi	Olive barb	*Puntius sarana*	LC	NA
25.			Chep chela	Fine scale razor belly minnow	*Chela cachius*	VU	RA
26.			Fulchela	Fine scale razor belly minnow	*Salmostoma phulo*	LC	MA
27.			Katari chela	Large razor belly minnow	*Salmostoma bacaila*	LC	NA
28.			Darkina	Flying barb	*Esomus danricus*	LC	NA
29.	Cyprinidontiformes	Aplochaeilidae	Kanpona	Blue panchax	*Apocheilus panchax*	LC	MA
30.	Decapoda		Gura icha	Monsoon river prawn	*Macrobrachium lamarre*	NO	CA
31.		palaemonidae	Boro icha	Monsoon river prawn	*Macrobrachium malcolmsonii*	NO	MA
32.			Katta icha	Giant river prawn	*Macrobrachium rosenbargii*	LC	RA
33.	Mugiliformes	Mugilidae	Khorsola, kholla	Mullet	*Rhinomugil corsula*	LC	RA
34.	Osteoglossiformes	Notopteriidae	Chital	Clown knife fish	*Notopterus chitala*	EN	RA
35.			Gol chanda	Indian glass fish	*Parambassis ranga*	LC	MA
36.		Ambassidae	Lamba chanda	Elongated glass perchlet	*Chanda nama*	LC	CA
37.			Lal chanda	Indian glass perchlet	*Parambassis lala*	LC	RA
38.	Perciformes	Anabantidae	Koi	Climbing perch	*Anabas testudineus*	LC	NA
39.			Kalisha, khoilta	Banded gourami	*Trichogaster fasciata*	LC	RA
40.		Gobidae	Bele, baila	Tank goby	*Glossogobius giuris*	LC	RA
41.		Nandidae	Meni	Mud perch	*Nandus nandus*	NT	RA
42.	Siluriformes	Bagridae	Gulsha, gula	Day's mystus	*Mystus cavasius*	NT	CA
43.			Tengra	Striped dwarf catfish	*Mystus vittatus*	LC	CA
44.			Gura tengra	Hovering catfish	*Chandramara chandramara*	DD	NA
45.			Bujuri	Long bled catfish	*Mystus tengara*	LC	MA
46.			Ayre	Long whiskered catfish	*Mystus aor*	VU	MA
47.			Guizza ayre	Giant River-catfish	*Mystus seenghala*	VU	RA
48.			Rita	Whale catfish	*Rita rita*	EN	RA
49.		pangasiidae	Pangas	Yellow tail catfish	*Pangasius pangasius*	EN	NA
50.		Schilbeidae	Bacha	Batchwa vacha	*Eutropiichthys vacha*	LC	MA
51.			Muri bacha	Murius vacha	*Eutropiichthys murius*	LC	MA
52.			Gaura	Garua vacha	*Clupisoma garua*	EN	RA
53.			Kajoli, henoli	Gangetic ailia	*Ailia colia*	LC	RA
54.			Batasi, baspata	Indian potasi	*Pseudeutropius atherinoides*	NT	MA
55.		Siluridae	Boal	Freshwater shark	*Wallago attu*	VU	MA
55.			Pabda	Pabo catfish	*Ompok pabo*	CR	MA
57.		Sisoridae	Baghair	Dwarf goonch	*Bagarius bagarius*	CR	RA
58.			Gang tengra	Indian gagata	*Gagata cenia*	CR	MA
59.	Synbranchiformes	Mastacembelidae	Guchi baim	Barred spiny eel	*Macrognathus pancalus*	LC	CA
60.			Tara baim	Lesser spiny eel	*Macrognathus aculeatus*	NT	RA
61.			Boro baim	Zig-zag eel	*Macrognathus armatus*	EN	MA
62.		Synbranchidae	Kuchia,khuica	Mud eel	*Monopterus cuchia*	VU	NA
63.	Tetradontiformes	Tetraodontidae	Potka, futka	Ocellated puffer fish	*Tetraodon cutcutia*	LC	RA

Figure 3 presents the recorded fish species by order in percentage (%).

