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Fishing Implements of the Vernacular Tradition of Ramshil, Gopalganj: Diversity, Craftsmanship and Functional Heritage

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Abstract

This study explores the vernacular fishing implements of Ramshil, Gopalganj, focusing on their diversity, craftsmanship, and functional heritage. These traditional tools represent a rich indigenous knowledge system closely linked to the region's riverine ecology and rural livelihoods. However, rapid environmental change, declining fish resources, and the spread of modern fishing technologies have led to their gradual decline. A qualitative research approach was used, based on field observations and interviews with 30 local artisans and fishers, supported by secondary literature and archival sources. The findings reveal a wide range of fishing implements such as chhai/dahir, gara, jhupi, polo, and barshi, constructed mainly from bamboo, cane, thread, and iron. Their design and use reflect deep ecological adaptation and seasonal fishing practices. The study shows that while these tools remain culturally significant, many are disappearing due to environmental degradation and reduced economic viability. The research highlights the need for documentation, cultural preservation, and integration of traditional knowledge into sustainable fisheries management.

Keywords: Fishing implements, Ecological knowledge, Indigenous craftsmanship, and Cultural heritage.

1. Introduction

Bangladesh is a riverine country, where rivers, canals, beels, haors, baors, and wetlands are an inseparable part of its natural environment and way of life. In this water-dependent setting, fish has long played a vital role as one of the main sources of food and livelihood for the Bengali people. Fishing is not merely a means of food collection; rather, it embodies a rich folk culture and a body of technological knowledge. Various types of vernacular fishing implements have emerged and developed through people's daily lives and environmental adaptation (Islam, 1996; Inocencio, 2025).

Across different regions of Bengal, diverse fishing methods and tools have evolved based on the nature of water bodies, fish species, and seasonal variations. Instruments such as nets, chais, polos, fishing rods, gasas, and jhupis represent unique examples of local artisans' skills, creativity, and the use of natural materials (Das and Banerjee, 1999; Fairouz *et al.*, 2024). These tools are significant not only in terms of functionality but also in their aesthetic value and cultural heritage. The Ramshil area of Gopalganj district, being rich in canals, beels, and wetlands, has developed a distinct tradition of fishing and associated folk technology.

The craftsmen and fisherfolk of this region have been constructing and using various types of fishing tools for generations. However, with the spread of modern technology, environmental changes, shrinking water bodies, and overfishing, this traditional knowledge system and its tools are now under threat. Therefore, documentation and analysis of this vernacular technology and cultural heritage have become extremely important in the present context.

This study is important from multiple perspectives. First, it will contribute to the preservation of a vanishing heritage by documenting the vernacular fishing tools and associated artisanal knowledge of the Ramshil area. This documentation of folk culture and traditional technology will serve as an important reference for future researchers. Second, the study will highlight the skills, innovative capacity of local artisans, and their strategies for the sustainable use of natural resources, which are relevant to sustainable development and environmentally friendly technological practices. Traditional fishing implements are generally eco-friendly and have comparatively less harmful impact on fish reproduction, making them a potential alternative to modern destructive fishing nets. Third, this research will add new information and analysis to studies on ethno-culture, folk technology, and rural economy. In particular, it will make an important contribution to understanding the wetland-based livelihood systems and occupational culture of southern Bangladesh. Finally, the findings of this study may assist policymakers and development organizations in taking effective measures for the conservation of traditional fishing gear, rehabilitation of artisans, and sustainable fisheries resource management.

Objective of the Study

The vernacular fishing implements used in the Ramshil area are an important part of the lifestyle, economy, and cultural heritage of the local community. Under the influence of modern technology, these traditional fishing tools and associated artisanal knowledge are gradually disappearing. Therefore, the main objective of this study is to explore the diversity, craftsmanship, usage methods, and socio-economic significance of traditional fishing implements in the Ramshil area. To achieve this objective, the following specific goals have been set -

- To identify the types, diversity, and functional characteristics of traditional fishing implements used in the Ramshil area;
- To analyze the construction techniques, material selection, and aesthetic craftsmanship of local artisans;
- To examine the changes in the usage status of traditional fishing implements in past and present contexts and their underlying causes;
- To determine the prospects and future challenges for the preservation of vernacular fishing implements and related heritage.

