

Occupational Health and Hygienic Provisions of Dried Fish Processing Workers in Bangladesh: A Gendered Perspective

By
Safina Naznin

A Thesis Submitted to the Faculty of Graduate Studies of
the University of Manitoba
in partial fulfilment of the requirement of

MASTER OF NATURAL RESOURCES MANAGEMENT

Clayton H. Riddell Faculty of Environment, Earth, and Resources
Natural Resources Institute
University of Manitoba
Winnipeg

Copyright © 2025 by Safina Naznin

Abstract

This exploratory research examines the gendered dimensions of occupational health and hygiene provisions among dried fish processing workers in Nazirartek, Cox's Bazar, Bangladesh, through the lens of feminist political ecology (FPE) and intersectionality. Using qualitative methods, including ethnographic observations, interviews, and oral history conversations, the research investigates how gendered division of labour and inadequate workplace infrastructure affect the health, dignity, and agency of workers, particularly women. The findings reveal that women predominantly occupy low-paid, labour-intensive roles with minimal access to sanitation, protective equipment, or safe rest areas, while men often hold supervisory or decision-making positions that offer better working conditions. Patriarchal workplace governance and social taboos related to menstruation, pregnancy, and caregiving further marginalize women's health and well-being. Additionally, the absence of regulatory oversight and collective bargaining mechanisms, as well as threats from climate-induced hazards, intensify their vulnerability. Despite their central contributions to the dried fish economy, women workers are excluded from *khola* (yard) governance structures and denied access to basic occupational rights. This study highlights the urgent need for gender-responsive labour policies and governance reforms that address the intersecting environmental, social, and institutional inequalities embedded in this informal sector. It calls for inclusive governance that ensures fair wages, occupational safety, access to healthcare, and the active participation of women in workplace decision-making. By foregrounding women's perspectives and everyday realities, this study adds to the broader efforts to promote fairness, sustainability, and safety in the fisheries sector.

Acknowledgement

All praise and thanks to the Almighty, who blessed me with strength, patience, and guidance throughout this journey. Alhamdulillah!

I extend my heartfelt thanks to my supervisor, Dr. Emdad Haque, for his unwavering support, patient guidance, and constant encouragement. From the earliest stages of framing my research to the final revisions, his thoughtful feedback and mentorship have been invaluable. I am grateful for his wisdom and kindness. I feel truly fortunate to have such an insightful mentor in my life.

I am also sincerely grateful to my thesis committee members, Dr. Derek Johnson, Dr. Nancy Kang, and Dr. Gias Uddin Ahsan, for their critical feedback, encouragement, and insightful suggestions, which greatly enriched this research. My sincere appreciation also goes to Dr. Fikret Berkes, who served as the Chair of my thesis defense and provided valuable input that helped sharpen my arguments and refine my conclusions.

I gratefully acknowledge the financial support I received from the Faculty of Graduate Studies, the Natural Resources Institute, and the Dried Fish Matters project through various scholarships and research funding, which enabled me to focus on my study, research, and writing.

To the faculty, staff, and colleagues at the Natural Resources Institute, thank you for your guidance, academic discussions, and friendship throughout this journey. I am also thankful to my friends and colleagues both in Bangladesh and Canada who stood beside me along the way, offering encouragement, moral support, and thoughtful input at different stages of this research. I would especially like to thank my Research Assistant, whose dedication, hard work, and valuable contributions in the field were instrumental to this study.

My deepest gratitude goes to the women and men of Nazirartek who entrusted me with their stories and experiences, sharing them with honesty and courage. The women participants, in particular, shaped the heart of this thesis. Despite their daily struggles, they generously gave their time and voices so that their realities could be better understood. Without their trust and contribution, this work would not have been possible.

Finally, to my family and loved ones - thank you for your endless encouragement, prayers, and sacrifices. Your love and endless support inspired me to stay committed and complete this work.

Dedication

This thesis is dedicated to the women of Nazirartek, who represent the experiences of working women in the informal sector across Bangladesh

TABLE OF CONTENTS

Abstract.....	i
Acknowledgement.....	ii
Dedication.....	iii
CHAPTER 1: Introduction.....	1
1.1 The Research Context.....	1
1.2 Research Purpose and Objectives.....	4
1.3 Methodological Overview.....	4
1.3.1 Research Approach and Worldview.....	6
1.3.2 The Study Area.....	7
1.3.3 Data Collection Procedure.....	8
1.3.4 Data analysis.....	9
1.4 Organization of the Thesis.....	10
1.5 Contribution of Authors.....	11
References.....	12
CHAPTER 2: Occupational Health and Hygiene Provisions for Dried Fish Processing Workers in Bangladesh.....	16
Abstract.....	16
2.1 Introduction.....	16
2.2 Conceptual Considerations.....	19
2.3 Regulatory Framework Governing the Dried Fish Sector in Bangladesh.....	23
2.4 Methods.....	25
2.4.1 Study Area.....	25
2.4.2 Research Design.....	27
2.4.3 Data Collection Procedures.....	27
2.4.4 Data Analysis.....	29
2.5 Results.....	29
2.5.1 Gendered Working Modalities in Nazirartek Dried Fish Sector.....	30
2.5.2 Physical Infrastructure in Nazirartek’s Dried Fish Processing Kholas.....	31
2.5.3 Institutional Governance Mechanisms in Nazirartek Kholas.....	35
2.5.4 Governance Challenges and Health Vulnerability.....	38
2.6 Discussion.....	41
2.6.1 Patriarchal Governance and Gendered Inequality.....	42
2.6.2 Limited Institutional Support and Regulatory Gaps.....	43

2.6.3 Gendered Impacts of Climate Change and Displacement.....	45
2.7 Conclusion	46
References.....	48
CHAPTER 3 : Gender Roles and Occupational Health Risks for Women Working in the Dried Fish Sector in Bangladesh.....	53
Abstract.....	53
3.1 Introduction.....	53
3.2 Conceptual Considerations	56
3.3 Methods.....	57
3.3.1 Study Area	57
3.3.2 Research Design.....	59
3.3.3 Data Collection Procedures.....	60
3.3.4 Data Analysis	62
3.4 Results.....	62
3.4.1 Women’s and Men’s Dried Fish Processing Activities	62
3.4.2 Gendered Occupational Hazards and Risks in Dried Fish Kholas.....	65
3.4.3 Women’s Coping Measures	68
3.4.4 Silence and Resistance	73
3.5 Discussion.....	74
3.5.1 Extreme Patriarchy.....	75
3.5.2 Lack of State Protection for Women Workers’ Occupational Health.....	77
3.5.3 Barriers to Collective Action	78
3.6 Limitations of the Study.....	79
3.7 Conclusions.....	79
References.....	81
CHAPTER 4 : Discussion and Conclusion	86
4.1 Introduction.....	86
4.2 Discussion.....	86
4.3 Key Findings.....	90
4.4 Policy Implications and Recommendations	97
4.5 My Reflections on This Thesis Journey.....	100
4.6 Limitations of the study	102
4.7 Major Contributions.....	102
4.8 Future Research Areas	103
4.9 Conclusions.....	104
References.....	106

Appendices.....	109
Appendix A: Research Ethics and Compliance Approval	109
Appendix B: TCPS 2 Core Certification.....	110
Appendix C: Semi-structured Interview Consent Form.....	111
Appendix D: Key Informant Interview Consent Form	116
Appendix E: Oral History Conversation Consent Form	121
Appendix F: Interview guide for Semi-structured Interview	126
Appendix G: Interview Guide for Key Informants.....	127
Appendix H: Interview guide for Oral History	128
Appendix I: Participant Observation Guide.....	129

LIST OF TABLES

Table 2.1. Labour Laws and Policies for Informal Workers in Bangladesh.....	23
Table 2.2. Distribution of Respondents by Participatory Rural Appraisal (PRA) Tools and Occupational Background.....	28
Table 3.1. Distribution of Respondents by Participatory Rural Appraisal (PRA) Tools and Occupational Background.....	60
Table 3.2. Gender-differentiated Roles and Responsibilities in Nazirartek <i>Khola</i>	62
Table 3.3. Perceived Health Risks in Dried Fish Processing Yards	66

LIST OF FIGURES

Figure 2.1. Conceptual Framework of the Study	21
Figure 2.2. Map of Nazirartek Dried Fish Khola (dried fish yard).....	26
Figure 2.3. Access to Resources and Services by Gender in Nazirartek <i>Khola</i>	32
Figure 2.4. Physical Infrastructure in the Nazirartek <i>Khola</i>	33
Figure 2.5. Gendered Division of Labour and Use of Gloves in the <i>Khola</i>	34
Figure 2.6. Perception of Relocation by Gender in Nazirartek <i>Khola</i>	40
Figure 3.1. Map of Nazirartek Khola (dried fish yard).....	58
Figure 3.2. Gender Division of Labour in Nazirartek <i>Khola</i>	65
Figure 3.3. Typical Hand Injury Incurred from Binding Fish for Drying without Protective Gear	67
Figure 3.4. Women’s Coping Measures in Nazirartek <i>Khola</i>	69
Figure 3.5. Summary of Gender Dynamics and Occupational Health Implications in the Dried Fish Processing Yards in Nazirartek.....	72

CHAPTER 1

Introduction

1.1 The Research Context

Globally, fisheries and aquaculture support the livelihoods of over 500 million people, playing a crucial role in food security, nutrition, and economic development (Food and Agriculture Organization of the United Nations [FAO], 2024). Within this sector, small-scale fisheries (SSF) constitute the backbone of employment and production, accounting for over 90 percent of fishers and fish processing workers worldwide, making a significant contribution to the domestic food supply and local economies (FAO, 2015). Women play an important role in the sector, particularly in post-harvest and processing activities, comprising around 40 percent of the workforce in aquatic value chains (FAO, 2024). Yet small-scale fishing communities often remain among the poorest, and socio-politically the most marginalized. Despite their socio-economic importance, SSFs are frequently undervalued in policy frameworks, and the working conditions within these subsectors—including occupational health and hygiene standards—remain poorly documented and inadequately addressed.

Dried fish is a key component of small-scale fisheries, contributing to household income, nutrition, and the well-being of fishing communities (Pradhan et al., 2022). It is typically produced using low-cost, traditional methods such as sun drying, salting, fermenting, and smoking, which allow for long-term storage at room temperature (Belton et al., 2022). Globally, around 10 percent of fish harvests are preserved through these techniques, making dried fish a crucial part of food systems in many coastal regions (FAO, 2020; Galappaththi et al., 2021). Despite its socio-economic importance, the dried fish sector operates informally, remains politically unrecognized, and is generally excluded from formal fisheries governance and policy frameworks (Belton et al., 2022; Hossain et al., 2013).

The FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (SSF Guidelines) identify fishing and dried fish processing as vital to poverty reduction and nutritional well-being in coastal communities (FAO, 2015; Pradhan et al., 2022). Accounting for 12 percent of global fish consumption, dried fish plays a significant role in food security and rural livelihoods, particularly for low-income populations (Belton & Thilsted, 2014). The SSF Guidelines emphasize the importance of integrating occupational health and safety into fisheries development while also promoting gender equality and social equity (FAO, 2015; Frangoudes et al., 2019; Kleiber et al.,

2017; Turner, 2024;). Similarly, the 2021 Committee on Fisheries Declaration calls for improved access and equal opportunities for women in the fisheries sector (FAO, 2021). However, there is limited research on the occupational hazards and social vulnerabilities faced by women in dried fish value chains (Halder et al., 2024; Prusty & Sharma, 2023; Salagrama & Dasu, 2021).

Dried fish has significant economic, cultural, and nutritional value in Bangladesh, where approximately 25 percent of the national fish catch is processed into the dried form (Belton et al., 2018). The fisheries sector—including fishing, aquaculture, handling, and processing—provides livelihoods for nearly 20 million people, of whom 1.4 million are female (Department of Fisheries [DoF], 2024; World Bank, 2022). Dried fish contributes to national food security by preserving nutrient-rich fish and ensuring access to affordable sources of protein and essential micronutrients, particularly for low-income communities. Additionally, it supports economic diversification and generates employment opportunities (Belton et al., 2018; Hossain et al., 2015).

Fish-drying and fermentation activities are mainly concentrated in specific regions of Bangladesh, including Chittagong, Cox's Bazar, Sylhet–Mymensingh–Comilla, and Khulna–Barisal–Patuakhali. The primary locations for marine fish-drying facilities are Nazirartek and Sonadia in Cox's Bazar District and Dublar Char in the Sundarbans, Khulna District. In the Sylhet–Mymensingh–Comilla region, the focus is mainly on drying freshwater fish. Smaller quantities of freshwater fish are also dried in the Chalan Beel area of north-central Bangladesh, Faridpur, and Kaptai Lake in the southeastern region of the country (Hossain et al., 2015; Hossain et al., 2022). This research focuses specifically on Nazirartek, one of the largest fish-drying yards in Bangladesh, situated at the mouth of the Bhakkali River in Cox's Bazar District. This site has a rich history, being one of the oldest commercial fish-drying facilities in the region, with nearly three decades of operation (Hossain et al., 2022).

In Bangladesh, dried fish processors operate with minimal institutional or organizational support, and government regulations to safeguard their rights or improve working conditions are largely absent (Hossain et al., 2015). Labour laws primarily cover the formal sectors, leaving informal workers, such as those in dried fish processing, without adequate protection. Although the National Occupational Safety and Health (OSH) Policy (2013) includes informal workplaces, its enforcement is inconsistent, especially in fish-drying yards (Department of Inspection for Factories and Establishments [DIFE], 2021). Many processing sites are located on government-owned (*Khas*) land without formal tenure, exposing workers to risks of eviction and displacement

due to development pressures (Hossain et al., 2013). These yards predominantly employ marginalized populations who face social vulnerability, exploitation, and ongoing occupational health hazards (Belton et al., 2022). Women workers, in particular, suffer from poor access to basic sanitation and hygiene facilities, which contributes to health disparities. Unsafe water and sanitation practices are a major global health concern, and inadequate facilities in workplaces increase risks of reproductive health problems (Campbell et al., 2015; Jeebhay et al., 2004).

Existing literature has further highlighted the severity of working conditions in dried fish processing sites in Bangladesh, especially for women workers. Examining the vulnerability of the fish processing workers, Halder et al. (2024) observed that women in coastal fish-drying yards in Cox's Bazar and Chattogram face routine exposure to heat, smoke, and unsanitary environments, with limited access to clean drinking water or separate, functional toilets. Such poor working conditions increase vulnerability to illness, fatigue, and reproductive health risks. In addition, Belton et al. (2018) emphasized that dried fish workers, particularly women, remain excluded from institutional protections and face overlapping social and economic marginalization due to their gendered roles in the value chain. There is an evident deficiency of proper drainage facilities within the processing yards, which likely makes the workplace unhygienic (Hossain et al., 2013). These findings collectively underscore the importance of gender-responsive occupational health and hygiene-related interventions within the informal dried fisheries sector in Bangladesh.

As noted above, mainstream fisheries science and economics tend to prioritize male-dominated harvest activities while overlooking the critical post-harvest work, such as drying and processing, which is largely performed by women. This gender bias not only marginalizes women's contributions but also obscures the physical and emotional toll of their labour (Pedroza-Gutiérrez & Hapke, 2022). To address these gaps, this research focuses on occupational health and hygiene provision in the dried fish processing sector in Bangladesh, emphasizing gendered impacts. Drawing on the frameworks of intersectionality and feminist political ecology (FPE), the study examines how overlapping systems of power—including gender, class, ethnicity, and migration status—shape women's roles, vulnerabilities, and health experiences in this informal and often overlooked segment of the fisheries value chain (Crenshaw, 1991; Galappaththi et al., 2021). Understanding these intersecting factors is crucial for addressing gender-based inequalities and social injustices in the sector.

1.2 Research Purpose and Objectives

The primary purpose of this research is to examine the gendered occupational health and hygiene provisions in *kholas* for the dried fish processing workers in Bangladesh. The specific objectives of the study are to:

- i) examine occupational health and hygiene provisions concerning physical infrastructure in dried fish *kholas*;
- ii) assess the mechanisms of institutional governance and the role of women workers in *khola* management decision-making;
- iii) examine the impact of external shocks, such as climate-induced atmospheric hazards (e.g., cyclones) or regulatory eviction on processing workers;
- iv) map the intersectional and gender-differentiated occupational status, roles, and health risks arising from the dried fish processing work; and
- v) examine the coping mechanisms of both women and men processing workers individually to emerging occupational risks and their respective efforts to protect health and rights.

By addressing these objectives, the study argues that the neglect of women's health needs and their exclusion from workplace governance are not isolated issues but reflect broader structural inequalities shaped by gendered labour divisions, patriarchal norms, and weak institutional accountability in the informal fisheries sector. These systemic barriers expose women to disproportionate health risks due to inadequate occupational infrastructure and limited access to sanitation, safety, and health services. The study further examines how external shocks, such as climate-induced hazards and forced evictions, may intensify precarity and disrupt the already fragile livelihoods of dried fish workers. In response, both women and men are likely to adopt informal coping strategies to manage occupational health risks and external shocks.

1.3 Methodological Overview

In this study, I used a qualitative research methodology to explore the occupational health conditions, institutional governance mechanisms, and gendered experiences of dried fish processing workers in Nazirartek, Cox's Bazar. I chose this approach because it allowed me to capture the complexity of participants' lived realities, particularly in a context shaped by intersecting social inequalities. To guide the inquiry, I adopted an ethnographic research design,

which enabled me to observe and engage directly with workers in their everyday environments.

Ethnography, rooted in anthropology and sociology, helped me examine the cultural practices, social norms, and power dynamics (Creswell, 2014) that shape life and labour in the dried fish yard, locally known as *khola* (Hossain et al., 2013). Through close observation and in-depth interaction, I examined how physical infrastructure and governance structures shape gendered divisions of labour, which in turn lead to unequal exposures to occupational risks. This approach enabled me to identify the factors shaping the voices of women workers, whose experiences are often marginalized in fisheries research. Ethnography's emphasis on intersubjectivity and ethically grounded engagement allowed me to build trust with participants and co-produce knowledge that reflected their realities (Watson & Till, 2010).

To complement the ethnographic approach and deepen the analysis of community dynamics and systemic inequities, I also employed a case study strategy of inquiry. Case studies are widely recognized for their utility in examining a bounded phenomenon within its real-life context (Yin, 2014). Case study research employs a community-based approach to explore contemporary socio-cultural dimensions, critical problems, and social processes within specific communities (Minkler, 2005; Yin, 2014). Although the case study approach does not allow a broad generalization and estimation of the background population, it enables the procurement of insights with details of the concerned phenomena. Nonetheless, this approach is particularly well-suited for investigating gendered occupational health risks in informal workplaces, such as the *khola*. In Nazirartek, it enabled me to examine how gender, labour, and institutional arrangements intersect to shape health vulnerabilities. The case study method also supported participant engagement in systematic inquiry, revealing how workers, especially women, navigate risks, interpret institutional responses, and collectively respond to challenges in their everyday work environments (Minkler, 2005).

My positionality as a Bangladeshi woman, born and raised in Bangladesh and currently based in Canada, deeply informed my approach to conducting this research. My familiarity with the local language, cultural norms, and gendered realities enabled meaningful engagement with participants and helped build rapport through shared understanding. At the same time, my academic training and affiliation with a Canadian institution positioned me as an outsider in some respects, creating perceived power differentials that I worked to navigate sensitively. Drawing on my professional background in the development sector, I approached the field with humility, a

commitment to reflexivity, and a strong sense of ethical responsibility. I remained attentive to how my own identity and institutional affiliations shaped interactions, striving to listen actively, minimize bias, and center participants' voices in both data collection and analysis. This relational and reflective stance was integral to the ethnographic and feminist methodology that guided the study.

1.3.1 Research Approach and Worldview

This qualitative ethnographic study explored occupational health and hygiene conditions among dried fish workers in Nazirartek, a major site for marine landings and fish drying in Bangladesh. An intersectional lens guided the analysis, revealing how overlapping identities—such as gender, class, ethnicity, and migratory status—influence workers' exposure to occupational risks and access to resources (Crenshaw, 1991). Grounded in social constructivist and transformative worldviews, my research centered on workers' lived experiences while examining the structural inequalities embedded in the patriarchal fisheries value chain (Creswell, 2014). The constructivist perspective allowed me to engage with the subjective realities of participants, while the transformative paradigm supported a critical analysis of power relations, exclusion, and systemic injustice.

To guide this analysis, I drew on the framework of feminist political ecology (FPE), which helped me examine how gendered norms and governance structures influence division of labour, health vulnerabilities, and decision-making in the dried fish sector (Elmhirst, 2015). FPE emphasizes gendered access to resources, participation in environmental decision-making, and the co-production of environmental knowledge (Rocheleau et al., 1996). It also highlights how capitalist development and environmental degradation intensify the socio-ecological vulnerabilities of low-income women. In particular, FPE enabled me to understand how poor physical infrastructure, especially inadequate sanitation, exacerbates occupational risks for women. These workspaces are often designed with 'men in mind', disregarding the specific needs of women and reinforcing structural inequalities. I also observed that institutional failures and informal governance practices frequently limit women's participation in workplace decision-making, leaving them more vulnerable to exploitation and unsafe conditions (Waylen, 2014).

Integrating intersectionality and the feminist political ecology approach allowed me to reveal how structural power dynamics and gendered norms collectively shape occupational health

outcomes, coping mechanisms, and everyday forms of resistance among the dried fish processing workers, particularly women in Bangladesh. While this exploratory research addresses some key intersectional factors, such as gender, socio-economic status, and caregiving responsibilities, the analysis could be further deepened to capture the comprehensive interplay of additional social categories, including age, ethnicity, as well as how these factors intersect with informal labour arrangements, social hierarchies, and access to resources. Despite these limitations, the study offers important insights into how gendered vulnerabilities are produced and experienced in occupational settings, providing a foundation for more comprehensive future research that examines the multiple dimensions of intersectionality in this context.

1.3.2 The Study Area

The study was conducted in Nazirartek, a prominent location known for its extensive artisanal marine landing and commercial fish-drying activities. Situated about 7 kilometres from Cox's Bazar District, Bangladesh, it is located in Ward No. 1 of the Cox's Bazar Municipality (Hossain et al., 2015). The fish-drying site in Nazirartek was established in 1991 on government-owned land adjacent to the Bhakkhali River, covering approximately 130 acres of dried fish processing operations (Hossain et al., 2015; Hossain et al., 2022).

Approximately 7,000 households are permanently settled at the Nazirartek dry fish center, with most having one or two members engaged in fish-drying activities. The total number of the working population involved in fish drying at this *khola* is around 12,000 (Hossain et al., 2022). Over the past decade, the region has also experienced a significant demographic shift due to the influx of displaced Rohingya migrants from neighboring Myanmar. As Rohingya people are not legally permitted to work in Bangladesh and face limited income-generating opportunities in the resettlement camps, many seek informal employment in nearby urban and coastal labour markets, including the dried fish sector in Cox's Bazar (Mahmood et al., 2017).

In Nazirartek, about half of the women employed in the dried fish sector come from marginalized groups, such as Rohingya migrants (Belton et al., 2018). Bengali women in this sector are often landless seasonal migrants from rural parts of Cox's Bazar District or other economically deprived regions. About one-third of them are widowed, abandoned, or divorced (Belton et al., 2018; Hossain et al., 2015), and in the absence of male support within a patriarchal context, they face heightened social and economic marginalization, which severely limits their

opportunities and security in the workforce. These communities generally live in extreme poverty, further compounding their vulnerability and exclusion (Galappaththi et al., 2021). Frequent natural disasters exacerbate these conditions by repeatedly disrupting livelihoods and deepening the socio-economic insecurities faced by both local and migrant populations in the dried fish sector (Belton et al., 2018).

1.3.3 Data Collection Procedure

I conducted fieldwork between November 2023 and March 2024 in Nazirartek, Cox's Bazar, in Bangladesh. Adopting a gendered and intersectional lens, I engaged in participant observation by spending time in processing yards, tea stalls, and workers' homes. These informal spaces allowed me to observe daily interactions among workers, supervisors, and owners, and to engage in spontaneous conversations that shed light on gender roles, power dynamics, and informal governance systems influencing workplace conditions. I paid particular attention to how health risks, caregiving responsibilities, and lack of institutional support intersected with gender, class, and migratory status to shape the differentiated experiences of women workers (Appendix D).

To complement observation, I employed Participatory Rural Appraisal (PRA) tools, conducting 30 open-ended interviews and 20 key informant interviews with participants representing diverse age, gender, ethnicity, and occupational backgrounds (Appendix F and G). These included Bengali and Rohingya women, adolescent girls, pregnant workers, supervisors, traders, association leaders, government officials, local NGO representatives, health professionals, and local government institute representatives. This intersectional approach helped me to capture multiple perspectives on occupational health, access to resources, and decision-making authority. I also conducted six oral history interviews with Bengali and Rohingya women, including pregnant workers, to gather deeper reflections on lived realities (Appendix H). These informal, narrative-based conversations often occurred during breaks or in domestic settings and provided rich, contextually grounded insights into lived experiences—especially around topics that are rarely addressed in formal interviews, such as menstrual health, workplace stigma, and informal coping mechanisms. Given the gendered nature of the dried fish sector and the concentration of women in the most precarious and health-risk-prone roles, a larger proportion of participants in this study were women (approximately 65%), reflecting the study's focus on gendered occupational health

experiences. The firsthand accounts of women were essential for uncovering specific vulnerabilities and invisible forms of labour that are often overlooked in policy and research.

To ensure data validity, I triangulated findings by comparing interview narratives with field observations. For example, when participants mentioned inadequate protective equipment, I noted whether this was reflected in their work environments. This process helped reinforce the credibility of the analysis by cross-verifying verbal accounts with observable conditions. Triangulation of the data and findings also allowed me to check their validity as well as detect inconsistencies; for example, silences in participants' narratives, offering deeper insight into power dynamics and structural barriers that may not be explicitly articulated. By integrating multiple forms of evidence, I was able to construct a more nuanced and trustworthy account of the gendered occupational health realities in the *khola*.

All research activities were conducted following ethical guidelines set by the University of Manitoba Joint Research Ethics Committee (Protocol # HE2023-0261) (Appendix A). This study was conducted in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) (Appendix B). Written or verbal informed consent was obtained from all participants in accordance with ethical guidelines (Appendix C, D and E).

1.3.4 Data analysis

To analyze the qualitative data collected during fieldwork, I adopted a systematic approach grounded in feminist political ecology and intersectionality. My goal was to gain a deeper understanding of how gendered power relations, social hierarchies, and structural conditions intersect to shape occupational health experiences in the dried fish sector. This involved systematically linking participants' narratives to observed practices and structural conditions, while remaining attentive to the social and gendered contexts that shaped their experiences.

I followed the stages of qualitative data analysis outlined by Forman et al. (2008), which included reviewing primary data, coding, organizing content into themes, and identifying relationships among those themes. Interview transcripts, field notes, and observational records were carefully reviewed to develop primary and sub-themes aligned with the research objectives and guiding questions. Key themes that emerged included gender roles, physical infrastructure, governance mechanisms, health impacts, and coping strategies.

These themes were then contextualized within the broader framework of feminist political ecology, which allowed me to explore how gendered division of labour, poor infrastructure, and institutional failures contribute to health-related vulnerabilities. Special attention was given to how women's experiences, shaped by informal work status, caregiving responsibilities, and migratory identities, differed from their male counterparts. To enhance credibility and validity, I triangulated findings by cross-referencing primary data with secondary sources, including policy documents, legal frameworks, and organizational reports related to occupational health and the fisheries sector.

1.4 Organization of the Thesis

This thesis is organized into four chapters and follows the “sandwich” or grouped manuscript format. Chapter 1 provides an overview of the research background, objectives, methodology, and the overall structure of the thesis. Chapters 2 and 3 are presented as individual manuscripts that have been prepared for submission to peer-reviewed academic journals.

Chapter 2, titled “*Occupational Health and Hygiene Provisions for Dried Fish Processing Workers in Bangladesh*,” focuses on three core areas: the state of physical infrastructure related to occupational health and hygiene in dried fish *kholas*, the governance mechanisms and participation of women workers in decision-making, and the impacts of external shocks such as climate-induced hazards or regulatory evictions on worker well-being. This chapter has been submitted to the journal *World Development*.

Chapter 3, titled “*Gender Roles and Occupational Health Risks to Women Dried Fish Processing Workers in Bangladesh*,” addresses the intersectional and gender-differentiated occupational roles and health risks in the dried fish sector. It also examines how women and men processing workers respond to occupational risks and their efforts to protect their health and rights. This chapter has been submitted to the journal *Gender, Work and Organization*.

It is important to note that there is some overlap in the methodological sections of Chapters 1, 2, and 3, as they utilize the same data collection methods and analytical approaches.

Chapter 4 concludes the thesis with a comprehensive discussion that includes the key findings of the study, major contributions, limitations, and key policy recommendations.

1.5 Contribution of Authors

This thesis follows a grouped manuscript-based format and includes four chapters. I am the sole author of Chapters 1 and 4, which were completed under the direct supervision of Dr. C. Emdad Haque.

Chapters 2 and 3 have been prepared as individual manuscripts for submission to peer-reviewed academic journals, and details of the co-authorship is described below.

Chapter 2: *Occupational Health and Hygiene Provisions for Dried Fish Processing Workers in Bangladesh*

I conducted the fieldwork, performed data analysis, and wrote the manuscript as the lead author. Dr. C. Emdad Haque provided overall supervision and scholarly guidance throughout the development of the study. Dr. Derek Johnson contributed conceptual insights and editorial support, particularly in shaping the analytical framework. This manuscript has been submitted to the *World Development* journal and is currently under review.

Chapter 3: *Gender Roles and Occupational Health Risks to Women Dried Fish Processing Workers in Bangladesh.*

As the lead author, I carried out the fieldwork, undertook data analysis, and prepared the manuscript. Dr. C. Emdad Haque offered overall supervision and support in structuring the research. Dr. Nancy Kang contributed critical theoretical input and editorial feedback, especially in articulating the gendered dimensions of occupational health risks. The manuscript has been submitted to the *Gender, Work and Organization* journal and is currently under review.

There is no conflict of interest to declare among any of the contributors. All co-authors are appropriately acknowledged for their respective contributions to the research and manuscript preparation. Throughout the research and writing process, I worked under the guidance of my academic advisor and received additional editing support from the Natural Resources Institute (NRI) and the Academic Learning Centre at the University of Manitoba. I did not use any artificial intelligence (AI)-generated tools in this research, including AI-assisted text generation, data analysis, or presentation. The findings and narratives reflect the authentic voices of participants and my direct engagement with the study context, ensuring the integrity and originality of the research process.

References

- Belton, B., & Thilsted, S. H. (2014). Fisheries in transition: Food and nutrition security implications for the global South. *Global Food Security*, 3(1), 59–66.
<https://doi.org/10.1016/j.gfs.2013.10.001>
- Belton, B., Hossain, M. A. R., & Thilsted, S. H. (2018). Labour, identity, and wellbeing in Bangladesh's dried fish value chains. In D. S. Johnson, T. G. Acott, N. Stacey, & J. Urquhart (Eds.), *Social wellbeing and the values of small-scale fisheries* (pp. 217–241). Springer International Publishing. https://doi.org/10.1007/978-3-319-60750-4_10
- Belton, B., Johnson, D. S., Thrift, E., Olsen, J., Hossain, M. A. R., & Thilsted, S. H. (2022). Dried fish at the intersection of food science, economy, and culture: A global survey. *Fish and Fisheries*, 23(4), 941–962. <https://doi.org/10.1111/faf.12664>
- Campbell, O. M. R., Benova, L., Gon, G., Afsana, K., & Cumming, O. (2015). Getting the basic rights—the role of water, sanitation and hygiene in maternal and reproductive health: A conceptual framework. *Tropical Medicine & International Health*, 20(3), 252–267.
<https://doi.org/10.1111/tmi.12439>
- Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review*, 43(6), 1241–1299.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approach* (4th ed.). Sage Publications.
- Department of Inspection for Factories and Establishments. (2021). *National profile on occupational safety and health in Bangladesh 2019*. Ministry of Labour and Employment, Dhaka, Bangladesh.
https://www.ilo.org/dhaka/Whatwedo/Publications/WCMS_819727/lang--en/index.htm
(Accessed January 30, 2025)
- Department of Fisheries. (2024). *National Fish Week Compendium* (p. 160) [In Bengali]. Ministry of Fisheries and Livestock, Dhaka, Bangladesh
- Elmhirst, R. (2015). Feminist political ecology. In T. Perreault, G. Bridge, & J. McCarthy (Eds.), *The Routledge handbook of political ecology* (pp. 519–530). Routledge.
- Forman, J., Creswell, J. W., Damschroder, L., Kowalski, C. P., & Krein, S. L. (2008). Qualitative research methods: Key features and insights gained from use in infection prevention research. *American Journal of Infection Control*, 36(10), 764–771.