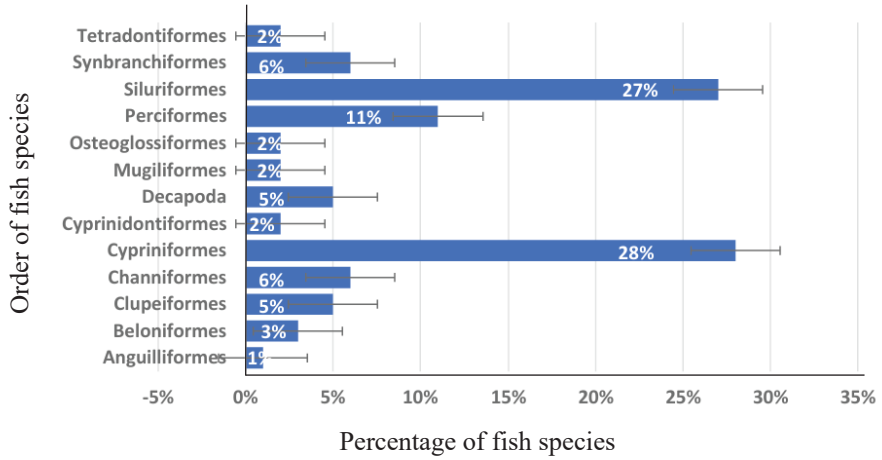

Figure 3. Percentages of fish species under different order.

Name of Fishing Gears Used by Fishermen

The study found that fishers in the Kalni River use a wide range of fishing gear, with 10 types recorded. *Ber jal* and *utar/kuna jal* were the most common used by 53% of respondents. Other frequently used gears included *gon jal* (19%), *borshi* or long lines (17%), *chai* traps (16%), and *current jal* (9%). *Jhaki jal* and *dharma jal* were each used by 8% of fishers, while *duwa* traps (6%) and *thela jal* (2%) were less common (Fig. 4).

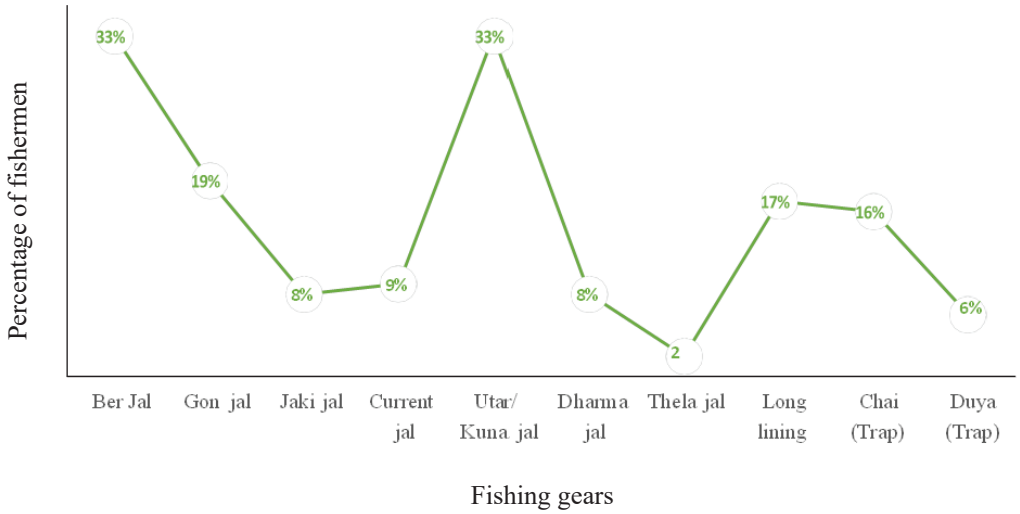

Figure 4. Fishing gears used by fishermen.

