

ISSN: 1683-8475

# NDC JOURNAL



VOLUME 23

NUMBER 1

DECEMBER 2024

A Professional Journal of National Defence College  
Bangladesh

*“Read! In the name of your Lord Who has created (all that exists)”*

*Surah Al-Alaq (Verse 96)*



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A Professional Journal of National Defence College, Bangladesh

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Volume 23 | Number 1 | December 2024

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National Defence College  
Bangladesh

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**Published by the National Defence College, Bangladesh**

Design & Printed by: Ornate Care

70/2, Nayapaltan, Dhaka-1000, Bangladesh

Cell: 01911546613, E mail: ornatecare@gmail.com

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## MESSAGE FROM THE CHIEF PATRON

It is with immense pleasure that I introduce the NDC Journal, Volume 23, Number 01, December 2024, which embodies our unwavering commitment to excellence in leadership, defense, security, strategy, and development studies. Since inception in 1999, the National Defence College has consistently pursued to be the leading national center of academic excellence, addressing the challenges of the 21st century. As we continue to navigate the complexities of the modern world, it is imperative that we remain steadfast in our pursuit of knowledge and understanding. I am confident that the insights presented in this journal encompassing varied subjects will contribute significantly to our collective efforts to address the challenges and opportunities that lie ahead.

The collection of research papers of this volume highlights the dedication and intellectual rigor of our Course Members and Faculty. These papers cover a diverse array of topics, all crucial to our nation's security and development. Through original insights and analysis, our contributors demonstrate their profound understanding of contemporary issues and their implications in both national and international arena.

I would like to congratulate all the authors whose works are featured in this journal. Their contributions reflect the culmination of rigorous research and thoughtful analysis, and I am confident that they will prove invaluable to readers seeking to deepen their understanding of the critical issues facing our world today.

My appreciation also goes to the Research and Academic Wing for their unwavering dedication to fostering a culture of intellectual inquiry and scholarly excellence at the National Defence College through conducting these research works. Additionally, I commend the diligence and the commitment of the editorial board in bringing this journal to fruition.



**Lieutenant General Mohammad Shaheenul Haque**  
Commandant  
National Defence College

## EDITORIAL

NDC Journal, a cornerstone of scholarly excellence of National Defence College, is a bi-annual publication dedicated to fostering a deeper understanding of the multifaceted challenges that our nation faces. This publication serves as a testament to our collective commitment to advancing knowledge and addressing the pressing issues of our time through rigorous research and thoughtful analysis.

In this edition of our esteemed journal (Volume 23, Number 01, December 2024), we present a collection of 12 research articles that reflect the diversity and complexity of contemporary issues, ranging from national security and economic development to social policy and technological innovation. Each article has been meticulously selected and reviewed to ensure that it meets the highest standards of academic pursuit.

The contributions in this volume exemplify the dedication and intellectual prowess of our researchers, who come from diverse backgrounds and bring a wealth of experience to their work. Their insights and findings not only enrich their respective fields but also contribute to the broader discourse on national and international issues. It is through such scholarly endeavors that we can better understand the challenges we face and develop informed strategies to address them.

I extend my deepest gratitude to all the authors whose work is featured in this edition. Their commitment to excellence and contributions to knowledge are truly commendable. The production of this journal is a collaborative effort, and we extend our heartfelt thanks to the editorial board, the Research and Academic Wing, and all those who have contributed to this publication. Their hard work, expertise and dedication are essential to the success of this journal.

Furthermore, I would like to express my sincere appreciation to our Chief Patron, the Commandant of NDC, Lieutenant General Mohammad Shaheenul Haque, OSP, BSP, ndc, hdmc, psc whose unwavering support and guidance have been instrumental in the publication of this journal. His leadership and vision are a source of inspiration to us all.

As with any scholarly work, we acknowledge that despite our best efforts, unintentional errors may occasionally occur in the journal. We ardently request our esteemed readers to consider those. And we shall feel obliged to receive constructive criticism if any. I hope that our valued readers find this edition both enlightening and thought-provoking. May it spark new ideas, encourage dialogue, and contribute to the advancement of knowledge in our country and beyond.



**Md Badrul Amin**

Air Vice Marshal

Editor-in-Chief

**ABSTRACTS**

**COMPREHENDING THE CONCEPT OF CENTRE OF GRAVITY:  
BANGLADESH PERSPECTIVE**

**Brigadier General Md Hakimuzzaman, SGP, ndc, afwc, psc**

Von Clausewitz coined the concept of Centre of Gravity (CG) in his book *Vom Kriege* (On War) in the context of 19th century European socio-political structure and phenomenon of war. Over the years, the concept of CG has variances in understanding and application due to the difference in national goal & objective, national interest, force structure, doctrine, etc. The CG is a well debated concept in Bangladesh Armed Forces (BDAF). Amid this backdrop, the paper aims to develop the concept of CG from Bangladesh (BD) perspective through a comprehensive study over the evolution of CG in different Western military doctrines and perception of different military theorists. Most of the Western military theorists prescribe CG as the source of mass strength or leverage, the physical or moral entity, primary component or entity. However, characteristic, capability, sources of power, or influence remain possible candidates of CG in the doctrine of the USA and UK, whereas, NATO added it's to be the entity always. No Service (entity) holds the required Critical Capability (CC) alone, rather the CCs are spread over the whole BDAF. In the era of Comprehensive National Power and Hybrid Warfare, revealing the actual source of power is extremely difficult, so as for Violent Non-State, and Proxy Actor. The primary mission of BDAF remains safeguarding the territorial integrity and sovereignty with the direct integration of people of BD, unlike the USA, UK or NATO. Therefore, the concept of CG and its application should be in consonance with the country's perspective.

**Keywords:** Centre of Gravity, Force Structure, Source of Mass Strength or Source of Leverage, Physical or Moral Entity, Primary Component or Entity, Comprehensive National Power, Hybrid Warfare, Violent Non-State Actor, Proxy Actor, Direct Integration of Peoples.

**UNTAPPED POTENTIALS OF AFRICA: COLLABORATION WITH  
BANGLADESH, CHALLENGES AND OPPORTUNITIES**

**Brigadier General Abu Hena Mohammad Razi Hasan, SUP, SPP, ndc, psc**

Over the last few decades, Africa has transformed from a 'Dark Continent' to a 'Continent of Possibility'. Despite long historical relations and the presence of Bangladeshi peacekeepers for over two decades in the continent, Bangladesh–

Africa relations remained dormant. However, Bangladesh has a tremendous opportunity to collaborate with Africa under the South-South Cooperation framework in trade, agriculture, pharmaceutical, RMG, halal industry, technology transfer sector, etc. The Gravity Model estimated that around \$634 million untapped export potential remains for Bangladesh in Africa. It was also revealed that Bangladesh's trade relations with Africa had been narrowly focused and impacted by conducive business environment and state of governance in African countries. Bangladesh-Africa peacekeeping relations have not been exploited to other sectors. Challenges like limited diplomatic reach, political instability and security concerns, cultural and language barriers, and less people-to-people connectivity, etc have impaired the enhancement of Bangladesh-Africa bilateral relations. Strengthening political and diplomatic engagement, finalizing 'Look Africa' policy, concluding agreements/MoUs, prioritizing public diplomacy and cultural promotion, and adopting a selective approach and targeted strategy, etc can mitigate the challenges emanating.

**Keywords:** Bangladesh-Africa Relations, Gravity Model, South-South Cooperation, Look Africa Policy, Diplomatic Reach.

## **CIVIL MILITARY COLLABORATION FOR EFFECTIVE FLOOD CONTROL MANAGEMENT IN BANGLADESH: A CASE STUDY**

**Brigadier General Md Mahbubur Rahman, ndc, afwc, psc**

The War of Liberation of Bangladesh was comprised of many tangible and intangible factors like cohesion, popular support, collaboration between civil and military outfits etc. Over the time, disasters have made civil and military more collaborative specially in flood control. No specific research was identified on Civil-Military collaboration for flood control. However, there are several researches on Civil Military Relations on security and disaster management. Flood of June-July 2022 of Sunamganj and Netrokona Districts were taken as case study areas for research. It was identified that existing collaboration of civil and military has improved than before. However, there are avenues of improvement for future collaboration. Conduct of seminars/ workshops, short training packages both at civil and army arena, training module at BPATC with increased military officers, formulating guidelines or SOPs/ROE and emphasizing flood control management during Military Operations Other Than War cycle of formation training of army are likely ways to enhance effective flood control.

**Keywords:** Civil-Military Collaboration, Flood Control, Disaster Management.

## **CLIMATE REFUGEE: A CHALLENGE FOR LIVELIHOOD SECURITY WITH REFERENCE TO BANGLADESH**

**Brigadier General Mohammad Shofiful Azam, SUP, PPMS, ndc, afwc, psc**

This research illuminates the critical issue of climate-induced refugees in Bangladesh, emphasizing its impact on livelihoods. Lamentably, the absence of international agreements exacerbates the challenges. The research employs a robust methodology, integrating quantitative and qualitative approaches to provide a nuanced understanding of the issue. By addressing the semantic challenges surrounding the term ‘climate refugee,’ the study contributes to clarity in communication and policy discourse. Bridging gaps in existing literature, recommendations for stakeholder integration, and a monitoring system offer practical solutions. The semantic challenge of ‘climate refugee’ nomenclature is aptly addressed. The research not only fills gaps in existing literature but also offers practical recommendations for government and non-government entities. The suggested short and long-term measures provide a roadmap for mitigating the adverse effects of climate refugees on livelihoods. Beyond its academic contribution, the research has tangible implications for policymakers, potentially influencing timely interventions and creating awareness at both governmental and organizational levels.

