



## The nature and challenges of river policing: A study on Tangail region river police unit

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### Abstract

This study examines the challenges faced by the Tangail River Police Unit in deterring river-based crimes such as illegal fishing, digging of sand, and smuggling in terms of understanding counterstrategies that will enhance the efficiency of law enforcement. A systematic quantitative study of 57 officers of mixed ranks was conducted, and Conflict Theory, Routine Activity Theory, and Resource Dependency Theory are utilized to structure the study to learn the socio-economic and structural determinants of such crimes. The report pinpoints severe challenges, including shortages of resources, inadequate training, and inadequate inter-agency coordination, that constrain the capacity of effective policing. The officers barely have necessary equipment and skills in crime detection and prevention, which impacts directly on the efficiency of law enforcement. Shortages of resources must be remedied, with more surveillance technology, training initiatives, and agency coordination to improve river security. The study identifies the paramount importance of investing in river policing facilities, urging policymakers to place top priority on resource allocation, training, and inter-agency coordination as a means of gaining more effective crime prevention and safe waterways for Bangladesh.

### Keywords:

River crime  
River policing  
River security.

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## 1. Introduction

In Bangladesh, river policing is highly important to maintain law and order in its extensive waterways, central to transportation, trade, and agriculture. Crimes like smuggling, piracy, illegal fishing, pollution, and encroachment are big challenges. According to the United Nations Office on Drugs and Crime, "drug trafficking through waterways is a growing global concern" (UNODC, 2021) and Bangladesh is no exception. According

to a report by Mollah (2023) in most cases, 77% are illegal fishing, while 57% are drugs trafficking; characterize the waterways, causing enormous harm to economic and public safety. They further noticed that incomplete investigation and unfair convictions were more frequent due to the weakness in law enforcement.

Even though the River Police was formed as far back as 2013, it is still suffering from a shortage of resources, poor coordination, and no special training. The Daily Star newspaper reported in 2022 (Star, 2022) that "the vast and complex river network makes effective monitoring and policing difficult," while in 2023, Bangladesh River Police admitted to urgent needs for updated technology and inter-agency collaboration. The paper focuses on the nature of river crimes and operational challenges in Tangail. The study will identify gaps and try to propose some solutions to help policymakers in upgrading river security.

River crimes have become a growing global menace. The nature of river crimes also varies from region to region. Piracy is widespread in Southeast Asia, with heavily armed gangs boarding vessels, robbing crews, and even holding them for ransom (Bueger, 2015). Destructive fishing in the form of dynamite use among other practices causes immense environmental and livelihood disruption throughout Africa accordingly (Andersen, 2017). Human trafficking down rivers exacerbates these concerns because victims can easily be smuggled across borders hiding behind lawful transactions (Leclerc, 2016). Such crimes have to be effectively combated through innovative means that call for cooperation beyond borders. Protocols introduced by the IMO (International Maritime Organization) address piracy and armed robbery at sea, and the Mekong River Commission has encouraged its members to become partners in a range of sustainable practices and shared responsibility (Cha, 2016; Sadan, 2020).

In Bangladesh, river crimes such as smuggling, illegal fishing, piracy, and pollution are persistent threats. These crimes are fueled by poverty, lack of employment opportunities, and weak law enforcement (Islam, 2019). The River Police, established in 2013 to address these challenges, has struggled with limited resources, inadequate training, and insufficient inter-agency coordination (Akter, 2020). Corruption is also a stumbling block to their efforts, and as the Star (2022) shows, illegal activities such as river grabbing are mostly left unchecked because of inefficiency in the system.

River crimes require modern approaches in order to combat them. They have been demonstrated to work elsewhere through community-oriented policing and intelligence-led policing. For instance, the use of drones for the surveillance of rivers by India has seen the detection of crimes double, while investment in specialized river police units in China has seen illegal fishing and smuggling fall drastically (Reuters, 2016; Standard, 2022). According to Hossain (2021) these all need to consider the context of Bangladesh, with its vast river network that raises many logistical issues.

However, each one of them needs further development of a legal framework, training, and raising awareness among the public. According to Zeng (2022) water-based crimes require specific legislations, while (Akbarzadeh, Yazdani, & Nikoo, 2020) recommend specialized water police who can be able to tackle both ecological and criminal issues. Bangladesh will be able to make its river police smarter and its rivers not only safer but also more ecologically sustainable by engaging modern technologies, effective community collaboration, and coping with corruption.

## 2. Methodology

This study adopts a quantitative, exploratory research design to investigate the nature and challenges of river policing in the Tangail region of Bangladesh. The Tangail River Police Unit, comprising 10 outposts, was chosen due to its high prevalence of river crimes and its critical role in managing the security of waterways. The total population consisted of 134 River Police officers, distributed across ranks as follows: 15 Inspectors, 20 Sub-Inspectors, 25 Assistant Sub-Inspectors, 30 Nayeks, and 44 Constables. Using Slovin's formula, the sample size was computed as follows to realize statistical reliability at manageable data collection.

$$n = \frac{N}{1 + N(e)^2}$$

Where:

N = 134 (Total population).

e = 0.1 (Margin of error).

$$n = \frac{134}{1 + 134(0.1)^2} = \frac{134}{1 + 13.4} = \frac{134}{14.4} = 9.29$$

Sample size calculated was 9.29, which for all practical purposes is rounded down to 9. To ensure proportional representation across ranks, the following calculations were used based on the ratio of officers in each rank (15:20:25:30:44, or 3:4:5:6:9, with a total ratio sum of 27).

Inspectors:  $\frac{3}{27} \times 9 = 1 \approx 1$ .

Sub-Inspectors:  $\frac{4}{27} \times 9 = 1.33 \approx 1$ .

Assistant Sub-Inspectors:  $\frac{5}{27} \times 9 = 1.5 \approx 2$ .

Nayeks:  $\frac{6}{27} \times 9 = 2 \approx 2$ .

Constables:  $\frac{9}{27} \times 9 = 3 \approx 3$ .

This stratified sampling ensured that all ranks were proportionally represented in the sample.

Data collection was by structured questionnaires, including closed and open-ended questions on socio-demographics, training, policing strategies, and challenges; pre-testing ensured that the instrument was clear. Respondents were selected from key outposts, including Bahadurabad Ghat and Bangabandhu Bridge. SPSS (Version 20) was used for statistical analysis, presenting trends like illegal fishing (77%) and drug trafficking (57%) alongside challenges like inadequate training and resources. Limitations included restricted data access, safety concerns, and a single region focus. Despite these, the study offers key insights into river policing challenges in Bangladesh and informs future research.

### *2.1. Ethical Considerations*

This study was conducted in accordance with ethical guidelines to ensure the integrity and confidentiality of the research process. Approval for the study was obtained from the Superintendent of River Police, Tangail Region, prior to data collection. All participants were informed about the research objectives, their voluntary participation, and their right to withdraw at any stage without consequences. Their written and verbal consent was obtained before conducting interviews or collecting any sensitive information.

To maintain privacy, the identities of participants, including law enforcement personnel, were anonymized, and all responses were handled with strict confidentiality. Data was safely stored and accessed only by the researcher to prevent unauthorized use. Additionally, no personal or sensitive information that could undermine the safety or integrity of individuals or the River Police Unit was disclosed.