2. Review of Literature

At present, traditional fishing methods and implements in rural society of Bangladesh are rapidly disappearing. In particular, various types of vernacular fishing gear once widely used in the Ramshil area of Gopalganj-such as chhai, polo, gara, jhupi, bhudi nets, etc.- are gradually declining in use. The widespread use of modern net technologies, such as current nets and Chinese nets, is not only disrupting fish reproduction but also replacing traditional fishing implements (Pal, 1996).

In addition, the filling of water bodies, construction of embankments and sluice gates, use of pesticides in agriculture, and population growth have significantly reduced the availability of natural fish. As a result, the functional relevance and practical necessity of traditional fishing tools have decreased. At the same time, declining professional interest among artisans and the withdrawal of the younger generation from this occupation have made the sustainable existence of this heritage even more uncertain. A major research problem is that most knowledge related to vernacular fishing tools is oral and experience-based rather than documented in written form. Consequently, this body of knowledge is at high risk of being lost. In this context, systematically documenting and analyzing the diversity, craftsmanship, and functional aspects of traditional fishing implements in the Ramshil area emerges as an urgent research problem.

A number of studies and books provide important discussions on the water-based environment of Bengal and the livelihood, economy, and folk technology that have developed around fisheries.

These studies offer insights into natural water bodies, fish diversity, fishing methods, and the evolution of traditional fishing implements, which help in building the theoretical foundation of the present research. While analyzing the historical and environmental context of the Bengal region, Syed Amirul Islam, (1996) notes that in this riverine area of rivers, canals, and beels, food collection was relatively easy and the fish demand of people was largely met from natural water bodies. This natural abundance played a significant role in the development of various fishing methods and implements. According to him, based on environmental diversity and the nature of water bodies, local communities developed their own indigenous technologies.

Detailed discussions on fishing technology in Bangladesh can be found in the works of Bishnu Das and Operesh Banerjee, (1999). They analyze the structure, usage methods, and technical aspects of various fishing implements such as fishing rods, nets, and traps. In particular, they highlight different types of knots used in fishing rods, such as clinch knot, blood knot, and loop knot, which vary according to fish size and species. This study indicates that fishing implements are not merely utilitarian tools but also reflect advanced technical skill.

In his research on shrimp fishing and coastal net technology, Dr. Sushanta Kumar Pal, (1996) presents various types and variations of nets. He analyzes the structure and functional differences of nets such as khepla net, behuti net, jhaki net, bhasan net, and thole net. His study shows that the design and use of nets are determined by the nature of water bodies, currents, fish behavior, and seasonal variations. In addition, studies on folk culture and folk technology reveal that such tools developed by rural communities are constructed using locally available materials such as bamboo, cane, thread, and creepers, and are both environmentally friendly and cost-effective (Bangla Academy, 1999). These technologies have been transmitted from generation to generation through oral and practical knowledge systems. However, a limitation of the existing literature is that most studies have been conducted at the national or broader regional level. Detailed ethnographic research focusing on the vernacular fishing implements of a specific area - particularly the Ramshil region of Gopalganj district - is comparatively lacking. Moreover, field - based

analysis on the changes in traditional fishing tools due to modern technology, environmental change, and social transformation remains limited. In this context, the present study will provide a field-based analysis of vernacular fishing implements in the Ramshil area, thereby making an important contribution to filling the existing gap in the literature.

3. Methodology

The present study follows a qualitative research approach. The Ramshil Union of Kotalipara Upazila in Gopalganj district has been selected as the study area. Since this region is dominated by rivers, canals, beels, and wetlands, it shows a notable diversity in the use and construction techniques of traditional fishing implements.

Both primary and secondary sources have been used for data collection. For primary data, a total of 30 artisans, fisherfolk, and experienced individuals from Khagbari, Rajapur, Johorkandi, Kafuladi, Mosuria, and Ramshil villages of Ramshil Union were interviewed using purposive sampling. Through these interviews, information was collected regarding local names, construction methods, practical techniques, and changing conditions of various fishing implements.

Secondary data sources include fishing implement specimens preserved in the National Museum, relevant books, research articles, journals, online journals, and websites. The collected data have been analyzed thematically to assess the diversity, craftsmanship, and functional significance of traditional fishing implements.

4. Results

The analysis of collected data reveals an integrated picture of the diversity, craftsmanship, and functional heritage of vernacular fishing implements in the Ramshil area of Gopalganj. By combining field-level data (artisan interviews and direct observation) with secondary sources (relevant literature), it is found that the fishing implements of this region are primarily based on locally available natural resources (bamboo, cane, thread, creepers, iron, etc.) and represent excellent examples of environment-friendly technology. In particular, the construction of tools such as chhai/dahir, gara, nets, jhupi, and fishing rods clearly reflects local know-

ledge, skill, and intergenerational experience. The analysis shows that the structure, materials, and usage methods of these tools are closely linked with local climate, seasonal cycles, and the nature of water bodies, indicating an important aspect of adaptability in folk technology (Ahmed, 2012; Islam & Haque, 2015).