**Keywords:** Climate Refugee, Livelihood Security, Bangladesh

## **POLLUTION IN THE BAY OF BENGAL: IMPACT ON BLUE ECONOMY OF BANGLADESH**

**Commodore Faisal Mohammad Arifur Rahman Bhuiyan  
(G), BSP, PPM, ndc, afwc, psc, BN**

Pollution in the Bay of Bengal carries significant implications for Blue Economy of Bangladesh, which heavily depends on its marine resources and coastal regions. Effectively addressing pollution in the Bay of Bengal necessitates the implementation of rigorous environmental regulations, the establishment of effective enforcement mechanisms, and international collaboration. However, overcoming the complexities and resource demands associated with legal and regulatory challenges can be formidable. Addressing sea pollution is pivotal for the sustainable development of the region and the well-being of its residents, necessitating a combination of stringent environmental regulations, enhanced waste management practices, public awareness campaigns, and international cooperation to mitigate pollution sources and its impacts.

**Keywords:** Pollution, Bay of Bengal, Blue Economy of Bangladesh.

## **ECONOMIC SECURITY AMIDST USURIOUS MONETARY SYSTEM AND PROFIT SHARING AGREEMENTS**

**Air Commodore Muhammad Mushtaqur Rahman**  
**BSP, BPP, ndc, afwc, psc, M Phil**

The concept of making money from non-participating capital has permeated the modern economy. Determine which of the profit-sharing agreement or the usurious monetary system truly protects economic security on a macro and micro level is vital because economic security involves the security of individual and organizational dividend. When Bangladesh is put up in the conversation, the impact would be more apparent because floating interest base finance conceals the accomplishments and efforts of communities. The idea of creating a participatory society, one founded on justice and economic fairness, is the sole determination of this humble research.

**Keywords:** Economic Security, Interest, Usury, Micro-Credit, Participatory Entrepreneurship, Shared Prosperity, Paper Notes, Morality.

## **FOURTH INDUSTRIAL REVOLUTION AND DIGITAL LITERACY: AN ANALYSIS FROM WOMEN EMPOWERMENT PERSPECTIVE**

**Joint Secretary Salma Siddiqua Mahtab, ndc**

In the history of civilization, technological advancement has led to prosperity and productivity and posed challenges. This technological advancement of the new era opens the avenue of Digital Literacy (DL). This digital literacy is essential for everyone in this digital world. Still, it is essential for women because it can empower women in various ways and close the existing gender gap. But it has been found that most women are excluded from the digital world and have barriers regarding access, use, creation, and influence of technology. The study aimed to explore the relationship between digital literacy and women's empowerment in the context of the fourth industrial revolution. The study was exploratory, qualitative, and based on primary and secondary data. Based on the analysis, it was observed that the 4IR poses both opportunities and challenges for women. There is a digital gender gap that hinders women empowerment. The study found that digital literacy can empower women and enable them to fully participate and thrive in the 4IR, contributing to a more inclusive and equitable digital future. However, further research is required in different contexts and aspects to harness the benefit of digital literacy to women empowerment to build an inclusive society.

**Keywords:** 4IR, Digital Literacy, Women Empowerment, Bangladesh

## **IMPACT OF ETHNIC-BASED POLITICS TOWARDS NATIONAL STABILITY: A MALAYSIAN PERSPECTIVE**

**Captain Syanaz bin Ibrahim, ndc**

Since Malaysia's independence in 1957, ethnic politics have been a persistent issue, culminating in the tragic ethnic clashes on 13 May 1969, which resulted in the deaths of hundreds, mainly Malays and Chinese. In response, the government introduced affirmative policies and national integration programs aimed at fostering unity among the country's diverse ethnic, racial, cultural, and religious groups. However, these measures have sometimes been viewed by minority ethnic groups, particularly Chinese and Indians, as biased in favor of Malays and indigenous communities. The formation of the National Unity Government (NUG) following the 15th general election marked a significant shift in Malaysia's political landscape, historically dominated by the United Malay National Organization (UMNO) within the National Front Coalition. The NUG's emphasis on power sharing and increased opportunities for minorities in government roles has been seen as a potential catalyst for addressing the concerns of Chinese and Indian communities and promoting national unity. Interviews with academic figures and political members from UMNO, MCA, and MIC reveal confidence in the NUG's ability to reduce ethnic political tensions. Despite ongoing challenges in balancing the aspirations of different ethnic groups, the NUG presents an opportunity for greater inclusivity and unity, underscoring the importance of collaboration and equitable policies in fostering a harmonious Malaysian society. This study will serve as a valuable resource for every political and ethnic group in Malaysia as they re-evaluate their political agenda with a focus on promoting unity among the diverse ethnic and religious populations in the country. Additionally, this research will also provide a useful reference for other scholars in the field of ethnic politics and its impact on a nation's stability.

**Keywords:** Ethnic Politics, National Unity Government (NUG), National Integration Program.

## **APPLICATION OF INDIRECT APPROACH IN WARFARE: BANGLADESH ARMED FORCES PERSPECTIVE**

**Lieutenant Colonel G M Rakibur Rahman, afwc, psc, Signals**

The application of military strategy has constantly evolved over time to address the challenges posed by modern warfare. Among these strategies, the indirect approach has emerged as a crucial method employed by armed forces to achieve tactical, operational, and strategic objectives. This research aims to investigate the

application of the indirect approach from Bangladesh Armed Forces (BDAF) perspective, keeping focus on its effectiveness in present context. The study utilizes a mixed-method approach, combining qualitative analysis of recent military operations and quantitative analysis. By analysing various tools, such as unconventional warfare, information operations, unmanned systems, this research examines the significance of indirect approach in operational domain of BDAF. Using statistical analyses augmented by in-depth historical analyses of conflicts spanning over two hundred years, it has been explored that there are different types of approaches: direct defence, indirect defence, direct attack, and indirect attack. It has been observed that interaction of similar approaches favours the strong actors whereas, opposite approaches favour the weak. It is believed that, bestowed with complex geographical terrain coupled with homogeneous culture, and population of Bangladesh, BDAF may offset numerical superiority of any of its potential adversaries, should they venture for it. However, BDAF needs to be technologically advanced to achieve that feat. This research also explores various employment strategies involving different tools of indirect approach. Finally, this study analyses impact of different tools of indirect approach on various domains.

**Keywords:** Indirect Approach, BDAF, Center of Gravity, Critical vulnerabilities, Physical, Psychological, Cognitive

## **TECHNOLOGICAL PREPAREDNESS FOR SECURED AND SUSTAINABLE COMMUNICATION FOR BANGLADESH ARMY: TRANSFER OF TECHNOLOGY VIS A VIS INDIGENOUS COMMUNICATION INDUSTRY**

**Lieutenant Colonel Mohammad Manzur Hossain, afwc, psc, Signals**

Considering the prolonged war scenario, national capacity to produce war supplies is no longer a luxury. Since communication is crucial in any conflict, Bangladesh Army (BA) is thereby trying to be self-sustained in the communication sector. To address this issue, either they adopt Transfer of Technology (TOT) approach or to introduce an Indigenous Communication Industry (ICI) to produce communication devices. Since last few years BA is attempting to envision domestic manufacture of military communication hardware, but progress still in primary level. There are a number of reasons yet selection of the most suitable course of action among TOT and ICI is focused on this research. As both approaches have pros and cons, it was required to conduct research to find out the most suitable approach for establishing communication manufacturing industry. However, considering the wide arena of communication devices the scope of the research is narrowed down and kept limited to wireless communication gadgets only. After

analysing the existing security and sustainability of the communication system of BA, the pros and cons of TOT and ICI were examined. Finally, through subjective and objective analysis based on communication principles using Statistical Package for Social Science (SPSS) software, Cost-Benefit analysis, Strength Weakness Opportunity Threat (SWOT) analysis a broad strategy and road map was derived. The functional recommendations were to have such kind of industry for BA following a mixed method approach where TOT to be initiated first to produce skilled manpower and infrastructures and then shifted to own indigenous communication industry.

**Keywords:** Security and Sustainability of Communication System, Transfer of Technology, Indigenous Communication Industry.

## **INTEGRATION OF DOMESTIC EXPERTISE FOR CAPACITY DEVELOPMENT: A ROADMAP FOR RESILIENT NAVY**

**Commander Anwar Hossain Manzoor, (E), afwc, psc, BN**

The Bangladesh Navy effectively leverages foreign acquisitions for its advanced weaponry and machinery, leading to significant expenses and maintenance challenges. Therefore, it is crucial to address these challenges by gradually nurturing a culture of self-reliant development, aiming to transform into a resilient maritime force. Moreover, this necessity should align with Bangladesh's future aim of advancing technological empowerment across various government institutions, including the Navy. Therefore, drawing inspiration from developed nations, collaborative initiatives that bring together the country's technical universities, advanced industries, and local talents can kindle innovation. This can lead to the improvement of cutting-edge technologies, encompassing naval platforms, equipment, sensors, and arsenals, thereby ultimately enhancing the nation's technological prowess. While pursuing this objective, challenges such as delineating innovation areas, navigating cultural differences, managing resource constraints, and reconciling conflicting motivations may emerge. Hence, this research aims to identify deficiencies in the current development system of BN and develop suitable policies and strategies for integration with domestic expertise. Additionally, the study aims to support policymakers in creating effective strategies, acting as a guide to boost BN's technological capabilities and contribute to the overall advancement of national technological prowess. Information and data were sourced from individuals participating in integrated collaborative initiatives. This included experienced technical specialists from Navy, professionals from well-established industries, local talents and scholars from technical universities. The research utilized both qualitative and quantitative

approaches to identify solutions. Additionally, statistical tools were applied for verification and analysis to ensure the reliability and accuracy of the findings.