This research maintained ethical standards concerning human subjects, ensuring that no harm—physical, psychological, or professional. The study also followed principles of fairness, objectivity, and transparency in data collection and analysis.

## **3. Findings**

The main objective of the study is to explore the nature and the challenges of River policing. The findings of the study are presented in part A (Socio-demographic characteristics), part B (Nature of River policing), part C (Challenges of River policing), part D (Recommendations for ensuring River security), and part E (Relationship between variables).

### *3.1. Part A: Socio Demographic Characteristics*

The study surveyed 57 officers from the Tangail River Police Unit. The team was largely male, with men making up 83.64% of respondents, while women accounted for only 16.36%. This highlights the gender disparity in law enforcement, a trend common in Bangladesh. Most of the officers (42.1%) were in their prime working years, aged 34 to 43, with a significant portion (29.82%) aged 24 to 33, suggesting an influx of younger personnel. Meanwhile, 15.79% were aged 44 to 53, and just 8.77% were over 54, indicating fewer officers remain in active service as they approach retirement.

Religiously, the group reflected the diversity of the region, with 86% identifying as Muslim, 10.5% as Hindu, and 3.5% as Buddhist. Family dynamics also stood out—nearly 79% of officers were married, reflecting a workforce balancing professional duties with family life, while 19.3% were single, and a small 1.75% were widowed, hinting at personal challenges some officers may face.

Education levels showed a range of qualifications. While 33.3% had completed SSC and 38.6% had HSC qualifications, only a smaller group had degrees (8.8%), graduate qualifications (5.3%), or postgraduate degrees (14%). This mix suggests that while many officers bring foundational education to their roles, there's potential for further professional development to enhance their capabilities.

#### *3.1.1. River Policing*

This part discusses the training of River Police Unit officers, their training types, techniques for combating river crimes, and perceptions about river policing.

- **Ranks of Officers:** The sample consisted of 57 officers across various ranks—inspectors, sub-inspectors, assistant sub-inspectors, nayeks, and constables. Constables made up the largest group, accounting for 33.3% of the respondents.
- **Experience in the Police Force:** The majority of officers have significant experience, with over half serving more than five years in the police force. The most common range of experience was between 6 to 10 years, representing 26.3% of respondents.
- **Tenure in the River Unit:** Many officers have long-standing experience in the river unit. Approximately 38.6% reported working in the unit for more than six years, while 24.6% have served between 4 to 5 years.

### *3.2. Part B: Nature of River Policing*

This study discussed the overall scenario of river crime and the response of river policing nationwide.

### 3.2.1. Training Programs

A concerning finding is the lack of training among officers. An overwhelming 89.47% reported they had not received any in-service training related to river crimes. Among the minority who did receive training, it mainly involved pair boat search techniques, vessel search and seizure, and survival training in water spaces.

### 3.2.2. Types of Training

For the few officers who did undergo training, the focus was on practical skills like pair boat searches, vessel search and seizure, and survival techniques in water. However, these programs reached only a tiny fraction of the workforce, leaving most officers without any specialized preparation.

### 3.2.3. Nature of River Crime and Policing

#### 3.2.3.1. Exploring the Most Prevalent River Crimes in Bangladesh

The most prominent crimes in this research were established to be illegal fishing at 98.2%, illegal sand excavation at 93.0%, and then river grabbing or encroachment at 80.7%. Other noticeable ones are smuggling/trafficking at 71.9%, river piracy at 61.4%, while activities considered less frequent are chemical dumping, extortion, and other crimes like water pollution. These show how illegal fishing and sand excavation both have contributed significantly to the community and environmentally while smuggling, piracy, and extortion remain really critical. Policymakers should focus on prevalent crimes, in cooperation with the police, and take effective resources and measures in protecting communities.

Figure 1 illustrates the Nature of river crimes in Bangladesh.

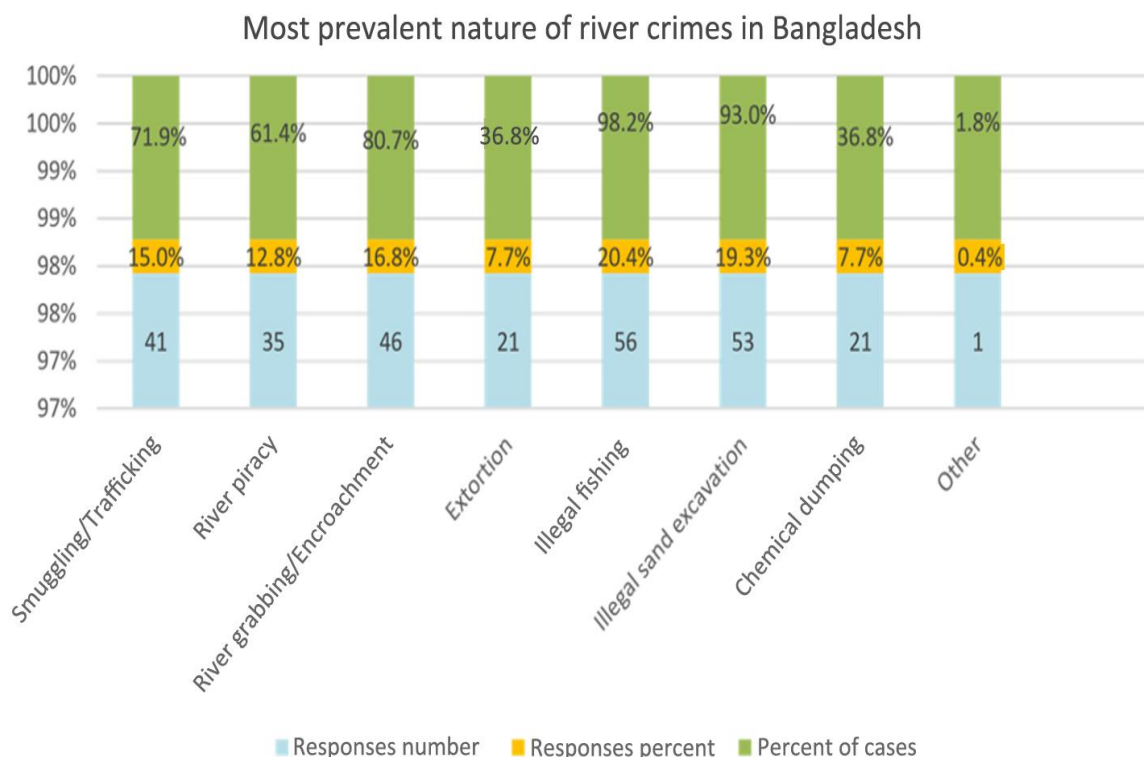
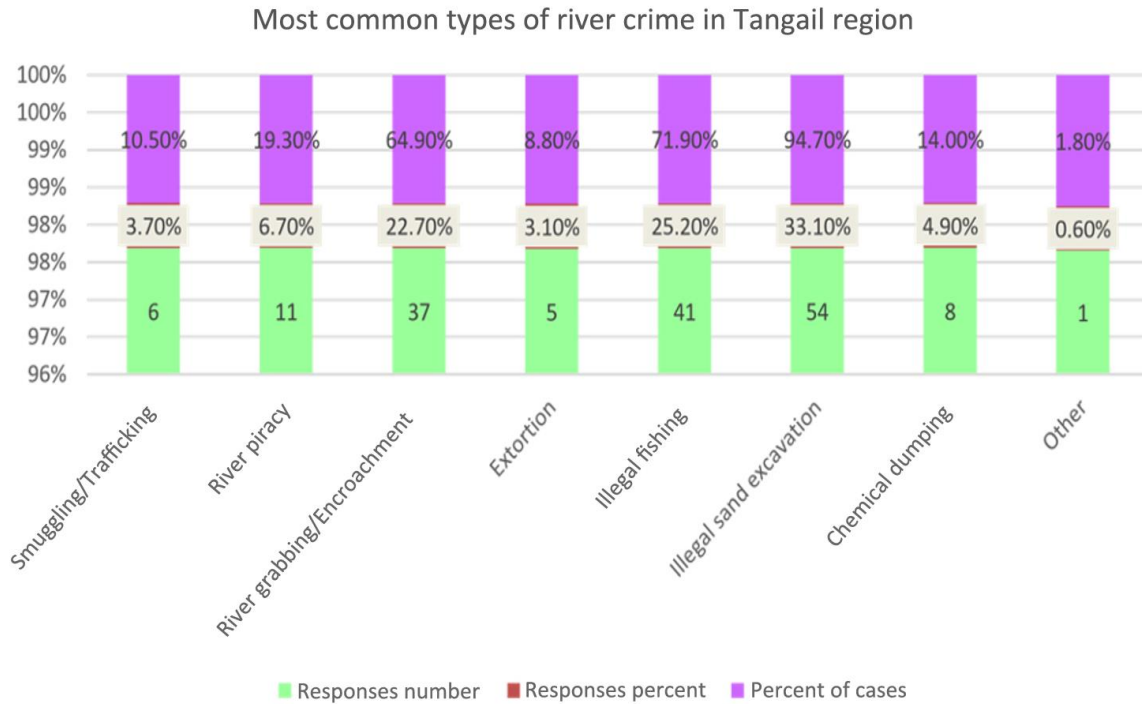