In the quantitative analysis, the collected data were classified and presented statistically. According to field data, at least 20-25 types of vernacular fishing implements are used in the Ramshil area, among which the 'chhai/dahir' alone shows the highest diversity (approximately 8–10 types). Seasonal usage analysis shows that during the rainy season (Ashar–Kartik), about 60-70% of the tools are used, whereas in the dry season (Falgun–Chaitra), the usage rate decreases to around 30-40%. Furthermore, the data indicate that large fish-catching tools (such as large dahir, juti, teda) are currently used less frequently, which reflects a decline in local aquatic resources. On the other hand, small fish-catching tools (ghuni dahir, chalon, small-mesh nets) are used comparatively more. Analysis of artisans' production capacity shows that an experienced artisan can produce an average of 20–30 tools per day (such as jhupi kora), indicating the contribution of this occupation to the local economy (DoF, 2020; BBS, 2019).

Case Study of Traditional Fishing Implements: Technology, Diversity and Aesthetic Perspective Chhai (Dahir/Duboir)

Among the traditional fishing traps in Bangladesh, chhai (dahir/duboir) is a widely known implement, which is more commonly referred to as dahir or duboir in the Ramshil area. It is mainly constructed from smooth and thin bamboo slats, where the slats are prepared by retaining a part of the green bamboo along with some hard white portion. After sun-drying, the slats are lightly scorched over fire before weaving, which gives them a darkened color that helps to blend with water and confuse fish. The main structure of the chhai, known as the "chhak," is made from thick bamboo (boro bamboo), which is bent into a specific shape to form a frame. The slats are then woven using thread (cot/nylon) or natural creepers, although the use of creepers has significantly decreased in recent times. A key feature of the chhai's structure is its opening or "pashi," through which fish enter and exit, and inside it

contains "pajal" or barriers that prevent fish from escaping after entry. The woven slats are attached to the chhak using a special technique, and a bamboo or rope mechanism is used to open and close the mouth of the chhai, locally known as *pashi* (Artisan: Noroom Ghotok, age: 51 years, village: Khagbari).

In this region, various types of chhai or dahir are used for fishing, and their local names also show considerable diversity. Among them, notable examples include Buischa dahir, Koiya dahir, Jibha dahir, Ghuni dahir, Cassette dahir, Kuichka dahir, Boro dahir, Ghuni cassette, and Bailga dahir, etc. Locally, the seasonal cycle is divided into two main periods - the period from Ashar to Kartik months is called "Baishya (monsoon) season," when most land remains submerged in water; and the period from Falgun to Chaitra months is called "Kharani season." During the Baishya season, Koiya dahir, Boro dahir, and Ghuni dahir are generally used more frequently, whereas in the Kharani season, Jibha dahir and Kuichka dahir are used more, as noted by artisan Norottom Ghotok. However, in many cases, chhai are used throughout the year in narrow canals (Artisan: Pramananda Gupta, age: 60 years, village: Khagbari).

Kuicha/Kuichka Dahir: Among the various types of dahir used in this region, Kuicha/Kuichka dahir, Ghuni dahir, and Jibha dahir are particularly notable. Kuicha or Kuichka dahir is generally square-shaped and has six barriers or pajal. It is mainly used for catching kuicha (eel-like fish), and worms are used as bait inside the chhai. Besides kuicha, laua and taki fish are also caught in this type of dahir. It is usually placed in bushy and riverbank areas. Kuicha are mostly caught from Agrahayan to Jaistha months, and small kuicha are more expensive than larger ones. Previously, kuicha were collected from the markets of Barishal and Agoiljhara for export (Artisan: Binoy Gupta, age: 52 years, village: Khagbari).

Ghuni: In ghuni dahir, the bamboo slats are relatively thinner and the gaps between the slats are smaller, making it a smaller structure that can be used in both low and high water conditions. This type of dahir is mainly used for catching small and coarse fish and is generally used more during the Baishya or monsoon season.