<https://doi.org/10.1016/j.ajic.2008.03.010>

- Frangoudes, K., Gerrard, S., & Kleiber, D. (2019). Situated transformations of women and gender relations in small-scale fisheries and communities in a globalized world. *Maritime Studies*, 18(3), 241–248. <https://doi.org/10.1007/s40152-019-00159-w>
- Food and Agriculture Organization of the United Nations. (2015). *Voluntary guidelines for securing sustainable small-scale fisheries in the context of food security and poverty eradication*.
- Food and Agriculture Organization of the United Nations. (2020). *The state of world fisheries and aquaculture 2020: Sustainability in action*. <https://doi.org/10.4060/ca9229en>
- Food and Agriculture Organization of the United Nations. (2021). *2021 COFI Declaration for sustainable fisheries and aquaculture*. <https://doi.org/10.4060/cb3767en>
- Food and Agriculture Organization of the United Nations. (2024). *The state of world fisheries and aquaculture 2024: Blue transformation in action*. <https://doi.org/10.4060/cd0683en>
- Galappaththi, M., Collins, A. M., Armitage, D., & Nayak, P. K. (2021). Linking social well-being and intersectionality to understand gender relations in dried fish value chains. *Maritime Studies*, 20(4), 355–370. <https://doi.org/10.1007/s40152-021-00232-3>
- Halder, C. E., Das, P. P., Rahman, S. M. T., Bhoumick, L. C., Tassdik, H., Hasan, M. A., & Mithun, S. N. (2024). Occupational hazards and risks among the women in fisher communities in Cox’s Bazar and Chattogram, Bangladesh. *PLOS ONE*, 19(7), e0297400. <https://doi.org/10.1371/journal.pone.0297400>
- Hossain, M. A. R., Sultana, M. T., Ferdous, S., Alam, S., Akhtar, R., & Rahman, S. (2022). *Key locations: Dry fish processing and trading in Bangladesh* (Working Paper 10; Dried Fish Matters). The University of Manitoba / Bangladesh Agricultural University / Jahangirnagar University.
- Hossain, M., Belton, B., & Thilsted, S. (2013). *Preliminary rapid appraisal of dried fish value chains in Bangladesh*. WorldFish.
- Hossain, M., Belton, B., & Thilsted, S. (2015). *Dried fish value chain in Bangladesh*. WorldFish. <https://doi.org/10.13140/RG.2.2.24362.77762>
- Jeebhay, M., Robins, T. G., & Lopata, A. (2004). World at work: Fish processing workers. *Occupational and Environmental Medicine*, 61, 471–474. <https://doi.org/10.1136/oem.2002.001099>

- Kleiber, D., Frangoudes, K., Snyder, H. T., Choudhury, A., Cole, S. M., Soejima, K., Pita, C., Santos, A., McDougall, C., Petrics, H., & Porter, M. (2017). Promoting gender equity and equality through the Small-Scale Fisheries Guidelines: Experiences from multiple case studies. In S. Jentoft, R. Chuenpagdee, M. J. Barragán-Paladines, & N. Franz (Eds.), *The Small-Scale Fisheries Guidelines: Global implementation* (Vol. 14, pp. 737–759). Springer. https://doi.org/10.1007/978-3-319-55074-9_35
- Mahmood, S. S., Wroe, E., Fuller, A., & Leaning, J. (2017). The Rohingya people of Myanmar: Health, human rights, and identity. *The Lancet*, 389(10081), 1841–1850. [https://doi.org/10.1016/S0140-6736\(16\)00646-2](https://doi.org/10.1016/S0140-6736(16)00646-2)
- Minkler, M. (2005). Community-based research partnerships: Challenges and opportunities. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 82(2 Suppl 2), ii3–12. <https://doi.org/10.1093/jurban/jti034>
- Pedroza-Gutiérrez, C., & Hapke, H. M. (2022). Women’s work in small-scale fisheries: A framework for accounting its value. *Gender, Place & Culture*, 29(12), 1733–1750. <https://doi.org/10.1080/0966369X.2021.1997936>
- Pradhan, S. K., Nayak, P. K., & Armitage, D. (2022). A social-ecological systems perspective on dried fish value chains. *Current Research in Environmental Sustainability*, 4, 100128. <https://doi.org/10.1016/j.crsust.2022.100128>
- Prusty, S., & Sharma, A. (2023). Occupational hazards faced by inland fishers of Odisha State, India. *Journal of Agromedicine*, 28(3), 425–432. <https://doi.org/10.1080/1059924X.2023.2178572>
- Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (1996). Gender and environment: A feminist political ecology perspective. In D. Rocheleau, B. Thomas-Slayter, & E. Wangari (Eds.), *Feminist political ecology: Global issues and local experiences* (pp. 3–23). Routledge.
- Salagrama, V., & Dasu, A. (2021). *Living on the edge: Perspectives of the small-scale women fish processors of northern coastal Andhra Pradesh, India* (Working Paper No. 07; Dried Fish Matters, p. 81). The University of Manitoba / District Fishermen Youth Welfare Association.
- Turner, J. M. M. (2024). Small scale fisheries and the challenges of occupational safety and health. *Journal of Agromedicine*, 1–3. <https://doi.org/10.1080/1059924X.2024.2434074>
- Watson, A., & Till, K. E. (2010). Ethnography and participant observation. In D. DeLyser, S.

- Herbert, S. Aitken, M. Crang, & L. McDowell (Eds.), *The SAGE handbook of qualitative geography* (pp. 121–137). SAGE.
- Waylen, G. (2014). Informal institutions, institutional change, and gender equality. *Political Research Quarterly*, 67(1), 212–223. <https://doi.org/10.1177/1065912913510360>
- World Bank. (2022). Supporting women fish farmers in Bangladesh to recover from pandemic losses. *World Bank Blogs*.
<https://blogs.worldbank.org/en/endpvertyinsouthasia/supporting-women-fish-farmers-bangladesh-recover-pandemic-losses> (Accessed 25 April 2025).
- Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Sage Publications.

CHAPTER 2

Occupational Health and Hygiene Provisions for Dried Fish Processing Workers in Bangladesh

Abstract

This exploratory research adopts a feminist political ecology (FPE) lens to investigate how infrastructure and institutional governance impact the occupational health and hygiene provisions for female workers in Bangladesh's dried fish processing sector. We employ qualitative methods and an ethnographic approach, including observations and interviews, to gather empirical evidence from the dried fish processing *kholas* (yards) in Nazirartek, Cox's Bazar district. The findings reveal that female workers lack adequate access to sanitation, hygiene, and meaningful participation in *khola* governance and decision-making processes. In addition, the interviewed women persistently suffer from physical discomfort and poor sanitary and hygienic conditions, which were further exacerbated by patriarchal norms. Threats from external forces, such as climate-induced disasters or eviction by regulatory forces, further deepen the insecurity of these female workers. Given these findings, we call for a more inclusive, gender-responsive governance approach that emphasizes establishing regulatory frameworks to ensure fair wages, safe working environments, and access to health services.

Keywords: Occupational health, hygiene, gender, dried fish, governance, Bangladesh

2.1 Introduction

Small-scale fisheries account for around 40 per cent of the global fish catch and support the livelihoods of approximately 500 million people, with women comprising 40 per cent of the workforce in the aquatic value chain (Food and Agriculture Organization of the United Nations [FAO], 2024). Dried fish represents 12 per cent of global fish consumption and is an important component of the small-scale fisheries sector, as its production and consumption are critical in supporting the income and sustainability of fishing communities, as well as the nutritional and social well-being of low-income communities more generally (Belton and Thilsted, 2014; Pradhan et al., 2022). This impact is reflected in the Food and Agriculture Organization's (FAO) Voluntary

Guidelines for Securing Sustainable Small-Scale Fisheries (SSF Guidelines), which highlight fishing and dried fish processing as key drivers of poverty reduction and nutritional improvement (FAO, 2015; Pradhan et al., 2022). The significance of dried fish as a livelihood source and food-system component has garnered it increasing attention in policy discussions (FAO, 2015).

The SSF Guidelines promote a human-rights-based approach that emphasizes support for post-harvest activities and the integration of occupational health and safety into all fisheries-development efforts to ensure the well-being of those involved in this sector (FAO, 2015; Turner, 2024). Similarly, the Committee on Fisheries Declaration for Sustainable Fisheries and Aquaculture stresses the importance of equal access and opportunities for women in the fisheries sector (FAO, 2021). The declaration also identifies occupational safety and health for women in the dried fish sector, particularly in processing, as a critical concern. However, while numerous studies have examined occupational hazards faced by men in the dried fish sector (Jeebhay et al., 2004; Ngaruiya et al., 2019; Prusty & Sharma, 2023), research on the health risks faced by women remains limited (Halder et al., 2024; Salagrama & Dasu, 2021; Tripathi et al., 2017).

In Bangladesh, dried fish plays a crucial role with respect to socio-economics, culture, and nutrition, accounting for around 25 per cent of the country's total fish catch (Belton et al., 2018). Consequently, the dried fish industry is key in supporting food security, particularly for low-income households, by preserving protein-rich resources and providing an affordable source of protein and micronutrients (Belton et al., 2018). In addition to advancing food production and economic diversification, the dried fish sector also generates significant livelihood opportunities, especially in coastal and marginalized communities, employing 20 million people, including 1.4 million women in fishing, fish farming, processing, handling, and trading activities (Department of Fisheries [DoF], 2024; Hossain et al., 2015; World Bank, 2022).

Most employment in the dried fish sector is informal. In particular, fish drying predominantly depends on informal institutions and relationships within Bangladesh's fisheries sector (Hossain et al., 2015). Fish-drying operations, locally known as *khola*, generally do not adhere to existing formal regulations (Hossain et al., 2013) and often lack basic physical infrastructure, such as adequate or functional toilets and hygiene facilities, thus creating a challenging environment for workers (Hossain et al., 2015). Furthermore, workers involved in dried fish processing receive little-to-no institutional or organizational support, with few government regulations having been established to protect their rights or improve their working

conditions (Hossain et al., 2015). Indeed, labour laws and policies in Bangladesh primarily relate to more formal employment, leaving informal workers without any clear institutional protections. While Bangladesh's National Occupational Safety and Health (OSH) Policy, 2013, applies to both formal and informal sectors, its implementation remains inconsistent, especially in informal workplaces such as in *kholas* (Department of Inspection for Factories and Establishments [DIFE], 2021). In Bangladesh, many dried fish processing sites are set up on *Khas* (government-owned) land without formal tenure (Hossain et al., 2013). This insecurity leaves workers vulnerable to eviction by authorities or displacement by commercial developments like tourism, often resulting in job losses (Hossain et al., 2013).

There are also concerns relating to environmental issues, inadequate water facilities, drainage problems, and poor sanitary and hygienic conditions, which all negatively impact the well-being of workers. Women must contend with particularly harsh working conditions and long hours, as issues relating to their health and safety remain unaddressed (Salagrama & Dasu, 2021). Thus, a more detailed evaluation of the health conditions faced by workers in dried fish processing is essential to addressing occupational health issues (Hossain et al., 2015).

Despite the significant role and inherent challenges of the dried fish economy, it remains a sector that has been largely overlooked by researchers and policymakers (Belton et al., 2022). Fisheries research typically focuses on fish and fishing activities, while land-based processes such as drying and trading, in which women play a major role, receive far less attention (Weeratunge et al., 2010). Embedded in the fisheries science and economics literature is the underlying assumption that fish-harvesting activities are more valuable than post-harvest activities, which leads to the latter often being overlooked or undervalued (Pedroza-Gutiérrez & Hapke, 2022). Notably, women in this sector face marginalization due to a lack of basic amenities and community support, as well as significant threats to their health and safety due to Bangladesh's patriarchal social structure, traditional beliefs, cultural barriers, and social and gender norms (Belton et al., 2018; Sultana, 2011).

Given these gaps in the literature, we examine gendered occupational health and hygiene provisions for workers in Bangladesh's *kholas*. This study has three main objectives: i) to examine occupational health and hygiene provisions relating to physical infrastructure in dried fish *kholas*; ii) to assess the mechanisms of institutional governance and the role of female workers in *khola* management decision making; and iii) to examine the impact of external shocks, such as climate-

induced atmospheric hazards (e.g., cyclones) or regulatory eviction, on workers. We contend that the neglect of women's health needs and their exclusion from workplace governance are not isolated issues; rather, they reflect broader structural inequalities shaped by gendered divisions of labour, patriarchal norms, and weak institutional accountability in the informal fisheries sector.

The remainder of this article is divided into five sections. In the next section, we outline the conceptual framework that will guide the research, followed by a brief overview of the legal framework concerning dried fish processing sector in Bangladesh. Next, we discuss the methods and procedures used for data collection, along with a description of the study area. We then present our findings relating to the dried fish sector in Nazirartek and analyze them from a gendered perspective, with a focus on physical infrastructure and institutional governance. Finally, we conclude by considering the implications of our findings in relation to the existing literature.

2.2 Conceptual Considerations

This research utilized the theoretical framework of feminist political ecology (FPE). FPE critically examines the role of women and marginalized groups in environmental issues and emphasizes the distinct environmental challenges often encountered by these groups due to their social, cultural, and economic positions (Rocheleau et al., 1996). This approach therefore draws upon women's knowledge and the gendered division of labour in understanding environmental changes. The framework underscores the importance of local knowledge, particularly that of women, in environmental management and policy making. Furthermore, FPE focuses not only on politics and power at various levels, but it also emphasizes gendered power relations and gender inequality (Elmhirst, 2015). Given its focus on women's relationships with nature, FPE is especially interested in addressing health issues, particularly women's health (Sultana, 2011).

From a FPE perspective, patriarchy is central to understanding how male domination operates within gendered divisions of labor, environmental practices, and access to resources (Rocheleau et al., 1996). Patriarchy is a “system of social structures and practices in which men dominate, oppress and exploit women” (Walby, 1990, p. 20). According to Kalabamu (2006), patriarchy is a system of gendered power relations in which men exercise authority over women by regulating their labour, reproduction, and sexuality, while also shaping women's social position, entitlements, and rights within society. Hartmann (1979) conceptualizes patriarchy as a system of social relationships among men. Although hierarchical, these relationships create

interdependence and solidarity, enabling men to collectively maintain dominance over women. This dominance extends into environmental and occupational spheres, where men's control over women's labor is reinforced through their restricting access to productive resources, limiting decision-making power, and regulating women's bodily and reproductive autonomy.

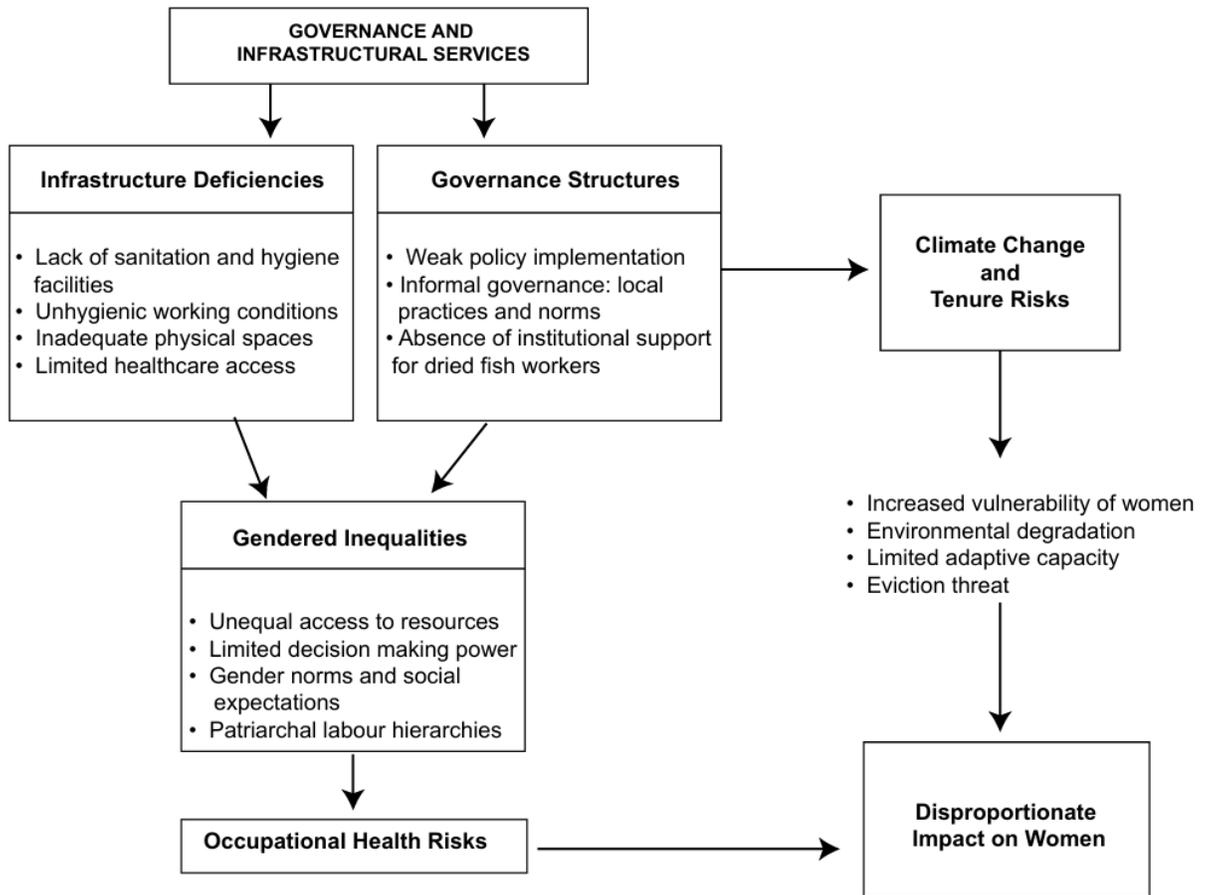
Patriarchy may further be understood as a comprehensive 'gender system' that consists of both explicit rules and implicit social expectations (Walby, 1990; Kalabamu, 2006). These norms, whether formally codified in laws and policies or informally embedded in everyday practices, regulate the relative positions of women and men in society. Within this system, women's roles are often constrained, while men are accorded distinct privileges and authority. Such arrangements extend across multiple spheres of life, determining power relations and responsibilities within families and households, shaping opportunities and constraints in the labour market and production systems, influencing access and representation in political institutions, and defining cultural expectations and practices. In this way, patriarchy operates as a pervasive structure that governs not only women's status but also legitimizes men's dominance across social, economic, and political domains (Kalabamu, 2006).

Our research draws on Walby's (1990) model of patriarchy to explain women's positions within informal work environments. Patriarchy is operationalized in this thesis research as a multi-dimensional system of structured gender inequality, manifested through social, cultural, and occupational practices in which men dominate and control women's labour, infrastructure, and decision-making. Women's exclusion from workplace governance, restricted access to resources, and limited scope to meet basic health and sanitation needs demonstrate how patriarchal norms are embedded in both social and occupational structures, shaping their everyday experiences of inequality, vulnerability, and marginalization.

Adequate physical infrastructure is crucial to the dried fish processing sector, as it creates a safe work environment, minimizes health risks, and ensures product quality. FPE highlights how poor infrastructure, particularly in relation to sanitation, disproportionately affects women, as they often bear the responsibility for family health and hygiene. In dried fish processing, the lack of adequate sanitation and safe workspaces exacerbates this vulnerability (Salagrama & Dasu, 2021). FPE posits that these physical spaces are often designed with 'men in mind'—that is, with little consideration of female workers' specific needs and vulnerabilities—thereby reinforcing gendered inequalities (Rocheleau et al., 1996).

Economic or social constraints may also create barriers preventing workers in dried fish processing, particularly women, from accessing medical care. FPE considers the social reproduction, care work, and reproductive work that women perform in addition to their paid employment, as these responsibilities often limit women’s ability to advocate for or take action to address the discriminatory working conditions (Figure 2.1).

Figure 2.1. *Conceptual Framework of the Study*



Source: Authors’ design

Figure 2.1 illustrates how weak governance, inadequate infrastructure, and informal norms contribute to gendered inequalities that, in turn, amplify occupational health risks. These vulnerabilities are further compounded by climate change and tenure insecurity, including eviction threats, which collectively impact women disproportionately. This disparity highlights the urgent

need for inclusive and gender-sensitive governance interventions in the dried fish sector.

Effective governance is crucial for enforcing safety standards, safeguarding workers' rights, reducing health risks, and promoting a safer working environment. Jentoft and Chuenpagdee (2009: 554) argue that governance is 'the outcome of a social process', which highlights the importance of understanding local contexts when attempting to capture the complexities of governance. Similarly, Johnson (2006) views governance as an ongoing process that promotes collaboration and dialogue among stakeholders, requiring public and private efforts to address societal issues, create opportunities, and uphold guiding principles within institutional frameworks. Governance also involves formal rules (e.g., policies), informal norms, and local arrangements, which all impact fishing livelihoods (Galappaththi et al., 2022; Kooiman et al., 2005).

In traditional fishing communities, local beliefs and socio-cultural norms significantly shape fishers' social and economic well-being, for example, by constraining economic mobility, limiting skill development, and restricting participation in governance processes. These negative impacts are particularly prominent for women (Immanuel et al., 2008), which further illustrates the importance of governance approaches that account for local complexities and decision-making dynamics. Interactive governance theory links governing systems and resource users through a shared platform that facilitates collaborative fisheries management while accounting for local social and cultural contexts (Jentoft & Chuenpagdee, 2009; Johnson, 2010). Incorporating FPE into interactive governance reveals how Bangladesh's patriarchal norms position men as decision makers and women in domestic, subordinate roles.

The institutional context comprises formal elements, such as laws, policies, and regulations, and informal components, including norms, traditions, and customary rights, as well as the market systems, local procedures, and social networks that shape governance dynamics (Galappaththi et al., 2022). In the dried fish processing sector, these institutional structures often fail to support workers, particularly women, leaving them vulnerable to exploitation and poor working conditions. FPE is critical of such governance failures on the grounds that they neglect social and environmental justice. Similarly, informal governance structures frequently restrict women's participation by predetermining the types of roles they can hold and limiting their access to resources and decision-making (Waylen, 2014). As illustrated in Figure 2.1, the institutional and environmental contexts in Nazirartek reinforce gendered marginalization and increase

women’s exposure to health risks.

FPE offers an approach for assessing how climate change and environmental risks exacerbate existing occupational health inequalities among dried fish processing workers. Women are disproportionately affected by such risks, as they are often more reliant on natural resources for their livelihoods and typically have fewer assets to help adapt to environmental changes (Desai & Zhang, 2021). In the dried fish sector, women’s limited access to adaptive technologies, alternative livelihoods, and institutional support heightens their vulnerability to environmental degradation, erratic weather patterns, and frequent disasters. Furthermore, FPE underscores how patriarchal power structures limit women’s ability to respond to these challenges by restricting their participation in decision making and reducing their access to infrastructure and policy support.

2.3 Regulatory Framework Governing the Dried Fish Sector in Bangladesh

Workers in Bangladesh’s dried fish sector face significant challenges in accessing legal protections, similar to those in other informal sectors. Although the Bangladesh Labour Act (2006) and its amendments (2013, 2018, 2022) include pro-labour measures, such as those supporting trade unions and preventing workplace harassment, their enforcement remains weak (DIFE, 2021). The National Labour Policy (2013) mandates safe workplaces, maternity protection, and minimum wages, but these safeguards rarely extend to informal workers (DIFE, 2021). The National Occupational Safety and Health (OSH) Policy (2013) covers both formal and informal sectors and mandates amenities like clean water and separate toilets for female workers; however, implementation is inconsistent, particularly in informal workplaces like dried fish processing *kholas*. Table 2.1 outlines key labour laws and policies in Bangladesh, with emphasis on their provisions and gaps in protecting informal workers, particularly in the dried fish sector.

Table 2.1. *Labour Laws and Policies for Informal Workers in Bangladesh*

Policy/Act	Key Provisions	Gaps/Challenges for Informal Workers (Dried Fish Sector)
Bangladesh Labour	- Occupational safety, health	- Does not specifically address

Act (2006) and Amendments (2013, 2018, 2022)	standards, and compensation in the formal sector. - 2022 amendment supports trade unions and prevents workplace harassment.	informal workers like dried fish processors. - Enforcement of protections remains weak.
National Labour Policy (2013)	- Ensures safe, healthy workplaces and maternity protection (Article 19). - Promotes non-discrimination and fair labour practices. - Provides a framework for setting minimum wages (DIFE, 2021).	- Informal workers lack access to minimum wages, regulated hours, and health protections. - Dried fish workers remain excluded from these legal protections.
National Occupational Safety and Health (OSH) Policy (2013)	- Applies to both formal and informal sectors. - Aims to reduce workplace accidents, injuries, and diseases. - Mandates clean drinking water, safe spaces, and separate toilets for female workers (DIFE, 2021).	- Although dried fish processing is not explicitly mentioned in the National OSH Policy (2013), it is covered under provisions for the informal sector. - Enforcement is weak, and many sites like Nazirartek lack basic sanitation and safety measures, thus increasing health risks, particularly for women.

Source: Authors' compilation

In addition to gaps in formal regulation, informal institutions strongly shape how the dried fish sector operates. Local associations, market intermediaries, and community leaders often control access to work, negotiate wages, and settle disputes. These influential actors typically rely on customary practices and local understandings rather than formal legal standards (Belton et al., 2018). Such informal systems often lack accountability and reinforce gender inequalities, with women's work often being viewed as secondary, thereby resulting in lower pay and limited roles in decision making (Galappaththi et al., 2022). These exclusions also heighten women's exposure

to unsafe and unhealthy working conditions, further increasing their vulnerability to occupational health risks.

2.4 Methods

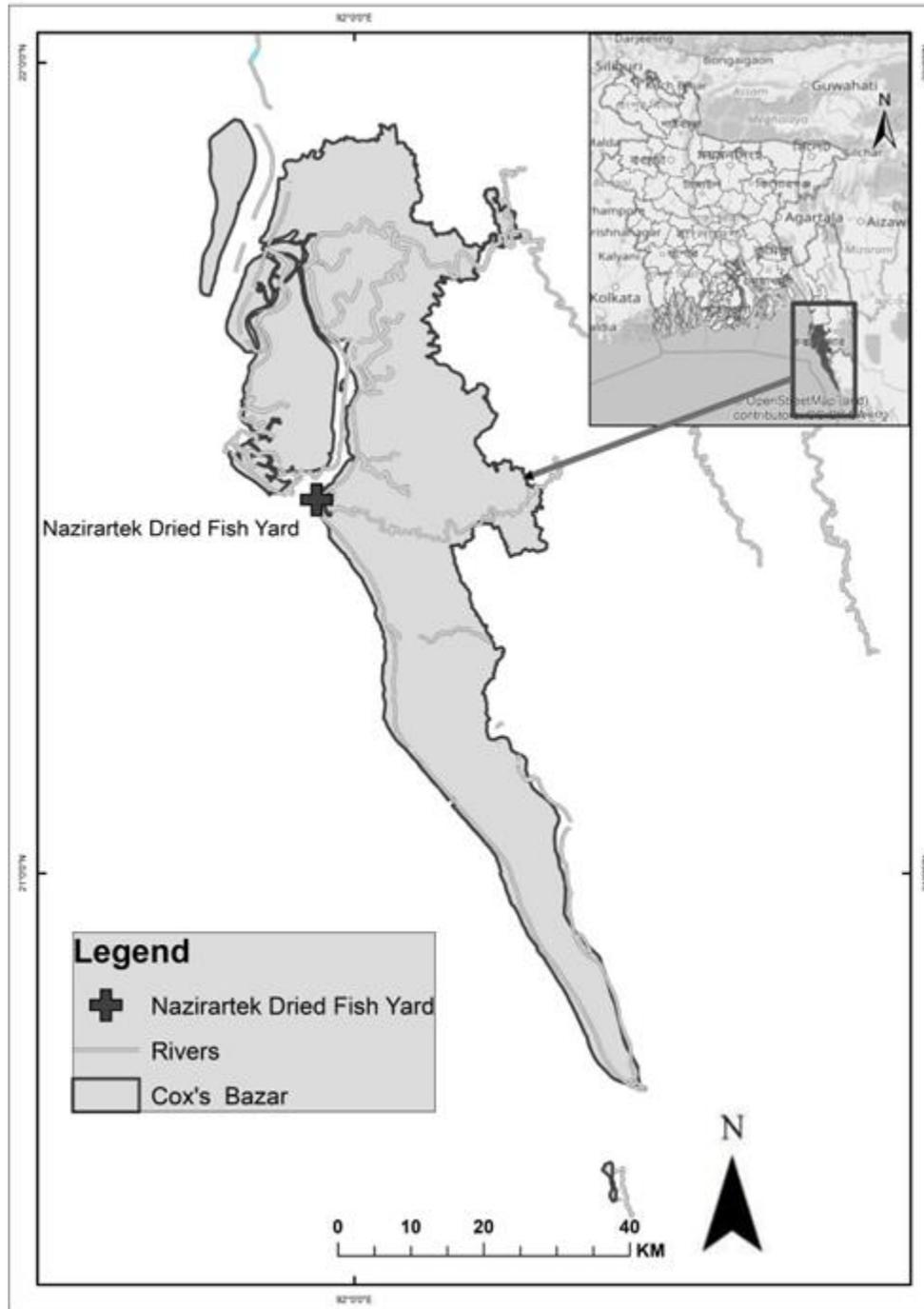
2.4.1 Study Area

The present study was conducted in Nazirartek, a village located 7 kilometres from Cox's Bazar District in Ward No. 1 of Bangladesh's Cox's Bazar Municipality (Hossain et al., 2015). This area is best known for its extensive artisanal marine landing and commercial fish-drying activities. Established in 1991 on government-owned land adjacent to the Bhakkhali River, the dried fish processing operations at Nazirartek now encompass an area of about 130 acres. (Hossain et al., 2015; Hossain et al., 2022). Currently, the Nazirartek fish-drying centre is home to approximately 7,000 households, with most having one or two members engaged in fish-drying activities (in total, around 12,000 residents are involved in fish drying at this *khola*); (Hossain et al., 2022). Notably, the region has experienced a significant demographic shift over the past decade due to the influx of displaced Rohingya migrants from neighboring Myanmar. As Rohingya people are not legally permitted to work in Bangladesh and face limited income-generating opportunities in the resettlement camps, many seek informal employment in nearby urban and coastal labour markets, including the dried fish sector in Cox's Bazar (Mahmood et al., 2017).

Approximately 50 per cent of women working in Nazirartek's dried fish sector come from marginalized groups, including Rohingya migrants (Belton et al., 2018). Bengali women working in Nazirartek are often landless seasonal migrants from rural parts of Cox's Bazar District or other economically deprived regions, with approximately one-third being widowed, abandoned, or divorced (Belton et al., 2018; Hossain et al., 2015). These groups generally live in extreme poverty, which further exacerbates their vulnerability and marginalization (Galappaththi et al., 2021).

The precarious living and working conditions of the local and migrant communities are further intensified by recurring natural disasters. For instance, in October 2023, Cyclone Hamoon caused widespread devastation across Cox's Bazar, affecting over 470,000 people, including nearly 2,500 Rohingya. The cyclone damaged more than 30,000 households and led to the temporary displacement of over 40,000 individuals (International Rescue Committee, 2023). Such climate-related events continue to disrupt livelihoods and worsen the socio-economic insecurities faced by those dependent on the dried fish economy.

Figure 2.2. Map of Nazirartek Dried Fish Khola (dried fish yard)



Source: Google Maps

2.4.2 Research Design

We employed an ethnographic research design to gain in-depth insight into the worldviews, labour conditions, and socio-cultural practices of the dried fish processors in our study area. Ethnography entails observing and analyzing the behaviours, language, and actions of a cultural group within their natural environment over time (Creswell, 2014). To operationalize the FPE framework, we adopted a feminist ethnographic approach that focuses on lived experience, power dynamics, and material conditions (Elmhirst, 2015). We applied four qualitative methods—participant observation, open-ended interviews, key informant interviews, and oral history—to explore how intersecting factors such as gender, class, and ethnicity shape women’s labour and occupational health in this sector.