Figure 1. Nature of river crimes in Bangladesh.

#### 3.2.3.2. Nature of River Crimes in the Tangail Region

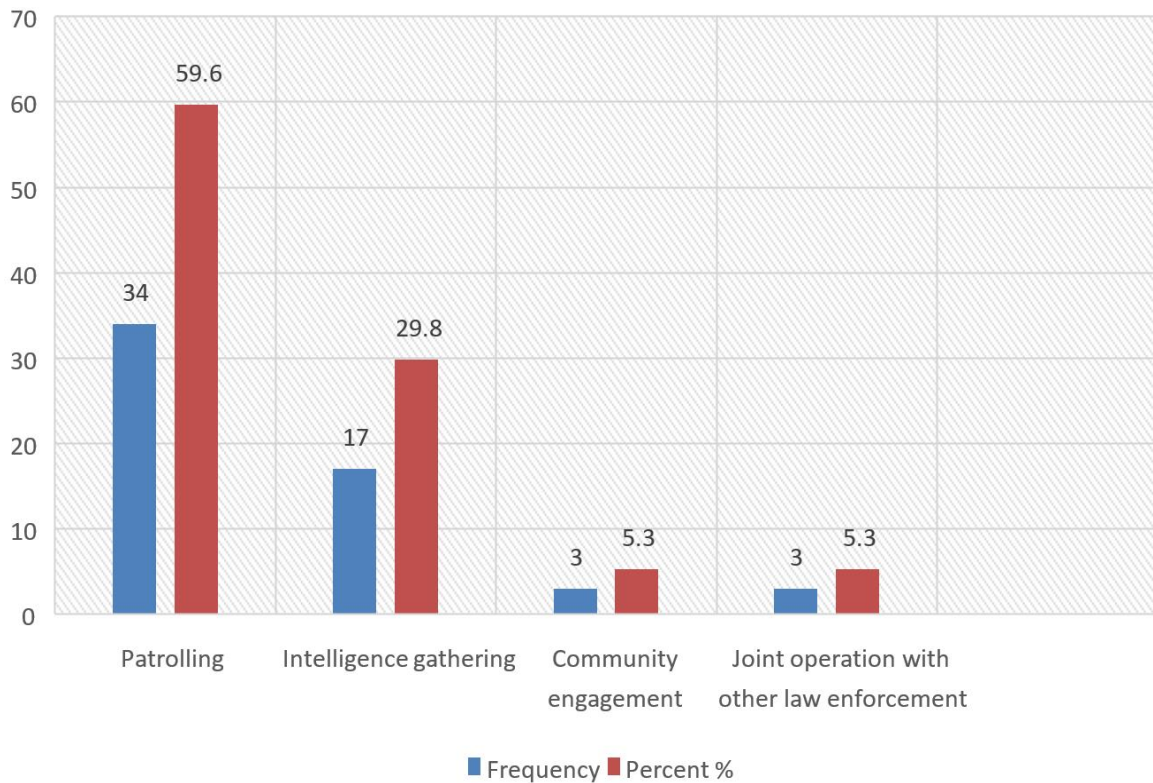
The most prevalent illegal activities in the Tangail area were found to be illegal sand excavation at 94.7% and river grabbing/encroachment at 64.9%. Illegal fishing was also high at 71.9%, while smuggling/trafficking stood at 10.5% and extortion at 8.8%. Other crimes that were less frequent included chemical dumping at 14% and river piracy at 19.3%. These results again point out the urgency of addressing sand excavation and river grabbing, which continue unabated despite government directives. Whosoever is engaged in these activities should be stopped through focused enforcement. Indeed, focused interventions against illegal sand excavation and encroachment will safeguard the natural resources of the region.

Figure 2 illustrates the Nature of river crimes in Tangail region.



**Figure 2.** Nature of river crimes in Tangail region.

Figure 3 illustrates the nature of Policing.



**Figure 3.** Nature of Policing.

### 3.2.3.3. Policing Strategies for Crime Detection and Combat in River Spaces

A number of policing strategies for combating river crimes were revealed from the study: Patrolling at 59.6%, followed by intelligence gathering at 29.8%; the minimal community engagements and joint operations with other law enforcement agencies both accounted for 5.3%. Accordingly, patrolling will be concerned mainly with observation and detection activity, while in intelligence gathering, its proactive methods rely on its