Jibha Dahir: Jibha dahir is comparatively larger in size and has wider gaps between the slats; it is

generally used in canals or rivers. It has two barriers or pajal, and from the middle of one section, a tongue-like projection extends outward, through which shrimp and baine fish are caught-this unique

structure is the reason it is called “Jibha dahir” (Artisan: Monotosh Gupta, age: 50 years, village: Khagbari).



Fig. 1: Ghuni Dahir - A small bamboo trap with closely spaced sticks, suitable for catching small fish.

Large Dahir/Chhai: In the case of large dahir or large chhai, the gaps between the bamboo slats are kept comparatively wide. This type of chhai is generally used for catching large fish, as small fish can easily escape through the gaps. It is mainly set in large water bodies and canals along with gara. In particular, this type of dahir is widely used for catching large fish such as rohu and catla.

Koiya Dahir: This type of dahir used for catching koi fish is called koiya dahir. Since koi fish regularly come to the surface of the water for oxygen, this type of chhai is usually not set in gara or flowing water; instead, it is placed in low-depth water near embankments or land areas. During installation, part of the chhai is kept elevated to attract fish, and the upper portion is covered with grass leaves to prevent excessive heat inside due to sunlight. This type of dahir has small barriers or pajal and is generally long and round-shaped (Artisan: Monindro Gupta, age: 55 years, village: Khagbari).

Ghuni Cassette: In ghuni cassette dahir, the thin bamboo slats are woven very densely, making it appear somewhat rectangular and structurally strong like bamboo. Due to this tight weaving, it is effective in trapping small and medium-sized fish. It is because of this special structure and weaving technique that this type of chhai is called “ghuni cassette.”



Fig. 2: Ghuni Kasset - A tightly woven, sturdy bamboo trap used for catching small and medium-sized fish.

Gara: There is a close relationship between gara and dahir; however, except for Koiya and Kuichka dahir, almost all types of dahir are used in coordination with gara. In areas where fish movement is high, gara is set or installed there. The height of the gara is generally determined based on the depth of the water, and it is usually 20 to 25 feet long; if necessary, it can also be made in smaller sizes.

Multiple garas are connected side by side and installed in land or canals using bamboo and ropes. The main purpose of the gara is to obstruct the movement of fish, so that fish searching for an exit reach the lower open (pajal) section, where a small gap is left for fish to pass through, and a chhai is placed on the opposite side of that gap. In this way, fish escaping through the gap in the gara are directly

trapped in the chhai. Sometimes chhai is also placed alongside the gara, as fish, while moving around near the gara, can easily enter the chhai. Generally, gara is not used in closed water bodies; rather, it is more commonly used in tidal canals and beels influenced by ebb and flow. In the past, a large number of fish species such as bele fish, shol, taki, shrimp, crab, rohu, catla, grass carp, turtle, magur, boal, chital, etc., were caught using gara and chhai;

however, their quantity has now significantly decreased. For the convenience of boat movement, a special “load gara” is placed in the middle of the gara system, which is installed transversely and kept floating by tying bamboo on top; as a result, it goes down when boats pass and then rises again afterwards (Artisan: Pradip Gupta, age: 25 years, village: Khagbari).



Fig. 3: Gara - A structure made of bamboo and rope that controls the movement of fish and guides them toward the trap.

Chalon: Chalon is a traditional fishing device made of bamboo and thin cane, which is produced in different sizes - small, medium, and large. It is mainly used in shallow water or under water hyacinth, where fish hidden inside the roots of water hyacinth are caught by dragging the chalon through it. Through this method, fish such as koi, kholsha, velsha, taki, as well as small puti, buicha, and tit puti are caught. During winter, when canals become almost dry during low tide, village boys and girls use chalon in muddy water to catch various fish including kholsha, velsha, taki, baim, guitka, and shing.

Khacha: A fish holding cage or “live holding cage” was once commonly used in almost every household in this area and is still partially in use. After catching fish, they are kept in this cage at the pond or canal ghat, allowing the fish to remain alive for a long time. Even large fish such as rohu and catla can be preserved alive in large cages. This cage is generally made of bamboo and is considered an important component of rural fish harvesting practices (Artisan: Krishnakanto Gupta, age: 65 years, village: Khagbari).



Fig. 4: Chalon - A hand-operated fishing device made of bamboo and cane used for catching fish.

Khadai/Khalai: Khadai or Khalai is a traditional tool used for cleaning cut fish. In this process, fish are soaked in water and repeatedly shaken, which helps easily remove dirt and blood from inside the fish. In this region, there is also another type of Khadai called “Baok,” which is mainly used for keeping fish alive during fishing. It is generally elongated in shape and has a small mouth or lid-like part attached to it (Artisan: Khagendranath Gupta, age: 40 years, village: Khagbari).