The participants were observed in the *kholas* and public spaces to get a sense of the daily routines, informal practices, and lack of basic infrastructure that disproportionately affect female workers. Interviews with workers, supervisors, community leaders, and officials revealed perceptions of health risks, workplace conditions, and gaps in institutional governance. Women’s long-term engagement was captured via oral histories, which highlighted intergenerational labour patterns and persistent inequalities, especially for marginalized groups like pregnant or Rohingya women. These methods collectively anchored the FPE framework in real-life experiences, revealing the intricate connections between gendered labour, environmental conditions, power relations, and social marginalization.

2.4.3 Data Collection Procedures

To understand the occupational health and hygiene provisions in the dried fish sector, we applied a qualitative method that focused on participant observation. We spent November 2023 to March 2024 in the processing *kholas* and nearby communal spaces, observing daily routines and engaging with workers informally in settings such as shops, homes, and roadside tea stalls. This close engagement offered valuable insights into gendered labour divisions and the informal rules shaping workplace practices.

Applying an intersectional lens, we conducted 30 open-ended interviews and 20 key informant interviews to capture diverse perspectives. Our respondents included Bengali and Rohingya female workers, pregnant workers, adolescent girls, supervisors, traders, association leaders, women activists, health professionals, non-governmental organization (NGO) staff, and

local government representatives (Table 2.2) to illuminate the complex ways in which gender, ethnicity, age, and occupational role influence experiences in this sector.

Table 2.2. *Distribution of Respondents by Participatory Rural Appraisal (PRA) Tools and Occupational Background*

Tool/Instrument	Number of Participants	Participants
Open-Ended Interviews	30	Bengali women fish processors (10) Rohingya women fish processors (5) Pregnant women (2) Adolescent girls (3) <i>Majhi</i> (women supervisors) (5) Male supervisors (5)
Key Informant Interviews (KII)	20	Dried fish traders/ <i>khola</i> owners (4) Dried fish association leaders (2) Women leaders and activists (4) Government officials (2) Local NGO (4) Health professionals (2) Local government institute representatives (2)
Oral History	6	Bengali women fish processor (2) Rohingya women fish processor (2) Pregnant women (2)

Source: Field data, 2023–2024

The open-ended oral history conversations yielded nuanced perspectives and rich contextual insights. The informal format encouraged participants to speak freely, which often elicited deeper reflections compared to formal interviews. We fostered trust and openness by engaging in casual dialogue during breaks, while observing work, or in shared spaces such as tea stalls and homes. These conversations typically began with general work-related topics before gradually probing deeper issues, such as health risks, gender roles, and menstrual challenges. We

intentionally included often-overlooked voices, such as older workers and young pregnant women, whose diverse experiences highlighted the intersecting barriers to health and well-being in the workplace.

To ensure the reliability and validity of our findings, we triangulated data by cross-checking information across interviews, observations, and oral histories. For example, if a worker mentioned the absence of protective equipment, the statement was verified through direct observation in the field. Throughout this process, we critically reflected on our own assumptions and positionality to avoid unintentionally privileging certain narratives. This triangulated and reflexive approach strengthened the credibility and depth of our analysis. Primary data were collected with consent using an audio recorder and then transcribed for analysis.

The research conducted was approved by the University of Manitoba (Canada) Joint Research Ethics Committee (Protocol # HE2023-0261). All data were collected by implementing the University of Manitoba research protocols.

2.4.4 Data Analysis

We followed Forman et al.'s (2008) four stages of qualitative data analysis: examining primary data, coding, thematic sorting, and identifying relationships among themes. We generated primary and sub-themes based on the interview transcripts, our field notes, and our observations. Key themes included physical infrastructure, gender roles, and governance mechanisms related to occupational health. These themes were then contextualized within the broader framework of feminist political ecology, paying particular attention to patriarchal and other structural inequalities, gendered labour dynamics, and health concerns. To complement and verify our findings, we also analyzed secondary data from official sources to triangulate information on legal entitlements, existing laws, and policies governing the dried fish sector.

2.5 Results

In this section, we explore the gendered vulnerabilities and lived experiences of workers in Nazirartek's *kholas*, with a focus on the intersections between working conditions, infrastructure, and governance. First, we examine the informal work arrangements underpinning the gendered division of labour within the *kholas*. Second, we consider the state of physical infrastructure, emphasizing how inadequate facilities impact the occupational health and hygiene

of female workers. Third, we evaluate institutional governance mechanisms, underscoring the frequent exclusion of women from decision-making processes. Finally, we synthesize these elements to show how weak governance, combined with external shocks such as cyclones and the threat of relocation, exacerbates health risks and entrenches structural insecurity among workers, particularly female workers.

2.5.1 Gendered Working Modalities in Nazirartek Dried Fish Sector

Nazirartek emerged as a major dried fish production site following the 1991 cyclone, which displaced communities from nearby islands such as Kutubdia, Moheshkhali, and Sandwip. Many of the people displaced by the cyclone settled on this public land and gradually forged livelihoods around fish drying. Although the land is publicly owned, *kholas* operators often treat it as inherited property, with claims being passed down through generations.

Fish drying in Nazirartek is highly seasonal, peaking from October to March, with Bombay duck, ribbonfish, and shrimp being among the most common species. The sector operates informally, with limited infrastructure and oversight. The approximately 1,000 *kholas* operating in the area are classified as either small or large based on their credit access, infrastructure, and workforce size. Small *kholas*—roughly 70 per cent of the total—employ 4 to 10 workers, operate with minimal financial resources, and participate actively in local fish markets and trade. Large *kholas*, which are managed by cooperatives or individual traders and employ between 10 and 30 workers, have comparatively better access to resources. Cooperatives pool resources to manage larger operations, coordinate markets, bulk-purchase raw fish, and oversee processing and distribution. Individual traders act as entrepreneurs. These individuals are able to invest in infrastructure and labour to sustain operations and negotiate better prices due to more stable access to capital and market connections.

The workplace structure in the *kholas* reflects persistent gender disparities. Men generally own and manage the businesses and are employed as full-time seasonal workers. Their employment is more stable, with higher pay and access to additional benefits. In contrast, women are excluded from ownership and decision-making roles. They are employed as day labourers and are primarily responsible for tasks such as sorting, washing, binding, and drying the fish (see Table 3.2). Women often work from sunrise to sunset with only a half-hour lunch break, earning around 350 Bangladeshi Taka (BDT) (US\$3) per day, or roughly half the pay of their male counterparts.

Moreover, they face poor working conditions, wage discrimination, and limited access to breaks or sanitation, further underscoring broader structural inequalities and the undervaluation of their work in the sector (see Section 3.4.1).

2.5.2 Physical Infrastructure in Nazirartek's Dried Fish Processing Kholas

In Nazirartek, physical infrastructure related to occupational health and hygiene is inadequate, particularly in terms of access to sanitation facilities, shaded rest areas, protective equipment, and healthcare services. The lack of functional toilets is an especially concerning issue, as is the tendency for employers to discourage workers from using those toilets that are available due to concerns regarding time management of workers and the cleanliness of toilet facilities. Significantly, male workers are often granted access to the available toilets, while female workers are generally prohibited from using them. This practice reflects the deeply embedded patriarchal nature of workplace governance, where women's bodily needs are ignored and access to basic facilities is mediated through gendered power relations. The restriction of women's access to sanitation reinforces their subordinated position in the workplace and augments health vulnerabilities that are normalized in the informal economy. Moreover, toilets that are in better condition are often kept locked, further restricting access for women (Figure 2.4 (a)).

In addition, social and cultural expectations further silence women from voicing these concerns about workplace conditions and occupational health and safety, particularly about issues of accessing toilets and maintaining personal hygiene. Through our interviews, we were informed that many women were hesitant to talk about toilets or menstruation, considering that such discussions are immodest or disrespectful in the Bangladeshi cultural context. In this way, management practices and gendered cultural norms converge to discipline women's bodies, embedding occupational health risks within patriarchal structures of control. This unequal arrangement is experienced in women's daily struggles, as they attempt to cope with these conditions by avoiding urination, restricting water intake, or waiting until lunch breaks to relieve themselves. These embodied challenges are intensified by social and cultural norms that discourage women from requesting improvements or voicing their needs, leaving them to navigate sanitation issues largely on their own.

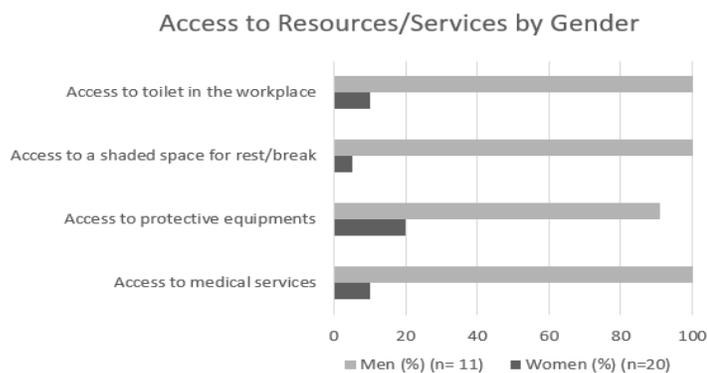
We acknowledge that our analysis is not exhaustive, rather still remains exploratory, as women's exclusion from sanitation facilities cannot be explained by workplace patriarchal rules

alone. Broader structural factors, such as land tenure arrangements, infrastructure planning, and the politics of development assistance, also shape the distribution and negotiation regarding accessing sanitation in Nazirartek¹. These overlapping dynamics intersect with patriarchal workplace norms to normalize women’s exclusion, leaving them with little or no space to negotiate their basic bodily needs.

Women’s limited access to workplace resources reflects a consistent gender gap, which is highlighted in Figure 2.3. The most significant gap relates to access to toilets in the workplace: while all the interviewed men had access to toilets, only 10 percent of women reported having access to a functional toilet in their workplace. This limited access hinders women’s ability to manage basic hygiene, particularly during menstruation or pregnancy. Around 95 per cent of women reported reducing their water intake during shifts to reduce their need to urinate, further underscoring the daily discomfort and health risks they face.

Similarly, all male participants reported having access to shaded spaces for rest or breaks compared to only 5 per cent of women. Each *khola* has a shaded room designated for storing fresh or dried fish. While 90 per cent of the interviewed owners claim this room is available for workers to rest, women workers said they are never allowed to rest during work hours, not even when they need to breastfeed. Instead, the owners primarily use the room for storing fish and for their own rest (Figure 2.4 (b)).

Figure 2.3. *Access to Resources and Services by Gender in Nazirartek Khola*



Source: Field data, 2023–2024

¹ These insights draw on the forthcoming PhD research of Sami Farook within the *Dried Fish Matters* project.

These unspoken norms reflect broader gendered power dynamics in the workplace wherein men can enjoy greater physical comfort and autonomy, while women are expected to remain constantly engaged in work, regardless of fatigue or personal needs. One woman worker shared, We are completely prohibited from using the shaded room, even in situations where we urgently need to sit down or breastfeed our babies. If we try to enter or even suggest using the room, the owners often shout at us and threaten to fire us. This space, intended for our use, is instead kept for storing fish or for the owners to take breaks, while we are left to ‘manage’ without any basic support.

Figure 2.4. *Physical Infrastructure in the Nazirartek Khola*



Note. (a) Functional toilets in the *khola*; (b) Shaded areas occupied by men—supervisor, and owner.

Source: Field data, 2023–2024. *Photo credit:* Safina Naznin

Female workers face acute challenges during menstruation, as they must stand for long hours without access to toilets or scheduled breaks. Around 85 per cent of women use old cloth to manage their periods, while only about 15 per cent use sanitary napkins, which require changing every 3 to 4 hours, especially during heavy flow. Without access to a private space or adequate sanitation facilities, they are unable to change these materials during their shifts. This not only causes discomfort and increases the risk of infection, but it also deepens their sense of shame and exclusion. Moreover, the working environment reinforces implicit misogyny and patriarchal control, as menstruation is generally stigmatized as impure and a threat to productivity. Social norms discourage open discussion of menstruation, which causes many women to internalize a

sense of shame regarding it. Despite experiencing physical discomfort and significant challenges, female workers often remain silent, as menstruation is a culturally sensitive, taboo, and deeply private issue. As one woman shared, ‘If the owner finds out we are on our period, they do not allow us to work. So, we just keep quiet and manage however we can’. These informal rules reflect entrenched gender norms that devalue women’s bodily needs and reinforce their marginalization in the workplace.

In Nazirartek, a clear gender disparity exists in the use of protective equipment. While 91 per cent of men reported having access to gear such as gloves, only 20 per cent of women reported similarly. This disparity may be due to women often being assigned tasks like binding together fish carcasses, which requires precision and delicate handling, making gloves impractical. Additionally, due to their economic situation, many women cannot afford to purchase gloves when needed. As a result, they work barehanded, directly exposed to salt, chemicals, and sharp fish bones and scales (Figure 2.5 (a)). In contrast, men typically engage in sorting, transporting, and drying, where protective gear is more commonly used (Figure 2.5 (b)). This gap in access to safety equipment puts women at greater risk of injury and long-term health issues in already unhygienic and physically demanding conditions.

Figure 2.5. *Gendered Division of Labour and Use of Gloves in the Khola*



Note. (a) A woman performing delicate tasks, like binding fish barehanded; (b) Men sorting fish, often with access to protective gear.

Source: Field data, 2023–2024. *Photo credit:* Safina Naznin

Sharp inequality was observed regarding access to medical services in the *khola*, with all men reporting access to healthcare compared to only 10 per cent of women. Medical services in this context refer to both formal and informal care, including access to local community clinics, mobile health workers, and first aid for minor injuries such as cuts, burns, and infections, common in fish processing work. This finding highlights one of the most critical challenges faced by female workers: the need to balance their long hours of physically demanding paid labor in the *khola* with their substantial unpaid domestic responsibilities, such as household chores and childcare. These overlapping roles severely constrain their ability to leave work for medical appointments, especially during working hours when wage deductions or job loss are potential risks. Financial barriers exacerbate this issue, as women typically earn less and have fewer resources to cover medical and transportation costs. Additionally, the absence of nearby healthcare facilities disproportionately affects female workers. These barriers increase the risk of injuries going untreated, especially given the repetitive and physically demanding nature of these women's work.

2.5.3 Institutional Governance Mechanisms in Nazirartek Kholas

Nazirartek's fish-drying operations exist as informal institutions and relationships, outside formal regulations. As noted above, Bangladesh's labour laws primarily focus on the formal sector, leaving informal workers unprotected. Although the National Occupational Safety and Health (OSH) Policy, 2013, applies to the formal and informal sectors, its implementation has been inconsistent, especially in informal workplaces like fish-drying *kholas*. Thus, these operations tend to ignore the legal frameworks and official guidelines intended to regulate their activities.

In Nazirartek, informal governance is deeply rooted in traditional customs, local power dynamics, and social networks, all of which influence decision-making, resource allocation, and conflict resolution. The system is underpinned by a deeply embedded patriarchal social structure characterized by male-dominated leadership, strict gender role divisions, and a cultural preference for male authority in public and economic spaces. This patriarchy is maintained through socio-cultural norms and male-controlled associations that collectively marginalize women from decision-making roles.

For the purpose of this study, informal governance is understood as the localized set of practices, rules, and decision-making processes shaped by social hierarchies, customs, and

networks rather than formal legal frameworks. Traditional customs, such as the practice of male *khola* owners or male supervisors allocating work, managing shared facilities, and directing daily labour without women's input, reinforce men's authority and women's subordinate roles. Local power dynamics, including the influence of community leaders, supervisors, and informal authorities who control access to resources and decision-making, further consolidate male dominance and limit women's agency. In Nazirartek, these practices operate through patriarchal norms and male leadership to regulate access to resources and mediate conflicts, systematically limiting women's participation and leadership in both economic and social spheres.

Socio-cultural norms, such as the expectation that women should prioritize household responsibilities over public engagement, taboos around discussing sanitation, menstruation, or other health-related issues, and the belief that men should hold authority in economic decision-making, reinforce such exclusion of women and maintain the gendered hierarchy within the community.

Khola owners, supervisors, and local leaders often act as key enforcers, excluding women from leadership forums or negotiations within the *khola*. As a result, despite their central role in dried fish production, women are typically confined to low-status tasks and exploited through low wages, unsafe working conditions, and lack of basic infrastructure (see Section 3.4.1). Women's limited economic power and weaker social networks reduce their capacity to challenge exclusion or workplace conditions, making it difficult for them to influence governance processes or advocate for their rights effectively.

One key feature of informal labour relations in Nazirartek is the *Majhi* system, which functions as a crucial organizational mechanism in dried fish processing. Under this system, a woman worker (the *Majhi*) is informally contracted to coordinate a group of 10 to 12 women who work together to process large volumes of raw fish. Approximately 60 percent of women workers in the *khola* are involved in this system, which is typically activated only when there is an abundant supply of raw fish that requires immediate processing. During such times, women work continuously for around 15–16 hours—from midnight until evening—with only brief breaks. The system improves coordination and slightly raises daily wages to around 600–650 Bangladeshi Taka (US\$5–5.5), with the amount shared equally among all the women in the group, not just the *Majhi*. However, this wage remains inadequate given the long, exhausting hours and extreme working conditions.

Despite offering some social recognition to the *Majhis*, the role comes without additional financial incentives or formal authority. *Majhis* lack bargaining power and cannot negotiate better wages or working conditions for their groups. Although the system provides a rare instance of women organizing labour, it operates within a rigidly patriarchal structure in which male owners retain control over all business operations and exclude women from decision-making. As such, the leadership roles of women within the *Majhi* system are largely symbolic, reflecting the structural limitations of informal labour governance in the sector that restricts women's agency. While the *Majhi* system may offer some practical advantages—such as work coordination, temporary income boosts, and peer support—it does not fundamentally shift the balance of power or address broader issues of gendered exploitation.

This gendered exclusion is echoed in formalized structures like the Nazirartek Fish Business Association, which features an executive committee consisting of nine male *khola* owners. While female workers are aware of its existence, they are systematically excluded from its operations. The association governs price-setting and business improvement, but has taken no steps to improve worker welfare. *Khola* owners, as well as association leaders focus on maximizing profits by minimizing costs like wages, infrastructure, and safety measures. This prioritizes their interests over their workers' well-being, leading to poor working conditions and unaddressed occupational risks. Thus, female workers face ongoing exploitation and unsafe workplaces. One committee member acknowledged that, although better facilities could help workers, tight profit margins were a barrier to pursuing this end:

We acknowledge that better facilities would benefit the women workers, but our profit margins are tight, especially given the current low level of production. We depend on government or NGO support for such improvements, as it is difficult to bear these costs on our own. Investing heavily in infrastructure now could further strain our profitability.

The municipality's role in local governance further illustrates this imbalance. Each year, Cox's Bazar municipality awards tax collection bids, which are unofficially managed by ruling political parties. These parties set fixed rates that all businesses must pay. While this system secures municipal revenue, it fails to address workplace safety or labour rights. One revenue team member confirmed the narrow focus: 'We are only responsible for collecting revenues; it is not our priority to look after the working environment. Although we discourage child labour, the working conditions are far better now, especially with improved road communication, which has boosted

business'. This statement illustrates how governance efforts prioritize revenue and infrastructure while neglecting the welfare of workers, particularly women.

Several local NGOs have stepped in to fill these institutional gaps and deliver critical services. Organizations such as COAST Foundation, Social Development Foundation (SDF), Dushtha Shasthya Kendra (DSK), People's Oriented Program Implementation (POPI), and Mukti Cox's Bazar contribute through programs that focus on: hygienic fish drying; public toilets; household-level water, sanitation, and hygiene; microcredit; education; and informal school infrastructure development, respectively. Despite their positive impacts on infrastructure development and capacity-building initiatives, these NGO initiatives often fail to reach women workers directly. Male employers control access to training and tend to prioritize men, viewing women mainly as labourers rather than stakeholders, which reinforces gender hierarchies and limits women's development opportunities. One of the female workers noted that:

The training program is intended for workers like us who are directly involved in dried fish processing. But instead, the owners go there for their personal interest. They bring along women who are not involved in this work, just to avoid taking us away from our jobs. They do not want to risk slowing down production, even if it means we miss the chance to learn skills that could improve our work.

2.5.4 Governance Challenges and Health Vulnerability

Located near the Bay of Bengal, Nazirartek faces persistent exposure to climate-induced hazards such as cyclones and floods, which significantly increase the vulnerability of workers in the fish processing sector. Data from the Cyclone Landfall Catalogue reveals that at least 30 cyclones have impacted Cox's Bazar over the past 50 years (Fakhruddin et al., 2022), repeatedly damaging critical infrastructure, including drying platforms, water points, and sanitation facilities. Our interviews with *khola* owners, local leaders, and workers highlighted two major governance challenges: the frequent disasters that damage critical physical infrastructure and the uncertainty surrounding a proposed relocation due to development projects. These issues are amplified by limited government support, weak disaster response, and inadequate infrastructure planning, which all hinder recovery efforts and compromise the health and safety of workers, particularly women. Women's safety is especially compromised due to the destruction of sanitation facilities, making it challenging to manage menstrual hygiene or maintain privacy during and after disasters.

The collapse of workspaces forces many to operate in unsafe, exposed, or flooded environments, often without clean water or rest areas, increasing the risk of injury, illness, and exploitation. The lack of private, safe sanitation spaces increases health risks for women and makes it more difficult for them to manage their daily work routines with dignity. These governance shortcomings are central to our research, as they illustrate how institutional weaknesses contribute to poor workplace environments and obstruct efforts to ensure the health, hygiene, and safety of workers.

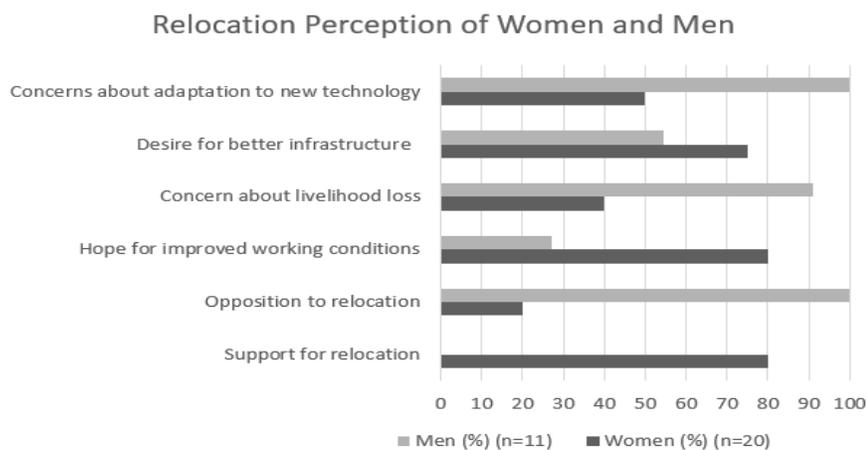
Limited government support in the aftermath of disasters is evident through the inadequate and delayed distribution of relief, which disproportionately affects women working in Nazirartek's *kholas*. The interviews revealed that government aid is often controlled by politically influential individuals, with female workers frequently being excluded from receiving assistance. One woman lamented that, 'Relief always goes to those who are close to the local leaders. We never receive anything—no food, no materials—because we are poor and have no connections with the powerful men'.

Although some NGOs provide recovery support, their efforts are fragmented and primarily target households rather than workplaces. This piecemeal approach to disaster relief became evident after Cyclone Mocha in 2023, when key facilities like toilets in the *kholas* remained unrepaired for months. This slow response disrupted daily operations and directly impacted workers' well-being, especially women, who require adequate sanitation due to menstruation, pregnancy, and other gender-specific health needs. The prolonged absence of these facilities intensified women's vulnerability, exposing them to health risks, indignity, and unsafe working conditions in the aftermath of climate shocks. As one female worker noted, 'We continued working after the cyclone, even when there was no proper toilet in the *khola*. During our period, we suffered in silence because there was nowhere to go'. These everyday challenges are intensified by the collapse of basic services following each disaster, exposing women to greater physical and psychological strain and reinforcing gendered health inequalities in the workplace. Women are usually constrained by restricted access to toilets, inadequate sanitation facilities in the *khola*, and the lack of privacy, which forces them to navigate daily hygiene under difficult and undignified conditions. When disasters such as cyclones disrupt basic services, the lack of accessible facilities becomes even more critical, exposing women to heightened health risks, indignity, and unsafe conditions. Damaged or out-of-operational sanitation facilities following disasters further restrict women from relieving themselves without compromising their safety or privacy. During and after

disasters, socio-cultural norms and safety concerns compel them to use damaged or unhygienic toilets, while men can go anywhere (e.g. open field) as needed. These restrictions compromise women’s ability to meet their biological needs related to menstruation, pregnancy, and urinary health, undermining their dignity and well-being.

Nazirartek’s inhabitants face the threat of eviction due to the expansion of the Cox’s Bazar Airport and the air force base, which adds another layer of insecurity. Interviews with *khola* owners and workers revealed that they have received no direct communication from government authorities or local institutions regarding the relocation process. Most people learned about the proposed relocation informally, through hearsay, rather than official channels. KIIs also revealed that even those involved in local governance could not provide clear details about how many people will be relocated or what compensation will be provided. Notably, there has been no stakeholder consultation that includes female workers, leaving them excluded from discussions and planning that directly affect their lives. This lack of a transparent, participatory, and well-communicated relocation strategy has deepened the community’s uncertainty and vulnerability, illustrating how informal governance, patriarchal norms, and limited institutional accountability intersect to shape lived experiences of risk. The threat of relocation without a clear, inclusive plan further discourages investment in necessary services, thereby perpetuating unsafe and unsanitary working conditions for workers and, especially, women.

Figure 2.6. *Perception of Relocation by Gender in Nazirartek Khola*



Source: Field data, 2023–2024

Despite this impending threat, the female workers maintained a positive outlook, with 80 percent suggesting that relocating to Khurushkul (one of the largest rehabilitation projects for climate-displaced communities, located approximately three kilometers from Cox's Bazar town) might ultimately lead to better workplace conditions (Figure 2.6). In Nazirartek, where most fish processing takes place in open, sun-exposed spaces, women spend long hours bending, cutting, and spreading fish with little to no protective measures. Prolonged exposure to intense heat not only accelerates fatigue but also increases physical strain, making their demanding work even more exhausting. For them, the idea of relocation carried the hope of shaded workspaces that could mitigate these risks. Although they received very limited information, women viewed the prospect of sun-shade as a possible step toward better working conditions, where basic needs like sun protection might be addressed. Their expectations suggest that, even amid uncertainty and marginalization, relocation is seen not only as a disruption but also as a potential opportunity for a safer and more supportive work environment. Conversely, male workers were strongly opposed to the move, primarily due to concerns about job security and adapting to new technology (Figure 2.6).

2.6 Discussion

The findings of this exploratory research illustrate how the poor and precarious occupational health and hygiene conditions faced by female workers in Nazirartek's fish-drying *kholas* are shaped by gender norms and governance failures. The interviewed women's access to resources and decision-making power was limited by systemic barriers and deeply entrenched patriarchal structures. As a result, these women were confined to roles that were low-paid, labour-intensive, and insecure, in addition to being disproportionately affected by inadequate sanitation, unhygienic workspaces, and a lack of legal protections. These structural inequalities increased the female workers' health, economic, and social vulnerabilities, thus perpetuating a cycle of marginalization and reinforcing their unequal status in the sector. The discussion of these findings is organized into three key themes: patriarchal governance, limited institutional support and regulatory gaps, and gendered impacts of climate change and displacement.

2.6.1 Patriarchal Governance and Gendered Inequality

The dried fisheries sector in Nazirartek is characterized by a patriarchal governance framework that systematically excludes women from attaining productive roles and participating in decision-making processes. Governance structures remain overwhelmingly dominated by men due to deeply ingrained socio-cultural norms that position them as the primary decision makers. Traditional beliefs about gender assign men authority over economic activities and community leadership, while women are relegated to unpaid or low-status labour. For instance, even the wives or daughters of *khola* owners are rarely seen in supervisory roles; instead, they are often confined to domestic responsibilities or informal support tasks within the family business. These gendered norms reinforce the idea that leadership and decision-making are inherently male domains, leaving women with little or no opportunity to challenge existing power structures. Economic discrimination appears in the persistent gender wage gap, whereby women receive lower pay than men for comparable work, thus reinforcing their subordinate economic status and limiting their influence within the sector. In terms of time, effort, and responsibility, women's work is comparable to men's work here. For example, both women and men carry fish manually, although men sometimes have the assistance of non-motorized vehicles for heavier loads. Women's work, however, often requires specialized skills and sustained dedication, such as carefully binding fish or sorting them with precision. These tasks demand attention and skillfulness. Despite these comparable demands, women's contributions are undervalued, highlighting structural inequalities within the sector. It is important to note that the term 'comparable' here is used analytically to highlight these disparities, rather than implying a universal consensus on challenges in the tasks.

Structurally, men dominate local institutions and *khola* management committees in Nazirartek, where women are excluded from formal leadership and decision-making roles. Our fieldwork revealed that *khola* operations are managed by male owners and supervisors, who have control over infrastructure planning, recruitment, and wage negotiations. This male dominance perpetuates women's confinement to undervalued, labour-intensive tasks such as sorting, drying, and cleaning fish, and limits their ability to influence workplace improvements or access resources. This gendered division of labour aligns with what Pedroza-Gutiérrez and Hapke (2022) describe as the systemic devaluation of "women's work", which is viewed as supplementary or informal rather than skilled and economically valuable. In Nazirartek, patriarchal norms and entrenched gender roles reinforce this inequality by positioning women as passive labourers rather than agents

of change, thereby restricting their participation in governance and formal recognition of their labour contributions. Women's exclusion is also reflected in the lack of infrastructure designed to meet their gender-specific occupational health needs—such as access to toilets, shaded rest areas, or menstrual hygiene supports—which further reinforces their vulnerability. This mirrors findings from other small-scale fisheries contexts, such as those in Lake Malawi, where Torell et al. (2021) observed that women were similarly restricted to subordinate roles and excluded from access to resources and leadership. These parallels underscore how patriarchal norms systematically marginalize women across geographies by devaluing their labour and denying them a voice in governance structures.

From an FPE perspective, the governance of the Nazirartek *khola* reveals deep-rooted gendered inequalities. Patriarchal systems restrict women's access to resources and shape social boundaries regarding what is acceptable for them to express in public. The absence of functional toilets is not just a matter of poor infrastructure—it is an expression of socio-cultural norms that discourage women from speaking openly about sanitation or hygiene, especially in male-dominated workspaces. During our interviews, many women expressed hesitation or discomfort about discussing toilet access or menstrual hygiene. They reported that asking for improvements in sanitation or toilet facilities would be considered '*sharamer kotha*' (shameful talk) and might be interpreted as immodest or disrespectful. This mirrors Sultana's (2009) findings, which indicate that women in rural Bangladesh often internalize cultural expectations of modesty and silence around bodily needs, particularly in public or male-dominated settings. Aswathy and Kalpana (2018) expand on the implications of this silence and suppression, noting that workplace policies that ignore women's biology reinforce their marginalization and harm their health and productivity. Patriarchal norms prevent women from voicing urgent issues, such as the need for menstrual hygiene facilities, which reflects systemic neglect that is rooted in governance that disregards women's specific needs as workers.

2.6.2 Limited Institutional Support and Regulatory Gaps

The institutional governance and regulatory gaps in the dried fish processing sector revealed entrenched power dynamics that intersect with gender, class, and labour hierarchies. Poor women, who occupy the lowest-paid and most labour-intensive positions, are especially vulnerable. This class-based marginalization enables greater surplus extraction from their work,

as their contributions are undervalued and treated as informal or supplementary. In Bangladesh, the informal sector, which employs 84.9 per cent of the workforce, including 96.6 per cent of employed women (BBS, 2023), remains beyond the reach of formal labour laws. This lack of institutional regulation disproportionately impacts women in dried fish processing, as it enables their continued exposure to hazardous conditions, wage exploitation, and exclusion from legal protections. Without formal contracts or legal protections, female workers remain vulnerable to patriarchal systems that undervalue their work and limit their access to resources and rights.