Causes of Fish Catch Declination

Respondents reported that fish decline in the Kalni River is driven by both natural and human factors. Key natural causes included rainfall fluctuation (69%), temperature changes (62%), flash floods (60%), siltation/erosion (35%), less frequently floods (28%) and droughts (8%) shown in Figure 5. Among manmade causes, harmful fishing gear (86%), water pollution (73%), and overfishing (68%) were most significant, followed by poison fishing (32%), sand extraction (18%), fishing with fences (15%), dam construction (11%), and navigation (9%) shown in Figure 6.

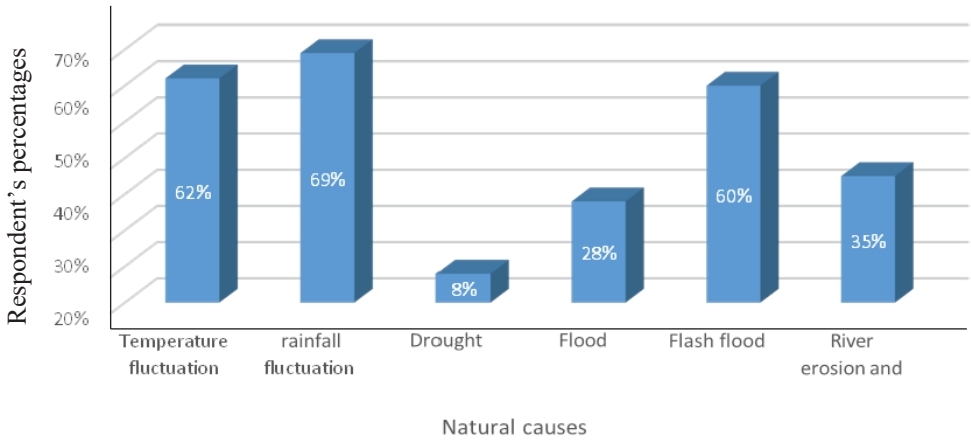

Figure 5. Natural causes of fish declination (multiple response).

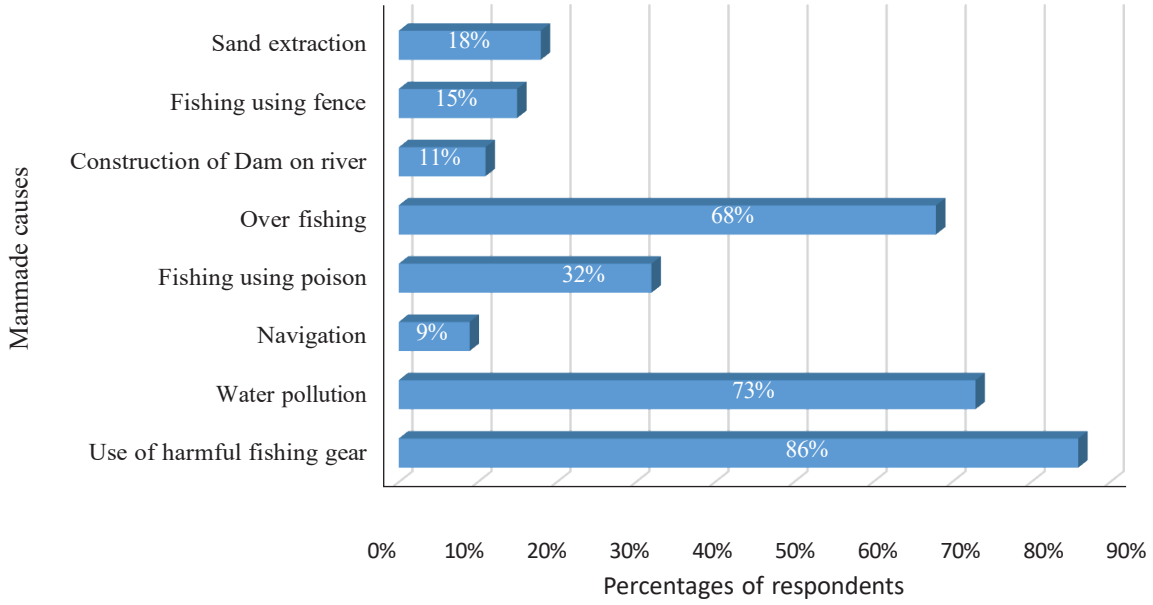

Figure 6. Manmade causes of fish declination (multiple response).