Fig. 5: Khadai/Khalai - a bamboo tool used for cleaning and preserving fish.

Jhaka: Jhaka is a bamboo-made tool used for carrying and storing fish. When a large quantity of fish is caught at once, Jhaka is used to transport them to the market or for sale. It is a simple, lightweight, and environmentally friendly traditional tool that has long been used in rural life (Artisan: Brajendranath Gupta, village: Khagbari).

Polo: Polo is a traditional fishing device made of bamboo, cane, and thread using special techniques, which was once widely used but is now much less common. Usually, during the months of Ashwin–Kartik, when water levels in the fields are low, fish were caught by holding a polo in the right hand and a baok in the left. While walking through knee-deep water, the position of fish could be identified in clear water, and at the right moment, the fish would be trapped using the polo. Then, by inserting a hand through the upper opening, the fish would be taken out and kept in the baok. According to Liton Munshi, “In 1998, when there was about one foot of water in the fields, fish were caught using polo” (Artisan: Monindro Gupta, age: 55 years, village: Khagbari).

Koch: Koch is a bamboo or slat-type pole about four to five feet long, with a sharp iron blade of two to three inches attached at the tip. Several slats are tied together at one end while the other end remains open. During fishing, the slats are spread out and the koch is thrown toward the fish after observing its position in the water. The sharp iron blade strikes or pierces the fish, enabling it to be caught. It is an ancient and skill-based fishing method (Artisan: Bhakta Talukdar, age: 44 years, village: Rajapur).

Juti: Juti is a large traditional fishing weapon, whose handle or shaft is usually 20 to 30 feet long, and the total structure, including the blade section, is

about 20 to 25 inches in length. It is used for hunting fish from a distance by determining their position and movement. At the head of the shaft, there are usually six to seven barbed iron blades attached, which are tied with rope using a special technique. When striking the fish, this barbed blade detaches from a fixed point and hangs with the rope, getting embedded in the fish’s body. Juti was used for catching large fish such as shoal, gojal, rohu, and catla (Artisan: Monmath Talukdar, age: 45 years, village: Rajapur).

Teda: Teda is a large and thick three-pronged fishing implement, with a large barbed blade attached at its head. It is mainly used to strike, injure, or capture strong and large fish. Due to its comparatively heavy and strong structure, it is effective for catching large fish in deep and strong water.

Phulkuchi/Jhupi: Jhupi or Phulkuchi is a multi-pronged, complex, and skill-based fishing weapon, which exists in two types-with barbs and without barbs. It is generally made in different sizes ranging from 8, 10, 12 up to 16-18 prongs, and the handle or shaft is usually 10 to 20 feet long. Previously, umbrella ribs were used to make the prongs, but now MS wire or GI wire (numbers 9 to 13) is used. The prongs are first heated in a coal furnace until red-hot and then hammered into shape; afterward, they are specially fixed at one end with a brass blade, where one prong is placed at the center and eight prongs are arranged around it like a flower-hence the name “Phulkuchi.” Some jhupis have barbs while others do not; brass and fine soldering material are used to make the barbs. An important part of the jhupi is the “hami,” which is made from a tin plain sheet and connects the jhupi to the handle. Its construction involves the use of a coal furnace, hammer, and electric blower (Artisan: Rasik Roy, age: 60 years, village: Rajapur).

Rigging Experience and Construction of Jhupi

Shaft: Artisan Bhakta Talukdar (age: 46, village: Rajapur) states that he collects bamboo for the jhupi shaft from Uttarpara of Kotalipara, although such shafts mainly come from the Sylhet region. After collecting the bamboo, it is heated over fire to straighten the shaft, and after applying heat, it is soaked in water to stabilize its shape. On the other hand, Muklesur Rahman (age: 50, village: West Gobapara), a jhupi shaft maker, mentions that he can

produce an average of 25–30 phulkuchi shafts per day, which plays an important role in meeting the local demand for jhupi-making craftsmanship.

Kharchi Kopano: Kharchi kopano is a traditional fishing technique in which fish are caught in the mud using phulkuchi or jhupi while sitting on a boat in specific parts of canals or water channels where fish are densely located. It is usually based on estimation and experience rather than direct vision, as fish such as shing, koi, baine, and velsha remain hidden under the mud. This practice of striking has been prevalent in this region for a long time (Artisan: Md. Ismail, age: 45, village: West Gobapara).