**Keywords:** Domestic Expertise, Capacity Development, Bangladesh Navy, Maritime Force.

## **IMPACT OF INTEGRATED COASTAL ZONE MANAGEMENT IN ACHIEVING SUSTAINABLE BLUE ECONOMIC GROWTH OF BANGLADESH: CHALLENGES AND WAYS FORWARD**

**Commander M Monzurul Islam, (TAS), NUP, afwc, psc, BN**

The research examines the impact of Integrated Coastal Zone Management (ICZM) on achieving sustainable Blue Economic Growth (BEG) in Bangladesh and proposes recommendations for successful implementation and integration of ICZM and the Blue Economy (BE) initiatives. The research is completed following the mixed research methodology (both qualitative and quantitative), where 112 literatures were consulted to find the Research Gap. The research highlights the advantages of Bangladesh of being a coastal nation, including its vast coastline, rich biodiversity, and supportive regulatory environment. The research identifies notable opportunities for BE growth in different sectors. It also expresses the connection between ICZM, BE, and BEG in Bangladesh, highlighting the interdependencies among different sectors such as Coastal Tourism, Marine Fisheries, Coastal Shipping, and Salt Production under Coastal Agriculture. The report discusses the challenges of implementing ICZM plans and connecting ICZM and BE for sustainable BEG like policy gaps, institutional constraints, and divergent stakeholder interests etcetera. The research findings confirm the significant link between ICZM implementation and BEG enhancement. Therefore, the implementation and integration of ICZM and BE is recommended, where the Bangladesh Navy (BN) is suggested as a coordinating body to assist in achieving ICZM goals and contributing to BEG. The report offers a roadmap for policymakers, practitioners, and stakeholders, addressing challenges and proposing viable solutions for implementation and integration of ICZM and BE. Recommendations include enhanced stakeholder collaboration, stronger governance frameworks, capacity building, and adoption of cutting-edge technologies. The findings and recommendations presented in this thesis serve as a valuable resource for shaping policies, strategies, and actions toward a more sustainable and prosperous BE in Bangladesh.

**Keywords:** Integrated Coastal Zone Management, Blue Economy, Sustainable Development Goal, Blue Economic Growth.

# **COMPREHENDING THE CONCEPT OF CENTRE OF GRAVITY: BANGLADESH PERSPECTIVE**

**Brigadier General Md Hakimuzzaman, SGP, ndc, afwc, psc**

## **Introduction**

The concept of Centre of Gravity (CG) was first introduced by Von Clausewitz, a Prussian General and military theorist in his book *Vom Kriege* (On War). Though the book emphasized the ‘moral, i.e., psychology’ and ‘political’ aspects of war, yet it is being studied more due to the concept of CG and for other concepts and operational art. The concept of CG (Schwerpunkt - one’s effort) remains as the core concept in the planning process of all military operations. However, a 200-year-old Clausewitz’s concept of CG has differences in understanding and application due to the notion of the nation, force structure, objective, doctrine, etc. Consequently, both the identification and analysis of CG and designing of the campaign thereupon differ significantly. In addition, the ever changing geopolitical and geostrategic equations, divergence in the national goal & objective including the national interest, and the perceptions of CG are reasonably dissimilar.

Similar to many countries, the concept of CG remains as the central pillar of the operational planning process for the Bangladesh Armed Forces (BDAF). In that, the concept of CG was first studied retrospectively of our great Liberation War (LW) 1971 through the lens of Western perception. Due to the lack of publications both in doctrinal and conceptual domains, the CG is a well debated concept in operational planning process in BDAF. In addition, the national goal & objective, national interest, the force structure & capability of BDAF, military objective, doctrine, etc. are quite different than that of Western countries and alliance (i.e., the USA, the UK and NATO). Therefore, the need of understanding the concept of CG

from Bangladesh (BD) perspective is the cornerstone in developing the Operational Approach and the Operational Design.

In view of the above discussion, and the problem identified, the paper holds the primary objective to developing the concept of CG from BD perspective including the method of identifying and analysing the CG. In pursuing the primary objective, the paper explores the genesis of the concept of CG with a sufficient degree of evolution as the 1st secondary objective. This leads to the 2nd secondary objective, i.e., the squaring of different expositions of the concept by different military theorists, including a critical overview of the concept in the Western military doctrines. The paper follows the explanatory method of research taking the secondary data from different literatures and doctrines. At the same time, knowledge and discourse of the Armed Forces War Course (AFWC) and National Defence Course (NDC) are aptly analysed at relevant places, including the conduct of Key Informant Interview.

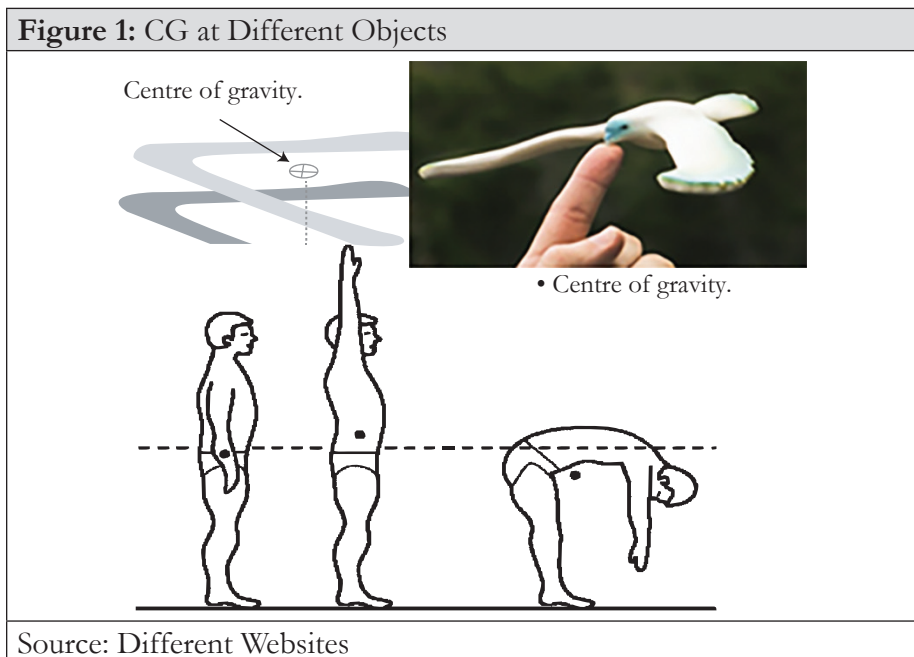
## **Aim**

The aim of this paper is to develop the apt concept of CG from BD perspective with a view to proposing an appropriate method of identifying and analysing the CG.

## **The Genesis and Evolution of the Concept of CG**

**The CG in Science and Takeaways.** The scientific definition of CG remains useful as the metaphor dealing with the socio-political issues. The most apt definition can be that in any object (including boomerangs), the point through which the total weight of the object can be said to act is called the CG. Figure -1 shows locations of a few interesting CGs of different objects. Following are a few important takeaways, which can also be applied to comprehend the concept of CG:

- The CG can be located at the outside of the object, e.g., boomerang. The CG is not always necessary to be located or lie into the body/object.
- The CG not necessarily be located at the middle or mean position of the object, nor even at the strongest part of the object. In addition, finding the location of the CG of an asymmetric object is always difficult. The application of these facts is observed in war between/among conventional against an asymmetric force, e.g., unconventional/sub-conventional/militia groups, etc.
- The location of the CG can be transitory for a dynamic/moving object. Similar way, the CG of fighting forces may also be transitory with respect to time, space and condition.



**Genesis of the Concept.** Clausewitz's wife Marie, with the aid of her brother and others edited Clausewitz's unfinished manuscripts and published them as his collected works in ten volumes. The first three of

these, comprising Vom Kriege (On War), appeared in 1832-34 (Bassford, Clausewitz and His Works). Clausewitz, whose formal education was generally in engineering<sup>1</sup> developed “On War” in the context of 19th century European socio-political structure and phenomenon of war. Consequently, the term Schwerpunkt, today’s CG appears about 40 times in Clausewitz’s book, On War. However, the German term ‘Schwerpunkt’ means main weight or focus or one’s effort, whereas the German specific term for Centre of Gravity is ‘Gravitationspunkt’. The original version of Schwerpunkt in German language and its English translation by Artificial Intelligence are shown in Table -1.

**Clausewitz’s Schwerpunkt-Mistranslated and Misunderstood.** In Book III and IV, Clausewitz uses the term ‘mass’ repeatedly. Elsewhere he switches to CG and Centre of Force. Since the terms ‘Centre of Mass’, ‘CG’, and ‘Centre of Force’, refer to the same point on an object or a body, they can be considered equal. In modern terminology, the term ‘mass’ is often replaced with numerical ‘superiority’<sup>2</sup>. Therefore, when he was using the various terminologies (‘Centre of Mass’, ‘CG’, ‘Centre of Force’ or ‘Numerical Superiority’), Clausewitz was probably talking about the same point. Considering the 19th century’s European socio-political canvas, 3rd party edition<sup>3</sup> from the manuscript, it cannot be ascertained that Clausewitz meant all four terminologies are same in either meaning or application. However, ‘numerical superiority’ in terms of man, equipment and capability can better explain as the Main Effort. At the same time, Centre of Mass can always be replaced by better suited term, Concentration of Forces and finally, in a dynamic battle space, Centre of Forces may not even exist. On the same note, the Schwerpunkt of Clausewitz was mistranslated by Anglo military theorists; Michael Howard and Peter Paret as the CG. In 1976, They translated Clausewitz’s “On War” (Howard, p. 595-596) into English presented at Table -1.

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1 Clausewitz devised many mechanical metaphors, e.g., Fulcrum, CG, Centre of Mass, Numerical Superiority, Shock, etc. and successfully conveyed the socio-political concepts through those.