Socio-demographic Profile of the Respondents

The demographic and socio-economic characteristics of the surveyed respondents in three villages provide insights into the living condition of the local population of the research area (Table 2).

Table 2. An overview of socio-economic characteristics of surveyed respondents of studied three sites

Variable	Description	Raw data	Frequency
Age	21-30	15	15%
	31-40	36	36%
	41-50	26	26%
	51-60	12	12%
	>60	11	11%
Level of education	Illiterate	48	48%
	Can sign only	25	25%
	Primary	20	20%
	Secondary	5	5%
	Higher secondary	2	2%
	Higher education	0	0%
Family size	Small (3-5)	39	39%
	Medium (6-8)	54	54%
	Large (9-11)	7	7%
Amount of land	Small sized land (1-40 dec)	66	66%
	Medium sized land (>40-80 dec)	26	26%
	Large sized land (>80 dec)	8	8%
Dwelling houses	Brick build	0	0%
	Semi brick build	8	8%
	Tin shed	85	85%
	Thatched	7	7%
No of year of fishing	11-20	39	39%
	>20-30	39	39%
	>30-40	15	15%
	>40	7	7%
Annual income	40,000- 60,000 BDT	21	21%
	60,001- 80,000 BDT	39	39%
	80,001-1,00,000 BDT	31	31%
	>1,00,001 BDT	9	9%
Source of credit facilities	NGO	64	64%
	Village cooperative	31	31%
	Govt. banks	5	5%
Ownership of fishing gear and boat	Have gear and own boat	31	31%
	Have gear and shared boat	43	43%
	Have gear but no boat	26	26%
Health facilities	Upazila health complex	13	13%
	Village doctors	80	80%
	Registered physicians	7	7%
Drinking water source	Own tubewell	11	11%
	Shared tubewell	89	89%
Sanitary facilities	Tin-shed	90	90%
	Semi-cemented	3	3%
	Cemented	0	0%
	Open toilet	7	7%

Effects of Fish Catch Decline on Fishers' Livelihood

When fishers' were asked, was the loss of fish catch affected their livelihood or not? According to the statement of 88% fishermen, fish catch declination greatly affected their livelihood while, the rest 12% was not affected by the declination of fish.

Effects on Education Facilities

Data on fishers' children revealed strong participation in primary education, with 54% of boys and 60% of girls enrolled. However, dropout rates rose sharply afterward: only 18% of boys and 14% of girls continued to secondary level, and even fewer reached higher secondary (8% boys, 6% girls) or higher education (4% boys, 2% girls. High primary enrollment is supported by government programs like free primary education and mid-day meals, but after primary level these supports decline, and fishers' low income prevents them from financing further education for their children.

Effects on Fish Catch

According to the statement of the fishers' (53%), during pre-monsoon fish catch were 1.0-2.0 kg/day, while 38% and 9% of the respondents stated the catch were 2.1-3.0 kg/day and 3.1-4.0 kg/day respectively. During monsoon, majority of the fishermen (51%) reported the catch was 3.1-4.0 kg/day while 32% and 13% of the fishermen stated 2.1-3.0 kg and 4.1-5.0 kg/day, respectively. Only 2% of the fishermen could manage to caught fish more than 5.0 kg in a day during monsoon and the rest 2% between 1.0-2.0 kg/day. When post-monsoon starts, 48% of the respondents, caught fish in between 2.1 to 3.0 kg in a day and 25% fishermen could manage to catch fish in between 3.1 to 4.0 kg. While the rest 21% and 6% of the fishermen fish catch remained in between 1.0 to 2.0 kg and 4.1 to 5.0 kg respectively (Fig. 7).