As noted by Hossain et al. (2013), Salagrama and Dasu (2021), and Belton et al. (2022), the dried fish sector's invisibility reinforces its marginal status in national development planning. This lack of recognition is compounded for women by patriarchal norms that deepen their vulnerability. For example, the failure to implement the National Occupational Safety and Health (OSH) Policy, 2013, has left women without institutional recourse to address unsafe working environments. Similarly, Tripathi et al. (2017) identify a global pattern wherein women in informal work endure unsafe conditions due to weak policy enforcement. Such governance failures, amplified by the remoteness and informality of small-scale fisheries, are evident in Nazirartek, where state oversight is nearly absent (Turner, 2024). FPE posits that this neglect is a reflection of patriarchal governance systems that marginalize women's work and well-being in both policy and practice.

NGO interventions in Nazirartek have introduced sanitation and hygiene initiatives; however, these efforts predominantly focus on the household level, such as promoting latrine use, access to safe water, and hygiene education within the home. While these are important, they fail to address the pressing needs of women in the workplace, where they spend long hours in unhygienic and unsafe conditions. As a result, the structural inequalities that contribute to women's marginalization—such as lack of access to workplace sanitation, inadequate rest areas, and exclusion from health and safety planning—remain unchallenged. These gaps limit the effectiveness of NGO programs in improving women's occupational health and reinforcing their rights as workers. Even in workplaces with sanitary latrines, patriarchal norms and *khola*-level power hierarchies often restrict women's access, forcing them to endure unsafe and undignified conditions. Salagrama and Dasu (2021) documented similar shortcomings in dried fish processing sites in India, where NGO efforts often overlook the institutional roots of women's exclusion.

These inequities are further reinforced by the exclusion of women from decision-making processes and their lack of bargaining power within the workplace. Women in Bangladesh's dried

fish sector work without formal contracts, which limits their ability to negotiate better wages or conditions (Hossain et al., 2015). Attempts to organize or demand rights are often met with threats of dismissal, discouraging collective action and reinforcing systemic exploitation and economic vulnerability (Hensman, 2001).

The lack of institutional recognition for informal sector workers reflects broader patterns of systemic exclusion. For instance, fisheries legislation often limits women's participation due to gender bias and the absence of concrete measures to effectively address gender issues (Galappaththi, 2022). In Nazirartek, the failure to integrate women's voices and needs into institutional frameworks perpetuates cycles of vulnerability and undermines the foundations for equitable and sustainable livelihoods.

2.6.3 Gendered Impacts of Climate Change and Displacement

In Nazirartek, women's health and safety are disproportionately compromised in post-disaster contexts, not only due to infrastructure damage, but also because of systemic marginalization rooted in patriarchal governance. Coastal communities in Bangladesh remain particularly vulnerable to climate change, with small-scale fishers facing unique and often amplified forms of vulnerability (Deb & Haque, 2016). In the FPE approach, environmental vulnerabilities are understood not merely as the outcomes of ecological exposure, but also as circumstances that are deeply shaped by socio-political structures and power relations. The evidence collected during our fieldwork shows that, after cyclones, sanitation facilities in *kholas* often remain unrepaired for extended periods, directly depriving women of private, hygienic spaces. Similarly, Chanda Shimi et al. (2010) reported that floods created significant public health risks by rendering about two-thirds of tube wells and all toilets unusable. The lack of institutional responsiveness to these gender-specific needs reflects a broader governance failure. FPE draws attention to how decision-making structures often exclude women, reinforcing their limited access to resources and adaptation mechanisms (Rocheleau et al., 1996). In Nazirartek, post-disaster recovery plans seldom address women's occupational health concerns, as female workers are largely excluded from consultation processes. Consequently, environmental disruptions reinforce existing socio-economic vulnerabilities for women instead of prompting meaningful institutional change.

The planned relocation of workers in Nazirartek revealed a gendered divergence in how the community perceives displacement. While male *kholas* owners expressed pessimism over potential disruptions to business and new operating environments, many female workers were cautiously optimistic. This hope was rooted in the possibility of improved working conditions, particularly greater access to shaded areas and better sanitation, which have long been absent in the existing *kholas*. However, this optimism does not necessarily arise from informed participation; rather, it reflects how women's experiences of environmental and governance changes are shaped by structural inequalities in access to resources, knowledge, and decision making (Elmhirst, 2011).

These structural inequalities are prominent in Nazirartek, as women remain excluded from stakeholder consultations, which is a form of institutional neglect that reinforces their limited access to critical information about the relocation process. Hence, the female workers' hopeful outlook is not the product of informed participation; rather, it is a reflection of their marginalized position in the current system and their desire for any improvement to their working conditions. FPE scholars argue that gendered power imbalances often leave women with little to lose in terms of capital, but much to gain in dignity, safety, and health, particularly in informal sectors with poor working conditions and minimal oversight (Rocheleau et al., 1996; Sultana, 2011). Similar patterns have been observed in other contexts, wherein displaced women anticipate better infrastructure and services, despite the risks of marginalization from planning that is not inclusive (Sahoo & Mishra, 2016; Sultana 2009). Without inclusive, gender-responsive governance, relocation may reinforce existing vulnerabilities. Collectively, the above-discussed findings emphasize the urgent need for a gender-sensitive and inclusive governance framework that ensures equitable outcomes for all affected groups.

2.7 Conclusion

This study examined the gendered dimensions of occupational health and institutional governance affecting women working in the dried fish processing *kholas* of Nazirartek, Cox's Bazar district, Bangladesh. By and large, the women working in this sector were confined to the most undervalued and insecure roles, with little-to-no protection from occupational health risks. The absence of regulatory oversight and formal recognition not only reflects weak governance, but it also reinforces patriarchal systems that marginalize women's voices and exclude them from

decision making. Applying an FPE approach, this exclusion can be understood as being structurally embedded within governance arrangements that overlook women's embodied labour and their specific health and hygiene needs. Consequently, female workers face vulnerability due to exploitative workplace conditions and external shocks (e.g., cyclones and forced evictions), thus perpetuating cycles of insecurity.

A multifaceted approach rooted in the principles of FPE is required to address the entrenched gender inequities in Nazirartek's dried fish sector. This approach should recognize the interlinked nature of structural inequalities, environmental governance, and the gendered experiences of work and health. To this end, we assert four key policy recommendations:

First, regulatory frameworks should formally recognize informal workers and include targeted provisions for occupational safety, fair wages, and gender-responsive infrastructure, especially sanitation facilities that accommodate women's bodily and reproductive needs within the *kholas*.

Second, given the absence of contracts and the constant threat of job loss, labour protections should be monitored through participatory, community-based mechanisms that ensure women's representation and reduce fear of retaliation.

Third, service providers such as local institutions, public agencies, and NGOs should adopt an integrated approach to delivering essential services, such as sanitation, health care, and labour protections, within the dried fish sector. These interventions should promote gender equity by creating safe spaces for women to voice their needs and participate in decision-making.

Additionally, targeted subsidies or financial incentives should be introduced to support *khola* owners in upgrading workplace infrastructure—particularly sanitation, shaded spaces, and first-aid health facilities—in line with gender-equitable standards. By compensating initial costs, such measures would help align economic incentives with social responsibility, making it more viable for employers to adopt inclusive practices.

Finally, efforts to raise awareness and expand rights education are crucial for empowering women to challenge patriarchal norms, understand their entitlements, and participate more effectively in governance and *khola*-level institutions. By embedding gender-responsive measures into both regulatory frameworks and everyday governance practice, these strategies will collectively create a foundation for a more just, inclusive, and sustainable small-scale fisheries sector in Bangladesh.

References

- Aswathy, P., & Kalpana, K. (2018). Women's work, survival strategies, and capitalist modernization in South Indian small-scale fisheries: The case of Kerala. *Gender, Technology and Development*, 22(3), 205–221.
<https://doi.org/10.1080/09718524.2019.1576096>
- Belton, B., Johnson, D. S., Thrift, E., Olsen, J., Hossain, M. A. R., & Thilsted, S. H. (2022). Dried fish at the intersection of food science, economy, and culture: A global survey. *Fish and Fisheries*, 23(4), 941–962. <https://doi.org/10.1111/faf.12664>
- Belton, B., Hossain, M. A. R., & Thilsted, S. H. (2018). Labour, identity, and wellbeing in Bangladesh's dried fish value chains. In D. S. Johnson, T. G. Acott, N. Stacey, & J. Urquhart (Eds.), *Social wellbeing and the values of small-scale fisheries* (pp. 217–241). Springer International Publishing. https://doi.org/10.1007/978-3-319-60750-4_10
- Belton, B., & Thilsted, S. H. (2014). Fisheries in transition: Food and nutrition security implications for the global South. *Global Food Security*, 3(1), 59–66.
<https://doi.org/10.1016/j.gfs.2013.10.001>
- Bangladesh Bureau of Statistics. (2023). *Labour force survey 2022*. Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh.
https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2023-10-25-07-38-4304abd7a3f3d8799fcb59ff91007b1.pdf
- Chanda Shimi, A., Ara Parvin, G., Biswas, C., & Shaw, R. (2010). Impact and adaptation to flood: A focus on water supply, sanitation and health problems of rural community in Bangladesh. *Disaster Prevention and Management*, 19(3), 298–313.
<https://doi.org/10.1108/09653561011052484>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.
- Deb, A. K., & Haque, C. E. (2016). Livelihood diversification as a climate change coping strategy adopted by small-scale fishers of Bangladesh. In W. Leal Filho, H. Musa, G. Cavan, P. O'Hare, & J. Seixas (Eds.), *Climate change adaptation, resilience and hazards* (pp. 345–368). Springer International Publishing. https://doi.org/10.1007/978-3-319-39880-8_21
- Department of Fisheries. (2024). *National Fish Week compendium* (p. 160) [In Bengali].

- Ministry of Fisheries and Livestock, Dhaka, Bangladesh.
- Department of Inspection for Factories and Establishments. (2021). *National profile on occupational safety and health in Bangladesh 2019*. Ministry of Labour and Employment. https://www.ilo.org/dhaka/Whatwedo/Publications/WCMS_819727/lang--en/index.htm
- Desai, Z., & Zhang, Y. (2021). Climate change and women's health: A scoping review. *GeoHealth*, 5(9), Article e2021GH000386. <https://doi.org/10.1029/2021GH000386>
- Elmhirst, R. (2015). Feminist political ecology. In T. Perreault, G. Bridge, & J. McCarthy (Eds.), *The Routledge handbook of political ecology* (pp. 519–530). Routledge.
- Fakhruddin, B., Kintada, K., & Hassan, Q. (2022). Understanding hazards: Probabilistic cyclone modelling for disaster risk to the Eastern Coast in Bangladesh. *Progress in Disaster Science*, 13, Article 100216. <https://doi.org/10.1016/j.pdisas.2022.100216>
- Food and Agriculture Organization of the United Nations. (2015). *Voluntary guidelines for securing sustainable small-scale fisheries in the context of food security and poverty eradication*. <https://openknowledge.fao.org/handle/20.500.14283/i4356en>
- Food and Agriculture Organization of the United Nations. (2021). *2021 COFI Declaration for sustainable fisheries and aquaculture*. <https://doi.org/10.4060/cb3767en>
- Food and Agriculture Organization of the United Nations. (2024). *The state of world fisheries and aquaculture 2024 – Blue transformation in action*. <https://doi.org/10.4060/cd0683en>
- Forman, J., Creswell, J. W., Damschroder, L., Kowalski, C. P., & Krein, S. L. (2008). Qualitative research methods: Key features and insights gained from use in infection prevention research. *American Journal of Infection Control*, 36(10), 764–771. <https://doi.org/10.1016/j.ajic.2008.03.010>
- Galappaththi, M., Collins, A. M., Armitage, D., & Nayak, P. K. (2021). Linking social well-being and intersectionality to understand gender relations in dried fish value chains. *Maritime Studies*, 20(4), 355–370. <https://doi.org/10.1007/s40152-021-00232-3>
- Galappaththi, M., Armitage, D., & Collins, A. (2022). Women's experiences in influencing and shaping small-scale fisheries governance. *Fish and Fisheries*, 23. <https://doi.org/10.1111/faf.12672>
- Halder, C. E., Das, P. P., Rahman, S. M. T., Bhoumick, L. C., Tassdik, H., Hasan, M. A., & Mithun, S. N. (2024). Occupational hazards and risks among the women in fisher

- communities in Cox's Bazar and Chattogram, Bangladesh. *PLOS ONE*, 19(7), e0297400.
<https://doi.org/10.1371/journal.pone.0297400>
- Hensman, R. (2001). Organizing against the odds: Women in India's informal sector. *Socialist Register*, 37. Available at: <https://socialistregister.com/index.php/srv/article/view/5764>
- Hossain, M., Belton, B., & Thilsted, S. (2013). *Preliminary rapid appraisal of dried fish value chains in Bangladesh*. WorldFish.
- Hossain, M., Belton, B., & Thilsted, S. (2015). *Dried fish value chain in Bangladesh*. WorldFish.
<https://doi.org/10.13140/RG.2.2.24362.77762>
- Hossain, M. A. R., Sultana, M. T., Ferdous, S., Alam, M. S., Akhtar, R., Rahman, M. S., Shahjahan, M., & Sumon, M. H. (2022). *Key locations: Dry fish processing and trading in Bangladesh* (Working Paper 10; Dried Fish Matters). The University of Manitoba; Bangladesh Agricultural University; Jahangirnagar University.
- Hartmann, H. I. (1979). The unhappy marriage of Marxism and feminism: Towards a more progressive union. *Capital & Class*, 3(2), 1–33.
<https://doi.org/10.1177/030981687900800102>
- Immanuel, S., Narayanakumar, R., & Ayyappan, S. (2008). Sustainable alternate livelihood avocations for coastal women in India. *Agricultural Situation in India*, 65(2), Article 2.
- International Rescue Committee. (2023). *Cyclone Hamoon ravages Cox's Bazar: Severe cyclonic storm affecting over 450,000 lives and damaging 13 IRC learning centers*. ReliefWeb. <https://reliefweb.int/report/bangladesh/bangladesh-cyclone-hamoon-ravages-coxs-bazar-severe-cyclonic-storm-affecting-over-450000-lives-and-damaging-13-irc-learning-centres> (Accessed January 30, 2025).
- Jeebhay, M., Robins, T. G., & Lopata, A. (2004). World at work: Fish processing workers. *Occupational and Environmental Medicine*, 61, 471–474.
- Jentoft, S., & Chuenpagdee, R. (2009). Fisheries and coastal governance as a wicked problem. *Marine Policy*, 33(4), 553–560. <https://doi.org/10.1016/j.marpol.2008.12.002>
- Johnson, D. S. (2006). Category, narrative, and value in the governance of small-scale fisheries. *Marine Policy*, 30(6), 747–756. <https://doi.org/10.1016/j.marpol.2006.01.002>
- Johnson, D. S. (2010). Institutional adaptation as a governability problem in fisheries: Patron–client relations in the Junagadh fishery, India. *Fish and Fisheries*, 11(3), 264–277.
<https://doi.org/10.1111/j.1467-2979.2010.00376.x>

- Kooiman, J., Bavinck, M., Jentoft, S., & Pullin, R. (Eds.). (2005). *Fish for life: Interactive governance for fisheries* (MARE Publication Series, No. 3). Amsterdam University Press. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-316403>
- Kalabamu, F. (2006). Patriarchy and women's land rights in Botswana. *Land Use Policy*, 23(3), 237–246. <https://doi.org/10.1016/j.landusepol.2004.11.001>
- Mahmood, S. S., Wroe, E., Fuller, A., & Leaning, J. (2017). The Rohingya people of Myanmar: Health, human rights, and identity. *The Lancet*, 389(10081), 1841–1850. [https://doi.org/10.1016/S0140-6736\(16\)00646-2](https://doi.org/10.1016/S0140-6736(16)00646-2)
- Ngaruiya, F. W., Ogendi, G. M., & Mokuu, M. A. (2019). Occupational health risks and hazards among the fisherfolk in Kampi Samaki, Lake Baringo, Kenya. *Environmental Health Insights*, 13, Article 1178630219881463. <https://doi.org/10.1177/1178630219881463>
- Pedroza-Gutiérrez, C., & Hapke, H. M. (2022). Women's work in small-scale fisheries: A framework for accounting its value. *Gender, Place & Culture*, 29(12), 1733–1750. <https://doi.org/10.1080/0966369X.2021.1997936>
- Pradhan, S. K., Nayak, P. K., & Armitage, D. (2022). A social-ecological systems perspective on dried fish value chains. *Current Research in Environmental Sustainability*, 4, Article 100128. <https://doi.org/10.1016/j.crsust.2022.100128>
- Prusty, S., & Sharma, A. (2023). Occupational hazards faced by inland fishers of Odisha State, India. *Journal of Agromedicine*, 28(3), 425–432. <https://doi.org/10.1080/1059924X.2023.2178572>
- Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (1996). Gender and environment: A feminist political ecology perspective. In D. Rocheleau, B. Thomas-Slayter, & E. Wangari (Eds.), *Feminist political ecology: Global issues and local experiences* (pp. 3–23). Routledge.
- Salagrama, V., & Dasu, A. (2021). *Living on the edge: Perspectives of the small-scale women fish processors of northern coastal Andhra Pradesh, India* (Working Paper No. 07; Dried Fish Matters, p. 81). The University of Manitoba / District Fishermen Youth Welfare Association.
- Sultana, F. (2009). Fluid lives: Subjectivities, gender and water in rural Bangladesh. *Gender, Place & Culture*, 16(4), 427–444. <https://doi.org/10.1080/09663690903003942>

- Sultana, F. (2011). Suffering for water, suffering from water: Emotional geographies of resource access, control, and conflict. *Geoforum*, 42(2), 163–172.
<https://doi.org/10.1016/j.geoforum.2010.12.002>
- Sahoo, D., & Mishra, N. (2016). Development-induced displacement and gender injustice: Some critical reflections. *Journal of Politics and Governance*, 5(4), 19–30.
<https://doi.org/10.5958/2456-8023.2016.00002.4>
- Torell, E., Manyungwa-Pasani, C., Bilecki, D., Gumulira, I., & Yiwombe, G. (2021). Assessing and Advancing Gender Equity in Lake Malawi’s Small-Scale Fisheries Sector. *Sustainability*, 13(23), Article 23. <https://doi.org/10.3390/su132313001>
- Tripathi, P., Kamath, R., & Tiwari, R. (2017). Occupational health and role of gender: A study in informal sector fisheries of Udupi, India. *Indian Journal of Occupational and Environmental Medicine*, 21, 45–50. https://doi.org/10.4103/ijoem.IJOEM_170_16
- Turner, J. M. M. (2024). Small scale fisheries and the challenges of occupational safety and health. *Journal of Agromedicine*, 1–3. <https://doi.org/10.1080/1059924X.2024.2434074>
- Waylen, G. (2014). Informal institutions, institutional change, and gender equality. *Political Research Quarterly*, 67(1), 212–223. <https://doi.org/10.1177/1065912913510360>
- Walby, S. (1990). *Theorizing patriarchy*. Oxford: Basil Blackwell.
- Weeratunge, N., Snyder, K. A., & Sze, C. P. (2010). Gleaner, fisher, trader, processor: Understanding gendered employment in fisheries and aquaculture. *Fish and Fisheries*, 11(4), 405–420. <https://doi.org/10.1111/j.1467-2979.2010.00368.x>
- World Bank. (2022). Supporting women fish farmers in Bangladesh to recover from pandemic losses. *World Bank Blogs*.
<https://blogs.worldbank.org/en/endpvertyinsouthasia/supporting-women-fish-farmers-bangladesh-recover-pandemic-losses> (Accessed April 25, 2025).

CHAPTER 3

Gender Roles and Occupational Health Risks for Women Working in the Dried Fish Sector in Bangladesh

Abstract

This study employs a qualitative, ethnographic approach grounded in feminist political ecology to examine how governance and existing management affect the roles, responsibilities, and health outcomes of both men and women workers in the dried fish processing sector in Nazirartek, Cox's Bazar, Bangladesh. To do so, we employ a qualitative, ethnographic approach grounded in feminist political ecology. The selected approach draws upon participant observation, interviews, and oral histories to explore intersectionality and health risks associated with the work environment. The results reveal that, while women primarily occupy low-paying, labour-intensive roles, men typically hold higher-level positions responsible for decision making, thus benefit more from better working conditions. Furthermore, the findings show that women face significant health risks due to long working hours, lack of protective equipment, and limited access to sanitation. These challenges are compounded by social taboos relating to menstruation, pregnancy, and childcare, which remain unaddressed in workplace policies. Moreover, a lack of state intervention and collective bargaining mechanisms leaves women workers especially vulnerable to exploitation and sub-optimal working conditions. The findings of this work demonstrate the urgent need for gender-responsive state policies, effective governance, and institutional support to address the intersecting vulnerabilities of women in this vital sector.

Keywords: Bangladesh; coping mechanisms; dried fish processing workers; gender; occupational health; women

3.1 Introduction

Dried fish is an important component of small-scale fisheries (SSF), as it contributes to food security and livelihoods in low-income fishing communities (Pradhan et al., 2022; Galappaththi et al., 2021). The Food and Agriculture Organization's (FAO) Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (SSF Guidelines) recognize dried fish's key role in poverty reduction and nutrition (FAO, 2015). Dried fish accounts for 12 percent of global fish consumption (Belton & Thilsted, 2014), with around 10 percent of fish harvests being processed

into dried fish using traditional, low-cost methods such as sun drying, salting, fermenting, and smoking (FAO, 2020; Galappaththi et al., 2021). Women play vital roles in the global fish economy, especially in the dried fish sector, where they make up about half the workforce and are involved across multiple stages of the value chain (Harper et al., 2017; Galappaththi et al., 2022). Despite their widespread involvement, women's contributions remain undervalued, undercompensated, and often overlooked in policies and resource management decisions (Pedroza-Gutiérrez & Hapke, 2022; Belton et al., 2018).

The SSF Guidelines emphasize the importance of integrating occupational health and safety into all fisheries-development efforts to ensure the well-being of those involved in the sector (FAO, 2015; Turner, 2024). Significantly, the SSF Guidelines also recognize gender equality and equity as fundamental principles in fisheries management (Kleiber et al., 2017; Frangoudes et al., 2019). Similarly, the 2021 Committee on Fisheries Declaration calls for improvements to women's access to the fisheries sector, including providing them with equal opportunities within it (FAO, 2021). Ensuring occupational safety and health for women in dried fish processing, particularly in field-based work, is central to these commitments. However, literature relating to this topic is limited. Whereas most existing studies focus on occupational hazards experienced by men (Prusty & Sharma, 2023; Olapade et al., 2021; Jeebhay et al., 2004), few examine the occupational risks and social vulnerabilities faced by women in dried fish value chains (Halder et al., 2024; Tripathi et al., 2017; Salagrama & Dasu, 2021).

In developing countries like Bangladesh, commercial and semi-commercial dried fish processing operations are mainly staffed by marginalized groups (Belton et al., 2022) who face social vulnerability, exploitation, and constant exposure to occupational health risks. Indeed, the dried fish sector is considered high-risk due to the many inherent physical, chemical, ergonomic, and biological hazards (Tripathi et al., 2017; Olapade et al., 2021).

Women working in Bangladesh's dried fish sector often lack access to basic sanitation and hygiene facilities in their workplaces; this not only undermines personal hygiene but it also causes humiliation and discomfort. The World Health Organization states that unsafe water, sanitation, and hygiene practices cause nearly one-tenth of the global disease burden (Campbell et al., 2015). Health disparities between men and women are influenced by biological and gender-related factors, with women being adversely affected by the physical and psychological features of their work environments (Jeebhay et al., 2004). Inadequate access to essential sanitation facilities such

as toilets, handwashing stations, sanitary napkin disposal units, and menstrual products increases the risk of reproductive health issues, including urinary tract infections (Campbell et al., 2015). Despite these challenges, data relating to occupational health in the dried fish processing sector remains scarce, leaving significant gaps in understanding the specific health risks faced by women workers. Thus, a thorough evaluation of the health conditions in dried fish processing facilities is essential to promoting safer, more equitable workplaces and reducing gender-based health disparities (Hossain et al., 2015).

Some research has applied feminist political economy or ecology to highlight that women in fishing communities have less political and economic power than their male counterparts. In addition, the fisheries science and economics literature often prioritizes fish harvesting activities, which are dominated by men, over post-harvest activities, which are typically performed by women, thus undervaluing and neglecting the toll these tasks take on women (Pedroza-Gutiérrez & Hapke, 2022). This bias extends to scholarly writing on fisheries, which has also disproportionately focused on male fishers.

Given these gaps, the present work examines occupational health and hygiene provisions for dried fish processing workers in Bangladesh, with a focus on gender impacts. To the best of our knowledge, this research is the first to study this topic in Bangladesh, especially in relation to women working in the dried fish sector. We apply intersectionality theory to analyze how multiple systems of power and oppression influence workers' roles, health outcomes, and coping mechanisms (Crenshaw, 1991). Intersectionality, rooted in US Black feminist experience, acknowledges how overlapping factors like gender, class, ethnicity, sexuality, and ability produce unique forms of discrimination and marginalization (Galappaththi et al., 2021). Understanding the intersections between these factors is crucial for addressing gender-based inequalities and social injustices in the sector.

This work seeks to achieve two main objectives:

- to map the intersectional and gender-differentiated occupational status, roles, and health risks arising from the tasks and environment relating to dried fish processing; and
- to analyze the strategies female and male workers employ to cope with emerging occupational risks and their respective efforts to protect health and rights.

In the following sections, we outline the conceptual framework that underpins the research, followed by a discussion of the selected methodological approaches and study locations. Next, we present our findings, highlighting the occupational health of women workers and the influence of gender on health impacts and coping mechanisms in the dried fish processing yards. Finally, we conclude by discussing and synthesizing the research outcomes and their broader implications.

3.2 Conceptual Considerations

This study's theoretical framework draws on *feminist political ecology* (FPE), which highlights the significance of power relations and structural inequalities, particularly those related to gender (Elmhirst, 2015). It explores how gender shapes access to, and control over, natural resources and resource-based livelihoods. In the dried fish value chain, gender intersects with other social factors, such as class, ethnicity, and age, to shape differentiated roles, vulnerabilities, and health outcomes for men and women (Galappaththi et al., 2021). FPE also considers how women, especially those from low-income households, are disproportionately affected by the ecological and economic crises created by capitalist development (Rocheleau et al., 1996). These conditions have prompted political awareness and collective mobilization among women who bear primary responsibility for securing their families' well-being and sustaining local ecosystems. These women's resistance is grounded in everyday struggles for economic survival, health, and environmental justice.

While collective action is a key theme in FPE, it is equally important to recognize more subtle forms of resistance and voice (Rocheleau et al., 1996), including how women navigate structural constraints and assert their agency in localized, culturally embedded ways. This research applies FPE methodologies to investigate women's strategies and actions to confront and mitigate these challenges, with particular emphasis on the overlapping roles of gender and culture in shaping contemporary resistance to sexist oppression at the local level.

In contemporary Western feminist theory, intersectionality serves as a key framework for understanding how multiple systems of oppression, such as gender, race, class, and sexuality, shape identities and social positions within power structures (Elmhirst, 2015). Intersectionality is central to feminist theorizing in diverse contexts, including local fisheries, as it helps explain how gender roles intersect with broader structural inequalities (Elmhirst, 2015; Galappaththi et al., 2021). Feminist research, focusing on fisheries, has increasingly applied intersectionality to

explore women's varied experiences, the unequal power dynamics they must navigate, and the root causes of gender inequality within labour and resource systems (Frangoudes et al., 2019; Kleiber et al., 2017). Such analyses highlight how patriarchal frameworks embedded in social institutions perpetuate hierarchies that privilege masculinity and marginalize femininity (Knott & Gustavsson, 2022), thereby reinforcing national and cultural norms regarding gender relations (Crenshaw, 1991).

Feminist research has shown that women's work in the dried fish value chain is often undervalued and overlooked, resulting in disproportionate burdens and a lack of attention to their specific needs (Pedroza-Gutiérrez & Hapke, 2022). These perspectives challenge conceptions of women as a homogeneous group and emphasize the interactions between gender roles and broader social, economic, and environmental factors (Ravera et al., 2016; Rohe et al., 2018). An intersectional approach highlights how age, marital status, caregiving responsibilities, displacement, and economic marginalization shape distinct vulnerabilities within the sector. FPE promotes inclusive strategies that center marginalized voices and advocate for equitable policies, better working conditions, and improved health and well-being, especially for those most affected by structural inequalities, such as wage gaps and poor hygiene provisions.

The present study builds on these feminist perspectives and examines how structural power relations and gendered norms shape occupational health and hygiene conditions in the dried fish processing sector in Nazirartek *khola* (the local term for dried fish yards), Bangladesh. In Bangladesh, women, especially those from displaced and low-income families, face disproportionate health hazards due to poor infrastructure, limited sanitation, and exclusion from decision-making. This fieldwork provides key insights into the visible inequalities and subtle ways women cope with and resist these challenges. Applying FPE, this research offers locally grounded insights that call for more inclusive policies recognizing women's roles, needs, and rights.

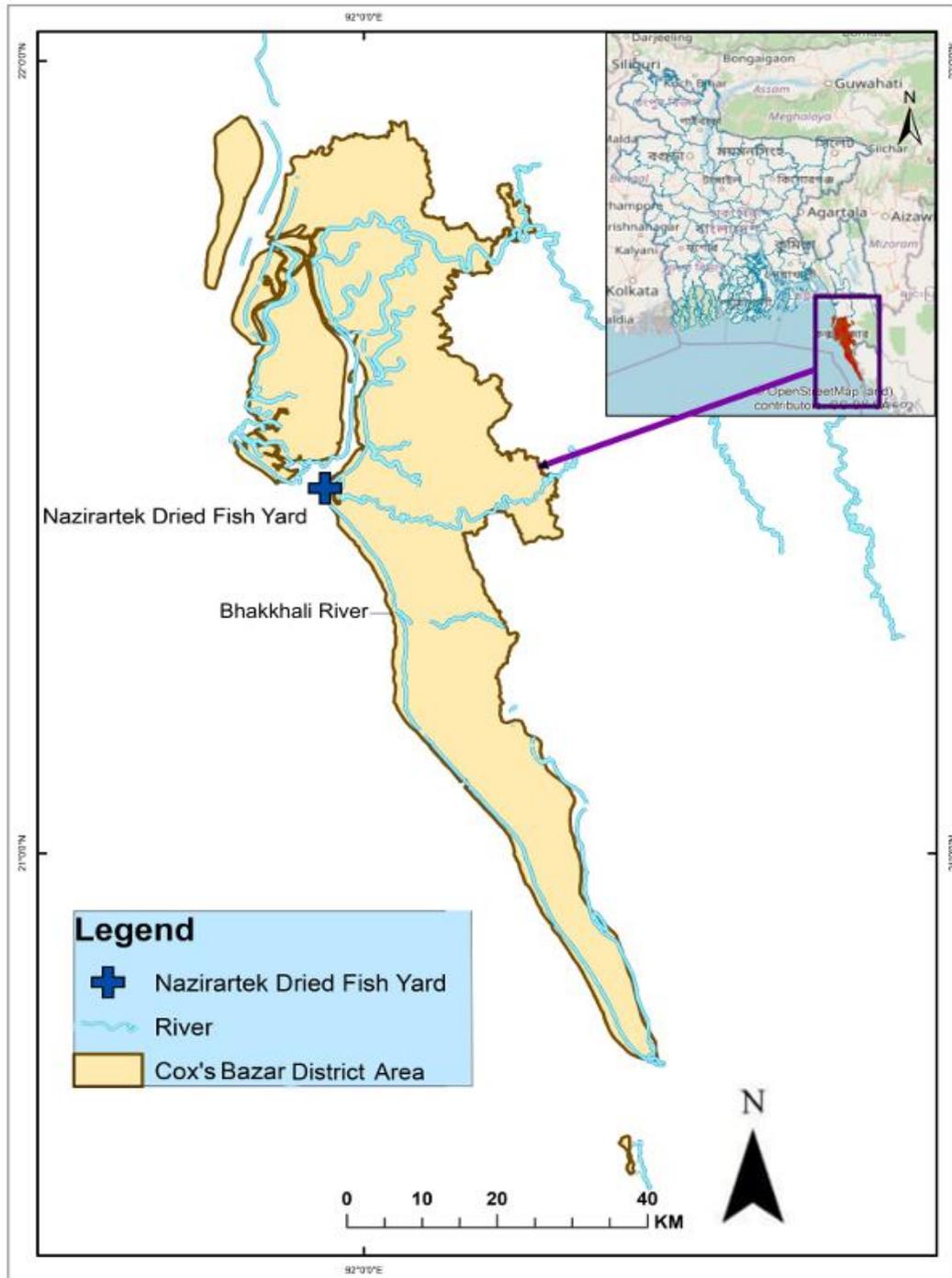
3.3 Methods

3.3.1 Study Area

This study was conducted in Nazirartek, Cox's Bazar, a location in Bangladesh prominent for its extensive artisanal marine landing and commercial fish-drying activities. Nazirartek's fish-drying site was established in 1991 on government-owned land adjacent to the Bhakkhali River (see Figure 3.1), where the dried fish processing operations encompass an area of about 130 acres

(Hossain et al., 2015; Hossain et al., 2022). The Nazirartek *khola* is home to approximately 7,000 permanent homes, with around 12,000 residents working in the fish-drying yards (Hossain et al., 2022).