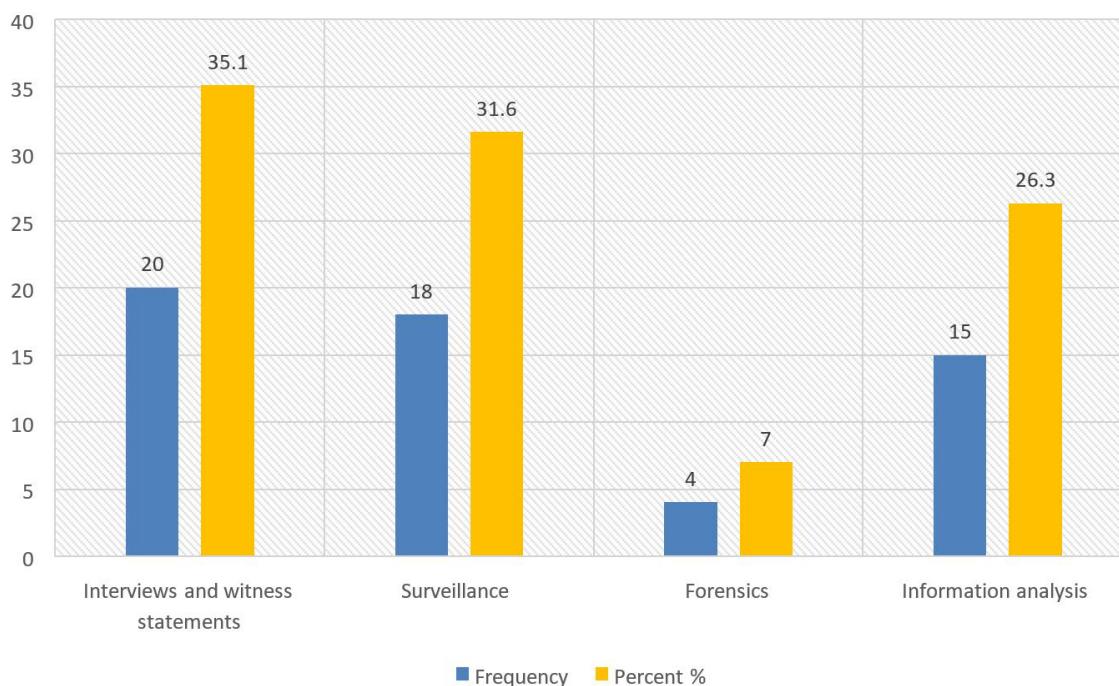
informants and surveillance. Community engagement and joint operations are underutilized but hold great potential for better collaboration.

In addition, the absence of technology-based equipment, such as GPS (Global Positioning System), drones, sonar, and digital mapping, restricts policing efficiency. It is possible that with advanced technologies and collaboration both at the community and agency levels, the rate of crime prevention and detection can increase largely. The focus on technological advancements and partnerships is key in bridging the gaps in effective river crime management.

#### *3.2.3.4. Investigating Techniques against Crimes along the Riverine Areas*

The investigation techniques of the River Police in the Tangail region, as identified from the study, were interviews and witness statements, as reported by 35.1% of the respondents, followed by surveillance at 31.6%, information analysis by 26.3%, and forensics, which was only used by 7%.

Figure 4 illustrates the nature of investigation of detect and combat River Crime.



**Figure 4.** Nature of investigation of detect and combat River Crime.

The traditional methods involve direct participation by an informant through interviews and observations. Minimal forensic applications reveal that this represents a gap either in resources or in the area of expertise. Advanced tools for forensic investigations, and evidence-based investigative work can better upgrade such investigations into precise and effective work. Investing in forensic capabilities and surveillance technologies will strengthen the efficiency of the River Police not only in effectively detecting but also fighting crime.

#### *3.2.3.5. Causes of Increasing River Crime*

The leading causes that have brought about the increase in river crimes in Bangladesh, as established by this study, were a lack of resources at 75.4%, poor funding, personnel, and equipment. Poor legal frameworks and lack of awareness and education ranked high at 54.4% due to the fact that the laws were old and the people did not know them. Corruption at 38.6%, lack of enforcement at 35.1%, abuse of political power at 22.8%, and poverty at 7.0% were other reasons that influenced this situation.

Figure 5 illustrates the causes of increasing River Crime in Bangladesh.

#### *3.2.4. Effective Policing Activities*

##### *3.2.4.1. The Distinctive Nature of Policing River Crime*

Results showed that 93% believe river policing is somewhat different from conventional policing, while 7% disagree. The difficulties in riverine settings impose the use of special modes of operation, skills, resources, and equipment; hence, this calls for specific methods to handle the crimes in rivers appropriately.

### Causes of river crime in Bangladesh

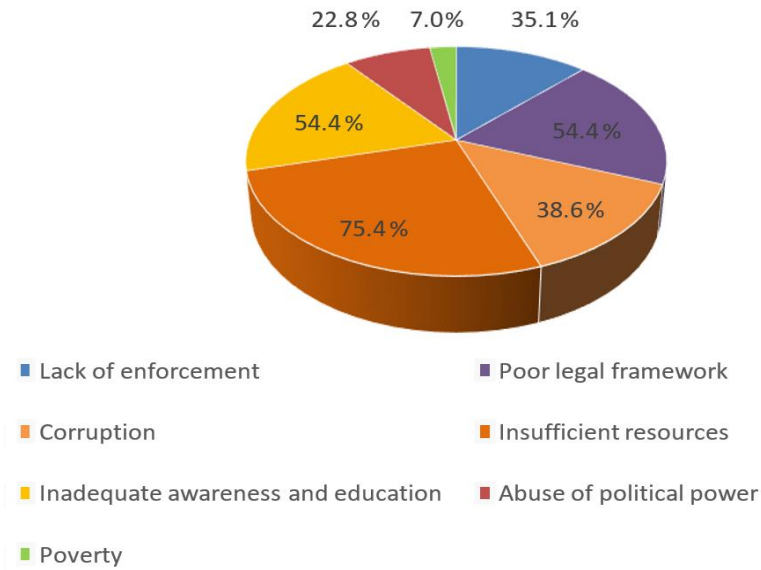


Figure 5. Causes of increasing River Crime in Bangladesh.

#### 3.2.4.2. Exploring the Unique Nature of River Policing

What makes river policing unique are issues to do with geography of the rivers, as pointed out by 33.3% of the respondents that are characterized by strong currents and fluctuating water levels, the mobility of the suspects reported by 22.8%, evidence cited by 14.0%, and in applying the laws, 29.8% identified the different policing strategies necessary in the riverine environment. These factors give further reason for the development of specialized methods in addressing the complexities of river policing.

#### 3.2.4.3. Effective Strategies for River Police

A number of strategies emerged as effective in combating river crimes. Increased patrolling, reported by 73.7% of the respondents, was the most effective method. This was followed by better training for personnel, 66.7%; improved intelligence gathering, 63.2%; and enhanced cooperation with other agencies, 64.9%. Other strategies, which included community engagement, were minimally used at 3.5%.

Figure 6 illustrates the effective strategies for river police.

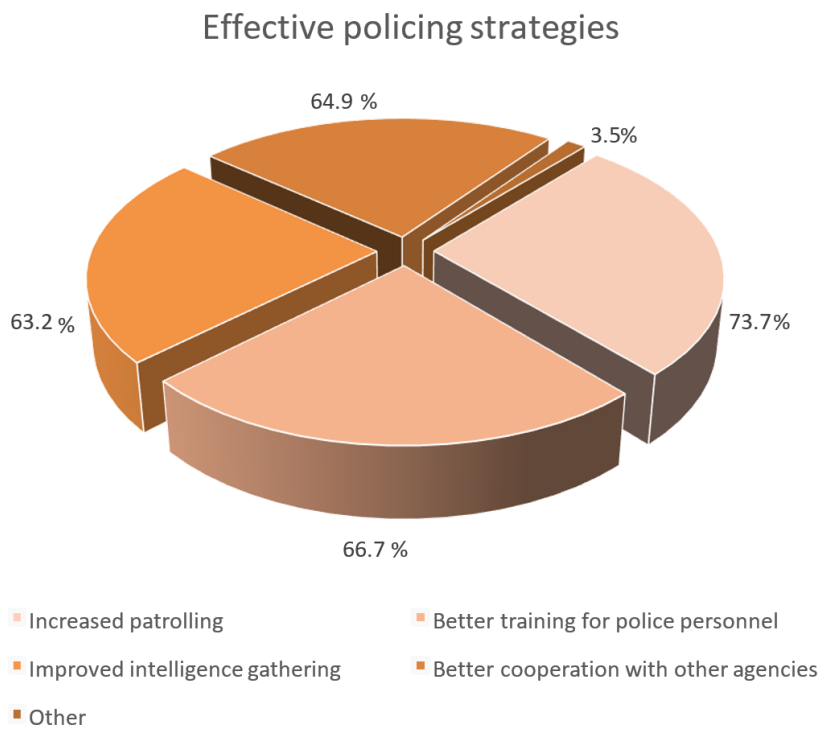


Figure 6. Effective strategies for river police.