Barshi (Hook): Barshi is a traditional fishing tool made of steel wire, which is first shaped by hammering and rubbing with cane, and then fitted with a barb. Afterward, the hooks are burned together in a coal fire, then fried in a pan over a stove, and finally dipped in coconut oil for finishing. Its construction involves materials such as steel wire, chisel, tree wood pieces, and noail, which are generally collected from markets in Chattogram or Dhaka. Barshi comes in various sizes - size 35 is used for catching puti fish; size 25 for shing, koi, foli, and tengra; size 19 for taki and shrimp; and sizes 18–14 for shoal and magur fish. Here, the higher the number, the thinner and smaller the hook; and the lower the number, the thicker and larger the hook (Artisan: Sunil Biswas, age: 53, village: Rajapur).

Baina Barshi: Baina barshi is generally made with a bamboo slat about five cubits long, with the base part slightly thinner. The thread used is about 1.5 feet long, and a hook is tied at the end of that thread. During fishing, small shrimp are used as bait, and the thin end of the hook is fixed into the soil under water so that fish are easily attracted to the bait.

Shinga Barshi: Shinga barshi is a special type of hook mainly used for catching shing fish. It is installed by embedding it into the soil like baina barshi, and fish are caught after waiting for a certain period. Although the main target is shing fish, occasionally other small fish species are also caught.

Daoin Barshi: Daoin barshi is a special technique-based fishing method, generally used in water bodies such as doba, beel, or andhi, where shoal and gojal fish are abundant. In this method, two bamboo

poles are fixed in the water at a distance of two to three cubits, and a strong thread is tied about one cubit above the water. Two hooks are suspended from this thread, where live puti fish are used as bait and kept very close to the water. Predatory fish are attracted by the bait and leap to get caught on the hook (Artisan: Md. Sattar Sardar, age: 98 years, village: Bandhabari).

Foilga Barshi: Foilga barshi is used by tying thread to the tip of water hyacinth, where the thread is usually about five cubits long. Shrimp is used as bait, and the hook is kept suspended under water near the soil so that fish are easily attracted and caught.

Chachra Barshi: Chachra barshi is a complex and technique-based hook method, where a six-foot-long thread is tied to the tip of a water hyacinth of about eight inches. It is attached to a chachra made of thick bamboo sticks, which is usually prepared at night. Inside the chachra, chulai grasshopper is used, which is collected from water hyacinth. Separate bait is prepared from the head and chest portions of the grasshopper, and burnt clay powder is mixed to strengthen the bait. The hook is placed under water about nine inches above the soil. Usually, koi fish are caught in this method, and at one time this type of hook was widely used in canals, beels, and ponds (Artisan: Kapil Rajib, age: 50 years, village: Johor-kandi).

Khowla Net / Jhaki Net / Hand Net: Although known by different names in this region - Khowla net, Jhaki net, or hand net - it is essentially the same type of fishing net. Different parts of this net are known as chip, chura, ga, jale kathi, jhul, and ghaiya. The jhul part hangs in the water, while the ghaiya part goes underwater and traps the fish, preventing them from escaping easily. During fishing, the net is held with the left elbow and hand using a special technique, and then spread and thrown into the water with the right hand so that it opens in the air and falls onto the water surface. After waiting for a while, the net is slowly pulled up by holding the chip. The mesh size of the net is determined according to the size of the fish—large mesh for big fish such as rohu and catla, medium mesh for medium-sized fish like punti, and fine mesh for very small fish like mola. Generally, bamboo tools called chata and thura are used to weave the net, where thread is wound and rotated

within the chata to form the net, and the structure of chata and thura varies depending on the mesh size (Liton Munshi, age: 32, village: Musuria).

Bhudi Net / Bhuti Net / Khot Net: Bhudi net, Bhuti net, or Khot net is a traditional fishing net mainly used in flowing canals or specific locations in fields. It is set in places with strong water current where fish naturally move. Often, barriers are created using gara or fences made from date palm branches to restrict fish movement, leaving a gap or opening where the Bhudi net is placed. Usually, a raised platform (macha) is built where fishermen sit. When fish enter the net, a special signal or khorchi is released to lift the net. In muddy water or at night, a string is tied to the net and held in hand so that the entry of fish can be detected by the pull or vibration of the string. The opening and closing mechanism of the Bhudi networks like the blinking of an eye, using a long bamboo stick called holi. An iron ring is attached to the holi, through which the khorchi is inserted to keep the net open, while the lower part is kept aligned with the ground. As soon as fish enter, the khorchi is released, causing the mouth of the net to close and trap the fish. The net is later lifted using a rope attached to the holi. This net is mostly used during low tide (Upananda Bairagi, age: 47, village: Johorkandi).