2 Term implying gaining an advantage over an adversary by having more soldiers or more equipment to dominate a situation

3 Published after the death of Clausewitz

## The Concept of CG by the Contemporary Military Theorists

Table 1: Comparison of Translated Meaning of the Concept of CG		
In Original German	Translation by AI	Translation by Michael Howard and Peter Paret
<p>So wie sich der <b>Schwerpunkt</b> immer da findet, wo die meiste Masse beisammen ist, und wie jeder Stoß gegen den <b>Schwerpunkt</b> der Last am wirksamsten ist, wie ferner der stärkste Stoß mit dem <b>Schwerpunkt</b> der Kraft erhalten wird, so ist es auch im Kriege</p>	<p>Just as the <i>centre of gravity</i> <b>always locates</b> itself where the <i>most mass is concentrated</i>, and as every impact against the centre of gravity of the load is most effective, as furthermore <i>the strongest impact is received with the centre of gravity of the force</i>, so it is also in war</p>	<p>One must keep the <i>dominant characteristics</i> of both belligerents in mind. Out of these characteristics a certain centre of gravity develops, <i>the hub of all power and movement, on which everything depends</i>...the point at which all our energies should be directed</p>
Source: Author Compilation		

**In the Literatures of Dr. Milan N. Vego.** Dr. Milan N. Vego describes and explains the concept of CG at length and defines the CG in generic terms as (Vego, p. VII-13):

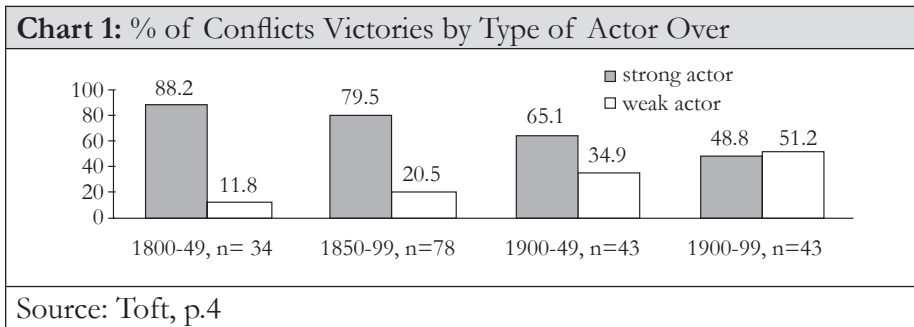
‘a source of massed strength - physical or moral - or a source of leverage whose serious degradation, dislocation, neutralization, or destruction would have the most decisive impact on the enemy’s or one’s own ability to accomplish a given political/ military objective’.

A few important arguments are appended below to figure out the relevance to our context:

- The CG is the mass strength or source of leverage to accomplish the given mission/ objective. The mass strength is not constant, rather it depends on the given objective. The mass strength of the Egyptian Forces in Yom Kippur War 1973 was the Armoured Corps, but the Air Defence (AD) Capability was found to be critical against mighty Israeli Air Power (i.e., CG of Israeli Defence Force (IDF) from Egyptian perspective). After knocking down and making ineffective of Egyptian AD Capability by the Ground and Special Forces, the IDF Air Power played havoc and consequently Egyptian Forces collapsed. It may be

argued that, the mass strength was the Egyptian Armoured Corps, but the AD Capability was the CG of Egyptian Forces in 1973. On the same note, the IDF Armoured Corps had been the battle winning element during both break-in and breakout operations of the Suez Canal. However, the same Armoured Corps of IDF miserably denied in Ismailia by the asymmetric strategy i.e., Small Group Operations against IDF Armoured both by Special Forces and Militias (Featured Documentary by Al Jazeera: The War in October the Battle and Beyond, Part 1-3). Therefore, it is not essential that the CG remains or lies in the mass strength always, rather it is also depended on method (Ways, i.e. Capability) appropriate for attaining the objective.

- Ivan Arregun-Toft in his book ‘How the Weak Win Wars – A Theory of Asymmetric Conflict’ reveals very interesting facts about the outcome/excepted effects when Strong versus Weak Actor and Direct versus Indirect Approach adopted by the belligerents. The data of two hundred years (1800-2003) shows that the Weak Actors were becoming more and more victorious over the Strong Actors, starting from 28.5% to 51.2% (Toft, p. 2-4, 38). Again, a Weak Actor has equal possibility to win over a Strong Actor when adopting Indirect against Direct Approach. Therefore, it was not and is not the mass strength (i.e., Means), rather it could be a characteristic of a Force (e.g, doctrine, operational approach, etc.), or a method, i.e., Ways (e.g, asymmetric, unconventional, sub-conventional, unrestricted, etc. types of warfare) which would also determine the fate of the armed conflict.



**Centripetal Force Concept of Dr. Echevarria.** Dr. Echevarria in his book ‘Clausewitz – Contemporary War’ redefines CG as a ‘focal point,’ not as a strength (or a weakness) or a source of strength. A CG is more than a critical capability; it is the point where a certain centripetal force seems to exist, something that holds everything else together (Echevarria, p.118-119). The following points related to BD perspective on the issue are drawn:

- Emphasis, not on strength or weakness or the sources of strength but on cohesion.
- Replaces the CG metaphor with ‘Centripetal Force’ that holds the force together.
- This concept was found to be effective in understanding warfare based on ideology, where transborder/regional/global elements exist, e.g., War on Terror. The CG generally lies in the ideology/values rather than entity. In that, the CG didn’t exist in the Western Forces, rather in the Western Values (Echevarria, p.118-119). Then the soaring question comes in, can Will to Fight, National Unity, Political Unity/ Will, Leadership, etc. replace this Centripetal Force?

**CG and Critical Vulnerability (CV) – Dr. Joe Strange.** CG can exist at all levels of war - tactical, operational, strategic. And, there can be multiple CGs at a particular level of war (Strange, p. 3, Part 2). According to Joe Strange and Colonel Richard Iron, the CGs (Strange, p. 7, Part 2):

‘Are physical or moral entities that are the primary components of physical or moral strength, power and resistance. They don’t just contribute to strength; they ARE the strength.’

CGs are physical or moral entities that strike effective blow in operations and campaigns designed to defeat enemy’s CG. Obviously, CGs must possess certain characteristics and capabilities, otherwise they would indeed not be CGs (Strange, p. 21, Part 2). Following discourse would be useful in finding most suitable definition for BD:

- The HUB is replaced by Primary Components in defining CG. At the same time, it negates three important aspects, i.e., Characteristics, Capabilities and Locations for CG.
- The root causes of war/conflict, pattern of conflict<sup>4</sup>, operational environment, etc. will determine the Ways-Means-Objective at all levels of wars. The primary components may not be the same for aforesaid variables, so as the CG(s).
- The USA has a number of Commands across the globe with sufficient and required capabilities, so as to NATO. The Command is augmented in different capabilities according to the given objective(s). In contrast, our critical fighting (predominately combat) capabilities are spread over different Services (BA, BN, BAF and other forces), i.e., no entity alone has war winning capabilities. In addition, concept of people's integration in direct war fighting effort further dilutes the idea of having only Primary Components as the CG(s).

**Concept of CG-Dr. Colonel (Retired) Dale C. Eikmeir.** In numerous articles, he tries to reveal flaws of the concept in different literatures of prominent military theorists and doctrines of the USA and NATO. He redefines the CG concept as:

‘The CG is the primary entity that inherently possesses the CCs to achieve the objective’.

The exposition of Dr. Eikmeir and related discourses are drawn to reveal the relevance to BD:

- $A$  (primary entity) +  $B$  (capabilities to achieve the objective) = CG.
- An objective is always linked to a CG. The CG is the primary possessor of the capabilities that achieve the objective. It isn't a source of power, rather is the possessor and wielder of that power. The existence of

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<sup>4</sup> Conventional, unconventional, sub-conventional, proxy, etc. Demographic, geographic, spillover, naturally entangled, territorial integrity, sovereignty, etc.

primary entity means, there is or are secondary or supporting, or even essential entities and those are CRs not CG.

- Interesting to note, in the definition there are NO ‘moral CGs’, only ‘physical CGs’. The explanation is simple and negates the possibilities of intangibles, e.g., moral strength, public opinion, righteousness of cause, will to fight, etc. Righteousness of cause and will to fight were perhaps the doers during the LW 1971. In addition, integration of Unconventional Warfare (UCW) and direct integration of People in the war (i.e., concept of Total People’s War - TPW) would be the driving forces during the war of BD, when needed. Besides, the Moral Component of Fighting Power<sup>5</sup> would be extremely significant, when the country fights for her own sovereignty and territorial integrity, unlike to the expeditionary forces like the USA, UK, NATO, etc. Armed Forces, that holds comparatively less Combat Power (resource, i.e., MEANS) than the adversary, naturally develop superior concept (WAYS, say, asymmetric or unorthodox) to achieve the objective (END STATE).
- The real CG is supported, other candidates are supporting and CG is the doer. However, considering a physical entity is always the doer, may mislead the fundamental understanding of the concept, since the doer physical entity most of the time is driven by some moral components (specially for a country like BD and other resistance forces/entities).

## **Evolution of the CG Concept in Western Military Doctrines**

**The Concept of CG in the Western Doctrines.** The definition of CG in the military doctrine of the USA, UK, and NATO over the time is presented at Table -2.

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5 Fighting Power has three components, i.e., Physical (i.e., Combat) Power, Moral and Conceptual Elements.