These strategies, especially patrolling and intelligence systems, need to be further strengthened, while collaboration and community involvement must be fostered in order to raise the level of effectiveness in river policing.

### 3.2.4.4. Perceptions on River Policing

Perceptions about the effectiveness of river policing reveal systemic issues. Only 5.3% of respondents strongly agreed that the River Police are effectively addressing crimes, with the majority finding the current efforts inadequate. Additionally, over 80% of respondents stated that the police lack advanced technologies like GPS, drones, and digital mapping, limiting their capabilities. Resource constraints were also a concern, with 64.9% strongly agreeing that the government should allocate more resources for river policing. Addressing these limitations in technology and resources is critical to improving the efficacy of river crime management.

Table 1 presents the Police perception of river policing.

Table 1. Police perception of river policing.

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The river police unit of Bangladesh is effectively addressing river crime.	21.10%	38.60%	14%	21.10%	5.30%
The current river policing in Bangladesh is adequate to handle river crime	21.10%	36.80%	19.30%	19.30%	3.50%
Respondent thinks of the government should allocate more resources to river policing to tackle river crime in Bangladesh.	0	0	3.50%	31.70%	64.90%
Police using developed technology to investigate river crime.	49.10%	36.90%	10.50%	3.50%	0

### 3.3. Part C: Challenges in Policing River Crime

#### 3.3.1. Challenges Faced in Policing River Crime

The study revealed that 96.5% of respondents reported facing challenges in policing river crime, while only 3.5% stated they faced no challenges. This overwhelming majority indicates that river policing is fraught with various obstacles for law enforcement agencies.

River policing poses significant challenges, requiring attention to the factors contributing to these difficulties.

#### 3.3.2. Types of Challenges in Policing River Crime

The study identified several challenges faced by the River Police unit. The most reported issue was a lack of logistics (91.2%), followed by a lack of skilled manpower (63.2%) and a lack of updated technology (61.4%). Other challenges included difficult working conditions (52.6%), lack of cooperation (47.4%), and a limited legal framework (33.3%). Corruption was cited in 28.1% of cases, while jurisdictional issues were the least reported, at 1.8%.

It is evident that overcoming deficiencies in logistics, manpower, and technology should be the top priority for strengthening the effectiveness of river policing.

Figure 7 illustrates the types of challenges in policing river crime.

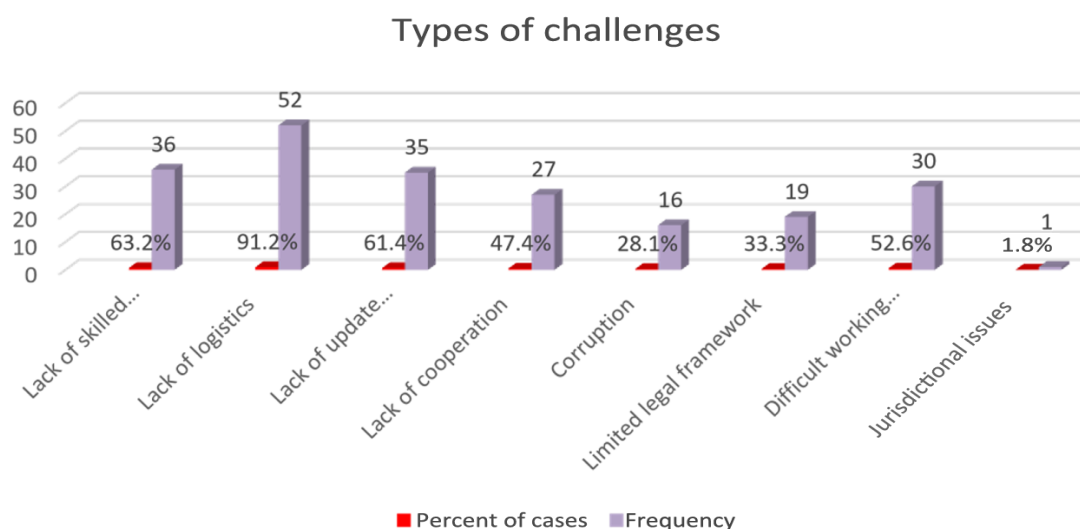


Figure 7. Types of challenges in policing river crime.



**3.3.3. Challenging Aspects of Managing River Crime**

The study highlighted key challenges in managing river crime. Response to river crime was the most challenging aspect, reported by 40.4% of respondents, followed by river space surveillance at 36.8%. Investigation of river crime was identified as a challenge by 22.8% of respondents. Challenges in surveillance stem from limited resources and complex river terrains, while response difficulties relate to coordination, resource availability, and response time. Investigations are hindered by factors like the remoteness of crime scenes and loss of evidence due to river conditions.

Improvement in the levels of surveillance, response mechanisms, and investigation capabilities are key aspects that aid in managing the crime in a river effectively.

**3.3.4. Nature of Risks Encountered by Police in Managing River Crime**

A number of life risks that faced the river police officers were presented from the study. The results indicated that drowning or other related water incidents presented the highest prevalence at 70.2%, while dangerous weather was the major risk factor attributed to 84.2%. Other significant risks included violent confrontations with suspects or criminals 66.7%, collision or accident with other vessels 43.9%, and rescue operations or other emergencies 50.9%. These findings indicate the hazardous nature of river policing, and the level of preparedness and resourcing required to minimize these risks.

This underlines the fact that river police officers require proper training and resource allocation, particularly in terms of managing high-risk conditions on a day-to-day basis.

**3.3.5. Perception of River Crime Regarding Training and Technology**

The findings indicated an overall lack of confidence in the sufficiency of current training programs, resources, and technology related to river crime policing. 43.9% strongly disagreed that the training programs are adequate, while 68.4% strongly disagreed that there is adequate skilled manpower and resources. Besides, 70.2% strongly disagreed that the police have adequate technological equipment, while 52.6% strongly disagreed that updated technology and software are being utilized.

About laws, 31.6% disagreed that the existing laws are adequate, and only 7% strongly agreed. A majority of 82.5% disagreed or strongly disagreed that police are adequately prepared to deal with the changing nature of river crime.

The findings highlight the dire need to enhance training programs, technological resources, and manpower in dealing with river crimes. In addition, a review and strengthening of existing laws is imperative in equipping river police to meet the challenges of the future.

Table 2 presents the perception on training and technology.