Vesal Net: The Vesal net is a traditional and technique-based fishing system used in canals or wetlands. In this method, two large long bamboo poles are tied together in a V-shape, and a net is attached to them. Additional bamboo poles are used to fix the structure in a canal or wetland, and a ladder-like structure is made with bamboo for the operator to move up and down. The head of the Vesal is submerged in water and left for some time, usually lifted every 20 to 30 minutes. When lifting the net, the operator stands at the joint of the bamboo poles, maintains balance, and steps down, causing the head of the Vesal to rise above the water. The fish are then collected with a bowl and placed in a cage, after which the net is reset in the water. The operator climbs back up using the ladder and waits again. Various species of fish are generally caught using this method (Baburam Sarkar, age: 55, village: Khagbari).

Dhomm Net: The Dhomm net is usually about 49 feet by 9 feet in size, although it can be made smaller or larger as needed. It is a hand-tied net with

approximately 0.5-inch mesh and has four frames around it, to which the net is attached. A lever-like mechanism is created using a five-hand-long vertical wooden pole and a 9–10 foot long bamboo pole, which is used to submerge and lift the net in water (Bijon Kumar Sarkar, age: 43, village: Johorkandi).

Kadra Method: Kadra is a common method used for catching large fish in big canals or water bodies. In this method, a barrier is created using large-mesh nets, and a structure similar to a patison or large trap net is set at a specific location. Thin sticks are planted inside the Kadra so that when fish enter, their movement can be easily detected from above. Usually, a person waits there for fish to enter and uses a specific trapping mechanism to close it once fish are inside. Later, fish are collected from the Kadra using a large-mouthed basket.

Light Fishing (Light Kopano): Light fishing is a technique of catching fish at night using a hurricane lamp (hajak light). A light is fixed at the front of a boat; one person rows the boat while another stands in front with a basket. In the light, fish can be easily seen in the water, especially at night when they move less or remain still. Taking advantage of this, fish are spotted and struck using the light (Bijon Kumar Sarkar, age: 50, village: Johorkandi).

Fala Pata: Fala pata is mainly practiced in the month of Chaitra in small canals where water recedes from the land. During this time, a barrier (bana) is used to obstruct the movement of fish, and at a specific point the bana is kept slightly lower, where a hand-woven net is strategically set. Shoal and gojal fish usually attempt to jump over the barrier and at that moment get trapped in the net. During high tide, when new water flows in, fish try to move toward larger canals, and while attempting to cross the barrier, they are caught in the net. (Regan Biswas, teacher, age: 33 years, village: Johorkandi.) Qualitative analysis shows that the fishing implements of the Ramshil region are not merely technical tools, but represent a living cultural heritage. The dark coloration used in the construction of chhai/dahir, the technique of confusing fish by blending with water, or the control of fish movement through gara - all are excellent examples of local knowledge-based innovation. Moreover, the naming of the tools (such as Koiya dahir, Jibha dahir, Ghuni cassette) reflects local language and cultural identity. According to artisans'

accounts, these tools were once widely used and formed part of family and social life; however, due to modern equipment, depletion of aquatic resources, and occupational shifts, this tradition is gradually disappearing.

In addition, the presence of aesthetics in craftsmanship is notable - such as the flower-like arrangement of jhupi (phulkuchi), the uniformity of net meshes, or the balanced weaving of bamboo - which reflects not only functionality but also aesthetic sensibility. From this perspective, vernacular fishing implements can also be considered a form of “functional art.” Overall, the qualitative analysis indicates that these tools are deeply connected with the local environment, economy, and culture, and their preservation and documentation are extremely important (Sillitoe, 1998; Rahman, 2017).

5. Discussion

The overall review of the findings of the study on vernacular fishing implements in the Ramshil, Gopalganj region reveals that the fishing practices of this area are, on the one hand, dependent on the natural environment, and on the other hand, they reflect a well-organized indigenous knowledge system. In the past, rivers, canals, beels, and low-lying lands were the main sources of fish, and local people harvested large quantities of fish using tools such as chhai (dahir), gara, bhuti nets, jhaki nets, jhupi, barshi, etc. According to elderly informants, during the 1970s–90s, catching 10–12 kg of fish in a single day or harvesting 8–10 maunds of fish from a single pond was a common occurrence. This indicates that at that time natural water bodies were rich in fish resources and vernacular technologies were highly effective (Banglapedia, 2023).