Figure 3.1. Map of Nazirartek Khola (dried fish yard)



Source: Google Maps

The region has experienced a significant demographic shift, as cyclones and other climate-related disasters have severely affected local fishing communities. An influx of displaced Rohingya migrants from neighboring Myanmar has compounded the effects of these climate-related disasters. In October 2023, Cyclone Hamoon caused widespread devastation in Cox's Bazar, impacting over 470,000 people, including nearly 2,500 Rohingyas. The storm damaged over 30,000 households, displacing over 40,000 individuals temporarily (International Rescue Committee, 2023). In Bangladesh, Rohingyas are not legally permitted to work, and there are no income-generating opportunities in the resettlement camps. As a result, many Rohingya adults go outside the camps and obtain informal sector work in Cox's Bazar (Mahmood et al., 2017).

Around 50 percent of the women working in Nazirartek's *kholas* are from marginalized groups, including Rohingyas and landless seasonal migrants (Belton et al., 2018). Bengali women working in this sector are often landless seasonal migrants from Cox's Bazar and other job-scarce areas, with one-third being widowed, abandoned, or divorced (Hossain et al., 2015; Belton et al., 2018). Given Bangladesh's patriarchal social structure, the absence of male support intensifies the social and economic marginalization experienced by these women, further limiting their opportunities and security in the workforce.

3.3.2 Research Design

A qualitative ethnographic research design was employed to gain in-depth insights into the worldviews and socio-cultural practices of workers in the dried fish processing yards. Rooted in anthropology and sociology, ethnography involves observing the behaviors, language, and practices of a cultural group within its natural setting (Creswell, 2014). This approach allowed us to uncover gender-based perspectives and critically examine the structural inequalities, power dynamics, and societal norms shaping the participants' labour and health experiences. Ethnography was deemed an appropriate lens for studying Bangladeshi women workers due to its emphasis on intersubjectivity and ethically grounded knowledge creation (Watson & Till, 2010), and for its ability to facilitate a first-hand examination of behaviours and interactions between *khola* owners and workers in their home environment.

3.3.3 Data Collection Procedures

Primary data for this study were collected between November 2023 and March 2024. To understand the provision of occupational health and hygiene in Nazirartek’s dried fish processing sector, we practiced participatory observation by immersing ourselves in the daily routines of the workers. We spent time in processing yards, roadside tea stalls, and homes, engaging in informal conversations and observing interactions among workers, supervisors, and yard owners. This close involvement helped us understand gender roles, local power dynamics, and the informal structures that shaped working conditions in the study area. Furthermore, we applied a gendered lens to examine in depth the distinct challenges women face with respect to workload, health risks, and limited workplace support.

In addition to observation, we employed participatory rural appraisal (PRA) in the form of 30 open-ended interviews and 20 key informant interviews. These interviews allowed us to capture the diverse range of perspectives shaped by the intersection of gender, ethnicity, age, and occupational role, among other identity markers. Respondents included Bengali and Rohingya women, pregnant workers, adolescent girls, male and female supervisors, traders, association leaders, activists, and local officials (Table 3.1). This intersectional approach provided nuanced insights into how power relations and social positions influence workers’ vulnerabilities, access to resources, and occupational health provisions. Primary data were collected using an audio recorder, with written consent being obtained prior to each interview. Verbal consent was obtained in lieu of written consent in cases where literacy constraints precluded the latter.

Table 3.1. *Distribution of Respondents by Participatory Rural Appraisal (PRA) Tools and Occupational Background*

Tool/Instrument	Number of Participants	Participants
Open-Ended Interviews	30	Bengali women fish processors (10) Rohingya women fish processors (5) Pregnant women (2) Adolescent girls (3) <i>Majhi</i> (women supervisors) (5) Male supervisors (5)

Key Informant Interviews (KII)	20	Dry fish traders/ <i>khola</i> owners (4) Dried fish association leaders (2) Women leaders and activists (4) Government officials (2) Local NGO representatives (4) Health professionals (2) Local govt. institute representatives (2)
Oral History	6	Bengali women fish Processors (2) Rohingya women fish processors (2) Pregnant women (2)

Source: Field data, 2023–2024

Open-ended oral history conversations helped to obtain nuanced perspectives and rich contextual insights. This informal format allowed participants to speak freely, which often yielded deeper reflections compared to the formal interviews. We created an atmosphere of trust by engaging the participants in casual dialogue during their breaks, while observing them at work, or in shared spaces like tea stalls and homes. These conversations often began by discussing general work-related topics, but they gradually branched out to explore deeper issues such as health risks, gender roles, and menstrual challenges. We intentionally included often-overlooked voices, such as older workers or young pregnant women, as their diverse experiences provided valuable insights into the intersecting barriers to health and well-being in the workplace.

To ensure the validity and reliability of our findings, we triangulated the data by cross-checking information from multiple sources. We compared what the participants shared during conversations with what we observed during our field visits. For instance, if a worker mentioned a lack of protective equipment, we looked for evidence of this deficit in their work environment. This process strengthened the credibility of our analysis and ensured that participants’ narratives were grounded in observed realities.

The proposed research was reviewed and approved by the University of Manitoba Joint Research Ethics Committee (Protocol # HE2023-0261) prior to the commencement of fieldwork. All data were collected in accordance with the University of Manitoba’s research protocols.

3.3.4 Data Analysis

We followed Forman et al.'s (2008) four steps of data analysis, namely, reviewing primary data, coding, organizing content thematically, and identifying relationships among themes. We developed primary and sub-themes from the interview transcripts based on our research objectives and guiding questions. Key themes that emerged included gender roles, health impacts, and coping mechanisms related to occupational health.

In addition, we analyzed interview transcripts, field notes, and observational data to identify recurring patterns and central issues. These themes were then situated within the broader framework of FPE, allowing us to consider the influence of patriarchal structures, gendered labour dynamics, and systemic health-related challenges. This approach enabled a deeper understanding of the structural issues embedded within the dried fish sector. Additionally, we collected and triangulated secondary data from official sources to examine laws, entitlements, and extant policies associated with the sector.

3.4 Results

3.4.1 Women's and Men's Dried Fish Processing Activities

Our findings revealed a distinct gender-based division of labour in the dried fish sector. Women were mainly responsible for sorting, cutting, cleaning, binding, and hanging raw fish on racks to dry, while men typically carried the fish and placed it on higher scaffolding (see Figure 3.2.(c)). Occasionally, the men assisted the women with sorting and drying, which also enabled them to monitor the women's activities (Table 3.2). The women worked alone, in pairs, or in groups, depending on the task. In addition to their work in the *khola*, the women were solely responsible for managing all household duties before and after their shifts.

Table 3.2. Gender-differentiated Roles and Responsibilities in Nazirartek Khola

Roles/Responsibilities	Men	Women
Catching and procuring fish	Responsible for catching and/or purchasing fish from local markets or directly from fishing boats.	Not involved in catching and procurement.
Fish transportation	Responsible for transporting	Responsible for assisting in

	the fish from the landing center to the yard. Mostly done using non-motorized vehicles, but sometimes performed manually.	transportation by carrying the load manually, either in their hands or on their body.
Fish preparation	Occasionally help with sorting and cleaning the fish. Such participation allows them to monitor women coworkers.	Responsible for the primary tasks of sorting, gutting, cleaning, binding, and preparing fish for drying.
Drying process	Responsible for setting up drying racks and managing the drying area. Also, responsible for hanging the fish at higher altitudes.	Mainly responsible for spreading fish on racks under the direct sun and monitoring the drying process.
Packaging and storing dried fish	Responsible for packing dried fish for transportation or sale in the market.	Responsible for active involvement in packaging. Often involved in performing delicate tasks like layering dried fish for storage.
Sales and marketing	Responsible for market negotiations with buyers and wholesalers.	Rarely responsible for, or involved in, sales and marketing.
Household responsibilities	Rarely responsible for, or involved in, household chores.	Bear primary responsibility for household work, including cooking, cleaning, and childcare.

Source: Field data, 2023–2024

The women typically worked from sunrise to sunset (about 12 hours daily), with only a

half-hour lunch break. They earned approximately 350 Bangladeshi Taka (BDT) (\$3.00 USD) daily, roughly half the pay of their male counterparts, who typically received 800–1000 BDT (\$7.00–9.00 USD) daily. Sometimes, the women would work late-night shifts for slightly higher pay, ranging from 600 to 650 BDT (\$5.00 to 5.50 USD); however, this wage was still less than the men’s pay for comparable workloads. Moreover, men were usually hired on year-long contracts, granting them job security and additional benefits such as accommodation, food, and protective equipment (see Figure 3.2.(d)). In contrast, women had no formal contracts, worked on a daily basis without protections, and were denied breaks for breastfeeding or using the restroom—further illustrating the structural inequalities embedded in the gendered labour hierarchy of the dried fish sector.

Bangladesh’s resolutely patriarchal social structure reinforced the undervaluation of women’s work, resulting in lower wages compared to men. Around 90 percent of the interviewed men devalued the women’s tasks, assuming that anyone could perform them. As Bilal (40), a male dockworker, remarks:

‘Women cannot do the tasks men perform, so women are paid less. Men’s work involves strength and efficiency, whereas women’s work is much slower. If men had to do the women’s tasks, they would finish them in half the time and still work twice as hard. The division of work is based on ability, and that’s why wages are different’ (Translated from Bengali).

In contrast, all the interviewed women (n=20) acknowledged the importance of the men’s work. They also considered their tasks complementary to those of the men, thus making the quality and productivity of the dried fish processing a collective effort. Shirin (65), who has been working in dried fish processing for over a decade, offers a counterpoint to the men’s viewpoint:

‘Everyone’s work is hard; fish drying is labour-intensive. We spend the entire day standing under the sun to complete our tasks, while the men carry heavy loads and bring the fish to us. They also lift and hang fish on tall stands, which is not easy task. Although we also carry fish during the drying process, they handle a lot of physically demanding work’ (Translated from Bengali).

Figure 3.2. *Gender Division of Labour in Nazirartek Khola*



Note. (a) Women drying fish without protective equipment under the direct sun; (b) Women attending to their childcare and fish production duties at the same time; (c) Men’s risky fish hanging labour; (d) Men’s work facilitated by protective gear.

Source: Field data, 2023–2024. *Photo credit:* Safina Naznin

In summary, the dried fish processing *kholas* in Nazirartek featured a pronounced gender-based division of labour. The women typically worked from sunrise to sunset with only a short lunch break and earned significantly less than men. They were also denied basic human rights, including access to a toilet and a separate space to breastfeed their children. In contrast, the men received higher pay, food, accommodation, and protective equipment. These disparities reflect entrenched patriarchal norms that devalue women’s labour.

3.4.2 Gendered Occupational Hazards and Risks in Dried Fish Kholas

The findings also revealed gender-differentiated health impacts, with women facing distinct risks due to their roles and working conditions. The women reported experiencing chronic body pain and persistent headaches from spending up to 12 hours per day sorting, cleaning, and

drying the fish in extreme weather conditions and unhygienic facilities without adequate protection. The men also faced health risks, but the nature and severity differed significantly from those faced by the women.

Table 3.3. *Perceived Health Risks in Dried Fish Processing Yards*

Occupational Health Risk Scenario	Women (%) (n=20)	Men (%) (n= 11)
Chronic body pain (esp. back, shoulder, arms)	100	45
Persistent headaches	80	0
Urogenital issues (including kidney problems and urinary tract infections)	70	--
Frequent hand injuries (from fish scales and bones)	100	18
Skin ailments (esp. irritation due to salt exposure)	85	18
Climate-induced fatigue (due to prolonged exposure to the sun and other extreme weather)	90	45
Menstrual health complications	80	--
Pregnancy-related health concerns	20	--
Falls and injuries (due to heavy lifting, slipping from heights)	10	54

Source: Field data, 2023–2024

As shown in Table 3.3, all the surveyed women reported chronic pain in their backs, shoulders, and arms due to repetitive tasks, heavy lifting, and prolonged standing, while less than half the men reported similar pain. Fatigue was also widely reported, with 90 percent of women citing exhaustion from working long hours in extreme heat. In contrast, the men reported lower fatigue levels, as they had more flexibility to take breaks.

Hand injuries were another prevalent issue, with all the women (100 percent) reporting frequent cuts and wounds from handling fish scales and bones (see Figure 3.3). The women noted that working without gloves was unavoidable, as their tasks required delicate, precise movements often hindered by protective gear. Conversely, only 18 percent of men reported similar injuries, highlighting how the gendered division of labour was reflected in the observed health outcomes. While women handled the fish directly, including sewing carcasses (see Figure 3.3), men engaged in transportation and drying tasks with protective gear, thus avoiding sharp fish waste like bones

and scales. Skin ailments were more common among women (85 percent compared to 18 percent in men), especially due to prolonged salt exposure. Salt is often seen as healing, but it dries out skin and stings when it encounters open cuts, bone pricks, and broken skin.

Figure 3.3. *Typical Hand Injury Incurred from Binding Fish for Drying without Protective Gear*



Source: Field data, 2023–2024. *Photo credit:* Safina Naznin

Restricted access to sanitation facilities further compounded women’s health struggles. Around 70 percent of the women report kidney and bladder problems, mainly from having to hold their urine due to the lack of safe, readily accessible toilets. In contrast, men did not report similar issues, as they had more freedom to leave the yard when they needed to relieve themselves. In addition, the women’s inability to take adequate hydration breaks, a matter related to renal health, further increased their vulnerability to urogenital health issues. Such infections typically require antibiotics, but the demanding nature of the women’s workday rarely allowed them time for

medical visits or treatment.

The gendered nature of occupational risks included reproductive health concerns. Eighty percent of the women reported poor menstrual health due to inadequate sanitation, lack of privacy, and stigma. They worked long hours with painful symptoms in unhygienic conditions, leading to discomfort, stress, and risk of infection. Shima (16) described the shame and implicit misogyny of such working conditions thusly:

‘I work long hours without proper sanitation, and managing my period is difficult. If the owner finds out, I may be sent home for being “impure,” which adds stress and costs me the income my family depends on’. (Translated from Bengali)

Though reported by a smaller proportion of women (20 percent), pregnancy-related health risks were also notable. Expectant mothers are often engaged in physically demanding tasks, such as heavy lifting, bending, and prolonged standing, without access to shaded rest areas or drinking water. These conditions increase the risk of dehydration, musculoskeletal injuries, and miscarriage. Interviewed with a local health professional confirmed that such occupational exposures significantly elevate risks of complications, including preterm labour, hypertension, and anaemia. Similarly, lactating mothers lacked access to medical care or flexible working conditions, thus endangering both maternal and child health.

Conversely, falls and injuries due to heavy lifting and working from heights (see Figure 3.2(c)) were more commonly reported by men (54 percent), underscoring the gendered differences in occupational hazards. Men engaged in physically demanding yet structurally supported roles, while women performed prolonged, repetitive, detail-oriented tasks without adequate protection from the extreme heat; readily available first aid; rest, relief, or hydration and nourishment breaks; clean and safe restroom facilities; a workplace free from gender-based stigma or possible slander; and accommodations for specific health hurdles related to menstruation or pregnancy. The interviews clearly attested to how gendered inequalities expose women to greater health risks and deny them basic workplace protections.

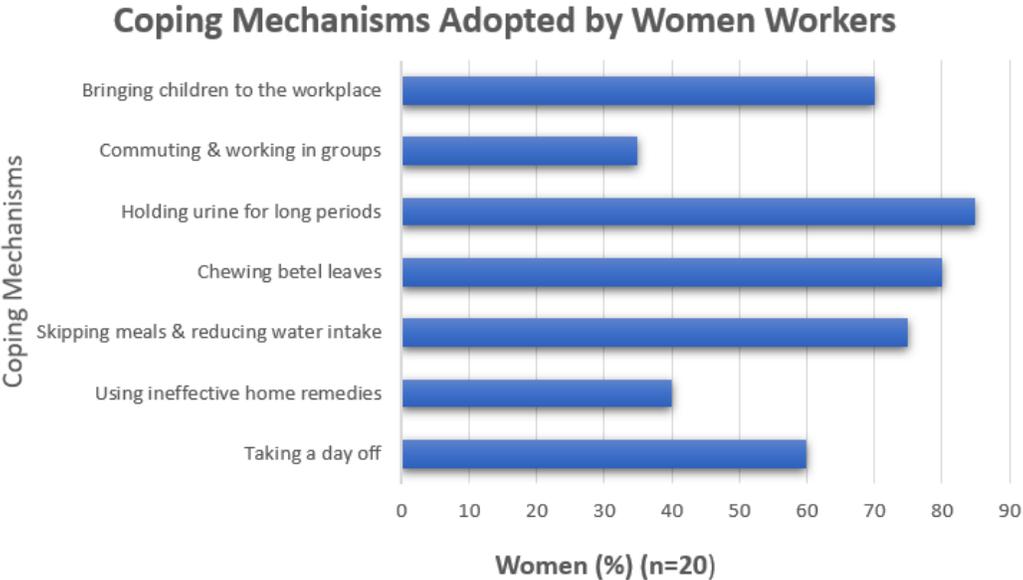
3.4.3 Women’s Coping Measures

The women in the *khola* shared the various coping measures they deploy to manage work-related hardships. Their adoption of these measures underlined how structural inequalities play a

significant role in diminishing the quality of life for women in this sector. Figure 3.4 depicts some of the coping measures mentioned by the women participants. For instance, 60 percent of the women reported taking a day off due to health issues; however, they also noted that financial constraints often made it difficult.

Menstruation worsened these challenges, as many women were forced to stay home due to physical discomfort and social pressure linked to cultural taboos discouraging discussion of this area of women’s health. In addition, some workers believed that exposure to the wind could harm their health during their periods, while others feared that their presence might cause the *khola* to become “impure”. These concerns often resulted in further isolation and, thus, less access to adequate healthcare.

Figure 3.4. *Women’s Coping Measures in Nazirartek Khola*



Source: Field data, 2023-2024

Forty percent of the women reported using non-pharmaceutical, relatively inexpensive or readily available home remedies like chili paste, henna, or kerosene to manage hand injuries sustained on the job, despite their ineffectiveness. According to the interviewed medical professional, these substances are not substitutes for proper wound care. Kerosene and chili paste

can cause further skin damage or infection, while only henna may provide minimal antibacterial properties. The health professional emphasized that repeated exposure to fish bones, salt, and sun exacerbates these injuries, and in many cases, antibiotic ointments, antiseptics, and protective dressings are medically necessary to prevent long-term complications, such as infections or chronic skin conditions. However, such treatment remains inaccessible to most women due to high costs, lack of employer support, and limited health service outreach in the *khola* areas. Given these constraints, women rarely sought professional medical treatment, even for injuries that visibly worsened over time. One worker, named Reshma (23), explained this dilemma as follows:

‘The fish-drying work is the hardest for us, and we stand all day under the sun without rest. We use chili paste or henna when our hands are cut because we have no medicine. Gloves do not help with this work, and we cannot afford them. We keep working in pain since missing a day means losing a day’s wage’. (Translated from Bengali)

Due to inadequate sanitation, 85 percent of women reported retaining their urine for extended periods, while 75 percent said they skipped meals and limited their water intake to avoid needing to relieve themselves during work hours. Holding urine regularly can lead to urinary tract infections, kidney disease, and bladder complications. In addition, 80 percent of respondents reported chewing betel leaves to help suppress hunger and thirst. However, over time this practice can cause gum irritation, tooth decay, and other serious oral health issues. As one worker (Rumki, 25) shared,

‘We deliberately drink less and hold urine all day since using the toilet often means going home, which the owner may not permit. Despite discomfort and thirst, we still chew betel leaves for a bit of relief’. (Translated from Bengali)

The physical toll of the work is amplified by persistent safety concerns and the emotional strain of unpaid caregiving responsibilities. To ensure safety from sexual violence while commuting to and from work, 35 percent of women reported travelling in groups, especially at night. Despite being discouraged by their employers, 70 percent of the women said they routinely brought their children to the *khola* due to a lack of childcare. While there, the children were left to play in nearby unsanitary conditions, sometimes under the care of older siblings, many of whom were also still children. This practice further extends the cycle of unpaid care work for women and girls. One working mother (Munni, 25) at the *khola* shared her concerns, thusly:

‘I have no one to care for my child at home, so I bring him to the *khola*. When he cries, my

employer gets angry. There's no space to breastfeed or care for him in private. I feed him wherever I can, but it's uncomfortable and embarrassing'. (Translated from Bengali)

From the employers' perspective, accommodating working mothers is a challenge. While they acknowledge the realities of motherhood, they also prioritize efficiency and productivity. One owner, Hasan (55), offered the following thoughts on this dilemma:

'We respect motherhood, and some women even bring their children to work. While this sometimes affects their performance, we still allow them to continue. However, at the end of the day, we must consider profit and productivity'. (Translated from Bengali)

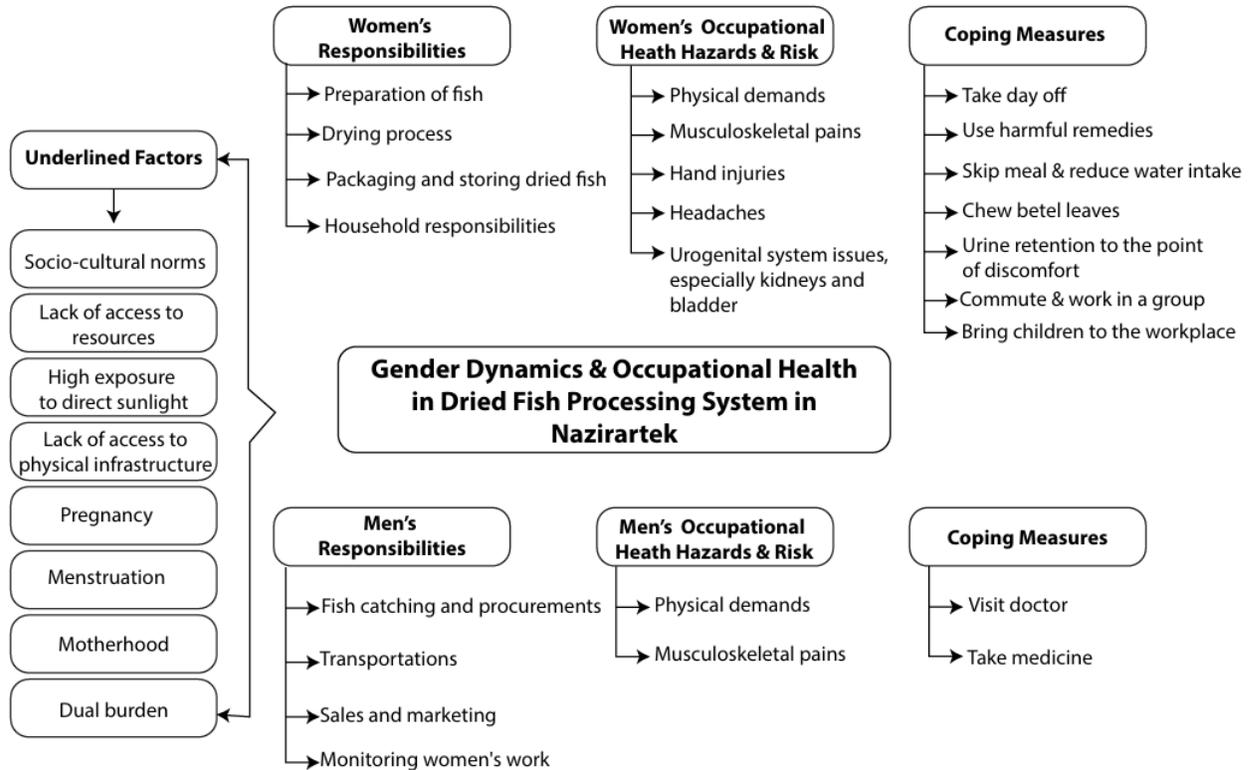
During our interviews, it became evident that the Rohingya women deliberately concealed their identities to avoid risks linked to their stateless status. One woman, Sumi (27), affirmed this, noting that, 'we are not legally allowed to work outside the camps, [so] it is safer not to mention our identity'. These women attempted to blend in by adopting the local language, gestures, and behaviours, while their coworkers quietly supported them, despite knowing their Rohingya identity. For their part, employers were willing to overlook their status as long as their work got done. These women received the same wages as Bengali workers for performing the same tasks. One employer, Ali (45), explained, 'We focus on the work, not where someone comes from. As long as they work properly, we don't see a difference. Everyone here earns the same for the same work'. This tacit acceptance enabled Rohingya women to work despite legal barriers, reflecting how political exclusion renders them invisible and dependent on informal networks for survival. Their precarious identity concerns, undoubtedly a source of psychological distress, exist on top of those faced by their Bengali peers.

As shown above, women workers in the Nazirartek *kholas* adopt a range of coping strategies to deal with harsh working conditions and deep structural inequalities, including taking unpaid days off, relying on home remedies for injuries, and chewing betel leaves to suppress hunger and thirst. Menstruation further complicates matters, as cultural taboos and physical discomfort often force these women to stay home. Furthermore, Rohingya women must conceal their identities, as their legal and social exclusion forces them to depend on informal networks for survival. These daily acts of endurance highlight the intersection of gender, poverty, and displacement, demonstrating the urgent need for inclusive, gender-sensitive labour protections.

Figure 3.5 summarizes the gender roles, occupational health hazards, and coping strategies in Nazirartek's dried fish processing sector. Our findings revealed a clear gendered division of

labour, with women mainly engaged in fish preparation, drying, packaging, and household responsibilities, and men handling fish catching, transportation, marketing, and supervision.

Figure 3.5. Summary of Gender Dynamics and Occupational Health Implications in the Dried Fish Processing Yards in Nazirartek



Source: Field data, 2023–2024

Women faced a broader range of health risks, including physical strain, musculoskeletal pain, hand injuries, and urogenital issues, conditions which are often intensified by inadequate infrastructure, socio-cultural norms, women’s bodily needs, and the dual burden of paid and unpaid work. The women’s coping strategies were largely informal and health-compromising, such as using home remedies, skipping meals, retaining urine, and working while simultaneously caring for children. In contrast, all interviewed male workers reported accessing formal healthcare when needed, typically visiting local pharmacies or clinics and using prescribed or over-the-counter medicine. Their relatively higher wages and job security enabled them to manage health issues more effectively. The flexible nature of their work allowed men to take time off to visit doctors as

needed. Additionally, patriarchal rules ensured their mobility, allowing male workers to move freely in search of care. Being relatively higher-paid, men could also afford the costs of treatment, giving them both the means and the agency to manage health issues more effectively than women, who faced financial constraints and social or workplace restrictions on seeking care.

3.4.4 Silence and Resistance

Women workers in the Nazirartek *kholas* must navigate a harsh and gendered work environment wherein silence becomes both a necessity and an inevitable form of resistance. Despite their important contributions to the fish-processing operations, these workers remained trapped in low-wage, labour-intensive roles, while the men held supervisory and decision-making power, thus reinforcing entrenched patriarchal hierarchies. Concerns or requests for workplace support were often met with dismissive responses informing them that, ‘If you have problems, you can leave. There are plenty of other women willing to take your place’ (Reshma, 23). This attitude reinforces a toxic masculinist power dynamic wherein women are viewed as replaceable labour, rather than co-workers with rights.

Employers exploit the surplus of available workers and women’s economic vulnerability, making it difficult for them to refuse exploitative conditions, even when such conditions affect their health and safety. Many women chose silence over protest, fearing retaliation or job loss. One woman shared, ‘If we speak up, there will be no work tomorrow. Better to keep our heads down and continue to work’ (Reshma, 23). These words of resignation capture the harsh reality faced by women workers: endure exploitative conditions or lose the ability to sustain themselves and their family. This compliance is not only forced but expected.

Patriarchal norms in Nazirartek place the burden of family survival on women, especially single mothers; men are not held socially accountable. These gendered expectations increase women’s economic dependence and marginalization in both the public and private spheres. Rojina (50) expressed her frustration with these norms as follows:

‘If a man leaves his wife, no one questions him. But if a woman speaks out, she is blamed for her own suffering because society expects her to bear all responsibilities for her children, no matter how unjust her circumstances’. (Translated from Bengali)

Rojina’s words reflect the deeply ingrained gender biases that make women fully responsible for their families, while absolving men from any accountability. Without access to

social safety nets, family support, or health services, these women remain trapped in a cycle of dependency on exploitative employers and local power structures, unable to challenge the injustices they face. Unlike men, who possess wider networks and social mobility, women workers experience further marginalization, reinforcing the patriarchal norms that limit their ability to seek support or improve their conditions.

In this context, silence is more than avoiding confrontation: it is a strategy for survival in a system that discourages resistance. One worker, Reshma (23) lamented, ‘Who will stand by us if we protest? No one! At least we can earn something by staying quiet’. These words capture the women workers’ fear of retaliation, the absence of any institutional support, and the reality that speaking out can mean losing their only source of income. For many women, silence is both a protective response and a coerced condition shaped by structural inequalities. It reflects women’s exclusion from basic labour rights and protections, thus enabling exploitative practices to continue unchallenged. Silence, therefore, becomes a form of endurance in an unjust system. In the absence of formal grievance mechanisms, social safety nets, or supportive institutions, women often lack safe avenues to raise their voices. Even when grievances are expressed, they are often met with indifference or dismissal, reinforcing the perception that speaking out may jeopardize one’s already precarious position. With limited alternatives for employment and deep responsibility for household survival, women often feel compelled to endure rather than resist. In such a context, silence does not signal acceptance, but reveals the difficult compromises women must make to sustain their livelihoods.

In Nazirartek, silence can also be understood as a form of passive resistance. Considering the harsh working environment, women often choose not to speak out because they do not want to be excluded from the workforce, and they continue with their livelihood within this system. Our observations indicate that the region is highly conservative in terms of belief systems, with strong religious and socio-cultural norms limiting women’s public roles. By participating in paid work outside the home, women are already challenging patriarchal norms, and by remaining silent, they find a way to participate in the workforce without openly confronting patriarchal restrictions.

3.5 Discussion

The findings of this research show how intersecting factors such as gender, ethnicity, and motherhood shape women’s experiences in the dried fish sector in Nazirartek, Bangladesh. Marginalized women—including Rohingya women, pregnant workers, and young working

mothers—face heightened discrimination and vulnerability. These findings highlight persistent gender inequalities and structural barriers that restrict women’s access to equitable and safe work environments. The explanations for and implications of these findings can be categorized into three broad themes: extreme patriarchy, lack of state protection for women's occupational health, and barriers to collective action.

3.5.1 Extreme Patriarchy

Nazirartek’s fish processing sector reflects entrenched gender hierarchies: women are relegated to strenuous tasks in poor conditions, while men enjoy positions of authority and more favourable conditions. This imbalance illustrates systemic inequalities in the distribution of labour and power, exemplifying the concept of “patriarchal structures within paid work”, where women are systematically excluded from higher-quality, better-paid jobs and concentrated in lower-status roles considered less skilled or less valuable (Walby, 1990, p. 21). In Nazirartek, this is evident as women dominate physically demanding, low-paid tasks in the dried fish sector, whereas men occupy decision-making and better-compensated positions. As Skaptadóttir and Rafnsdóttir (2000) have demonstrated, women's work is often undervalued and labeled as easy or unskilled, while men's labour is typically regarded as difficult or skilled. These inequalities are further reinforced by persisting economic disparities. Despite their indispensable labour contributions, women often suffer wage discrimination, earning nearly half of what men receive for comparable work (see section 2.6.1) (Galappaththi et al., 2023). The gendered division of labour ensures that men dominate supervisory and management roles, effectively allowing them to regulate and control women’s work (Hossain et al., 2015; Galappaththi et al., 2021). This patriarchal environment reinforces a structural hierarchy that places women in lower-paid, labour-intensive roles with little opportunity for upward mobility.