**Table 2** Perception on training and technology.

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The training programs are enough for policing river crime.	43.9%	33.3%	22.8%	0	0
There have adequate skilled manpower and resources for combating river crime.	68.4%	22.8%	8.8%	0	0
River police are using update technology and software.	52.6%	28.1%	19.3%	0	0
The laws regarding river crime are enough.	14%	31.6%	26.3%	21.1%	7%
Police have enough technological equipment to deal with river crime.	70.2%	19.3%	7%	1.8%	1.8%
Police are adequately prepared to deal with the changing landscape of river crime.	35.1%	47.4%	17.5%	0	0

**3.4. Part D: Recommendations for Ensuring River Space Security**

**3.4.1. Measures for Effective River Crime Policing**

The study highlights key measures recommended for enhancing river crime policing. The most emphasized measure is developing an effective surveillance and monitoring system, supported by 78.9% of respondents. The use of advanced technologies like drones and monitoring tools is critical to improving detection and prevention. Developing advanced technological systems, such as AI, GIS, and Big Data, was supported by 75.4%.

Figure 8 illustrates the recommended training program by respondent.

### Recommended training programme to the officials

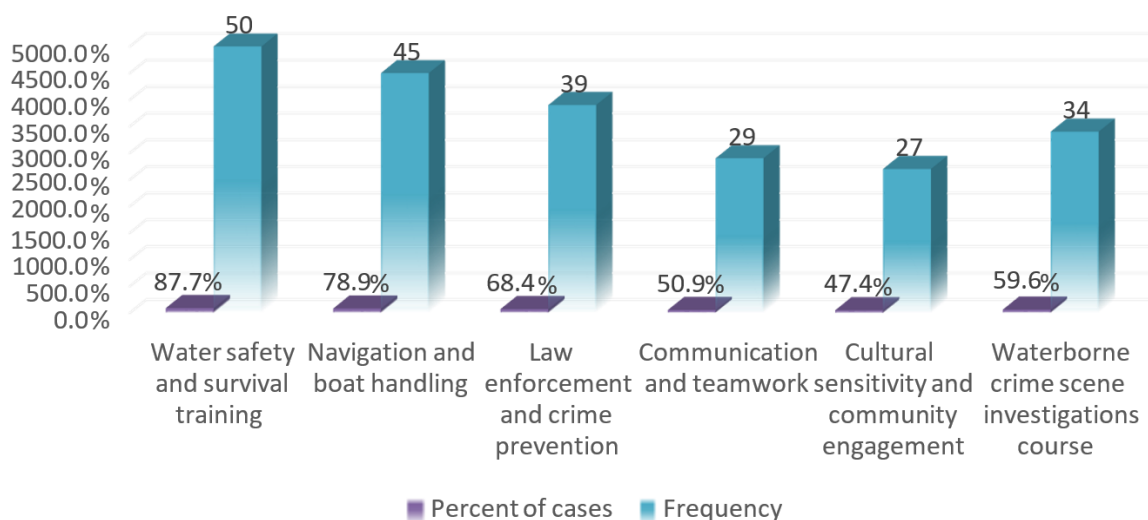


Figure 8. Recommended training program by respondent.

Addressing the lack of skilled manpower was another key focus, with 63.2% suggesting training programs and skill-building initiatives. Community-based policing strategies were recommended by 52.6% of respondents to foster trust and cooperation between law enforcement and local communities. Developing a strategic plan, with clear goals and objectives, was highlighted by 38.6%, while inter-agency collaboration was less emphasized, supported by 8.8%.

Effective river crime policing requires advanced technology, skilled manpower, and strong community and inter-agency partnerships to address the unique challenges of river spaces.

#### 3.4.2. Effective Training Programs for River Crime Policing

The study identified those aspects of training that were most strongly justified for river crime policing. Most strongly supported, at 87.7%, was the need for water safety and survival training to be provided to ensure officer safety in and around water at all times. Navigation and boat handling training was strongly supported by 78.9% based on the high degree of proficiency required in watercraft operations.

As many as 68.4% would recommend the training in policing and crime prevention so that the officers can ideally enforce laws which pertain to water. An equal number propose that communication/collaboration/teamwork should be emphasized between personnel, taking a share of 50.9%. Some 47.4% indicate cultural sensitivity training with an aim of understanding many diverse communities; while the final proposal is 59.6% for specialized evidence collection training within the framework of the Waterborne Crime Scene Investigations Course, collecting and preserving evidence in aquatic environments.

Comprehensive training programs covering safety, navigation, enforcement, and community engagement are crucial for equipping officers to manage the complexities of river crime policing effectively.

#### 3.4.3. Developing River Space Security

The study outlined a number of recommendations that would ensure river space security. The most emphasized was adequate staffing and resources, supported by 82.5% of the respondents. This includes adequate personnel for monitoring and patrolling, and the provision of necessary equipment and technology to address security threats.

Intelligence-led policing, supported by 63.2%, focuses on using data and information in order to effectively anticipate and respond to security challenges. More enhanced security using surveillance cameras, physical barriers, and developing capacity for emergency responses at 59.6 percent each; regulation development and enforcement at 57.9 percent, and consultations/collaborative partnerships at 56.1 percent. Finally, public education and awareness drive was supported at 52.6 percent for promoting river security and safety concerns within communities.

Finally, regular risk assessment was recommended, supported by 50.9%, to proactively identify and mitigate potential threats.

The enhancement of river space security will be effectively developed through multiple approaches: integrating resources, regulations, intelligence, and community partnerships to comprehensively and proactively address the challenges.

Figure 9 illustrates the recommendations for ensuring River space security.

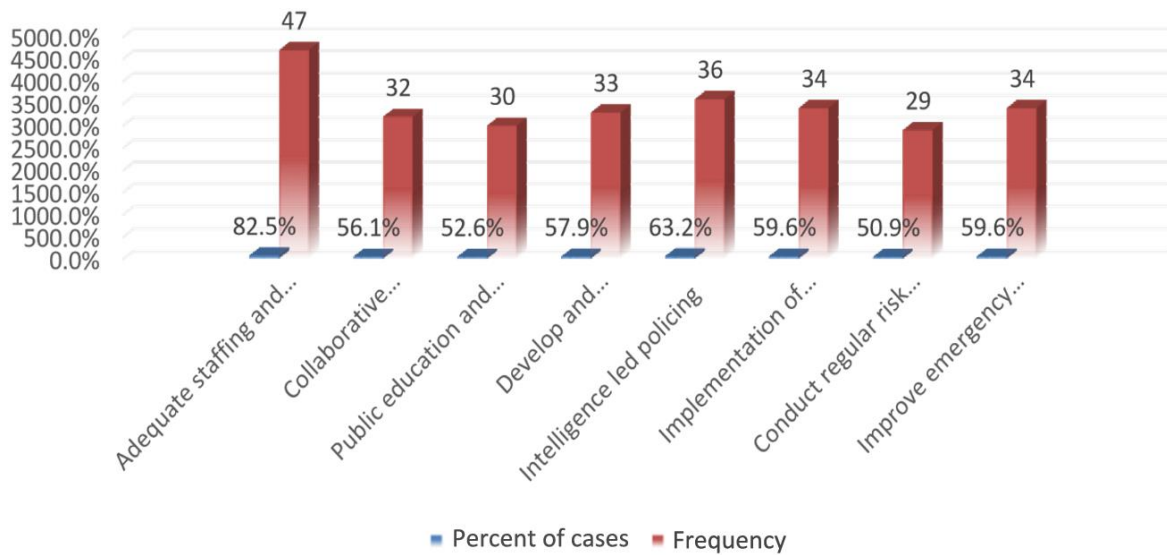


Figure 9. Recommendations for ensuring River space security.