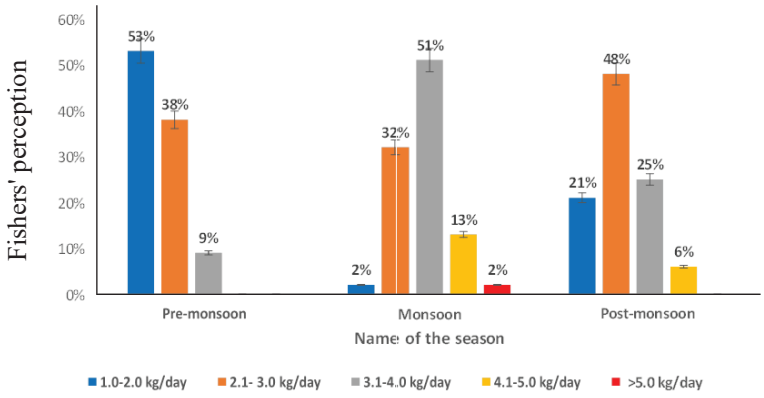

Figure 7. Seasonal variations of fish catch in present.

Effects on Fish Consumption

According to the collected data, 92% reporting decrease fish consumption. While the rest 8% of the respondents are unsure of the effects and none of them have observed an increase or any change in consumption (Fig. 8).

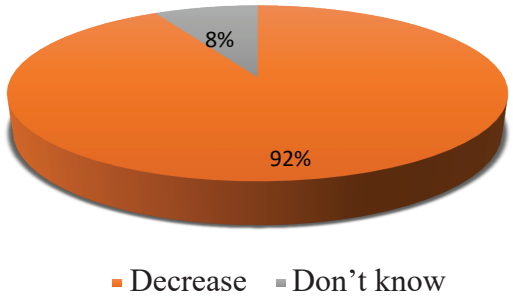

Figure 8. Fish consumption status.

Effects on Housing Facilities

The survey showed that 47% of fishers experienced improved housing conditions, often by taking loans or engaging in alternative occupations. Despite declining incomes due to reduced fish biodiversity, 85% now live in tin-shed houses and 8% in semi-brick homes. However, 15% reported worsening housing conditions, 32% saw no change, and 9% were unsure, reflecting the mixed impacts of biodiversity loss on household wellbeing (Fig. 9).

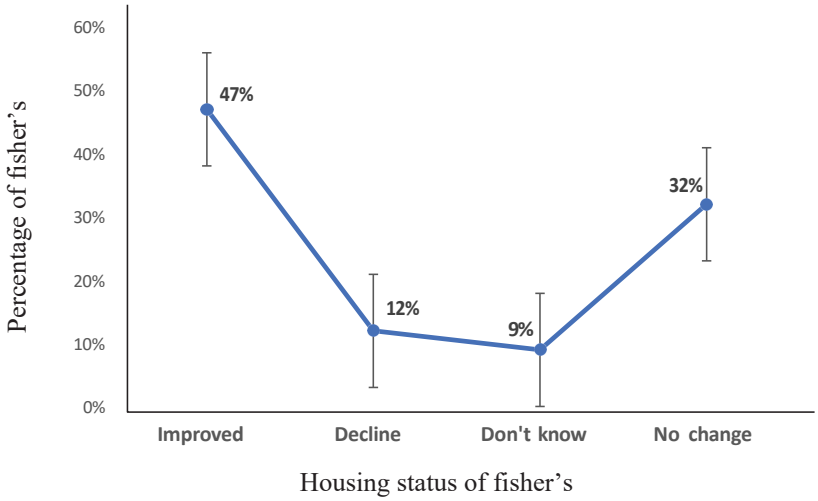

Figure 9. Status of housing facilities.

Effects on Health Facilities

Most fishers (51%) reported a decline in their health facilities, reflecting the impact of reduced fish biodiversity. Meanwhile, 27% noted improvements, 15% saw no change, and 7% were unsure of any effects.