Power dynamics are a central element of patriarchy, shaping how social and economic life is organized. These dynamics are not only expressed through relationships between men and women but are also embedded in the social construction of gender. Men’s authority is reinforced through socially constructed rules and expectations related to work, social status, and participation in political or other public spheres. These norms define what is considered appropriate work for women and men, legitimizing women’s confinement to low-status, physically demanding roles while men occupy decision-making positions and maintain control over resources and

opportunities.

In this context, women workers also contend with patriarchal traditions that place the burden of domestic work and the family's survival directly on their shoulders. The "double burden" phenomenon forces them to try to balance unpaid household responsibilities—including cooking, cleaning, caregiving, and managing household health—with physically demanding paid labour in the fish-drying yards. This creates an exploitative dynamic wherein their unpaid efforts remain invisible and undervalued, yet indispensable to family survival. Several women shared how they begin their day well before sunrise to complete household chores before heading to work, and must resume these duties immediately upon returning home, often without rest or support. This routine erodes their physical health and reinforces the normalization of overwork. These experiences reflect the broader patriarchal expectations that shape women's lives in Nazirartek. Patriarchal structures legitimize the distribution of labour by framing domestic responsibilities as inherently "women's work", while men retain control over decision-making, resources, and higher-status tasks. In practice, women often manage childcare, household duties, and family health alongside long hours of paid labour, such as caring for children at the *khola* while processing fish. This constant balancing act illustrates how patriarchal norms simultaneously exploit women's labour and normalize their overwork, positioning their contributions as essential but undervalued in both the domestic and economic spheres.

In this regard, Jalali (2021) highlights how patriarchal ideologies systematically render women's work invisible, treating it as secondary to men's. Likewise, Pedroza-Gutiérrez and Hapke (2022) argue that patriarchal labour structures consistently relegate and devalue women's economic contributions, thereby preserving a rigid sexist framework that views their labour as inconsequential. This systemic undervaluation of women's work, both tangible and intangible, ensures and perpetuates their continued economic marginalization.

Beyond economic oppression, socio-cultural norms reinforce patriarchal control by stigmatizing women's sanitation needs. Menstruation and urination are treated as shameful acts, which limit women's autonomy and expose them to ridicule and health risks as they seek to avoid shame. Jalali (2021) argues that cultural taboos lead to unhygienic practices, reinforcing exclusion and subordination. In the workplace, this stigma justifies neglect and devaluation. Women's glaring exclusion from leadership in the fish-drying sector further entrenches patriarchal control over resources, leaving women economically dependent, socially subordinated, and unable to

challenge inequalities without risking further marginalization (see Section 2.6.1).

3.5.2 Lack of State Protection for Women Workers' Occupational Health

The findings of this study reveal that women workers in the dried fish sector face disproportionate challenges related to occupational health protections. While limited state interventions contribute to gaps in healthcare access, the root of these disparities lies primarily in the patriarchal nature of the work environment. Women have little to no access to healthcare services and workplace support, whereas male workers typically benefit from better systems, such as hospital access and medications. These differences reflect how patriarchal labour relations and gendered power dynamics within the workplace, rather than solely state absence, shape unequal access to health resources and protections. Tripathi et al. (2017) documented similar disparities, noting heightened vulnerability among female fisheries workers due to limited social services, excessive workloads, and minimal control over income.

The lack of accessible, reliable, and safe sanitation facilities at the Nazirartek *khola* severely impacts women's health. Despite working long hours in the scorching sun, many women deliberately avoid drinking water to avoid urinating, as safe toilets are often unavailable. This practice leads to chronic dehydration and increases the risk of kidney and bladder problems, including urinary tract infections. These challenges are further intensified by the lack of adequate menstrual hygiene facilities. As UNICEF and the WHO (2020) report, such conditions negatively affect women's physical and mental well-being, increase absenteeism, and lower productivity. These findings resonate strongly with the lived experiences of women in Nazirartek, where the absence of safe and dignified sanitation options directly contributes to widespread health issues, absenteeism, and daily distress.

Women's health vulnerabilities in Nazirartek are shaped by intersecting factors of gender, reproductive status, age, and economic marginalization. The state's failure to recognize and accommodate women's specific health needs across different life stages, such as pregnancy, lactation, youth, and older age, compounds these vulnerabilities. In the *kholas*, no formal workplace protections or accommodations exist for pregnant, menstruating, or postpartum women, despite the physically demanding nature of fish processing work that poses significant risks to their health.

In this regard, Halder et al. (2024) highlight how the combined burden of unpaid domestic

labour and exploitative economic conditions creates profound physical and psychological strain for women, increasing their risk of long-term health consequences and limiting their professional opportunities. Similarly, inadequate access to health services and contraception results in frequent pregnancies without sufficient recovery time, heightening risks of maternal anemia, compromised immunity, and complications such as low birth weight and preterm delivery. Patel et al. (2019) report comparable findings among pregnant working women in India, who face increased vulnerability to infections and adverse pregnancy outcomes. Our study echoes these findings, revealing that the systemic denial of healthcare rights, manifested through insufficient sanitation, lack of maternal protection, and absence of workplace accommodations, reflects broader structural neglect rooted in gendered and economic inequalities. Women in the dried fish sector in Nazirartek experience multiple vulnerabilities: their gender positions them in low-status, physically demanding work; their economic marginalization limits access to healthcare and social protection; and for some, additional factors such as age or ethnic minority status further restrict their ability to advocate for better conditions. For instance, pregnant women and breastfeeding mothers often continue to work long hours at the *khola* without proper rest, access to sanitation facilities, or facilities to care for their infants, exposing them and their children to significant health risks. This intersectional neglect not only undermines women's health but also perpetuates their marginalization within the dried fish sector's labour hierarchy.

3.5.3 Barriers to Collective Action

In Nazirartek, women workers face exploitative conditions that are exacerbated by their limited bargaining power and barriers to collective organization, which traps them in a cycle of exploitation (see Section 3.4.4). Galappaththi et al. (2021) observe that women in coastal fishing communities rarely participate in associations or advocacy, thus reinforcing their invisibility in policy and workplace reforms. Similarly, Karlsdóttir's (2008) findings show that women often avoid raising work-related concerns, accepting their lack of agency and leadership opportunities. Without collective power, women struggle to challenge the systemic inequalities underpinning their economic and social vulnerability.

Several studies highlight that women in Bangladesh concentrate in low-paying, labour-intensive jobs where their contributions are undervalued and adequate social protections are lacking (Kabeer & Mahmud, 2004). Societal norms deeply rooted in gendered roles and

expectations further restrict women's ability to advocate for fair wages and better workplace conditions. These norms often confine women to domestic and caregiving duties, excluding them from public spaces and decision-making forums, which limits their participation in collective action (Agarwal, 2001). In patriarchal settings, women are discouraged from getting involved in labour movements, further marginalizing their efforts to challenge systemic discrimination. Notably, gender-blind governance systems in fisheries organizations perpetuate inequities, further undermining women's well-being and increasing their vulnerability (Koralagama et al., 2017).

In Nazirartek, women's limited access to education significantly restricts their participation in decision-making, which reinforces their marginalization and limits the inclusiveness and effectiveness of collective action. Fish-drying communities in coastal Bangladesh often possess inadequate educational infrastructure and fewer opportunities for skills development, which hinders economic diversification and perpetuates cycles of poverty (Mitu et al., 2021). These barriers are especially detrimental for women, who already face gendered divisions, inadequate support systems, greater exclusion, and fewer opportunities to influence gender-equitable outcomes through collective action.

3.6 Limitations of the Study

This study focused on Nazirartek in Cox's Bazar, which limits its broader applicability. The findings relating to occupational health were based on participant observations and self-reported experiences, without medical validation, and language barriers during data collection may have resulted in misinterpretation. Although we tried to reduce bias by triangulating the data through diverse perspectives, this research is primarily descriptive. It lacks analysis of medical correlations that could deepen our understanding of health impacts. Furthermore, this study focused on binary gender roles and did not explore the experiences of gender-diverse, non-binary individuals, or persons with disabilities.

3.7 Conclusions

This study examined gendered occupational health risks faced by dried fish processing workers in Bangladesh, with a particular focus on women workers. We explored intersectional and gender-differentiated occupational roles, health implications, and the coping mechanisms employed by these workers, highlighting their struggles, resistance to deprivation, and efforts to

protect their bodies, health, and rights. In Nazirartek, structural inequalities rooted in entrenched patriarchal power dynamics continue to restrict women workers' access to fair wages, safe working conditions, and essential healthcare services. The persistence of disempowerment, often expressed through enforced or chosen silence, reinforces structural, collective, and individual vulnerabilities.

The absence of state interventions and infrastructure aimed at mitigating gendered health risks remains a central concern within feminist political ecology, which emphasizes the state's role in challenging unequal power structures. Lack of regulatory oversight leaves women highly vulnerable to exploitation, poor working conditions, and inadequate healthcare. Thus, a more pragmatic approach involves shared accountability among the state, employers, and civil society. The state should lead in establishing protective frameworks, but these must be supported by collective efforts to ensure fair labour practices and access to essential services. Capacity-building efforts led by the state, non-governmental organizations (NGOs), and community-based organizations (CBOs) are also essential to empowering women workers to organize, negotiate, and advocate for their rights. Collaboration between government institutions, worker organizations, and advocacy groups can foster sustainable interventions that uplift women's contributions and protect their health and dignity.

Gender-informed labour policies should explicitly include informal sector workers and enforce compliance mechanisms. In addition, women's participation in workplace representation and leadership must be prioritized to challenge structural inequalities. Furthermore, financial and social protection programs can reduce reliance on exploitative employers. At the same time, educational initiatives should promote awareness of labour rights and expose the systemic biases, including sexism and misogyny, that underlie workplace inequities.

References

- Agarwal, B. (2001). Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework. *World Development*, 29(10), 1623–1648. [https://doi.org/10.1016/S0305-750X\(01\)00066-3](https://doi.org/10.1016/S0305-750X(01)00066-3)
- Belton, B., Hossain, M. A. R., & Thilsted, S. H. (2018). Labour, identity and wellbeing in Bangladesh's dried fish value chains. In D. S. Johnson, T. G. Acott, N. Stacey, & J. Urquhart (Eds.), *Social wellbeing and the values of small-scale fisheries* (pp. 217–241). Springer International Publishing. https://doi.org/10.1007/978-3-319-60750-4_10
- Belton, B., Johnson, D. S., Thrift, E., Olsen, J., Hossain, M. A. R., & Thilsted, S. H. (2022). Dried fish at the intersection of food science, economy, and culture: A global survey. *Fish and Fisheries*, 23(4), 941–962. <https://doi.org/10.1111/faf.12664>
- Belton, B., & Thilsted, S. H. (2014). Fisheries in transition: Food and nutrition security implications for the Global South. *Global Food Security*, 3(1), 59–66. <https://doi.org/10.1016/j.gfs.2013.10.001>
- Campbell, O. M. R., Benova, L., Gon, G., Afsana, K., & Cumming, O. (2015). Getting the basic rights – The role of water, sanitation and hygiene in maternal and reproductive health: A conceptual framework. *Tropical Medicine & International Health*, 20(3), 252–267. <https://doi.org/10.1111/tmi.12439>
- Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review*, 43(6), 1241–1299. <https://doi.org/10.2307/1229039>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.
- Elmhirst, R. (2015). Feminist political ecology. In T. Perreault, G. Bridge, & J. McCarthy (Eds.), *The Routledge handbook of political ecology* (pp. 519–530). Routledge.
- Food and Agriculture Organization of the United Nations. (2015). *Voluntary guidelines for securing sustainable small-scale fisheries in the context of food security and poverty eradication*.
- Food and Agriculture Organization of the United Nations. (2020). *The state of world fisheries and aquaculture 2020: Sustainability in action*. <https://doi.org/10.4060/ca9229en>
- Food and Agriculture Organization of the United Nations. (2021). *2021 COFI declaration for*

- sustainable fisheries and aquaculture*. <https://doi.org/10.4060/cb3767en>
- Forman, J., Creswell, J. W., Damschroder, L., Kowalski, C. P., & Krein, S. L. (2008). Qualitative research methods: Key features and insights gained from use in infection prevention research. *American Journal of Infection Control*, 36(10), 764–771. <https://doi.org/10.1016/j.ajic.2008.03.010>
- Frangoudes, K., Gerrard, S., & Kleiber, D. (2019). Situated transformations of women and gender relations in small-scale fisheries and communities in a globalized world. *Maritime Studies*, 18(3), 241–248. <https://doi.org/10.1007/s40152-019-00159-w>
- Galappaththi, M., Collins, A. M., Armitage, D., & Nayak, P. K. (2021). Linking social wellbeing and intersectionality to understand gender relations in dried fish value chains. *Maritime Studies*, 20(4), 355–370. <https://doi.org/10.1007/s40152-021-00232-3>
- Galappaththi, M., Armitage, D., & Collins, A. (2022). Women’s experiences in influencing and shaping small-scale fisheries governance. *Fish and Fisheries*, 23(6), 1320–1333. <https://doi.org/10.1111/faf.12672>
- Galappaththi, M., Weeratunge, N., Armitage, D., & Collins, A. M. (2023). Gendered dimensions of social wellbeing within dried fish value chains: Insights from Sri Lanka. *Ocean & Coastal Management*, 240, 106658. <https://doi.org/10.1016/j.ocecoaman.2023.106658>
- Halder, C. E., Das, P. P., Rahman, S. M. T., Bhoumick, L. C., Tassdik, H., Hasan, M. A., & Mithun, S. N. (2024). Occupational hazards and risks among the women in fisher communities in Cox’s Bazar and Chattogram, Bangladesh. *PLOS ONE*, 19(7), e0297400. <https://doi.org/10.1371/journal.pone.0297400>
- Harper, S., Grubb, C., Stiles, M., & Sumaila, U. R. (2017). Contributions by women to fisheries economies: Insights from five maritime countries. *Coastal Management*, 45(2), 91–106. <https://doi.org/10.1080/08920753.2017.1278143>
- Hossain, M., Belton, B., & Thilsted, S. (2013). Preliminary rapid appraisal of dried fish value chains in Bangladesh. Dhaka: WorldFish.
- Hossain, M., Belton, B., & Thilsted, S. (2015). Dried fish value chain in Bangladesh. WorldFish, Bangladesh. <https://doi.org/10.13140/RG.2.2.24362.77762>
- Hossain, M. A. R., Sultana, M. T., Ferdous, S., Alam, M. S., Akhtar, R., Rahman, M. S., Shahjahan, M., & Sumon, M. H. (2022). *Key locations: Dry fish processing and trading in Bangladesh* (Working Paper No. 10; Dried Fish Matters). The University of Manitoba

/ Bangladesh Agricultural University / Jahangirnagar University.

- International Rescue Committee. (2023). *Cyclone Hamoon ravages Cox's Bazar: Severe cyclonic storm affecting over 450,000 lives and damaging 13 IRC learning centers*. ReliefWeb. <https://reliefweb.int/report/bangladesh/bangladesh-cyclone-hamoon-ravages-coxs-bazar-severe-cyclonic-storm-affecting-over-450000-lives-and-damaging-13-irc-learning-centres> (Accessed January 30, 2025).
- Jalali, R. (2021). The role of water, sanitation, hygiene, and gender norms on women's health: A conceptual framework. *Gendered Perspectives on International Development*, 1, 21–44. <https://doi.org/10.1353/gpi.2021.0001>
- Jeebhay, M., Robins, T. G., & Lopata, A. (2004). World at work: Fish processing workers. *Occupational and Environmental Medicine*, 61(6), 471–474. <https://doi.org/10.1136/oem.2002.001099>
- Kabeer, N., & Mahmud, S. (2004). Globalization, gender and poverty: Bangladeshi women workers in export and local markets. *Journal of International Development*, 16(1), 93–109. <https://doi.org/10.1002/jid.1065>
- Karlsdóttir, A. (2008). Not sure about the shore! Transformation effects of individual transferable quotas on Iceland's fishing economy and communities. In M. E. Lowe & C. Carothers (Eds.), *Enclosing the fisheries – people, places and power* (pp. 99–117). American Fisheries Society. <https://doi.org/10.47886/9781934874059.ch6>
- Kleiber, D., Frangoudes, K., Snyder, H. T., Choudhury, A., Cole, S. M., Soejima, K., Pita, C., ... & Williams, M. J. (2017). Promoting gender equity and equality through the Small-Scale Fisheries Guidelines: Experiences from multiple case studies. In S. Jentoft, R. Chuenpagdee, M. J. Barragán-Paladines, & N. Franz (Eds.), *The Small-Scale Fisheries Guidelines: Global implementation* (pp. 737–759). Springer. https://doi.org/10.1007/978-3-319-55074-9_35
- Knott, C., & Gustavsson, M. (2022). Introduction to fishy feminisms: Feminist analysis of fishery places. *Gender, Place & Culture*, 29(12), 1669–1676. <https://doi.org/10.1080/0966369X.2022.2135492>
- Koralagama, D., Gupta, J., & Pouw, N. (2017). Inclusive development from a gender perspective in small scale fisheries. *Current Opinion in Environmental Sustainability*, 24, 1–6. <https://doi.org/10.1016/j.cosust.2016.09.002>

- Mahmood, S. S., Wroe, E., Fuller, A., & Leaning, J. (2017). The Rohingya people of Myanmar: Health, human rights, and identity. *The Lancet*, 389(10081), 1841–1850.
[https://doi.org/10.1016/S0140-6736\(16\)00646-2](https://doi.org/10.1016/S0140-6736(16)00646-2)
- Mitu, S. J., Schneider, P., Islam, M. S., Alam, M., Mozumder, M. M. H., Hossain, M. M., & Shamsuzzaman, M. M. (2021). Socio-economic context and community resilience among the people involved in fish drying practices in the South-East coast of Bangladesh. *International Journal of Environmental Research and Public Health*, 18(12), 6242.
<https://doi.org/10.3390/ijerph18126242>
- Olapade, O. J., Kpundeh, M. D., Quinn, P. G., & Nyuma, G. J. Y. (2021). Occupational hazards, risk and injuries of fish processors in Tombo a coastal fish landing site, Sierra Leone, West Africa. *International Journal of Fisheries and Aquaculture*, 13(1), 27–39.
<https://doi.org/10.5897/IJFA2020.0770>
- Patel, R., Gupta, A., Chauhan, S., & Bansod, D. W. (2019). Effects of sanitation practices on adverse pregnancy outcomes in India: A conducive finding from recent Indian demographic health survey. *BMC Pregnancy and Childbirth*, 19(1), 378.
<https://doi.org/10.1186/s12884-019-2528-8>
- Pedroza-Gutiérrez, C., & Hapke, H. M. (2022). Women's work in small-scale fisheries: A framework for accounting its value. *Gender, Place & Culture*, 29(12), 1733–1750.
<https://doi.org/10.1080/0966369X.2021.1997936>
- Pradhan, S. K., Nayak, P. K., & Armitage, D. (2022). A social-ecological systems perspective on dried fish value chains. *Current Research in Environmental Sustainability*, 4, 100128.
<https://doi.org/10.1016/j.crsust.2022.100128>
- Prusty, S., & Sharma, A. (2023). Occupational hazards faced by inland fishers of Odisha State, India. *Journal of Agromedicine*, 28(3), 425–432.
<https://doi.org/10.1080/1059924X.2023.2178572>
- Ravera, F., Iniesta-Arandia, I., Martín-López, B., Pascual, U., & Bose, P. (2016). Gender perspectives in resilience, vulnerability and adaptation to global environmental change. *Ambio*, 45(3), 235–247. <https://doi.org/10.1007/s13280-016-0842-1>
- Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (1996). Gender and environment: A feminist political ecology perspective. In D. Rocheleau, B. Thomas-Slayter, & E. Wangari (Eds.), *Feminist political ecology: Global issues and local experiences* (pp. 3–23). Routledge.

- Rohe, J., Schlüter, A., & Ferse, S. C. A. (2018). A gender lens on women's harvesting activities and interactions with local marine governance in a South Pacific fishing community. *Maritime Studies*, 17(2), 155–162. <https://doi.org/10.1007/s40152-018-0106-8>
- Salagrama, V., & Dasu, A. (2021). *Living on the edge: Perspectives of the small-scale women fish processors of northern coastal Andhra Pradesh, India* (Working Paper No. 07; Dried Fish Matters, p. 81). The University of Manitoba / District Fishermen Youth Welfare Association.
- Skaptadóttir, U. D., & Rafnsdóttir, G. L. (2000). Gender construction at work in Icelandic fish plants. *NORA - Nordic Journal of Feminist and Gender Research*, 8(1), 5–16. <https://doi.org/10.1080/080387400408026>
- Tripathi, P., Kamath, R., & Tiwari, R. (2017). Occupational health and role of gender: A study in informal sector fisheries of Udupi, India. *Indian Journal of Occupational and Environmental Medicine*, 21, 45–50. https://doi.org/10.4103/ijoem.IJOEM_170_16
- Turner, J. M. M. (2024). Small scale fisheries and the challenges of occupational safety and health. *Journal of Agromedicine*, 1–3. <https://doi.org/10.1080/1059924X.2024.2434074>
- UNICEF (United Nations Children's Fund), & WHO (World Health Organization). (2020). *State of the world's sanitation: An urgent call to transform sanitation for better health, environments, economies, and societies*. World Health Organization and United Nations Children's Fund. <https://www.who.int/publications/i/item/9789240014473>
- Watson, A., & Till, K. E. (2010). Ethnography and participant observation. In D. DeLyser (Ed.), *The SAGE handbook of qualitative geography* (pp. 121–137). SAGE. <https://doi.org/10.4135/9780857021090.n9>

CHAPTER 4

Discussion and Conclusion

4.1 Introduction

This chapter presents a synthesis of key findings in relation to the study's core objectives, which explored occupational health and hygiene provisions, institutional governance mechanisms, the gender-differentiated impacts of external shocks, gendered health impacts, and coping strategies in the dried fish processing sector in Nazirartek, Bangladesh. Drawing on intersectional and feminist political ecology (FPE) frameworks, the discussion section situates these findings within broader structural dynamics of gender, labour, and the informal governance system. The chapter also outlines policy implications, highlights the research contributions, discusses limitations of the study, and proposes directions for future research. It concludes with the researcher's reflective insights on the study process and outcomes.

4.2 Discussion

The findings of the present study reaffirm that the dried fish sector in Nazirartek, Bangladesh, operates within a deeply embedded patriarchal governance structure that systematically marginalizes women. This marginalization manifests in women's confinement to low-status, informal, and underpaid labour, with limited access to leadership and decision-making processes. Socio-cultural norms that position men as community leaders and economic actors continue to shape and constrain women's agency, reinforcing their economic dependency. These findings highlight both the deep-rooted gender-based division of labour in Nazirartek and the wider societal norms that continue to devalue women's roles in the fisheries sector in Bangladesh.

While these findings reflect local realities, they are also indicative of global trends that undermine women's contributions to the economy and hinder the attainment of societal goals. For example, the relative overrepresentation of women in informal, low-paid, post-harvest roles documented by the Food and Agriculture Organization of the United Nations (FAO, 2020) resonates strongly with the occupational segregation observed in Nazirartek. These occupational patterns are shaped by entrenched gender norms that perceive women's labour as supplemental, despite their significant contributions—a trend also noted by Harper et al. (2017) and Weeratunge et al. (2010). Our findings reinforce this, showing that women in Nazirartek remain undervalued

and largely excluded from formal recognition and equitable participation in the fisheries economy. The findings of the present study further demonstrate that such marginalization directly affects women's occupational health and everyday working conditions in the dried fish yards.

Our research findings also confirm the assertions of Pedroza-Gutiérrez and Hapke (2022) and Galappaththi et al. (2021), who contend that gender inequalities are structurally embedded in small-scale fisheries governance, where decision-making institutions routinely exclude women, perpetuating power asymmetries across production systems. In Nazirartek, women's exclusion from *khola*-level decision-making reflects broader patterns of systemic marginalization from accessing resources, organizational networks, and leadership opportunities, compounded by the absence of gender-sensitive physical infrastructure in the workplace.

The absence of gender-sensitive physical infrastructure—such as clean toilets, shaded rest areas, and menstrual hygiene facilities—reveals how women's embodied experiences are systematically overlooked in workplace planning. This neglect cannot be attributed solely to resource scarcity—instead it highlights the gendered norms that prioritize men's needs over women's in public and institutional spaces. Studies across low- and middle-income countries similarly demonstrate that inadequate sanitation and menstrual hygiene provisions heighten health risks for women, contributing to chronic discomfort, infections, and social stigma (Hennegan et al., 2019; Sommer et al., 2015). Women are conditioned to frequently suppress basic needs—like drinking water or managing menstruation—due to the lack of physical facilities, a finding echoed in the work of Salagrama and Dasu (2021) in coastal India. This pattern is evident in Nazirartek as well, where the absence of institutional support for women's health contributes to ongoing cycles of physical strain and occupational vulnerability. As our findings show, many women internalize these burdens as an expected part of their gendered responsibilities, mirroring observations from other male-dominated work environment (Aswathy & Kalpana, 2018; Hennegan et al., 2020).

These embodied experiences of inequality become even more acute in times of crisis. Our study found that climate-induced disasters such as cyclones, tidal surges, and floods frequently disrupt physical infrastructure in Nazirartek. While all workers are affected, women—who already occupy more precarious roles and lack savings, formal contracts, or social safety nets—face greater difficulties in recovering from such disruptions. Several women reported being unable to return to work due to damaged infrastructure and caregiving responsibilities at home. Yet, many are also

bound to work in inundated and unsafe areas due to pressing livelihood needs, risking further health complications. Feminist political ecology frameworks emphasize this intersection, arguing that women's vulnerabilities are shaped not just by environmental risks, but by the socio-political systems that restrict their access to resources, decision-making, and recovery mechanisms (Arora-Jonsson, 2011; Rocheleau et al., 1996). These findings are supported by Resurrección (2013) and Weeratunge et al. (2010), who argue that women's vulnerabilities are magnified by their exclusion from climate governance and access to natural resources, while development and climate agendas reinforce these vulnerabilities by negatively portraying women as passive victims or 'natural resource managers', and by failing to address the structural power imbalances that underpin their marginalization. In Nazirartek, women's exclusion from disaster risk reduction and planning indicates broader gendered governance weaknesses in Bangladesh. Similarly, as observed by Chanda Shimi et al. (2010) and Hossain et al. (2020), inadequate sanitation during floods leads to unsafe hygiene practices that disproportionately affect women, highlighting the persistent institutional neglect of their needs.

Our study also identified the threat of displacement due to infrastructure development, particularly the planned airport expansion, as a significant concern among workers and the business community in Nazirartek. Although promises of improved facilities were made, implementation has remained weak, particularly in addressing the specific needs of women. This reflects global findings that displacement often exacerbates gendered vulnerabilities. Thukral (1996), Smyth et al. (2015), and Sahoo and Mishra (2016) have demonstrated that women displaced by large-scale development projects often lose access to essential resources and experience adverse health outcomes. In Nazirartek, women shared a mixture of hope and uncertainty regarding relocation—some viewed it as a possible escape from exploitative work conditions. However, they were not adequately informed or consulted about the process, reflecting their exclusion from decision-making structures. Sultana (2009) similarly explains how governance systems often overlook women in recovery and resettlement efforts, reinforcing cycles of gendered marginalization.

In the face of these multiple challenges, women in our study area adopt coping strategies, but socio-economic dependencies and inadequate workplace support constrain their options. Many women continue to work while experiencing health issues like urinary tract infections or fatigue related to menstruation and pregnancy, often driven by financial need. These findings align with

Halder et al. (2024) and Salagrama and Dasu (2021), who observe that women working in informal sectors like dried fisheries and post-harvest activities often deprioritize their health due to economic pressures, job insecurity, and systemic infrastructure gaps. In our study, women's reluctance to voice their health and sanitation needs was further shaped by prevailing cultural norms that stigmatize discussions of reproductive health, especially in male-dominated spaces. This aligns with broader literature documenting how gendered taboos and social hierarchies inhibit women's ability to advocate for supportive working conditions, thereby reinforcing structural inequalities in occupational health governance (Jalali, 2021; Jewitt & Ryley, 2014).

Structural barriers to collective action also shape these coping patterns. In Nazirartek, the lack of gender-sensitive governance is compounded by women's limited collective representation. Their inability to form or participate in collective organizations not only isolates them individually but also weakens their capacity to resist systemic inequalities and advocate for improved working conditions. While our findings align with Galappaththi et al. (2021) and Weeratunge et al. (2010), who document women's underrepresentation in formal fisheries institutions, our study extends this analysis by linking such exclusion to inadequate education and skills training—particularly in coastal contexts like Nazirartek. This resonates with Mitu et al. (2021), who argue that limited educational infrastructure restricts women's opportunities for economic diversification and leadership. Additionally, deeply rooted socio-cultural expectations around modesty, duty, and silence discourage women from publicly voicing grievances or challenging workplace norms. This pattern, widely observed in other parts of the world (Agarwal, 2001; Karlsdóttir, 2008), reinforces their invisibility in both labour discourse and institutional planning.

The absence of collective power contributes to the persistence of exploitative labour conditions in Nazirartek. *Khola* owners, who act as both employers and informal regulators, maintain overarching control over the workplace. Our findings reveal that these actors exercise disproportionate influence over resource distribution, wage structures, and working conditions. Women's socio-economic vulnerabilities are routinely exploited within these informal arrangements, where their labour is undervalued as cheap, unskilled, and easily replaceable. This reflects broader dynamics identified by Harper et al. (2017) and Kabeer and Mahmud (2004), who show that patriarchal norms in informal sectors often entrench women's marginalization. Moreover, our study highlights that existing legal and policy protections are largely ineffective in informal dried fishery contexts. Despite the existence of formal guidelines, enforcement remains

weak or absent, allowing *khola* owners to operate without accountability while neglecting basic occupational health and safety standards. These findings align with those of Belton et al. (2018) and Pedroza-Gutiérrez and Hapke (2022), who contend that the lack of formal recognition of women as workers contributes to their invisibility within fisheries governance frameworks.

In conclusion, the challenges women face in Nazirartek are multifaceted and systemic. Our study demonstrates that the gendered marginalization of women in the dried fish sector is not merely a reflection of socio-cultural norms, but the outcome of interlocking institutional, environmental, and economic exclusions. While previous research has documented gender inequalities in fisheries, our findings deepen this understanding by illustrating how women's embodied vulnerabilities, governance exclusions, and infrastructural neglect converge to produce complex layers of inequality. Feminist political ecology and intersectionality offer a valuable lens for examining these dynamics, revealing that power operates not only through formal institutions but also through cultural norms and embodied experiences. Addressing these challenges requires more than isolated policy interventions—it demands a fundamental restructuring of governance systems, workplace infrastructure, and gender relations within the dried fish economy.

4.3 Key Findings

To understand the overall insights gained through this research, this section provides a synthesis of the results pertinent to the research objectives. The findings highlight how gendered labour roles, informal governance, and the lack of institutional support shape the daily struggles of women dried fish processing workers in Nazirartek, reinforcing their marginalization in both the workplace and broader socio-economic structures. A summary of the key findings is presented below:

Workplace Physical Infrastructure Fails to Support Women's Occupational Health and Bodily Needs with Dignity

The physical infrastructure systematically fails to support women's occupational health, bodily needs, and reproductive roles with dignity in the Nazirartek dried fish *kholas*. While male workers often access functional toilets and shaded rest areas, the majority of women are excluded from these basic facilities. Only 10 percent of women report access to toilets, and even fewer (5 percent) have access to private or shaded spaces to take a break, particularly for menstrual management or breastfeeding their child. Clean functional toilets are often locked or designated

for the use of male owners and workers, reflecting a workplace culture that marginalizes women's needs and treats them as secondary.

In the absence of adequate infrastructure, women are left with no choice but to endure unsafe practices that compromise their health and dignity. Around 85 percent of women report retaining urine for long hours, while 75 percent skip meals and restrict water intake to avoid the need for relief during work. To manage hunger and thirst, 80 percent chew betel leaves mixed with areca nut and lime, providing temporary comfort but contributing to long-term oral health problems. These practices expose women to serious health risks, including urinary tract infections, kidney diseases, and other health complications. Together, these conditions expose not only inadequate infrastructure but also a fundamental neglect of women's right to safe and respectful working conditions.