3.5. Bivariate Analysis

Bivariate analysis has been done between two variables that focus on techniques of crime detection, challenges faced by the officers, and nature of river crimes. This allows for an in-depth look into how various factors interact within river policing.

Table 3 presents the techniques to detect/combat crime in the river space.

Table 3. The techniques to detect/combat crime in the river space.

			Techniques to detect/Combat crime in the river space				Total
			Patrolling	Intelligence gathering	Community engagement	Joint operation with other law enforcement	
Any challenge faced in policing river crime	Yes	Count	33	16	3	3	55
		% within challenges faced by the respondent in policing river crime	60.0%	29.1%	5.5%	5.5%	100.0%
	No	Count	1	1	0	0	2
		% within challenges face by respondent in policing river crime	50.0%	50.0%	0.0%	0.0%	100.0%
Total		Count	34	17	3	3	57
		% within challenges face by respondent in policing river crime	59.6%	29.8%	5.3%	5.3%	100.0%

3.5.1. Relationship Between Techniques to Detect Crime and Challenges Faced by Police Officers

The techniques used for the detection of crime and challenges that were associated with them were analyzed. Patrolling was the most common technique employed by 59.6%, followed by intelligence gathering at 29.8%, while community engagement and joint operations were each reported by 5.3%.

Of the total sample of 96.5% facing problems in policing river crimes, patrolling was noted as a difficulty for 60%, while gathering intelligence was pointed out by 29.1%. In engaging with communities, the figure is 5.5%, the same percentage given to joint operations with other agencies. A minimal 3.5% do not face challenges in policing river crimes.

Improving river crime detection and response needs to take on board patrolling and intelligence gathering difficulties because they are the key techniques that would be utilized.

Table 4 represents the Nature of challenges faced by the police officers

**Table 4.** The Nature of challenges faced by the police officers.

		Gender		Total	
		Male	Female		
Nature of challenges faced by the police officers	Lack of logistics	Count	48	4	52
		%within challenges	92.3%	7.7%	100%
	Lack of skilled manpower	Count	36	0	36
		%within challenges	100.0%	0.0%	100%
	Lack of updated Technology	Count	33	2	35
		%within challenges	94.3%	5.7%	100%
	Lack of cooperation	Count	25	2	27
		%within challenges	92.6%	7.4%	100%
	Corruption	Count	15	1	16
		%within challenges	93.8%	6.2%	100%
	Limited legal Framework	Count	18	1	19
		%within challenges	94.7%	5.3%	100%
	Difficult working condition	Count	26	4	30
		%within challenges	86.7%	13.3%	100%
	Others	Count	1	0	1
		%within challenges	100.0%	0.0%	100%
Total	Count	53	4	57	
	%within challenges	93.0%	7.0%	100%	

*3.5.2. Relationship Between Gender and Nature of Challenges*

The analysis explored the relationship between gender and the challenges faced by police officers. Among the 57 participants, 53 were male, and 4 were female. The most commonly reported challenge was a lack of logistics, cited by 92.3% of male respondents and 7.7% of female respondents. Similarly, challenges such as lack of skilled manpower (100% male), lack of updated technology (94.3% male, 5.7% female), and lack of cooperation (92.6% male, 7.4% female) were predominantly reported by male officers.

Table 5 represents the Relationship between challenges faced by the officers and dealing with River Crimes Crosstabulation.

Table 5. Relationship between challenges faced by the officers and dealing with River Crimes crosstabulation.

		Nature of crime								Total	
		Smuggling	River piracy	River grabbing/ Encroachment	Extortion	Illegal fishing	Illegal sand excavation	Chemical dumping	Other		
Types of challenge	Lack of logistics	Count	6	11	34	5	39	49	8	1	52
		% within crime	100.0%	100.0%	91.9%	100.0%	95.1%	90.7%	100.0%	100.0%	
		% of total	10.5%	19.3%	59.6%	8.8 %	68.4%	86.0%	14.0%	1.8%	91.2%
	Lack of skilled manpower	Count	5	8	25	4	24	36	7	0	36
		% within crime	83.3%	72.7%	67.6%	80.0%	58.5%	66.7%	87.5%	0.0%	
		% of total	8.8%	14.0%	43.9%	7.0 %	42.1%	63.2%	12.3%	0.0%	63.2%
	Lack of update Technology	Count	4	8	25	3	27	34	6	0	35
		% within crime	66.7%	72.7%	67.6%	60.0%	65.9%	63.0%	75.0%	0.0%	
		% of total	7.0%	14.0%	43.9%	5.3 %	47.4%	59.6%	10.5%	0.0%	61.4%
	Lack of cooperation	Count	3	6	20	2	23	26	6	0	27
		% within crime	50.0%	54.5%	54.1%	40.0%	56.1%	48.1%	75.0%	0.0%	
		% of total	5.3%	10.5%	35.1%	3.5 %	40.4%	45.6%	10.5%	0.0%	47.4%
	Corruption	Count	2	4	11	3	14	16	4	0	16
		% within crime	33.3%	36.4%	29.7%	60.0%	34.1%	29.6%	50.0%	0.0%	
		% of total	3.5%	7.0%	19.3%	5.3 %	24.6%	28.1%	7.0 %	0.0%	28.1%
	Limited legal framework	Count	1	6	17	2	14	18	5	1	19
		% within crime	16.7%	54.5%	45.9%	40.0%	34.1%	33.3%	62.5%	100.0%	
		% of total	1.8%	10.5%	29.8%	3.5 %	24.6%	31.6%	8.8 %	1.8%	33.3%
	Difficult working condition	Count	1	7	22	2	24	28	4	1	30
		% within crime	16.7%	63.6%	59.5%	40.0	58.5%	51.9%	50.0	100.0	
		% of total	1.8%	12.3%	38.6%	3.5	42.1%	49.1%	7.0	1.8%	52.6
others	Count	0	0	1	0	0	1	0	0	1	
	% within crime	0.0%	0.0%	2.7%	0.0	0.0%	1.9%	0.0	0.0%		
	% of total	0.0%	0.0%	1.8%	0.0	0.0%	1.8%	0.0	0.0%	1.8%	
Total	Count	6	11	37	5	41	54	8	1	57	
	% of total	10.5%	19.3%	64.9%	8.8	71.9%	94.7%	14.0	1.8%	100.0	

Other challenges included corruption (93.8% male, 6.2% female), limited legal framework (94.7% male, 5.3% female), and difficult working conditions (86.7% male, 13.3% female). Only 7.0% of officers reported facing challenges outside of these categories, with all such cases being reported by male respondents.

While the data is heavily skewed towards male respondents, the findings emphasize the need for addressing challenges such as logistical issues, manpower, and technology that affect officers irrespective of gender.

### *3.5.3. Relationship Between Challenges Faced by Officers and Dealing with River Crimes*

The analysis examined the challenges officers face while dealing with various river crimes, such as smuggling, river piracy, river grabbing, extortion, illegal fishing, illegal sand excavation, and chemical dumping. The most reported challenge was lack of logistics, which affected 91.2% of respondents across all crime types, particularly illegal sand excavation (86%) and illegal fishing (68.4%).