However, analysis of the present situation shows that this abundance of fish resources has significantly declined. The construction of embankments and sluice gates for controlling water flow, filling of water bodies, overfishing, use of pesticides, and the use of harmful modern nets (such as current nets and Chinese nets) have damaged fish reproduction and the natural ecosystem. As a result, not only has the number of fish decreased, but the use of traditional tools is also declining. Many artisans report that tools which were once in high demand (such as polo, koch, juti) are now almost on the verge of

extinction, while some tools (such as chhai, khacha, khalai) still survive on a limited scale (Shamsuddin, 1995; Bangla Academy, 2018).

From an economic perspective, it is observed that in the past many families were entirely dependent on fishing and tool-making, but at present this occupation is no longer sustainable as a sole source of livelihood. As a result, artisans are becoming involved in agriculture, small businesses, or other professions. Although in some cases there is limited demand for traditional tools in local and international markets (such as export abroad), it is not sufficient. This suggests that for vernacular technology to survive economically, new markets and conservation initiatives are required (Bishnu Dutta and Banerjee, 1999). Another important observation of the study is that these fishing implements are deeply connected with local culture, lifestyle, and social structure. Almost every household possesses some form of fishing tool, which is part of their daily life. The craftsmanship, naming, and usage methods of these tools are the result of local knowledge, experience, and environmental adaptation, which can be considered an invaluable intangible cultural heritage (Nihar Ranjan Ray, 2020). From a future perspective, it can be said that without proper conservation and management, these vernacular fishing implements and the associated knowledge system may gradually disappear. Therefore, it is necessary to regulate fishing during breeding seasons, conserve natural water bodies, stop the use of harmful nets, and provide socio-economic support to artisans. At the same time, this heritage can be preserved through research, documentation, and policy initiatives.

In order to preserve and develop the vernacular fishing implements and associated heritage of the Ramshil, Gopalganj region, the following recommendations are proposed. First, effective measures should be taken to conserve natural water bodies - canals, beels, ponds, and low-lying lands. Coordinated actions by local administration and communities are needed to stop land filling, illegal encroachment, and obstruction of water flow. Second, fishing activities should be regulated during the breeding season of fish (especially from Boishakh to Ashar) to ensure the protection of brood fish and fry. Third, the use of harmful modern nets such as current nets and Chinese nets should be

strictly controlled or banned, as these nets indiscriminately destroy all types of fish and threaten future fish resources. Fourth, training, financial support, and market access should be ensured for local artisans so that they are encouraged to produce traditional implements and sustain their livelihoods. Fifth, these vernacular technologies should be recognized as cultural heritage and preserved through research, documentation, and museum or exhibition initiatives.

In addition, awareness on folk technology and culture should be increased in educational institutions, cooperative-based production and marketing systems should be developed at the local level, and the potential of these implements in international markets (e.g., as handicrafts) can be explored. Above all, an integrated conservation strategy involving local communities, researchers, and policymakers is the need of the time.

6. Conclusion

The vernacular fishing implements of the Ramshil, Gopalganj region are not merely livelihood-based technologies; rather, they represent a rich traditional knowledge system deeply connected with the local environment, culture, and social structure. The diversity and craftsmanship of tools such as chhai (dahir), gara, nets, jhupi, and barshi demonstrate that the people of this region have long been innovating and using their own technologies in harmony with the natural environment. However, due to changing times, environmental degradation, uncontrolled use of modern technology, and socio-economic transformations, this tradition is currently facing various challenges. The decline in fish abundance, occupational shifts among artisans, and the disappearance of certain implements all indicate a looming crisis.

Nevertheless, this study suggests that with proper conservation, increased awareness, and policy initiatives, these vernacular fishing implements and the associated knowledge system can be revitalized. Through the participation of local communities, government support, and research-based planning, this heritage can be preserved for future generations. Thus, the vernacular fishing implements of Ramshil can be considered not only as relics of the past but also as important elements of sustainable development and cultural continuity.

7. Author Contributions

All the authors contributed in conceptualizing and designing the study. J. N.: contributed in data analysis and report writing. L.B. and BCL contributed in preparing article from the study.

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9. Conflicts of interest

The author declares no conflict of interest.

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