The Gendered Division of Labour in Nazirartek Dried Fish *Khola* Reflects Deep-Rooted Patriarchal Norms That Undervalue Women's Work and Contributions

In Nazirartek dried fish *kholas*, the division of labour is sharply gendered, with women undertaking the most repetitive and labour-intensive tasks (such as sorting, cleaning, and drying fish), while men handle tasks deemed to require more strength (like lifting or placing fish on high racks). These gendered assignments are used to justify higher wages and better benefits for men, even though women often work longer hours, from sunrise to sunset, without adequate breaks or access to protective equipment. Men dominate supervisory roles and decision-making positions, reinforcing occupational hierarchies that devalue women's contributions.

From a feminist political ecology perspective, this workplace discrimination is compounded by broader societal norms that place the full burden of household maintenance and childcare on women, particularly those who are widowed, divorced, abandoned, or whose husbands are away from home for long periods due to fishing. Without support from male partners in a patriarchal society, these women face intensified social and economic exclusion, which further restricts their access to stable employment and workplace security. Male disengagement from domestic responsibilities is normalized, while women's unpaid care work remains unrecognized. Without access to social safety nets, family support, or childcare, many women bring their children to the *khola*, further entrenching the cycle of unpaid care. Juggling 12-hour workdays with domestic responsibilities, women experience a double burden that limits their economic mobility

and reinforces their dependence on exploitative employers for survival. As a result, women's labour—both paid and unpaid—remains systematically undervalued, sustaining a cycle of invisibility and inequality that denies them recognition, fair compensation, and dignity in work.

Gendered Neglect of Occupational Safety Forces Women to Rely on Harmful Coping Mechanisms in the Absence of Structural Protections

As a result of both workplace and social inequalities, women in Nazirartek face disproportionate health risks. Their physically demanding tasks, performed under direct sun exposure without adequate rest or protection, lead to chronic pain in the back, shoulders, and limbs, as well as persistent headaches and fatigue. The lack of sanitation facilities forces many to retain urine and skip meals, resulting in urinary tract infections, kidney strain, and nutritional deficiencies. Moreover, women report that working without gloves is unavoidable, as their tasks demand delicate, precise movements that protective gear often hinders. As a result, performing fine, repetitive work barehanded to maintain dexterity frequently leads to cuts, infections, and salt-induced skin conditions. Yet only 20 percent of women report using gloves, compared to 91 percent of men, reflecting a gendered distribution of personal protective equipment and the assumption that women's tasks are less hazardous. This unequal allocation not only exposes women to daily injuries but also signals a broader disregard for their safety and well-being in the workplace.

Access to formal healthcare is equally gendered—while all male respondents in the study reported receiving some form of medical support, only a small fraction (10 percent) of women could access such care. Women's long working hours, low income, and unpaid domestic responsibilities further limit their ability to seek treatment. In the absence of medical services, many women rely on culturally embedded home remedies—such as applying chili paste, kerosene, or henna paste to open wounds—which, although accessible and familiar, can exacerbate infections or cause further harm. The normalization of such informal and harmful strategies reflects not merely personal choice or resilience, but rather survival tactics adopted within a system that provides little to no institutional support or recognition of women's rights and their need for dignified working conditions in this informal economy.

Women’s Reproductive Health Needs are Frequently Overlooked due to Informal Workplace Norms and Gendered Power Structures

In Nazirartek *kholas*, women’s reproductive health, including menstrual hygiene and pregnancy-related needs, is systematically neglected due to informal workplace norms and patriarchal attitudes that treat women’s bodies as disruptions to productivity. Eighty percent of women experience menstrual health problems caused by insufficient sanitation, limited privacy, and prevailing social stigma. They are forced to work long hours despite painful symptoms in unhygienic conditions, experiencing discomfort, stress, and a higher risk of infection—yet are denied the space to rest or manage their health needs with dignity.

Menstruation is heavily stigmatized—considered impure and inappropriate to mention at work—which leads women to stay silent or miss work entirely, further jeopardizing their financial stability. These taboos reinforce a workplace culture where women’s biological realities are ignored, contributing to cycles of exclusion and silence.

Pregnancy-related challenges are also intensified by physically demanding tasks, lack of rest accommodations, and the absence of support for expectant or lactating mothers. The result is increased vulnerability to maternal health complications, without any institutional provisions to mitigate these risks. These intersecting biological and social factors further compound the marginalization of women in the dried fish sector, exposing them to overlapping vulnerabilities that remain unaddressed by current workplace structures.

A feminist political ecology perspective reveals that the neglect of women’s reproductive health is rooted in broader power imbalances that shape how work is distributed, managed, and valued. By overlooking gender-specific requirements in the workplace, these systems reinforce gender inequalities and deprive women of their right to safe, respectful, and inclusive working environments.

Patriarchal Governance and Informal Power Structures Reinforce Women’s Exclusion from Leadership and Development Opportunities

Workplace governance operates largely through informal and patriarchal systems that exclude women from leadership and decision-making in the Nazirartek *khola*. Although women make up the majority of the workforce, they remain underrepresented on key platforms, such as the Nazirartek Fish Business Association, where male owners exercise full control over business

operations, working conditions, and economic decisions. This exclusion prevents women from influencing workplace policies or advocating for their rights, reinforcing a system where their contributions are undervalued.

Within the *khola*, the *Majhi* system designates certain women to oversee small groups of female workers, but these roles are mostly symbolic. These women receive no additional wages or authority, and they lack bargaining power to improve wages or safety conditions. Meanwhile, male owners retain complete control, preserving patriarchal dominance in both governance and economic benefits.

This power imbalance also affects women's access to development and training opportunities. While NGOs offer valuable services like hygiene education, microcredit, and skills training, male employers often restrict women's participation. In many cases, women are excluded entirely or replaced with others, as owners prioritize uninterrupted production. These forms of gatekeeping limit women's ability to acquire new knowledge, improve their working conditions, or build economic resilience, trapping them in low-wage, insecure work with little chance for upward mobility.

Persistent Climate Hazards and Weak Governance Exacerbate Vulnerability and Unsafe Working Conditions for Fish Processing Workers in Nazirartek

Located near the Bay of Bengal, Nazirartek is highly vulnerable to frequent climate hazards such as cyclones and floods. Over many years, these recurring disasters have devastated critical infrastructure needed for fish processing, including drying platforms, sanitation facilities, and water sources. The destruction of this infrastructure severely worsens workplace conditions, and consequently exposes workers, particularly women, to increased health risks. Compounding these challenges are significant governance failures. Limited government support for disaster relief, inadequate infrastructure planning, and politicized distribution of aid have obstructed effective recovery efforts. As a result, damaged facilities remain unrepaired for extended periods, creating unsanitary and unsafe environments that hinder workers' ability to perform their jobs safely and with dignity.

The absence of robust social safety nets further exacerbates these vulnerabilities. Without formal mechanisms for financial assistance, healthcare, or livelihood support during and after disasters, fish processing workers must rely on informal and often insufficient coping strategies.

Women are disproportionately impacted by this gap, facing additional burdens related to menstruation, pregnancy, and childcare—without access to private, hygienic sanitation or maternal health services in the workplace. This intersection of environmental risk, governance shortcomings, and social neglect underscores the urgent need for inclusive policies and targeted interventions to protect the health and livelihoods of the Nazirartek fish processing community.

Gendered Differences in Perception of Relocation Highlight Women’s Aspirations for Improved Work Conditions Amidst Uncertain Futures

The impending relocation of Nazirartek dried fish yards, prompted by airport and air force base expansion, has created deep uncertainty among dried fish workers. While many women cautiously express hope for improved conditions in the new settlement, such as shaded drying platforms and better sanitation, their voices are largely absent from formal planning processes. In contrast, male workers are more resistant to the move, fearing job loss and challenges adapting to new technologies.

Despite women forming the majority of the labour force, they have been excluded from decision-making, consultations, and updates regarding the timeline, compensation, or design of the new site. This exclusion reflects broader patterns of gendered marginalization and reinforces their lack of power in shaping workplace futures. This lack of transparency generates fear and uncertainty, impeding community readiness and creating barriers to investment in improved infrastructure and working conditions.

Rohingya Women Conceal their Identities to Avoid Legal Risks, Relying on Informal Networks to Secure Livelihoods Despite Political Exclusion

Rohingya women, facing statelessness and legal prohibitions on work outside the resettlement camps, deliberately hide their identities when working in Nazirartek *khola* to avoid potential legal consequences. They blend in by adopting local language and behavior, with quiet support from their coworkers. Employers, aware of their status but focused on productivity, tolerate their presence and pay them equal wages for equivalent work. This implicit acceptance allows Rohingya women to earn a living despite official restrictions, but adds layers of psychological stress and invisibility, highlighting how political exclusion intersects with gender and economic marginalization in shaping precarious work conditions.

Intersectionality as a Vehicle of Exploitation

In Nazirartek, women's experiences of exploitation are shaped not only by gender but also by their class position, reproductive status, caregiving roles, and migratory identity. These overlapping social categories intensify and often render invisible the health and livelihood vulnerabilities women face. For example, menstruating women frequently suffer from persistent discomfort and infections due to prolonged exposure to unsanitary drying yards and the lack of private, safe spaces to manage their menstrual hygiene. Around 80 percent of the respondents reported about silently enduring severe cramps or bleeding while continuing to work long hours in the heat, fearing income loss or retaliation from supervisors. Similarly, women who bring their children to the *khola*, due to the absence of affordable childcare, must balance heavy physical labour with constant caregiving, breastfeeding between tasks, taking care of sick children, or shielding them from workplace hazards. This dual burden results in chronic exhaustion and limits their ability to demand change. Rohingya women experience compounded exclusion due to their statelessness, lacking access to formal healthcare or social protections. Feminist political ecology perspectives reveal that these intersecting identities are not only sources of vulnerability but also central to the structures of inequality embedded in informal labour sectors. These intersectional dynamics are central to understanding how gendered exploitation is sustained—and quietly contested—in precarious work environments like Nazirartek.

Silence Functions as a Complex and Coerced Strategy of Endurance in the Absence of Institutional Protection

In this deeply unequal labour context, silence is not merely the absence of resistance but a necessary tactic for navigating daily precarity. Without any union, grievance mechanisms, or regulatory oversight, women have no safe space to voice concerns. Speaking out often leads to job loss or social stigmatization, while remaining silent offers a fragile means of economic survival. Employers often withhold work or dismiss those who raise complaints, making resistance prohibitively costly. As a result, women routinely suppress their grievances and continue working under harmful conditions to secure daily wages essential for their families. This silence is not voluntary; it is shaped by fear, systemic neglect, and the recognition that there are no viable alternatives. It becomes a form of endurance, a survival strategy within an exploitative system that consistently denies women agency, recognition, and justice.

The pervasive silencing of women workers reflects a broader failure to uphold their rights and well-being within the patriarchal labour system. It exposes entrenched structural inequalities—economic, social, and political—that exclude women from equal participation and access to basic labour rights. These women are far from passive; they demonstrate immense resilience in navigating hostile environments with limited choices. Yet, resilience alone cannot redress injustice. Transformative change requires collective, gender-equitable action to ensure decent work, fair pay, safe conditions, and accessible support—restoring dignity and voice to women workers.

4.4 Policy Implications and Recommendations

Addressing the entrenched gender and occupational health inequities in Bangladesh’s dried fish sector requires a multifaceted policy approach grounded in feminist political ecology. Recognizing the interconnected nature of gendered labour dynamics, environmental vulnerabilities, and systemic power imbalances, effective interventions should go beyond isolated solutions to promote gender-responsive governance, social protection, and structural change. The following recommendations are organized into three categories: First, context-specific actions for the Nazirartek *Khola* reflect the acute gender-based vulnerabilities and poor working conditions experienced by women in this particular site. Second, general recommendations for all women dried fish workers respond to the broader structural challenges they face across various locations. Finally, sector-wide recommendations for all dried fish workers focus on strengthening governance, expanding access to essential services, and improving labour rights in the informal economy—aiming to ensure safety, equity, and dignity through coordinated and inclusive policy responses.

A. Policy Recommendations Specific to Nazirartek *Khola*

- **Inclusive Local Governance Structures:**

Khola-level management committees with equitable gender representation should be institutionalized. Women's lived experiences and concerns should be reflected in decisions regarding workplace safety, operations, and infrastructure improvements.

- **Improvement of On-Site Infrastructure and Services:**

The physical working environment in Nazirartek should be established and improved by

providing functional sanitation facilities, safe drinking water, shaded rest areas, and accessible first-aid and healthcare services.

- **Localized Enforcement of Occupational Health and Safety Policy:**

Site-specific occupational health and safety protocols should be developed, that reflect the spatial, labour, gender, and climatic realities of Nazirartek. Measures to reduce exposure to environmental hazards and ensure compliance through regular monitoring should be prioritized, with particular attention to the distinct needs and vulnerabilities of women and marginalized groups.

- **Community-Level Capacity Building:**

Community-based legal literacy, health and safety training, and awareness sessions within Nazirartek *khola* should be implemented to equip workers, especially women, with knowledge of their rights and workplace entitlements.

- **Challenging Gender Norms in Practice:**

Khola-based dialogues and awareness programs should be facilitated to challenge prevailing gender hierarchies, reduce tolerance for discrimination, and promote shared responsibilities across genders in workspaces.

B. Policy Recommendations for All Women Dried Fish Workers

- **Promotion of Women's Leadership and Voice:**

Gender equity in all fishery-related policies should be mainstreamed by mandating women's active participation in co-operatives, different committees, and worker organizations across dried fish sites.

- **Equitable Health and Social Services:**

Gender-responsive healthcare services (e.g., maternal care, mental health, and reproductive health) should be expanded, with specific provisions for women working in informal and hazardous conditions.

- **Sector-Wide Capacity Building and Rights Education:**

National programs that offer legal training, workplace rights education, and leadership development for women in the dried fish sector should be scaled up. These should also promote collective action alongside accessible and gender-responsive reporting mechanisms to address harassment, exploitation, and other workplace injustices.

- **Transformative Gender Norm Interventions:**

Gender-awareness modules should be integrated into adult education, NGO outreach, and media platforms to reshape public attitudes toward women's work in fisheries, and support more equitable labour relations.

- **Use of Media and Digital Platforms for Awareness and Innovation:**

Strategic use of local media, social media, and digital storytelling should be encouraged to raise awareness about workers' conditions, challenge gender-based stigma, and amplify women's voices.

C. Policy Recommendations for All Dried Fish Workers in Bangladesh

- **Recognition and Formal Inclusion of the Sector:**

Dried fish processing should be recognized as a legitimate economic activity within fisheries and labour policies. Informal workers should be included in national labour laws and policies.

- **Strengthened Occupational Health and Safety (OHS) Policies and Monitoring:**

Occupational health and safety (OHS) standards across all dried fish yards should be revised and enforced, with a focus on ensuring gender-sensitive infrastructure such as separate and safe toilet facilities, designated space for women, and proper ventilation to improve overall working conditions.

- **Integrated Service Delivery Across Sites:**

Service provision among NGOs, local governments, and ministries should be coordinated better to ensure equitable, gender-responsive access to health, sanitation, and legal support services for all dried fish workers, regardless of location.

- **Support for Economic Diversification and Resilience:**

Livelihood diversification programs and savings/credit schemes should be developed that are specifically tailored to address the unique needs and challenges faced by women workers, helping them cope with shocks such as seasonal unemployment and climate impacts.

- **Challenge Harmful Social Norms and Promote Rights Awareness:**

Policies should integrate strategies to transform discriminatory social norms through gender-sensitivity training, rights education, and public awareness campaigns that

empower women and support collective advocacy.

- **Public Subsidies for Sector-Wide Modernization:**

Targeted subsidies and incentive programs to support the modernization of dried fish yards across Bangladesh should be introduced, with a focus on inclusive infrastructure and environmentally sustainable practices that improve health, safety, and efficiency for all workers.

4.5 My Reflections on This Thesis Journey

Working on this research has been both an intellectually rigorous and personally eye-opening journey. Investigating the occupational health and hygiene conditions of dried fish processing workers in Bangladesh through a gendered lens allowed me to connect theoretical concepts with the lived experiences of marginalized women. Drawing on feminist political ecology and intersectionality, I sought to understand how gender roles shape health outcomes in the informal fisheries sector. My academic training equipped me with the conceptual tools to interrogate structural inequalities, but it was the voices and experiences of women in Nazirartek that gave this research its depth and meaning.

This research brought together my academic interests in gender and environmental justice and my professional background in development, enabling me to engage meaningfully with the everyday struggles of women in the informal fisheries sector, which are often overlooked. Throughout the research, I contended with the multifaceted dimensions of gendered health vulnerabilities, shaped by structural inequalities, patriarchal governance, and socio-economic marginalization.

At the outset, a thorough review of FPE and intersectionality literature allowed me to frame occupational health not only as a biomedical concern but as a political and gendered issue. This theoretical grounding was essential in making sense of the complex and layered challenges experienced by dried fish processors, particularly women, who bear the brunt of unhygienic working conditions, lack of infrastructure, and limited recognition in policy or workplace governance.

The fieldwork experience in Nazirartek was particularly insightful. As I observed and interacted with workers in the *kholas*, I gained firsthand understanding of how women's labour is

consistently undervalued and made invisible, even though it is central to sustaining the dried fish economy. Many women shared their experiences of poor sanitation, health complications, and limited access to protective measures—conditions normalized by both institutional neglect and cultural silence. These conversations deeply resonated with the core aims of feminist inquiry, to center voices that are often excluded and to question the systems that render them invisible.

My positionality as a Bangladeshi woman conducting research in a familiar socio-cultural environment offered both advantages and challenges. Being acquainted with social norms and knowledgeable about the local context helped in building trust, particularly with women participants who often felt more comfortable sharing sensitive issues with someone they saw as empathetic and non-judgmental. However, my association with a foreign academic institution also positioned me as an outsider in certain ways, making me continually reflect on the power dynamics inherent in the research process. I navigated this carefully, trying to listen more than speak and to center participants' perspectives in my interpretations.

Language barriers presented an additional challenge, as many participants spoke in local dialects. To support the fieldwork process, I collaborated with a local female research assistant who was fluent in the local dialect. Her contributions were invaluable in bridging linguistic and cultural gaps and in creating a comfortable environment for participants to express their views. While I was able to communicate effectively with women, patriarchal gatekeeping sometimes restricted access to certain spaces or limited the willingness of male gatekeepers to allow women's full participation. These challenges showed how gender affects the research process itself. This also reminded me why it is important to use feminist approaches that focus on building respectful relationships and understanding the local social and cultural context.

This thesis research has expanded my understanding of occupational health beyond physical indications, prompting me to consider how social norms, institutional structures, and environmental risks interact to shape gendered vulnerabilities. It has also solidified my commitment to participatory, community-engaged research that not only documents injustices but seeks to inform meaningful, gender-responsive policy interventions.

One of the most important lessons I take away from this research is that gendered vulnerabilities are not just the result of poor infrastructure or weak governance—they are embedded in everyday social relations, cultural expectations, and institutional silences. The research process has strengthened my understanding of how structural oppression operates at

multiple levels and how gender-transformative approaches are essential in addressing these injustices.

This thesis research also reinforced the importance of reflexivity and humility in research. My goal was not simply to document challenges, but to amplify voices that are often excluded from policy discourse. I remain grateful to the women and men who entrusted me with their stories, and I hope this work contributes, in some small way, to advocating for safer and more equitable working conditions in the dried fish sector of Bangladesh, and in the global context.

4.6 Limitations of the study

This study focused on the dried fish sector in Nazirartek, Cox's Bazar, which may limit the generalizability of its findings to other regions. Cultural norms around gender, hygiene, and labour conditions may have influenced participants' willingness to fully disclose sensitive information, potentially leading to underreporting or socially desirable responses. Language barriers during data collection may have caused minor misinterpretations, despite efforts to ensure accurate communication. The limited time in the field and relatively small number of interviews also constrained the depth and breadth of data. Occupational health insights were based on participant observations and self-reported experiences, without clinical assessment or medical validation, making the analysis primarily descriptive. Moreover, the study focused on binary gender roles and did not explore the experiences of gender-diverse individuals or persons with disabilities, limiting its inclusivity. As an exploratory study, the research introduces the intersectional lens, but a more comprehensive and in-depth analysis is needed to fully understand how multiple social categories interact to shape occupational health risks and coping strategies of the dried fish processing workers.

4.7 Major Contributions

This study makes a significant contribution to feminist and occupational health research by examining the gendered dimensions of occupational health and hygiene within the informal dried fish processing sector in Bangladesh. It addresses a critical research gap by exploring how socio-cultural norms, institutional governance, and inadequate workplace infrastructure intersect to create gender-specific health vulnerabilities and reinforce inequalities often overlooked in policy and academic discourse. Drawing on feminist political ecology perspectives and an intersectional

lens, the study highlights the lived experiences of women dried fish workers, emphasizing their marginalization in decision-making and their exposure to hazardous working conditions.

Additionally, the research contributes to the literature on informal labour by revealing the structural barriers faced by women, including wage disparities, inadequate workplace facilities, and limited avenues for collective action. By centering women's voices and drawing attention to gender-blind governance, the study offers nuanced insights into the systemic inequalities that perpetuate occupational health risks. The findings serve as a foundational resource for policymakers, practitioners, and scholars seeking to improve working conditions and promote gender equity in the dried fish sector, both in Bangladesh and in comparable global contexts. As such, the study enriches global discourse on gender, labour, and health in small-scale fisheries while advancing Bangladesh-specific scholarship through empirically grounded, contextually relevant analysis.

4.8 Future Research Areas

Based on the observations and findings of my study, the following research areas could help improve outcomes in the dried fish sector in Bangladesh:

- **Expand geographical scope:** Future research should go beyond Nazirartek and include other dried fish processing hubs in Bangladesh to enable comparative analyses of occupational health risks, gender dynamics, and governance practices across diverse socio-ecological settings.
- **Incorporate clinical assessments:** As clinical evaluations of workers' physical and mental health will deepen our understanding of the impacts of prolonged exposure to hazardous and unhygienic working conditions, they should be pursued.
- **Analyze patriarchal structures and intersectionality:** Further research is needed to examine how patriarchal norms, together with intersectional factors such as age, education, economic status, and ethnicity, shape gendered labour hierarchies in Nazirartek and other sites, as well as the variations of these experiences across different social groups.
- **Investigate child and adolescent labour:** More attention is needed on the health, safety, and psychosocial well-being of children and adolescents engaged in dried fish processing, an often-overlooked vulnerable group.

- **Examine environmental and climate change impacts:** How changing climate patterns, such as rising temperatures and extreme weather events, affect dried fish production, working conditions, and community livelihoods should be investigated.
- **Evaluate service provision and gaps:** Research should examine the availability, accessibility, and quality of healthcare, social support services, and social safety nets in fish-drying yards, with a particular focus on identifying gaps and assessing the local institutions' capacity to meet workers' needs.
- **In-depth socio-economic research:** Further investigation is needed into the intersection of poverty, indebtedness, food insecurity, and informal labour arrangements in the dried fish sector. Understanding these underlying socio-economic drivers can inform more targeted and sustainable policy and program interventions.

4.9 Conclusions

This research has explored the gendered dimensions of occupational health and hygiene in Bangladesh's dried fish processing sector, focusing on the experiences of women workers in the Nazirartek *kholas*. Using feminist political ecology and intersectional analysis, the study reveals how entrenched patriarchal norms, poor infrastructure, and gender-blind governance systems contribute to unsafe working conditions and heightened health risks for women. These challenges are further intensified by women's limited role in decision-making; their concentration in low-paid, labour-intensive jobs; and the absence of protective institutional mechanisms.

The study also examines how external shocks, such as cyclones and regulatory evictions, compound existing vulnerabilities. Women's ability to collectively advocate for better conditions is constrained by social norms, lack of education, limited mobility, and exclusion from leadership roles. Importantly, the presence of women in decision-making or leadership positions may not lead to equality unless structural changes are effectively implemented to ensure fair access, representation, and meaningful authority for women. These barriers to collective action, along with fragmented coping mechanisms at the individual level, further exacerbate their occupational health risks and reinforce structural inequalities.

Addressing these issues through targeted, gender-responsive interventions, such as improving physical infrastructure, ensuring women's representation in governance, and fostering

safe, equitable working environments, can significantly enhance the well-being of dried fish workers. With inclusive and sustained efforts, it is possible to break the cycle of health vulnerability and build a more just and resilient future for women in this sector.

References

- Agarwal, B. (2001). Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework. *World Development*, 29(10), 1623–1648.
[https://doi.org/10.1016/S0305-750X\(01\)00066-3](https://doi.org/10.1016/S0305-750X(01)00066-3)
- Arora-Jonsson, S. (2011). Virtue and vulnerability: Discourses on women, gender and climate change. *Global Environmental Change*, 21(2), 744–751.
<https://doi.org/10.1016/j.gloenvcha.2011.01.005>
- Aswathy, P., & Kalpana, K. (2018). Women's work, survival strategies and capitalist modernization in South Indian small-scale fisheries: The case of Kerala. *Gender, Technology and Development*, 22(3), 205–221.
<https://doi.org/10.1080/09718524.2019.1576096>
- Belton, B., Hossain, M. A. R., & Thilsted, S. H. (2018). Labour, identity, and wellbeing in Bangladesh's dried fish value chains. In D. S. Johnson, T. G. Acott, N. Stacey, & J. Urquhart (Eds.), *Social wellbeing and the values of small-scale fisheries* (pp. 217–241). Springer International Publishing. https://doi.org/10.1007/978-3-319-60750-4_10
- Chanda Shimi, A., Ara Parvin, G., Biswas, C., & Shaw, R. (2010). Impact and adaptation to flood: A focus on water supply, sanitation and health problems of rural community in Bangladesh. *Disaster Prevention and Management*, 19(3), 298–313.
<https://doi.org/10.1108/09653561011052484>
- Food and Agriculture Organization of the United Nations. (2020). *The state of world fisheries and aquaculture 2020: Sustainability in action*. <https://doi.org/10.4060/ca9229en>
- Galappaththi, M., Collins, A. M., Armitage, D., & Nayak, P. K. (2021). Linking social wellbeing and intersectionality to understand gender relations in dried fish value chains. *Maritime Studies*, 20(4), 355–370. <https://doi.org/10.1007/s40152-021-00232-3>
- Halder, C. E., Das, P. P., Rahman, S. M. T., Bhoumick, L. C., Tassdik, H., Hasan, M. A., & Mithun, S. N. (2024). Occupational hazards and risks among the women in fisher communities in Cox's Bazar and Chattogram, Bangladesh. *PLOS ONE*, 19(7), e0297400.
<https://doi.org/10.1371/journal.pone.0297400>
- Harper, S., Grubb, C., Stiles, M., & Sumaila, U. R. (2017). Contributions by women to fisheries economies: Insights from five maritime countries. *Coastal Management*, 45(2), 91–106.
<https://doi.org/10.1080/08920753.2017.1278143>

- Hennegan, J., Shannon, A. K., Rubli, J., Schwab, K. J., & Melendez-Torres, G. J. (2019). Women's and girls' experiences of menstruation in low- and middle-income countries: A systematic review and qualitative metasynthesis. *PLoS Medicine*, *16*(5), e1002803. <https://doi.org/10.1371/journal.pmed.1002803>
- Hennegan, J., Kibira, S. P. S., Exum, N. G., Schwab, K. J., Makumbi, F. E., & Bukenya, J. (2020). 'I do what a woman should do': A grounded theory study of women's menstrual experiences at work in Mukono District, Uganda. *BMJ Global Health*, *5*(11). <https://doi.org/10.1136/bmjgh-2020-003433>
- Hossain, B., Sohel, M. S., & Ryakitimbo, C. M. (2020). Climate change-induced extreme flood disaster in Bangladesh: Implications on people's livelihoods in the Char Village and their coping mechanisms. *Progress in Disaster Science*, *6*, 100079. <https://doi.org/10.1016/j.pdisas.2020.100079>
- Jalali, R. (2021). The role of water, sanitation, hygiene, and gender norms on women's health: A conceptual framework. *Gendered Perspectives on International Development*, *1*, 21–44. <https://doi.org/10.1353/gpi.2021.0001>
- Jewitt, S., & Ryley, H. (2014). It's a girl thing: Menstruation, school attendance, spatial mobility and wider gender inequalities in Kenya. *Geoforum*, *56*, 137–147. <https://doi.org/10.1016/j.geoforum.2014.07.006>
- Kabeer, N., & Mahmud, S. (2004). Globalization, gender, and poverty: Bangladeshi women workers in export and local markets. *Journal of International Development*, *16*(1), 93–109. <https://doi.org/10.1002/jid.1065>
- Karlsdóttir, A. (2008). Not sure about the shore! Transformation effects of individual transferable quotas on Iceland's fishing economy and communities. In M. Lowe & C. Carothers (Eds.), *Enclosing the fisheries: People, places, and power* (pp. 99–117). American Fisheries Society.
- Mitu, S. J., Schneider, P., Islam, M. S., Alam, M., Mozumder, M. M. H., Hossain, M. M., & Shamsuzzaman, M. M. (2021). Socio-economic context and community resilience among the people involved in fish drying practices in the south-east coast of Bangladesh. *International Journal of Environmental Research and Public Health*, *18*(12), 6242. <https://doi.org/10.3390/ijerph18126242>
- Pedroza-Gutiérrez, C., & Hapke, H. M. (2022). Women's work in small-scale fisheries: A

- framework for accounting its value. *Gender, Place & Culture*, 29(12), 1733–1750.
<https://doi.org/10.1080/0966369X.2021.1997936>
- Resurrección, B. P. (2013). Persistent women and environment linkages in climate change and sustainable development agendas. *Women's Studies International Forum*, 40, 33–43.
<https://doi.org/10.1016/j.wsif.2013.03.011>
- Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (1996). Gender and environment: A feminist political ecology perspective. In D. Rocheleau, B. Thomas-Slayter, & E. Wangari (Eds.), *Feminist political ecology: Global issues and local experiences* (pp. 3–23). Routledge.
- Sahoo, D., & Mishra, N. (2016). Development-induced displacement and gender injustice: Some critical reflections. *Journal of Politics and Governance*, 5(4), 19–30.
<https://doi.org/10.5958/2456-8023.2016.00002.4>
- Salagrama, V., & Dasu, A. (2021). *Living on the edge: Perspectives of the small-scale women fish processors of northern coastal Andhra Pradesh, India* (Working Paper No. 07; Dried Fish Matters, p. 81). The University of Manitoba / District Fishermen Youth Welfare Association.
- Smyth, E., Steyn, M., Esteves, A. M., Franks, D. M., & Vaz, K. (2015). Five 'big' issues for land access, resettlement and livelihood restoration practice: Findings of an international symposium. *Impact Assessment and Project Appraisal*, 33(3), 220–225.
<https://doi.org/10.1080/14615517.2015.1037665>
- Sommer, M., Hirsch, J. S., Nathanson, C., & Parker, R. G. (2015). Comfortably, safely, and without shame: Defining menstrual hygiene management as a public health issue. *American Journal of Public Health*, 105(7), 1302–1311.
<https://doi.org/10.2105/AJPH.2014.302525>
- Sultana, F. (2009). Community and participation in water resources management: Gendering and naturing development debates from Bangladesh. *Transactions of the Institute of British Geographers*, 34(3), 346–363. <https://doi.org/10.1111/j.1475-5661.2009.00345.x>
- Thukral, E. G. (1996). Development, displacement and rehabilitation: Locating gender. *Economic and Political Weekly*, 31(24), 1500–1503.
- Weeratunge, N., Snyder, K. A., & Sze, C. P. (2010). Gleaner, fisher, trader, processor: Understanding gendered employment in fisheries and aquaculture. *Fish and Fisheries*, 11(4), 405–420. <https://doi.org/10.1111/j.1467-2979.2010.00368.x>

Appendices

Appendix A: Research Ethics and Compliance Approval



University
of Manitoba

Research Ethics and Compliance

Human Ethics - Fort Garry
208-194 Dafoe Road
Winnipeg, MB R3T 2N2
T: 204 474 8872
humanethics@umanitoba.ca

PROTOCOL APPROVAL

Effective: November 21, 2023

Expiry: November 20, 2024

Principal Investigator: Safina Naznin
Advisor(s): C Haque
Protocol Number: HE2023-0261
Protocol Title: *Occupational Health and Hygienic Provisions of Dried Fish Processors in Bangladesh: A Gendered Perspective*

Liz Millward, Chair, REB2

Research Ethics Board 2 has reviewed and approved the above research. The Human Ethics Office (HEO) is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans- TCPS 2 (2022)*.