**Table 2: The Definition of CG in Western Military Doctrines**

<u>CG in the USA Doctrines</u>	<u>CG in the NATO Doctrine</u>
<p>The US Army introduced the concept of the CG in its 1986 version of FM 100-5 as:</p> <p>‘The CG of an <b>armed force</b> refers to those <b>sources of strength or balance</b>. It is that characteristic, capability, or <b>locality</b> from which the force derives its freedom of action, physical strength, or will to fight.’</p> <p>In 1993 the US Army revised the definition and declared:</p> <p>‘The CG is the <b>hub of all power and movement upon which everything depends</b>. It is that characteristic, capability, or location from which enemy and friendly forces derive their freedom of action, physical strength, or will to fight’</p> <p>US Joint Doctrine immediately revised the concept in 1994, JP 1-02 redefined as;</p> <p>‘Those <b>characteristics, capabilities, or localities</b> from which a military force derives its freedom of action, physical strength, or will to fight.’</p> <p>A slight change in 2002, defined the CG as, replacing localities with sources of power;</p> <p>‘... those <b>characteristics, capabilities, or sources of power</b> from which a military force derives its freedom of action, physical strength, or will to fight.’</p>	<p>NATO adopted the concept of CG and following the US doctrine defined it in <i>Allied Joint Publication (Doctrine) AJP-01(D), 2013</i> as;</p> <p>‘Characteristics, capabilities, or <b>localities</b> from which <b>a nation, an alliance</b>, a military force or other grouping derives its freedom of action, physical strength, or will to fight.’</p> <p>However, <i>Allied Joint Publication (AJP) -5; Allied Joint Doctrine for the Planning of Operations</i>, Edition A Version 2 with UK National Elements, <b>2019</b> abruptly evolved to a new stance and defines CG as:</p> <p>‘The primary <b>source of power</b> that provides an actor its strength, freedom of action, or will to fight. <b>It is always an entity.</b></p> <p><u>CG in the UK Doctrine</u></p> <p>The UK Joint Doctrine Publication (JDP) 5-00, 2<sup>nd</sup> Edition, Change 2, July 2013 defines CG as;</p> <p>‘A characteristic, capability, or <b>influence</b> from which a nation, an alliance, a military force or <b>other civil or militia</b> grouping draws its freedom of action, physical strength, <b>cohesion</b> or will to fight.’</p> <p>Though, the UK has its own operational doctrine, yet it follows the NATO doctrine once it operates within the alliance. Despite, having the effective and contemporary elements/ aspects (e.g., <b>influence, other civil or militia grouping, cohesion</b> etc.) in the definition, the UK may follow different approach according to its employment.</p>
<p>Source: Author Compilation from Respective Doctrines</p>	

## A Critical Analysis through the Lens of Bangladesh

- **Geographic Feature and LW 1971: A Retrospect Analysis.** There is a tendency to select important geographic feature/locality as CG. The identification of Dhaka as the CG of the Pakistani Forces in LW 1971, perhaps lead to such notion. In fact, there was hardly any defence to guard Dhaka by Pakistani Forces in 1971 (Bhaskar, 2018). Fall of Dhaka to 101 Communication Zone without any real combat testifies Dhaka was not the CG of any level<sup>6</sup>. It may be argued strongly that the moral defeat (including defeat in Diplomatic Line) in the then

<sup>6</sup> Pakistan appreciated that the northern part of East Pakistan would be captured by Indian Forces in order to setting up BD Government and resettling the refugees. The forces deployment also suggests the hypothesis. Ibid.

East Pakistan caused the collapse of Pakistani forces operating in the then East Pakistan. In addition, the factor of location/locality was relegated from military doctrines different countries, and which can well be covered by either DP or Vital Ground.

- According to the AJP 5-00, 2019<sup>7</sup>, the ‘CG is always an entity’, which deserves the following striking discourse from BD perspective:
  - BD cannot take the same definition as the NATO or UK due to the fundamental differences in doctrine, organisational (including force structure and capabilities) aspects, objective(s), etc.
  - In the modern time, a single entity (i.e., Service/Force/Task Group) doesn’t hold any CC alone, rather the CCs (e.g., AD or Cyber capabilities) are generally spread over number of entities.
  - All the defeat mechanism (destroy, isolate, disintegrate, and dislocate) aims at either threat capability/ability or at positional advantages, not at a particular entity of the threat (JP 5-0, p. III-34-35).
  - In the era of hybrid warfare, discovering the entity that provides strength, freedom of action and will to fight, is extremely difficult, and engaging that entity sometimes beyond own capability. In Cyber Warfare scenario, it may not be possible to fight the entity, rather the capability. The sources of power of Violent Non-State Actor(s) (VNSA), or proxy may not be even in the immediate battlespace, rather it remains grey, obscure and located elsewhere.
  - Fighting an ideology at any level of warfare, source of power doesn’t remain in the physical entity, rather it’s either characteristic or influence that drives the entity to fight. The driver/influencer is the doer, not the entity always.
  - In LW 1971, approximately, out of 100 thousand Pakistani Forces (News18, 1971 Indo-Pak War), 93 thousand surrendered against the casualties of only 3-8 thousand (The Civilianization of War,

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7 Which the UK has acknowledges as the allied doctrine

2018) implies, CG may not be the entity always at any level of warfare. Military history also reveals that the number of Prisoners of War has always been much higher than the casualties in the war. The fate of the war changed with the change in the leadership or doctrine with the same force (entity) and same belligerents.

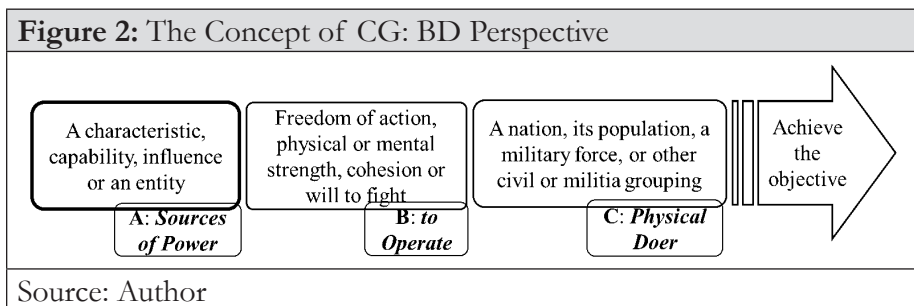
- The outcome of any war not entirely depends on the mass strength or the size of the entity, rather both tangible (doctrine, ways, critical system/platform/weapon, etc.) and intangible (leadership, righteousness of cause, will to fight, national unity, etc.) factors determine the fate of the war.

## Revisiting the Concept of CG from BD Perspective

**CG - BD Perspective.** As the paper summarises the concept of CG coined by relevant military theorists and overviews the concept of CG laid down in different military doctrines, including the Joint Doctrine of BDAF, the paper prescribes the following definition of the CG for BD:

‘A characteristic, capability, influence or an entity from which a nation, its population, a military force or other civil or militia grouping derives its freedom of action, physical strength, cohesion or will to fight to achieve the objective.’

**Exposition and Rationales.** The concept of CG can be divided into 4 elements, i.e. A, B, C and the Objective as expressed in Figure -2.



In the construct of the CG, ‘C’ is/are the physical doer, who draws sources of power and energy from ‘A’ for operating ‘B’ towards the achievement of the Objective. The physical doer does only when it is influenced, powered

and energised by 'A'. Therefore, CG lies in 'A', not in 'C'. Though the elements of A, B or C are necessarily singular, rather in most of the cases, these are the combinations of more than one element. The following discourse is going to clarify a few of our existing concepts about the CG (focusing more on Operational Level for BD):

- Why is the location/locality, i.e., geographical feature excluded from the concept? To address this, first of all, we need to identify the objective of the threat clearly. If it is to defeat the adversary's military operations, or degrade opponent's military capability or similar type of objective, then the particular locality is unlikely to provide 'B'. However, if the threat objective is to achieve control of a specific territory (locality) or the whole country, then the specific locality (may even be the capital of the country) may generate power and energy to 'C' to operate 'B', then the locality would be one of the most important DPs. In fact, there is no such geographic feature in BD from where BDAF draws its 'B' effectively, i.e., the fall of that geographic feature would cause ruin or collapse of war-fighting effort.
- What about an entity as likely CG? BD has to fight jointly today and also in future. No Service alone hold any critical capability which provides 'B', rather it is the joint effort not only by three Services, but also from direct people's integration (e.g., UCW or TPW, etc.). On the question of country's territorial integrity or sovereignty, even a Service may turn into ineffective, then rest of BDAF along with the people will continue to fight towards the attainment of the objective. On the other hand, any element of military entity of the potential adversary doesn't also hold de facto CCs to attain the objective inside BD<sup>8</sup>. One may even argue about the Operational/Theatre Reserve (a combined forces) as the CG at Operational Level. Certainly, it influences a portion of the Area of Operation (AOP), which, sometimes determines the Main Effort of ensuing operations. The engagement of the Reserve is mostly

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<sup>8</sup> For example, for conduct of an Operational Manoeuvre essentially needs suitable Armoured elements, Operational Fire, apt Air Support, Early Warning, etc. which is otherwise a combine effort of Army, Navy and Air Component

preserved for the most critical event closer to the attainment of the final objective or employed to obstruct attainment of threat ultimate objective. Then, what about the operations, battles, or the engagement till the employment of the Reserve of either side? In fact, the Reserve is primarily kept for contingency and a campaign may even end up without direct employment of the Reserve. However, when a truly joint force<sup>9</sup> holds all the required CCs (say, for a particular objective) or elimination/complete destruction of an entity is the objective, or the entity truly provides power to operate 'B', only then the entity may turn into the CG for the operations.