Effects on Income

More than half of the fishers (55%) reported declining income, while 25% saw an increase, 15% noted no change, and 5% were unsure. One respondent from Sunampur described living hand-to-mouth and relying heavily on loans. Currently, 82% of fishers depend on loans, compared to just 24% two decades ago. Most borrow from NGOs (64%), followed by village cooperatives (31%), with only 5% using government banks.

Coping Strategies Adopted by Fishers Due to Fish Catch Decline

Due to declining fish catch and reduced income, Kalni River fishers adopt various coping strategies. Short-term responses include crop farming (59%), increased fishing effort (56%), animal husbandry (51%), reducing expenses (32%), and daily labor (22%), with few taking no action (10%) or using savings (3%). Long-term strategies include shifting to crop farming (79%), increasing fishing effort (27%), driving autorickshaws/vans (20%), working as laborers (12%), and migrating for work (7%).

Discussion

Causes of Declination of Fish Catch

Numerous natural and manmade factors were identified that contribute to declining fish catches, leading to reduced fish biodiversity and increasing habitat degradation.

As natural causes, Rainfall fluctuation was identified as the leading natural cause of reduced fish catch, cited by 69% of respondents. Temperature fluctuation (62%) and flash floods (60%) were the next major factors, followed by river erosion and siltation (35%), floods (28%), and droughts (8%). Same natural causes but with different intensity of perception, were identified by Arefin et al. (2018) who conducted a research in the Rupsa River, Khulna, Bangladesh. The researchers found water reduction as the primary natural factor which was cited by 93.25% of respondents, followed by accumulation of silt and sediment (91.00%), increase of temperature (61.75%) and turbidity (56.00%), While Sunny et al. (2020) found that changes in the length of the rainy season, early onset of summer or winter were the main threats in the waterbody of northeastern Bangladesh.

As manmade causes of fish biodiversity declination, respondents identified the use of harmful fishing gear as the major causes of man-made fish biodiversity declination as 86% of the respondents identified it, while Islam et al. (2017) found overfishing was the primary culprit, accounting for 40% of biodiversity loss in the Bhairab River in Jessore. Present study found water pollution and over fishing as the second and third most causes of biodiversity reduction as stated by 73% and 68% of the respondents, respectively. The almost same causes were identified by Flowra et al. (2013), Jahan et al. (2020) and Rubel et al. (2016). Whereas, Haque et al. (2023) identified that the construction of dams and other anthropogenic factors have significantly disrupted and declined the fish habitat of the Mathabanga River. Sarkar et al. (2012) also found the same threats as in their research they found illegal fishing, pollution, obstruction of water, accumulation of silt, and invasion of non-native species governing fish biodiversity reduction. Same manmade causes were found by Akter et al. (2020) in the Khiru River.

Effects on Education Facilities

Data showed that fishers' children's education is indirectly affected by declining fish catch. Government support at the primary level- such as free education and mid-day meals- helps maintain high enrollment, with 54% of boys and 60% of girls attending primary school. Similar result was found by Eriyanti et al. (2020) as the researchers revealed that governmental policy towards the fishermen have impact towards their life and these were proven as these policies increasing their children education quality in Minangkabau ethnics. The study found that enrollment sharply declines after primary school, as reduced government support and fishers' low incomes limit their ability to fund secondary, higher secondary, and higher education. Marine et al. (2014) also found lower education level in the Surma River fishers community as they found that majority of the fishers were illiterate, while Haque (2013) stated that 57.5% respondents in his study area reported improved in their education facilities.

Effects on Fish Catch

Data on seasonal fish catch showed recurrent fluctuations, with 53% of fishers reporting only 1–2 kg of fish per day during the pre-monsoon, insufficient to sustain their livelihoods. Similar catch rate was found by Mustafa and Brooks (2008). They found that comparing with base year 1997, the fish catch got decreased in 2002 and the amount of fish catch is 1.54 kg per day per person. Ahmed et al. (2013) found substantial decrease of fishermen daily fish catch inhabiting in the Old Brahmaputra River which affecting their daily livelihood negatively. Masangameno and Mangora (2016) analyzed the fish catch data from 1985 to 2004 and found a constant reduction in fish catches in the Kilombero River basin.