This approval is subject to the following conditions:

- i. Approval is granted for the research and purposes described in the protocol only.
- ii. Any changes to the protocol or research materials must be approved by the HEO before implementation.
- iii. Any deviations to the research or adverse events must be reported to the HEO immediately through an REB Event.
- iv. This approval is valid for one year only. A Renewal Request must be submitted and approved prior to the above expiry date.
- v. A Protocol Closure must be submitted to the HEO when the research is complete or if the research is terminated.
- vi. The University of Manitoba may request to audit your research documentation to confirm compliance with this approved protocol, and with the UM *Ethics of Research Involving Humans* [Ethics of Research Involving Humans](#) policies and procedures.

Appendix B: TCPS 2 Core Certification



Appendix C: Semi-structured Interview Consent Form

(Available in Bengali versions)



Project Title	Occupational Health and Hygienic Provisions of Dried Fish Processors in Bangladesh: A Gendered Perspective
Principal Investigator	Safina Naznin MNRM student, Natural Resources Institute University of Manitoba, Winnipeg, Manitoba Canada, R3T 2N2 Email: [REDACTED] Mobile: [REDACTED]
Research Supervisor	Dr. C. Emdad Haque Professor, Natural Resources Institute University of Manitoba, Winnipeg, Manitoba Canada, R3T 2N2 Email: [REDACTED] Mobile: [REDACTED]

This consent form, a copy of which will be left with you for your records and reference, is only part of the informed consent process. It should give you a basic idea of what the research is about and what your participation will involve. Please feel free to ask if you would like more detail about something mentioned or information not included here. Kindly take the time to read this carefully and understand any accompanying information.

Purpose of the research

I am a graduate student at the University of Manitoba in Canada. Currently, I am conducting my master's thesis research. The main purpose of my research is to explore occupational health and hygienic provisions for processing workers in the dried fish production system in Bangladesh.

The specific objectives are:

1. To look at how safe and clean the place where they process dried fish is, and how well it's managed.
2. To see if men and women who work with dried fish have different jobs and if it affects their health.
3. To find out how the workers handle problems and changes in their work.
4. To identify the main challenges and way forward to make a safe and healthier working environment.

Recruitment of participants:

To achieve the objective of my research, I plan to conduct interviews with various individuals, including men and women dried fish processors, traders who are directly involved in the dried fish value chain in Cox's Bazar, Bangladesh. I am requesting your participation in this study for this interview. Given your direct involvement in the dried fish value chain in your area, your insights and experiences can provide valuable knowledge and insights regarding occupational health and hygiene provisions in the dried fish processing systems in Bangladesh.

Study procedures

- Semi-structured interviews are like friendly talks where we have some planned topics to discuss, but we can also ask new questions and learn new things during the conversation. These interviews

help us gather information about what people think, feel, and believe, especially when it comes to how dried fish workers see their health and hygiene issues. I will ask a series of questions aimed at gathering insights into occupational health and hygiene issues. If you'd like, I can provide you with the complete set of questions for your review.

- The interview is expected to last around 45 minutes, and I will schedule it at your convenience, either in terms of timing or location. I will personally conduct the interview as the principal investigator. Feel free to ask any questions for clarification during the session.
- Your personal information, such as your name, address, occupational, and educational background, will not be solicited. Your participation will remain anonymous. Additionally, I kindly request that you refrain from disclosing the names and addresses of other individuals during or after the interview. I may wish to indirectly quote your statements in my master's thesis paper, journal articles, and conference papers. If you agree, you can choose whether to be quoted by a pseudonym, or anonymously. Please review the consent options in the box below if you are willing to grant permission for quotations. Please note that no direct quotes will be linked to individual participants, ensuring complete anonymity of the information. Also, you have the option to waive the anonymity if you wish to.
- If you would like to receive a concise summary of the findings (approximately 2-3 pages), I can provide it to you via email or a physical mailing address. The preliminary results are expected to be available around December 2024.

Data gathering, storage, and destruction

An audio recording device will be used to capture the interview, and I will make handwritten notes in my personal notebook regarding the key points discussed. The interview will be conducted among individuals engaged in dried fish processing, including processors, and traders. I, as the PI will personally administer the open-ended questions. I will ask the questions with a printed copy of the questionnaire and will collect information in the paper-based system. To ensure the accuracy of the information, I, the primary researcher will transcribe the audio recordings. Both the audio recording device and handwritten notes will be securely stored in a locked filing cabinet in my room in a hotel, where I will stay during the time of data collection. I will scan all data and upload them on OneDrive soon after collect these with utmost priority and confidentiality. The UofM provided an audio recording device, which will be used to record responses and it will be deleted soon after stored it in the UofM password protected OneDrive account. Electronic copies of transcripts and digital field notes will be individually encrypted and stored in the password-protected OneDrive account, which is under the management of the University of Manitoba. All data including electronic transcripts and audio recordings will be destroyed in February 2026.

Nature of participation and benefits

Your involvement in this research is entirely voluntary. There won't be any monetary rewards or immediate tangible gains for your participation. Nonetheless, your valuable input will be highly regarded, and the outcomes of this study will be advantageous for the dried fish industry in Bangladesh. Your involvement will contribute to the accumulation of knowledge and contribute to the formulation of policy recommendations.

Potential risk

In general, this research presents minimal risks to the participants. The potential risks associated with this study are on par with the everyday risks one encounters in regular life. As the principal investigator, I will take special care to ensure that your emotional and mental well-being is not compromised. There is no risk to participants concerning the safeguarding of the information you provide. Any information or stories that might reveal your identity will be kept confidential or modified to maintain confidentiality. Also, some issues related to workplace safety might come forward during the interview and considering the emotional risk, I would like to inform you about the community and psychosocial support available in the areas. For

example, Dr. Mohammad Kafil Uddin, MBBS, MPhil is providing psychosocial support in the Cox's Bazar areas and there is a One stop crisis center providing support who are working under the Ministry of Women and Children Affairs in the nearby places of Nazirartek in Cox's Bazar. As a methodological principle, sensitive emotional topics will be handled with caution, and further exploration will be avoided if participants express discomfort.

Privacy and confidentiality

In this research, the principal investigator will be rigorous in upholding privacy and confidentiality standards. No personal information or directly identifiable details will be recorded, ensuring that your information remains anonymous. However, to send a summary of findings (2-3 pages) we may need your contact details such as email/ mailing address. Please note that your contact address will be securely stored in a locked filing cabinet using a three-digit code key. Additionally, coding numbers will be employed to remove any directly identifiable information, including personal contact details. Electronic transcripts and field notes will be preserved using three-digit codes with encryption. This coding will solely serve to identify raw data, establishing a direct link between raw data and personal contact information. This linkage will facilitate data verification and clarification in case any uncertainties arise during data analysis. It can also be used to send you a summary of the findings at your mailing address. Please be informed that my supervisor will have access to all information, including both directly and indirectly identifiable information.

The collected data will be utilized for the purpose of thesis preparation, conference presentations, brief summaries, and journal articles. The study results will be presented in a descriptive and analytical manner, with no direct quotes utilized in result presentations unless you give your consent. Data will be used anonymously for publications, ensuring that no information is used in a manner that would compromise your privacy and confidentiality.

Anonymity and Confidentiality

All information provided through interviews will be kept confidential, and the research results will be reported anonymously. However, you can waive anonymity if you wish to see your name appear in the research outputs of this study. I will use codes to ensure anonymity and confidentiality in recording and processing this interview. For example, I will indicate your livelihood, location and gender to quote important statements from our interview and the number on the interview list. For example, DC-F001 whereas D means Dried fisher, C means Cox's Bazar, F stands for female and 001 represents the serial number from the interview list. Your personal information will be kept separately from interview transcripts, notes, and audio recordings. The identical coding format will also extend to naming the corresponding audio file linked to a specific transcript. If you agree to be interviewed, I will speak with you in a location of your choice ensuring the utmost confidentiality.

Withdrawal

Participation in this research is entirely voluntary. You can withdraw your consent and participation at any time during the interview. Please tell me directly if you intend to withdraw your participation during our interview. If you withdraw during the interview, I will ask you to indicate what you wish to do with the data collected up to that point. Upon request, all copies of the data will be destroyed and excluded from the study. If you choose to discontinue the interview at any time, your information will not be documented, the data will be erased from the audio voice recorder, and any handwritten notes will be securely disposed of. If you wish to withdraw from the study after the interview, please feel free to communicate with me at email: [REDACTED] Mobile: [REDACTED]. Please be informed that you must inform your withdrawal decision before May 2024.

Dissemination

The results of the research will be shared through academic conferences, peer-reviewed journals, and the

final thesis will be accessible on the University of Manitoba's website. The thesis will also be archived in the University of Manitoba's repository, MSpace (<https://mspace.lib.umanitoba.ca>). If participants express interest, a condensed summary of the findings will be distributed to them.

Feedback

Research participants can show interest to receive the summary report. After concluding the semi-structured interview, before switching off the recorder, I will recap and summarize the crucial information and primary concepts that you've conveyed during our conversation. I'll then ask for your confirmation regarding my understanding of your statements. If you notice any misinterpretations, please feel free to point them out. I will review and rectify them for accuracy. Furthermore, a brief summary of the study's findings (2-3 pages) will be made available to participants approximately by December 2024. Please indicate the option how you wish to receive this non-technical summary.

- Sent to email address: _____
- Sent to the following address: _____
- Not interested to receive the summary of findings.

Consent:

I am requesting you to indicate the following items that you agree with these.

<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher can use the audio voice recorder for this interview.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher may take hand-written notes during the interview session.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher can directly quote my information for publications using my real name.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher may use quotations by a pseudonym for future publications anonymously. Please cite my information using the following pseudonym.....
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that I have read out the full consent form and I have understood my rights to withdraw from the study.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that I am participating in this study willingly.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way. This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project, you may contact any of the above-named persons or the Human Ethics Officer at 204-474-7122 or

HumanEthics@umanitoba.ca.

A copy of this consent form has been given to you to keep for your records and reference.

Participant's signature

Date:

Researcher's signature:

Date:

Appendix D: Key Informant Interview Consent Form

(Available in Bengali versions)



Project Title	Occupational Health and Hygienic Provisions of Dried Fish Processors in Bangladesh: A Gendered Perspective
Principal Investigator	Safina Naznin MNRM student, Natural Resources Institute University of Manitoba, Winnipeg, Manitoba Canada, R3T 2N2 Email: [REDACTED] Mobile: [REDACTED]
Research Supervisor	Dr. C. Emdad Haque Professor, Natural Resources Institute University of Manitoba, Winnipeg, Manitoba Canada, R3T 2N2 Email: [REDACTED] Mobile: [REDACTED]

This consent form, a copy of which will be left with you for your records and reference, is only part of the informed consent process. It should give you a basic idea of what the research is about and what your participation will involve. Please feel free to ask if you would like more detail about something mentioned or information not included here. Kindly take the time to read this carefully and understand any accompanying information.

Purpose of the research

I am a graduate student at the University of Manitoba in Canada. Currently, I am conducting my master's thesis research. The main purpose of my research is to explore occupational health and hygienic provisions for processing workers in the dried fish production system in Bangladesh.

The specific objectives are:

5. To look at how safe and clean the place where they process dried fish is, and how well it's managed.
6. To see if men and women who work with dried fish have different jobs and if it affects their health.
7. To find out how the workers handle problems and changes in their work.
8. To identify the main challenges and way forward to make a safe and healthier working environment.

Recruitment of participants:

To achieve the objective of my research, I plan to conduct interviews with various individuals, including Dry-fish traders, Dried Fish Association Leaders, Government Officials, and Local administrators who possess knowledge and expertise in the dried fish value chain in Cox's Bazar, Bangladesh. I am requesting your participation in this study as a key informant. Given your direct or indirect involvement in the dried fish value chain in your area, your insights and experiences can provide valuable knowledge and insights regarding occupational health and hygiene provisions in the dried fish processing systems in Bangladesh.

Study procedures

- The technique of data collection will be Key Informant Interviews (KII), which is used to conduct an interview with participants who know about the overall functionalities of the dried fish processing system.
- I will ask a series of questions aimed at gathering insights into occupational health and hygiene issues. If you'd like, I can provide you with the complete set of questions for your review.
- The interview is expected to last around 45 minutes, and I will schedule it at your convenience, either in terms of timing or location. I will personally conduct the interview as the principal investigator. Feel free to ask any questions for clarification during the session.
- Your personal information, such as your name, address, occupational, and educational background, will not be solicited. Your participation will remain anonymous. Additionally, I kindly request that you refrain from disclosing the names and addresses of other individuals during or after the interview.
- I may wish to indirectly quote your statements in my master's thesis paper, journal articles, and conference papers. If you agree, you can choose whether to be quoted by a pseudonym, or anonymously. Please review the consent options in the box below if you are willing to grant permission for quotations. Please note that no direct quotes will be linked to individual participants, ensuring complete anonymity of the information. Also, you have the option to waive the anonymity if you wish to.
- If you would like to receive a concise summary of the findings (approximately 2-3 pages), I can provide it to you via email or a physical mailing address. The preliminary results are expected to be available around December 2024.

Data gathering, storage, and destruction

An audio recording device will be used to capture the interview, and I will make handwritten notes in my personal notebook regarding the key points discussed. The interview will be conducted among individuals engaged in dried fish processing, including processors, and traders. I, as the PI will personally administer the open-ended questions. I will ask the questions with a printed copy of the questionnaire and will collect information in the paper-based system. To ensure the accuracy of the information, I, the primary researcher will transcribe the audio recordings. Both the audio recording device and handwritten notes will be securely stored in a locked filing cabinet in my room in a hotel, where I will stay during the time of data collection. I will scan all data and upload them on OneDrive soon after collect these with utmost priority and confidentiality. The UofM provided an audio recording device, which will be used to record responses and it will be deleted soon after stored it in the UofM password protected OneDrive account. Electronic copies of transcripts and digital field notes will be individually encrypted and stored in the password-protected OneDrive account, which is under the management of the University of Manitoba. All data including electronic transcripts and audio recordings will be destroyed in February 2026.

Nature of participation and benefits

Your involvement in this research is entirely voluntary. There won't be any monetary rewards or immediate tangible gains for your participation. Nonetheless, your valuable input will be highly regarded, and the outcomes of this study will be advantageous for the dried fish industry in Bangladesh. Your involvement will contribute to the accumulation of knowledge and contribute to the formulation of policy recommendations.

Potential risk

In general, this research presents minimal risks to the participants. The potential risks associated with this study are on par with the everyday risks one encounters in regular life. As the principal investigator, I will take special care to ensure that your emotional and mental well-being is not compromised. There is no risk

to participants concerning the safeguarding of the information you provide. Any information or stories that might reveal your identity will be kept confidential or modified to maintain confidentiality. Also, some issues related to workplace safety might come forward during the interview and considering the emotional risk, I would like to inform you about the community and psychosocial support available in the areas. For example, Dr. Mohammad Kafil Uddin, MBBS, MPhil is providing psychosocial support in the Cox'sBazar areas and there is a One stop crisis center providing support who are working under the Ministry of Women and Children Affairs in the nearby places of Nazirartek in Cox'sBazar. As a methodological principle, sensitive emotional topics will be handled with caution, and further exploration will be avoided if participants express discomfort.

Privacy and confidentiality

In this research, the principal investigator will be rigorous in upholding privacy and confidentiality standards. No personal information or directly identifiable details will be recorded, ensuring that your information remains anonymous. However, to send a summary of findings (2-3 pages) we may need your contact details such as email/ mailing address. Please note that your contact address will be securely stored in a locked filing cabinet using a three-digit code key. Additionally, coding numbers will be employed to remove any directly identifiable information, including personal contact details. Electronic transcripts and field notes will be preserved using three-digit codes with encryption. This coding will solely serve to identify raw data, establishing a direct link between raw data and personal contact information. This linkage will facilitate data verification and clarification in case any uncertainties arise during data analysis. It can also be used to send you a summary of the findings at your mailing address. Please be informed that my supervisor will have access to all information, including both directly and indirectly identifiable information.

The collected data will be utilized for the purpose of thesis preparation, conference presentations, brief summaries, and journal articles. The study results will be presented in a descriptive and analytical manner, with no direct quotes utilized in result presentations unless you give your consent. Data will be used anonymously for publications, ensuring that no information is used in a manner that would compromise your privacy and confidentiality.

Anonymity and Confidentiality

All information provided through interviews will be kept confidential, and the research results will be reported anonymously. However, you can waive anonymity if you wish to see your name appear in the research outputs of this study. I will use codes to ensure anonymity and confidentiality in recording and processing this interview. For example, I will indicate your livelihood, location and gender to quote important statements from our interview and the number on the interview list. For example, DC-F001 whereas D means Dried fisher, C means Cox's Bazar, F stands for female and 001 represents the serial number from the interview list. Your personal information will be kept separately from interview transcripts, notes, and audio recordings. The identical coding format will also extend to naming the corresponding audio file linked to a specific transcript. If you agree to be interviewed, I will speak with you in a location of your choice ensuring the utmost confidentiality.

Withdrawal

Participation in this research is entirely voluntary. You can withdraw your consent and participation at any time during the interview. Please tell me directly if you intend to withdraw your participation during our interview. If you withdraw during the interview, I will ask you to indicate what you wish to do with the data collected up to that point. Upon request, all copies of the data will be destroyed and excluded from the study. If you choose to discontinue the interview at any time, your information will not be documented, the data will be erased from the audio voice recorder, and any handwritten notes will be securely disposed of. If you wish to withdraw from the study after the interview, please feel free to communicate with me at email: [REDACTED]; Mobile: [REDACTED]. Please be informed that

you must inform your withdrawal decision before May 2024.

Dissemination

The results of the research will be shared through academic conferences, peer-reviewed journals, and the final thesis will be accessible on the University of Manitoba's website. The thesis will also be archived in the University of Manitoba's repository, MSpace (<https://mspace.lib.umanitoba.ca>). If participants express interest, a condensed summary of the findings will be distributed to them.

Feedback

Research participants can show interest to receive the summary report. After concluding the key informant interview, before switching off the recorder, I will recap and summarize the crucial information and primary concepts that you've conveyed during our conversation. I'll then ask for your confirmation regarding my understanding of your statements. If you notice any misinterpretations, please feel free to point them out. I will review and rectify them for accuracy. Furthermore, a brief summary of the study's findings (2-3 pages) will be made available to participants approximately by December 2024. Please indicate the option how you wish to receive this non-technical summary.

- Sent to email address: _____
- Sent to the following address: _____
- Not interested to receive the summary of findings.

Consent:

I am requesting you to indicate the following items that you agree with these.

<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher can use the audio voice recorder for this interview.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher may take hand-written notes during the interview session.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher can directly quote my information for publications using my real name.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher may use quotations by a pseudonym for future publications anonymously. Please cite my information using the following pseudonym.....
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that I have read out the full consent form and I have understood my rights to withdraw from the study.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that I am participating in this study willingly.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued

participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way. This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project, you may contact any of the above-named persons or the Human Ethics Officer at 204-474-7122 or HumanEthics@umanitoba.ca.

A copy of this consent form has been given to you to keep for your records and reference.

Participant's signature

Date:

Researcher's signature:

Date:

Appendix E: Oral History Conversation Consent Form

(Available in Bengali versions)

Project Title	Occupational Health and Hygienic Provisions of Dried Fish Processors in Bangladesh: A Gendered Perspective
Principal Investigator	Safina Naznin MNRM student, Natural Resources Institute University of Manitoba, Winnipeg, Manitoba Canada, R3T 2N2 Email: [REDACTED] Mobile: [REDACTED]
Research Supervisor	Dr. C. Emdad Haque Professor, Natural Resources Institute University of Manitoba, Winnipeg, Manitoba Canada, R3T 2N2 Email: [REDACTED] Mobile: [REDACTED]

This consent form, a copy of which will be left with you for your records and reference, is only part of the informed consent process. It should give you a basic idea of what the research is about and what your participation will involve. Please feel free to ask if you would like more detail about something mentioned or information not included here. Kindly take the time to read this carefully and understand any accompanying information.

Purpose of the research

I am a graduate student at the University of Manitoba in Canada. Currently, I am conducting my master's thesis research. The main purpose of my research is to explore occupational health and hygienic provisions for processing workers in the dried fish production system in Bangladesh.

The specific objectives are:

9. To look at how safe and clean the place where they process dried fish is, and how well it's managed.
10. To see if men and women who work with dried fish have different jobs and if it affects their health.
11. To find out how the workers handle problems and changes in their work.
12. To identify the main challenges and way forward to make a safe and healthier working environment.

Recruitment of participants:

To achieve the objective of my research, I plan to conduct informal conversations with various individuals, including men and women dried fish processors, who have diverse knowledge and long experience in the dried fish processing systems in Cox's Bazar, Bangladesh. I am requesting your participation in this study for Oral History conversation. Given your direct involvement in the dried fish value chain in your area, your insights and experiences can provide valuable knowledge and insights regarding occupational health and hygiene provisions in the dried fish processing systems in Bangladesh.

Study procedures

- The data collection procedure will be an oral history. Oral history will focus on your past memory and testimony or understanding of past experiences.
- I will ask a series of questions aimed at gathering insights into occupational health and hygiene issues. If you'd like, I can provide you with the complete set of questions for your review.
- The interview is expected to last around 60 minutes, however, depend on the respondent's life story details and therefore the respondent will be given time as long it takes to complete the story, and I will schedule it at your convenience, either in terms of timing or location. I will personally conduct the interview as the principal investigator. Feel free to ask any questions for clarification during the session.
- Your personal information, such as your name, address, occupational, and educational background, will not be solicited. Your participation will remain anonymous. Additionally, I kindly request that you refrain from disclosing the names and addresses of other individuals during or after the conversation.
- I may wish to indirectly quote your statements in my master's thesis paper, journal articles, and conference papers. If you agree, you can choose whether to be quoted by a pseudonym, or anonymously. Please review the consent options in the box below if you are willing to grant permission for quotations. Please note that no direct quotes will be linked to individual participants, ensuring complete anonymity of the information. Also, you have the option to waive the anonymity if you wish to.
- If you would like to receive a concise summary of the findings (approximately 2-3 pages), I can provide it to you via email or a physical mailing address. The preliminary results are expected to be available around December 2024.

Data gathering, storage, and destruction

An audio recording device will be used to capture the interview, and I will make handwritten notes in my personal notebook regarding the key points discussed. The interview will be conducted among individuals engaged in dried fish processing, including processors, and traders. I, as the PI will personally administer the open-ended questions. I will ask the questions with a printed copy of the questionnaire and will collect information in the paper-based system. To ensure the accuracy of the information, I, the primary researcher will transcribe the audio recordings. Both the audio recording device and handwritten notes will be securely stored in a locked filing cabinet in my room in a hotel, where I will stay during the time of data collection. I will scan all data and upload them on OneDrive soon after collect these with utmost priority and confidentiality. The UofM provided an audio recording device, which will be used to record responses and it will be deleted soon after stored it in the UofM password protected OneDrive account. Electronic copies of transcripts and digital field notes will be individually encrypted and stored in the password-protected OneDrive account, which is under the management of the University of Manitoba. All data including electronic transcripts and audio recordings will be destroyed in February 2026.

Nature of participation and benefits

Your involvement in this research is entirely voluntary. There won't be any monetary rewards or immediate tangible gains for your participation. Nonetheless, your valuable input will be highly regarded, and the outcomes of this study will be advantageous for the dried fish industry in Bangladesh. Your involvement will contribute to the accumulation of knowledge and contribute to the formulation of policy recommendations.

Potential risk

In general, this research presents minimal risks to the participants. The potential risks associated with this

study are on par with the everyday risks one encounters in regular life. As the principal investigator, I will take special care to ensure that your emotional and mental well-being is not compromised. There is no risk to participants concerning the safeguarding of the information you provide. Any information or stories that might reveal your identity will be kept confidential or modified to maintain confidentiality. Also, some issues related to workplace safety might come forward during the interview and considering the emotional risk, I would like to inform you about the community and psychosocial support available in the areas. For example, Dr. Mohammad Kafil Uddin, MBBS, MPhil is providing psychosocial support in the Cox's Bazar areas and there is a One stop crisis center providing support who are working under the Ministry of Women and Children Affairs in the nearby places of Nazirartek in Cox's Bazar. As a methodological principle, sensitive emotional topics will be handled with caution, and further exploration will be avoided if participants express discomfort.

Privacy and confidentiality

In this research, the principal investigator will be rigorous in upholding privacy and confidentiality standards. No personal information or directly identifiable details will be recorded, ensuring that your information remains anonymous. However, to send a summary of findings (2-3 pages) we may need your contact details such as email/ mailing address. Please note that your contact address will be securely stored in a locked filing cabinet using a three-digit code key. Additionally, coding numbers will be employed to remove any directly identifiable information, including personal contact details. Electronic transcripts and field notes will be preserved using three-digit codes with encryption. This coding will solely serve to identify raw data, establishing a direct link between raw data and personal contact information. This linkage will facilitate data verification and clarification in case any uncertainties arise during data analysis. It can also be used to send you a summary of the findings at your mailing address. Please be informed that my supervisor will have access to all information, including both directly and indirectly identifiable information.

The collected data will be utilized for the purpose of thesis preparation, conference presentations, brief summaries, and journal articles. The study results will be presented in a descriptive and analytical manner, with no direct quotes utilized in result presentations unless you give your consent. Data will be used anonymously for publications, ensuring that no information is used in a manner that would compromise your privacy and confidentiality.

Anonymity and Confidentiality

All information provided through interviews will be kept confidential, and the research results will be reported anonymously. However, you can waive anonymity if you wish to see your name appear in the research outputs of this study. I will use codes to ensure anonymity and confidentiality in recording and processing this interview. For example, I will indicate your livelihood, location and gender to quote important statements from our interview and the number on the interview list. For example, DC-F001 whereas D means Dried fisher, C means Cox's Bazar, F stands for female and 001 represents the serial number from the interview list. Your personal information will be kept separately from interview transcripts, notes, and audio recordings. The identical coding format will also extend to naming the corresponding audio file linked to a specific transcript. If you agree to be interviewed, I will speak with you in a location of your choice ensuring the utmost confidentiality.

Withdrawal

Participation in this research is entirely voluntary. You can withdraw your consent and participation at any time during the interview. Please tell me directly if you intend to withdraw your participation during our interview. If you withdraw during the interview, I will ask you to indicate what you wish to do with the data collected up to that point. Upon request, all copies of the data will be destroyed and excluded from the study. If you choose to discontinue the interview at any time, your information will not be documented, the data will be erased from the audio voice recorder, and any handwritten notes will be securely disposed

of. If you wish to withdraw from the study after the interview, please feel free to communicate with me at email: [REDACTED]; Mobile: [REDACTED]. Please be informed that you must inform your withdrawal decision before May 2024.

Dissemination

The results of the research will be shared through academic conferences, peer-reviewed journals, and the final thesis will be accessible on the University of Manitoba's website. The thesis will also be archived in the University of Manitoba's repository, MSpace (<https://mspace.lib.umanitoba.ca>). If participants express interest, a condensed summary of the findings will be distributed to them.

Feedback

Research participants can show interest to receive the summary report. After concluding the oral history conversation, before switching off the recorder, I will recap and summarize the crucial information and primary concepts that you've conveyed during our conversation. I'll then ask for your confirmation regarding my understanding of your statements. If you notice any misinterpretations, please feel free to point them out. I will review and rectify them for accuracy. Furthermore, a brief summary of the study's findings (2-3 pages) will be made available to participants approximately by December 2024. Please indicate the option how you wish to receive this non-technical summary.

- Sent to email address: _____
- Sent to the following address: _____
- Not interested to receive the summary of findings.

Consent:

I am requesting you to indicate the following items that you agree with these.

<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher can use the audio voice recorder for this interview.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher may take hand-written notes during the interview session.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher can directly quote my information for publications using my real name.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that the researcher may use quotations by a pseudonym for future publications anonymously. Please cite my information using the following pseudonym.....
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that I have read out the full consent form and I have understood my rights to withdraw from the study.
<input type="checkbox"/> Yes <input type="checkbox"/> No	I agree that I am participating in this study willingly.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way. This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project, you may contact any of the above-named persons or the Human Ethics Officer at 204-474-7122 or HumanEthics@umanitoba.ca.

A copy of this consent form has been given to you to keep for your records and reference.

Participant's signature

Date:

Researcher's signature:

Date:

Appendix F: Interview guide for Semi-structured Interview

Code:

Location of interview:

Date:

1. How would you describe the physical infrastructure in the dried fish processing yard and its impact on the health and hygiene of workers?
2. What are the specific health implications associated with the different occupational roles, positions and statuses of women and men in the dried fish processing sector?
3. Can you share examples of coping strategies employed by women and men in the dried fish processing sector to address occupational challenges, considering factors such as gender, socio-economic status, and other relevant aspects?
4. Is there any gender-specific coping strategies that women or men employ in the dried fish processing system? If yes, what are they, and how do they differ?
5. What are the major barriers or challenges that hinder the improvement of occupational health and hygienic provisions in the dried fish processing system?
6. Are there any specific initiatives or policies currently in place to address the gender specific occupational health and hygiene needs in the dried fish processing sector?
7. How do women and men dried fish processing workers participate in decision-making processes related to occupational health and hygiene? Are their voices adequately represented?
8. Can you share any gender specific success stories or examples of initiatives that have effectively improved occupational health and hygiene provisions in the dried fish processing system?
9. In your opinion, what are the key factors that should be taken into consideration when developing strategies to enhance occupational health and hygienic provisions in the dried fish processing system?

Appendix G: Interview Guide for Key Informants

Code:

Location of interview:

Date:

1. In your opinion, what are the main challenges or barriers faced by workers in maintaining good occupational health and hygiene standards in the dried fish processing yards?
2. How does the physical infrastructure of dried fish processing yards affect the occupational health and hygiene of workers?
3. What are the existing institutional governance mechanisms and regulations in place to ensure occupational health and hygiene in dried fish processing yards?
4. What are the primary reasons for any existing disparities in occupational health and hygiene conditions between women and men working in the dried fish processing system?
5. In your view, how do the current occupational health and hygiene provisions in the dried fish processing system impact the overall well-being and productivity of the workers?
6. Based on your experience, what are the most critical areas that require immediate attention and improvement in terms of occupational health and hygienic provisions in the dried fish processing yard?
7. What are the major barriers that prevent the improvement of occupational health and hygiene provisions in the dried fish processing system?
8. Are there any specific initiatives or policies in place to address the occupational health and hygiene needs of women and men in the dried fish processing sector?
9. What are the existing mechanisms for ensuring the participation and engagement of women in decision-making processes in the dried fish processing yard?
10. How the workers themselves have taken action and worked towards enacting legislation to improve their own situation?
11. What opportunities do you see for enhancing occupational health and hygiene provisions in the dried fish processing sector?
12. How do you see the role of different stakeholders, such as government agencies, industry associations, or NGOs, in addressing the challenges and opportunities related to occupational health and hygiene in this sector?

Appendix H: Interview guide for Oral History

Code:

Location of interview:

Date:

1. How would you describe the physical infrastructure in the dried fish processing yard and its impact on the health and hygiene of workers life?
2. Can you share examples of coping strategies employed by women and men in the dried fish processing sector to address occupational challenges, considering factors such as gender, socio-economic status, and other relevant aspects?
3. Is there any gender-specific coping strategies that women or men employ in the dried fish processing system? If yes, what are they, and how do they differ?
4. What are the major barriers or challenges that hinder the improvement of occupational health and hygienic provisions in the dried fish processing system?
5. How do women and men dried fish processing workers participate in decision-making processes related to occupational health and hygiene? Are their voices adequately represented?
6. Can you share any gender-specific success stories or examples of initiatives that have effectively improved occupational health and hygiene provisions in the dried fish processing system?
7. Based on your knowledge and experience, what recommendations would you make to improve occupational health and hygienic provisions in the dried fish processing sector, taking into account the gender-specific needs of the workers?

Appendix I: Participant Observation Guide

Location of Participant Observation:

Date:

1. Physical infrastructures (eg. water, sanitation and hygiene facilities, shed/space to take rest etc.) in the dried fish processing yard
2. Fish Handling and processing activities (whether they use hand gloves, mask, or take any protective measures etc.)
3. Who does what (men and women's activities)
4. What are the main challenges or barriers faced by workers in maintaining good occupational health and hygiene? (eg. Standing long time under the sun, carry heavy weight etc.)
5. Find out any existing opportunities or potential areas for improvement regarding occupational health and hygienic provisions in the dried fish processing sector (eg. Some NGOs might work there to improve their health and safety issues, which will be clearly visible during the observation process).