- The CG lies in 'A', not in 'C'. However, cohesion or will to fight may remain as the possible candidates of CG at Strategic Level.
- In the era of 'Comprehensive National Power' (CNP)<sup>10</sup>, the concept of 'Unrestricted Warfare', ever increasing the application of 'Hybrid War' make the both strategic and operational environment much more complex than before. Further, this complex environment widens the scope of more Proxy War, Irregular Warfare, Semi-conventional, Surrogate Warfare<sup>11</sup>, etc. (Krieg Andreas and Rickli Jean-Marc, 2019). Altogether, in the conventional scenario, both power and ability of any nation don't remain in the single entity (say military, economy or even politics, etc.) with a view to pursuing her national interests or goals. Similarly, at operation level, the both power and capability are spread over different entities. Therefore, neutralising any entity doesn't necessarily ensure the unlocking the CG at the operational level.
- The US led 'War on Terror' continued for the last two decades and failed to achieve their both operational and strategic objectives. The CG of threat from the US perspective arguably was, 'Middle Eastern

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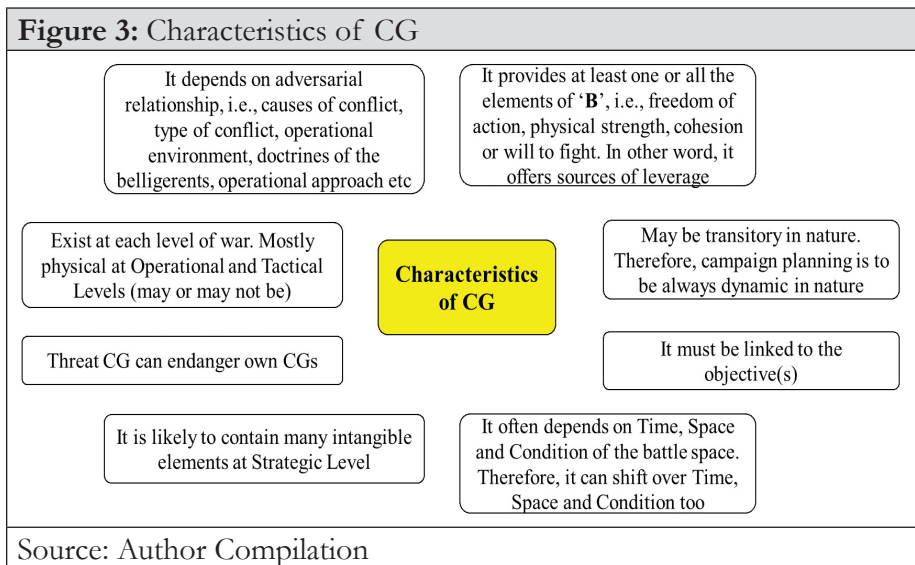
9 Force development including equipment, training, doctrine, planning, etc. are carried out jointly and under the single headquarters and leadership

10 Generally, defines the sum total of the powers or strengths of a country in economy, military affairs, science & technology, education and resources and its influence

11 A patron's outsourcing of the strategic, operational, or tactical burdens of warfare, in whole or in part, to human and/or technological substitutes in order to minimize the costs of war.

terror groups centred on Al Qaeda<sup>12</sup>. After over two decades, Al Qaeda not only spread all over the world, but also influenced the aftermath of the US’s invasion of Iraq, where ‘Islamic State of Iraq and the Levant (ISIL), ISIS, etc. evolved. The relevancy of the concept CG is in question when fighting against an ideology. However, many of the Western military scholars through the retrospective analysis advocate ‘Ideology’ would be the appropriate CG of ISIL from the US perspective. It may be safe to argue that the CG of the ISIL or Al Qaeda was not the ‘entity’ per se, rather ‘influence (A)’ of the theological belief (i.e., ideology, a metaphysic), which drives the ‘C’ in order to achieve ‘B’.

**Characterising CG.** Characterising the CG actually helps to identifying/ constituting the CG(s), so as to determining the Operational Approach. A few (not necessarily exhaustive), but important characteristics of CG are mentioned at Figure -3, which otherwise help to evaluate possible CG candidates (Figure -5) through a subjective analysis.



12 'Understanding Centres of Gravity and Critical Vulnerabilities' by Dr. Jeo Strange and Colonel Richard Iron, p-20

## Identification and Analysis of the CG, how?

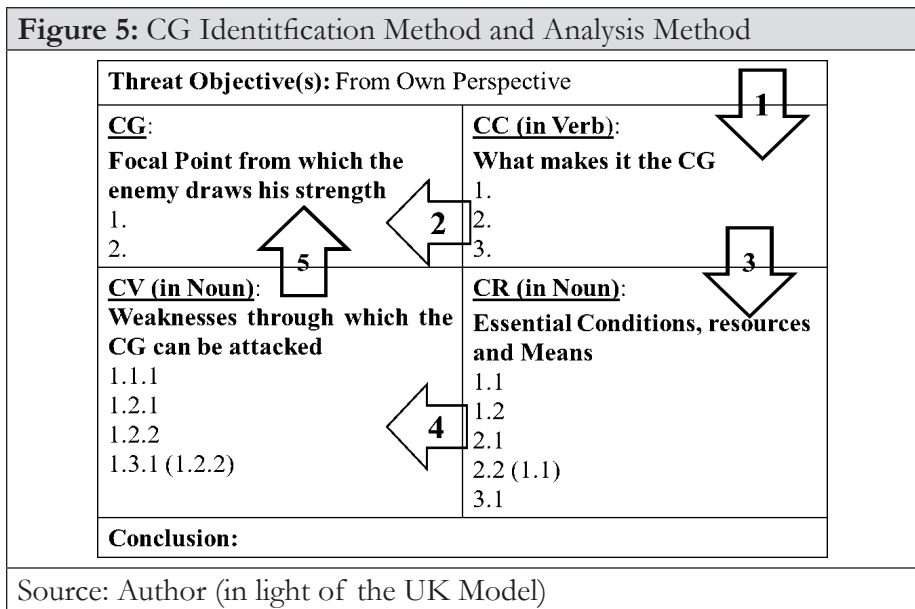
**Objective Based Approach.** The CG of either side; own and threat strongly linked with the objective(s) of respective sides. Though at Operational Level, Operational Objective(s) is/are received/deduced from the objective of the Strategic (Military Strategic Level for BD case) level, yet careful analysis of the Joint Intelligent Preparation of Operational Environment (JIPOE), including Operational Estimate are sine qua non in order to understand the strategy likely to be adopted by the opponents. Figure-4, shows that objective of lower level is generally derived from the objective of higher level of operations, whereas the CG of each level is generally derived from the objective of the same level. Again, a single objective of higher level may produce more than one objective. However, the threat CG from own perspective for a given situation and objective(s) are not easy to identify, rather it requires a vast understanding of the threat objective vis-à-vis her capability, vulnerability, strategic culture, causes of conflict, likely pattern & type of conflict, doctrine, etc. Therefore, it is the composing of the threat CG from own perspective rather mere an identification.

**Figure 4: Sequence of Understanding CG at Different Levels**

Level	End State	Objective	CG
Strategic			
Military Strategic			
Operational			
Tactical			May or may not have

Source: Author

**Methodology of the Threat CG Construction and Analysis at Optional Level.** A good number of CG identification/composition methods<sup>13</sup> have been studied with a view to suggesting the most appropriate method for BD at Operational Level. Out of which, Dr. Jeo Strange’s 6 Box Method and the UK Model are very close to formulate a feasible model/format to identify/compose the CG at Operational Level of BDAF. Author prescribes both the identification and analysis of CG should be done through single method in order to avoid any confusion. Here, the very analysing sequence is the key in the prescribed model, which goes through five steps towards the conclusion, i.e., the composition of the CG. The details of each step are illustrated in Table -3.



13 Mind Mapping based on set criteria of CG, Strategic Ring Model of Warden, National Element of Value Model, Critical Strength (CS) - CV by Dr. Milan Vego, Dr. Jeo Strange’s CG-CC-CR-CV Construct (6 box Method), System of System Analysis (SOSA), Dr. Eikmeir’s Ways-Means-End State Construct, Current UK model, etc. are a few important methodologies that are studied.