Effects on Fish Consumption Status

The study revealed a significant decline in fish consumption, with 92% of fishers reporting decreased intake, while 8% were unsure of any change. A report by MACH (2003) stated that the average consumption of fish got increased in all the sites in their study area. A study from Kolavanga Beel stated the impact on fishermen's fish consumption, where majority of the fishermen (60%) cited due to the fish sanctuary, their fish consumption rate is increased (Khan et al., 2018) while a researcher found in his study area that out of 40 respondents 24 respondent's fish consumption rate got increased (Haque, 2013). This result is totally opposite to my result as in my study area there was no sanctuary to conserve the local fish species and human and natural interventions were accelerating the declination by having their impact on fish biodiversity and causing the decrease of fish biodiversity which made fishermen's fish consumption status to be decreased day by day which was started by 92% of the respondents.

Effects on Housing Facilities

Despite declining income from reduced fish biodiversity, 47% of fishers reported improved housing, with 85% living in tin-shed houses and 8% in semi-brick homes. Similar result was found study on the Galachipa River and the Old Brahmaputra River by Rubel et al. (2022) and Kabir et al. (2012) respectively. In their research area, 85% of the fishermen were living in tin shed houses while 10% of them living in semi-cemented house (Rubel et al., 2022). While, Kabir et al. (2012) found 60% of the household were living in tin shed with bamboo and 30% households were living in tin shed with tin wall. On the other hand, in present research, 15% of the fishers have experienced a declining state in their housing facilities. While 32% of the respondents cited "No change" on their housing facilities which indicates that their housing facilities remain stable as they could not change their housing facilities due to their low income from fishing.

Effects on Health Facilities

Majority of the respondents in the study area are observing declining trends in their house facilities as 51% of the respondents cited that they were experiencing a decline in their health facilities which is quite opposite to the result of Khan et al. (2018) as they recorded in their researched area that fishermen were experiencing a better health facilities than past. The establishment of a sanctuary increased fish catch in that area, improving economic stability and enabling the fishing community to access better health facilities.

Effects on Income

Data showed that 55% of fishers experienced declining income over the past 20 years due to biodiversity loss, 25% saw an increase, 15% reported no change, and 5% were unsure. Consequently, many fishers have become increasingly dependent on loans. It was found that 20 years ago 24% of the fishermen were dependent on loan which was increased to 82% in present. In a research by Perret and Yuerlita (2014) revealed that in West Sumatra out of three households groups, second group fishers were experiencing

declined fish catch which results in low income which disrupting their socioeconomic condition. Tikadar et al. (2022) studied in the northeastern floodplains of Bangladesh and revealed that in these areas income got affected by several factors such as NGOs membership, age, training activities. They found that fishers' who were involved in training activities had 50% higher income than those who weren't. Due to solely dependent on fishing, fishers' from lower and upper Meghna hilsa sanctuaries found destitute with low income (Sunny et al., 2021). Experimenting with two sites, Sufian et al. (2019) found that the livelihoods of fishermen are negatively impacted in both regions by declining fish variety but the fishing community of Dekar Haor was impacted most and decreasing income from fishing made women from Dekar Haor, motivated to change their job from fishing.

Conclusion

The study concludes that the Kalni River ecosystem has undergone significant degradation due to the combined effects of natural variability and human-induced pressures, leading to a marked decline in fish biodiversity and catch. This decline has directly undermined the livelihoods of local fishing communities by reducing income, worsening access to education, health, sanitation, and housing, and increasing dependence on loans. Seasonal variations in fish availability further intensified livelihood insecurity, forcing many fishers to shift toward alternative income sources. The findings highlight the absence of effective management and conservation measures in the Kalni River and emphasize the urgent need for sustainable fisheries management, habitat restoration, regulation of destructive fishing practices, and community-based livelihood support to protect fish biodiversity and improve the long-term well-being of fishing communities.

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