The lack of skilled manpower was reported by 63.2%, significantly impacting cases of illegal sand excavation (66.7%) and river grabbing (67.6%). Similarly, the lack of updated technology was cited by 61.4%, affecting crimes like chemical dumping (75.0%) and illegal fishing (65.9%). The lack of cooperation impacted 47.4%, primarily in illegal sand excavation (48.1%) and illegal fishing (56.1%).

Other challenges, such as corruption (28.1%) and a limited legal framework (33.3%), were less frequently mentioned but still significant in certain cases like extortion (60.0%) and chemical dumping (62.5%). Difficult working conditions affected 52.6%, with illegal sand excavation (51.9%) and illegal fishing (58.5%) being the most impacted.

Addressing the systemic challenges such as logistics, manpower, and technology is critical to enabling officers to effectively combat a range of river crimes, particularly those with significant environmental and societal impacts.

### *3.5.4. Relationship Between Nature of Crimes and Policing Strategies Used*

This analysis explored the relationship between different types of river crimes and the policing strategies employed to detect or combat them. Patrolling was the most frequently used strategy, applied in 59.6% of cases overall, including illegal fishing (58.9%), illegal sand excavation (56.6%), and river grabbing (58.7%). Intelligence gathering was the second most common method, used in 29.8% of cases, with significant application in smuggling (34.1%) and river piracy (28.6%).

Less utilized strategies included community engagement (5.3%) and joint operations with other law enforcement agencies (5.3%), which were minimally applied across all crime types. For instance, community engagement was used in only 6.5% of river grabbing cases and 5.4% of illegal fishing cases. Joint operations were infrequent, appearing in 5.7% of illegal sand excavation cases and 4.8% of chemical dumping cases.

The reliance on patrolling and intelligence gathering highlights the need for expanding the use of community engagement and joint operations, which could enhance the effectiveness of policing strategies across all crime types.

## *3.6. Hypothesis Test*

### *3.6.1. Hypothesis-1*

*H<sub>0</sub> (Null hypothesis): There is no association between Challenges faced by the respondent in policing River crime and the respondent having adequate skilled manpower and resources for combating River crime.*

*H<sub>1</sub> (Alternative hypothesis): There is an association between Challenges faced by the respondent in policing River crime and respondents having adequate skilled manpower and resources for combating River crime.*

Table 6 presents the Hypothesis-1.

**Table 6.** Hypothesis-1.

<b>Chi-square tests</b>			
Pearson chi- square	Value	df	Asymp. sig. (2-sided)
	29.217 <sup>a</sup>	9	0.001

**Note:** a, significance level.

A Chi-Square test for independence with  $\alpha = .05$  was used to assess whether the Challenges faced by the respondent in policing River crime are related to the respondent having adequate skilled manpower and resources for combating River crime. The result of hypothesis test-1 mentioned that the chi-square value is 29.217a and the P-value is 0.001 which is less than 0.05. So, here the null hypothesis has been rejected, and the alternative hypothesis has been accepted. So, it can be said that there is a significant relation between the Challenges faced by the respondent in policing River crime and the respondent having adequate skilled manpower and resources for combating River crime.

### *3.6.2 Hypothesis-2*

*H<sub>0</sub> (Null hypothesis): There is no association between the types of Policing respondents followed to combat River crime and the current River policing in Bangladesh is adequate to handle River Crime.*

$H_1$  (Alternative hypothesis): There is an association between the nature of Policing respondents followed to combat River crime and the current River policing in Bangladesh is adequate to handle River Crime.

Table 7 presents the Hypothesis-2.

Table 7. Hypothesis-2.

Chi-square tests			
	Value	df	Asymp. sig. (2 sided)
Pearson chi-square	13.939 <sup>a</sup>	12	0.305

Note: a. significance level.

A Chi-Square test for independence with  $\alpha = .05$  was used to assess whether types of Policing respondents followed to combat River crime and whether the current River policing in Bangladesh is adequate to handle River Crime. The result of hypothesis test-2 mentioned that the chi-square value is 13.939a and the P-value is 0.305 which is less than 0.05. So, here the null hypothesis has been accepted, and the alternative hypothesis has been rejected. So, it can be said that there is no significant relation between the Challenges faced by the respondent in policing River crime and the respondent having adequate skilled manpower and resources for combating River crime.

#### 4. Discussion

This study tries to examine the nature and challenges of river policing in the Tangail region quantitatively, drawing on sociodemographic characteristics, the policing method used, and challenges faced by the River Police. Key findings include.

1. Socio-Demographics: The majority of the respondents were Muslims, 86%, while the educational level among officers was found to be very low, with only 14% having completed postgraduate education. A considerable 89.5% lacked specialized training in river crime detection and response. This echoes findings by Islam (2019) that developing more training and education will help in combating river crime.

2. The nature of crimes on the rivers mainly includes illegal fishing, accounting for 71.9%; sand excavation, and river grabbing were the next, while the frequency of smuggling and extortion is 10.5% and 8.8%, respectively. Lack of resources is mentioned by 75.4% of the participants, weak laws by 54.4%, lack of awareness by 54.4%, and political interference by 22.8%. These findings are supported by Faruk (2021) and Brisman (2018) who recorded escalating river crimes in Bangladesh as a result of poor enforcement coupled with rampant environmental violations.

3. Methods of Policing: The most frequent methods of policing were interviewing and taking statements from witnesses (35.1%), gathering evidence (31.6%), and analyzing information (26.3%). Very few cases involved forensic analysis (7%) because the technology was simply not available. An overwhelming number of the officers (93%) believed that river policing differs from other types of policing in significant ways, necessitating special methods of policing. Similarly, Eman and Meško (2021) recommend intelligence-led and community-oriented policing to deal with the complexities arising from waterway crimes.

4. Challenges and Risks: Dangerous weather conditions were a big risk at 84.2%, while 96.5% reported challenges in addressing river crime due to limited personnel, resources, and outdated technology. Siregar, Karim, and Asis (2018) also reported resource shortages and personnel limitations to be critical barriers to effective water policing in Papua New Guinea.

5. Recommendations: Advanced surveillance systems (78.9%) using drones and AI-based tools were highly recommended for improving monitoring and response times. Community-based policing, inter-agency collaboration, better training programs, and updated equipment were also urged to enhance operational effectiveness. These recommendations are in tandem with the findings of Eman and Meško (2021) who insisted on the integration of advanced technology and collaborative approaches in water policing.

6. Policy Implications: Improvement in the socio-economic condition of the river community, augmentation of employment opportunities, and enforcement of stringent law may reduce the river crimes considerably. In addition, Islam (2019) have also related that poverty and unemployment are two root causes of river crimes, which need to be addressed with enforcement reforms. Besides, it is also advisable to adapt specific strategies like Intelligence-Led and Problem-Oriented Policing, as stated by White (2018).

#### 5. Conclusion and Recommendation

The river policing in Bangladesh is important to ensure public safety, work towards sustainable development, and protection of natural resources. However, some serious challenges it confronts include insufficient infrastructure, inadequate training, corruption, and poor coordination among agencies. It is necessary that the government make proper investments in equipment, training, and communication networks so that these issues can be duly addressed. It means closer coordination between the River Police and Coast Guard for streamlining the efforts in this regard.

While doing this, corruption and accountability need to be checked with severe measures against the officers. Community involvement and awareness about the need for river policing will really more community

support in conserving the areas of the river. With these actions given priority, Bangladesh will have a secure waterway, better ecosystems, and a sustainable development pathway.

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