<b>Table 3: CG Identification Method and Analysis</b>	
<p style="text-align: center;"><b>Step-1 (WAYS)</b></p> <ol style="list-style-type: none"> <li>1. Threat Operational objective is generally derived from the objective of Strategic/ Military Strategic objective (Figure -4).</li> <li>2. List the CCs that the threat essentially needs to achieve the Objective(s) and in form of <i>Adverbs</i>, which are otherwise indicative to WAYS (caution: avoid a long list).</li> <li>3. Cross-examine each CC against other in order to minimize number of the CC by adding additional qualification/ capability to a relevant CC.</li> <li>4. Example: ability to defeat Threat offensive, ability to hold own territory, ability to integrating Population in TPW etc.</li> </ol>	<p style="text-align: center;"><b>Step-2 (WAYS)</b></p> <ol style="list-style-type: none"> <li>1. Follow the definition (including relevant characteristics) of CG, find out probable CG candidates, which <b>hold/ supported</b> by the all CCs of Step -1.</li> <li>2. Ask questions:                     <ol style="list-style-type: none"> <li>a. Does the candidate perform the primary action that achieve the objective(s)? Yes (Y)</li> <li>b. Is it supported or hold all the CCs? Y</li> <li>c. Is it the primary doer? Y, physical or moral?</li> <li>d. Does it drive the primary doer to do? Y</li> </ol> </li> </ol>
<p style="text-align: center;"><b>Step-3 (MEANS)</b></p> <ol style="list-style-type: none"> <li>1. List corresponding CR(s) for each CC in the form of <b>Nouns</b>. These are the conditions, resources and means to achieve its CC.</li> <li>2. Cross-examine each CR against other in order to minimize number of the CR by adding additional qualification/ capability to a particular CR</li> <li>3. Example:                     <ol style="list-style-type: none"> <li>1.1 (corresponding to CC-1) Manoeuvre element capable of conducting manoeuvre within and beyond boundary.</li> <li>2.1 (corresponding to CC-2) Operational fire elements able to conduct operational fire covering whole of Land Area of Operation (AOP)</li> </ol> </li> </ol>	<p style="text-align: center;"><b>Step-4 (MEANS)</b></p> <ol style="list-style-type: none"> <li>1. These are the deficient or vulnerable to corresponding CR in order to neutralization or falling of CG.</li> <li>2. List corresponding CV(s) for each CR.</li> <li>3. Prime Distinction between <b>CV &amp; CW</b> (Critical Weakness); weakness which can be exploited is the CV, and rests are CWs.</li> <li>3. Write in <i>qualitative noun form</i>, e.g., lack of... etc.</li> <li>4. Example:                     <ol style="list-style-type: none"> <li>1.1.1 (corresponding to CR 1.1) inadequate (or lack of) technically compatible tanks</li> <li>1.1.2 (corresponding to CR 1.1) lack of long and medium Artillery support for conducting operational manoeuvre.</li> </ol> </li> </ol>
<p style="text-align: center;"><b>Step-5 (Cross Check)</b></p> <ol style="list-style-type: none"> <li>1. Crosscheck the CG Candidate can guard maximum/ most of the CVs.</li> <li>2. If, CG Candidate fall short to satisfy substantial number of CV, then iterate the whole process.</li> </ol>	<p style="text-align: center;"><b>Conclusion</b></p> <ol style="list-style-type: none"> <li>1. Step -2 &amp; 5 should compose the most appropriate CG.</li> <li>2. <b>Subjective Analysis.</b> Further, crosscheck the relevant characteristics of CG in the form of question, e.g., will the neutralization of the CG Candidate cause devoid of 'B'?</li> <li>3. Operational Art of the Commander will remain as the KEY.</li> </ol>
<p>Source: Author (in light of the UK Model)</p>	

## Conclusion

Clausewitz, developed the concept of CG in the 19th century's socio-economic context of Europe though, yet it works till date. The German term 'Schwerpunkt' means main weight or focus or one's effort, appears 40 times in Clausewitz's book, On War, where the German specific term for Centre of Gravity is 'Gravitationspunkt'. The English (mis)translation of 'On War' by Michael Howard and Peter Paret, in 1976 may be considered the origin of different versions of the concept of CG.

Throughout the last couples of decades, Western military theorists formulated different definitions of the CG. Dr. Milan Vego prescribes CG, as a source of mass strength or a source of leverage.... However, the data from two hundred years (1800-2003) shows that the Weak Actors were becoming more and more victorious over the Strong Actors, starting from 28.5% to 51.2%. Therefore, it was not and is not the mass strength always (i.e., Means), rather it could be a characteristic of a Force (e.g., doctrine, operational approach, etc.), or a method, i.e., Ways (e.g., asymmetric, unconventional, sub-conventional, unrestricted, etc. types of warfare) which would also determine the fate of the armed conflict. On the other hand, Dr. Echevarria focuses on cohesion, replacing the CG with the metaphoric 'Centripetal Force' that holds forces together. Dr. Jeo Strange prescribes, the primary components (i.e., entity) of physical and moral strength and resistance as the CG, refuting characteristics, capabilities and locations. Dr. Dale C. Eikmeir describes, the CG is the primary entity that inherently possesses the CCs and CG is the doer. There are NO moral CGs, only physical. Righteousness of cause, will to fight were perhaps the doer during the LW 1971. In addition, integration of UCW and direct integration of People in the war (i.e., the concept of TPW) would be the driving forces during the war of BD.

The concept of CG was taken into Western military doctrine in 1980's onwards. The concept of CG evolved in the US military from 1986, through 1993, 1994 and 2002 and stands, 'those characteristics, capabilities or sources of power from which a military force derives its freedom of action, physical strength, or will to fight'. The NATO abruptly relegated the 'characteristics, capabilities, or localities', which were there in 2013 and prescribed in 2019, 'the primary source of power....and its always an entity'. On the other hand, the UK stands till 2013, 'A characteristic, capability, or influence from which...?'

Despite the huge difference in the perspective, force structure, force development, doctrine, training, alliance (or national) goals/objectives, etc., BDAF cannot have the same definition of CG of NATO/UK. In reality, no single entity (including any TG) doesn't hold any CC alone, rather CC

is generally spread over a number of entities. In the era of hybrid warfare, discovering the source of power is extremely difficult, so as for the VNSA, proxy actor, etc. It may be argued that the USA led Western allies, including NATO failed in war terror due to the wrong selection of CG, i.e., entity. Furthermore, the collapse of Pakistani Force in the LW 1971 was primarily due to moral defeat, not the entity. That is why, Prisoner of War was 93 thousand against only casualties of 3-8 thousand. The author prescribes, 'A characteristic, capability, influence or an entity from which a nation, its population, a military force or other civil or militia grouping derives its freedom of action, physical strength, cohesion or will to fight to achieve the objective' as the definition of CG from BD perspective. However, the possibility of an entity emerges as the CG remains limited to the truly joint force (which is far away for both BD and potential adversaries) or when the elimination/complete destruction of an entity is the objective or when the entity provides power to operate. Furthermore, unlike the military of the USA, UK, and NATO, the primary objective of BDAF remains to safeguard the territorial integrity and sovereignty of the country, where integration of UCW and TPW, etc. are the most viable options.

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Brigadier General Md Hakimuzzaman, SGP, ndc, afwc, psc was commissioned with 27 BMA Long Course in the Corps of Engineers. He obtained B.Sc. Engineering (Civil), and MDS from MIST and National University respectively. He completed MPhil (Part -1) from BUP and currently pursuing PhD on “Energy Security and Geopolitics-Bangladesh Perspective” from JU. He holds the award, Sena Gaurab Podak (SGP) (Army Medal of Glory) and Chief of Army Staff, Commendation (non-operational). He had been Instructor Class III in School of Military Engineering and obtained Distinguish Instructor award. Currently, he is serving as Directing Staff (Army) at AFWC Wing for the 2nd time. He served twice as Grade 2 Staff Officer in Military Operations Directorate, and Director, Works Directorate at Army Headquarters. Prior to becoming the Colonel Staff, 66 Infantry Division, he was the pioneer Chief Operations Officer (COO) of newly established Army War Game Centre. Brigadier General Zaman Commanded 88 Infantry Brigade and 18 Engineers Battalion. In addition, he participated in UNAMSIL, Sierra Leone and MINURCAT, Chad as Logistic Officer and Military Liaison Officer respectively. He has keen interest in travelling, music and reading. He is married and father of two sons.

# **UNTAPPED POTENTIALS OF AFRICA: COLLABORATION WITH BANGLADESH, CHALLENGES AND OPPORTUNITIES**

**Brigadier General Abu Hena Mohammad Razi Hasan  
SUP, SPP, ndc, psc**

## **Introduction**

Africa, despite challenges like poverty and political uncertainty, presents significant economic opportunities. Apart from the vast reserves of minerals, Africa's burgeoning and youthful population offers another substantial economic potential. The continent's population will swell from 1 billion to 2.4 billion by 2050, with about half under 25 years old providing a strong workforce (AFDD, 2019). Simultaneously, the expanding middle class's (1.1 billion by 2060) (AfDB, 2011) appetite for consumer goods and services creates lucrative prospects for business expansion. Asian countries like China, India, and Pakistan are actively engaging with Africa's growth. China's trade with Africa reached \$282 billion in 2023 (Nyabiage, 2023) through initiatives like the Belt and Road Initiative. India, a leader in South-South Cooperation, has enhanced relations with Africa offering technical aid in agriculture, healthcare, education, etc. Pakistan's 'Look Africa' Policy resulted in a \$6 billion trade with Africa in 2019-2020 (Nyabiage, 2023; Khan, 2022).

Bangladesh is yet to realize the extensive potential in its relations with African countries. Despite historical ties and shared memberships in international forums, Bangladesh's engagement with Africa remains limited. Bangladeshi presence in Africa through a large UN peacekeeping footprint hasn't translated into robust diplomatic, economic, and social ties. Bangladesh-Africa trade represents only 1.45% of Bangladesh's global trade (ITC Database, 2023). The envisioned 'Look Africa' Policy from 2015 is yet to be operationalized. Government's South-South Cooperation (SSC) commitment lacks substantial initiatives to engage with Africa, hindering potential collaboration.

With a Trade-to-GDP ratio of 24 in the year 2022 (World Bank, 2023), Bangladesh's exports lack diversity both in market destination and products. The reality of the shrinking market for its RMG product in western hemisphere and manpower market in Middle East may force Bangladesh to look for an alternative destination in Africa. At the same time, with the energy security of the country being tested for its strength in the wake of the Ukraine- Russia war, Bangladesh needs to look for energy source diversification and Africa could be a plausible option. Africa is emerging as one of the most potential regions of the world offering Bangladesh opportunities for positive change.

## **Significance of the Research**

The research holds dual significance. Academically, it explores Bangladesh-Africa relations' intricate political, economic, and security dynamics, testing their impact on export potential using the Gravity Model. Conceptually, it integrates South-South Cooperation, Gravity Model, Peacebuilding Theory, and World System Theory. In terms of policy advocacy, the study furnishes empirical data and insights into Africa's untapped prospects, aligning them with Bangladesh's needs. This research serves as a unique interdisciplinary bridge between academia and policy advocacy, shedding light on unexplored dimensions of international relations.

## **Research Questions**

**Primary Question.** What factors had determined the potential for collaboration between Bangladesh and African countries?

**Secondary Questions.** What are the experiences of neighbouring and regional countries in expediting their engagement in Africa and what does it signifies to Bangladesh?

- What steps has Bangladesh taken to leverage peacebuilding platforms in Africa and turn them into persuading strategic fronts bilaterally?

- What are the underlying opportunities available to and challenges encountered by Bangladesh in different sectoral collaborations with African countries?
- What are the ways to overcome the challenges and barriers of Bangladesh-Africa bilateral cooperation?

## **Research Methodology**

The research paper is explanatory and analytical. The study has been carried out using mainly the qualitative methodology. However, a quantitative approach is also followed to analyze the relevant data and secondary sources that merit such an approach. Hence, this may be said that it is a 'triangulation' approach, which is followed to craft the research.

**Primary Data Collection.** Two vital methods in social science research, Key Informant Interviews (KII) and Focused Group Discussions (FGD) were used to collect necessary primary data.

**Secondary Data Collection.** Various sources, such as reports of international agencies and UN bodies, reference books, newspapers, and magazines, etc provided the secondary data. Quantitative data was collected from IMF's Direction of Trade Statistics (DOTS) Database (2023), ITC Trade Map (2023), UN COMTRADE Database (2023), and Foreign Trade Statistics Data of MoFA. For other economic indicators such as World Bank World Development Indicator (WDI) Database and CEPII data were used.

**Data Analysis.** Analysis of the data was done both manually and statistically following a planned analytical approach. Ten countries out of all the regions of Africa with different types of economies were selected for eight factor bilateral relations analysis. A panel data consisting of last 20 years export data of Bangladeshi African countries, GDP and population of Bangladesh and all African countries, the distance, WTO membership, religious similarity, colonial history, presence of Bangladeshi peacekeepers and embassies in Africa was prepared. 'EViews 12 Student Version' software was used to estimate 'Bangladeshi Export Potential' through multiple regression analysis based on the Gravity Model of Trade Flow.

## Theoretical Framework

The research fuses 4 concepts of South-South Cooperation (SSC), Gravity Model, Peacebuilding through Development theory, and World System Theory (Figure 1). South-South Cooperation (SSC) explains the exploratory nature of relations between countries of the Global South i.e. Bangladesh and African countries in the fields of trade and investment, technology transfer, and knowledge sharing. The classic Gravity Model of Trade Flow Theory as shown below argues that trade volume between nations correlates with their GDP sizes and inversely relates with their distance:

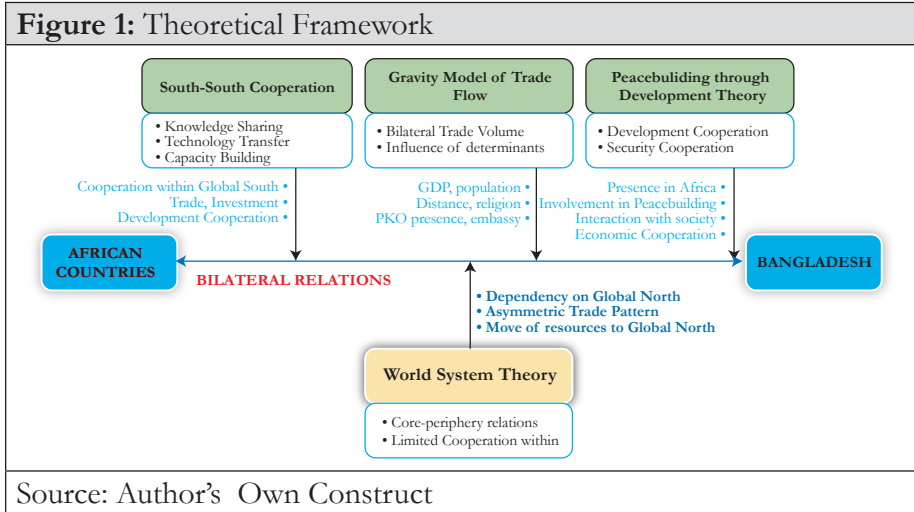
$$\text{Trade}_{ij} = \alpha \text{GDP}_{ix} \text{GDP}_{j/} \text{Distance}_{ij}$$

However, the research uses following customized form of the classic Gravity Model of Trade Flow Theory in order to test the impact of a number of factors on Bangladesh trade potentials to Africa:

$$\begin{aligned} \ln \text{Exp}_{ij} = & \beta_0 + \beta_1 \ln \text{GDP}_i + \beta_2 \ln \text{POP}_i + \beta_3 \ln \text{GDP}_j + \beta_4 \\ & \ln \text{POP}_j + \beta_5 \ln \text{DIST}_{ij} + \text{sibling\_ever} + \text{WTO\_membership} \\ & + \text{common\_religion} + \text{bd\_pko\_presence} + \text{bd\_embassy\_} \\ & \text{presence} \end{aligned}$$

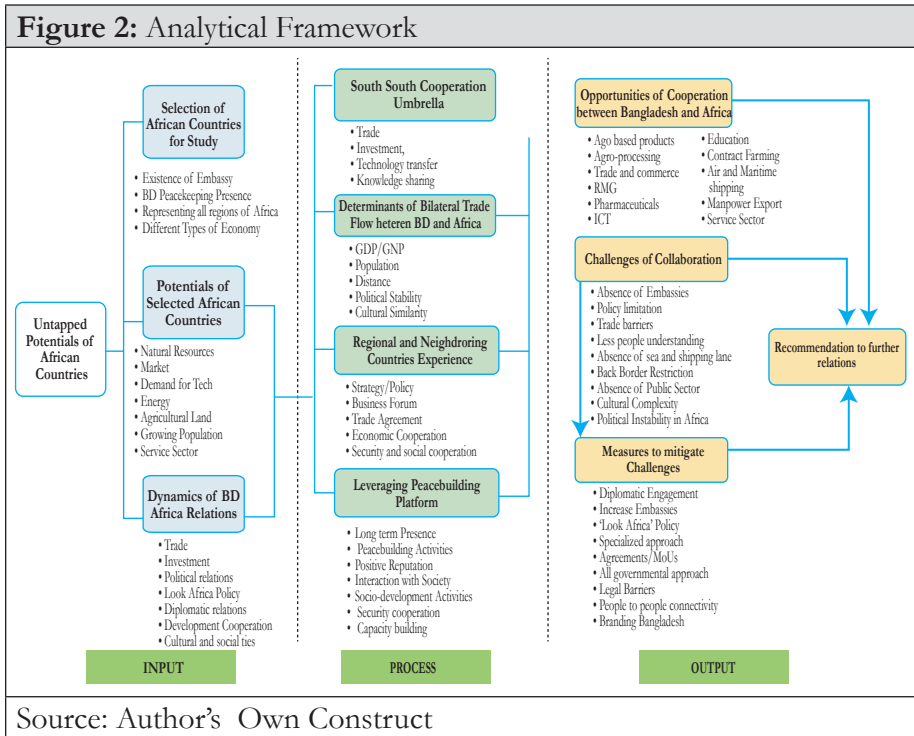
Here, ln is the natural logarithm,  $\text{Exp}_{ij}$  is the export potential of Bangladesh, GDP, POP are variables depicting GDP and Population of Bangladesh and African countries, DIST is distance between them, sibling\_ever, WTO\_membership, common\_religion, bd\_pko\_presence, bd\_embassy\_presence are dummy variables taking either 1 or 0 depending in value.  $\beta_i$  ( $i=0,1,2,3,4,5$ ) - parameters that has been estimated by the model.

This study is also supported by the theory of Peacebuilding through development which is used to examine the contribution of Bangladesh Peacekeeping activities in Africa. World System Theory was also explored, which suggest that relations between Global North and Global South are more probable than those within the Global South.



## Analytical Framework

The analytical framework of the study is shown below (Figure 2):



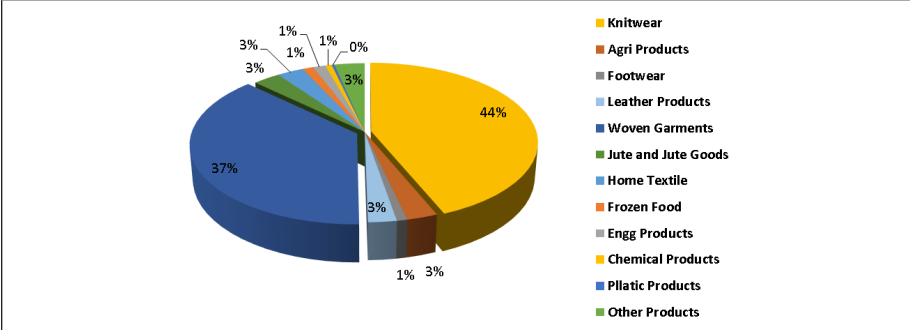
## Findings of Research

**African Trade Dynamics.** Africa's projected average real GDP growth for 2023-24 stands at 4.1%, outpacing global and European averages (AfDB, 2023). Steady GDP and GDP per capita growth are expected up to 2060 due to increased investment, higher FDI, stability, and improved governance (AfDB, 2023). The growth in Africa is fueled by several factors such as demography, expanding labour force, the rise of the middle class, urbanization, industrialization, and access to technology, etc.

**Africa's Trade with Major Partners.** Africa's most significant trade and investment partner is the EU. In 2018, the combined value of goods exchanged between EU and Africa amounted to 235 billion euros (32% of Africa's total trade) (Kappel, 2020). The West has engaged with Africa through several specialized agreements such as African Growth and Opportunity Act (AGOA), 'Everything but Arms' (EBA), Economic Partnership Agreements (EPAs), etc among others. These special and preferential agreements encourage African countries to trade easily with Europe with additional preference rather than with Asia and Global South thereby undermining the concept of SSC.

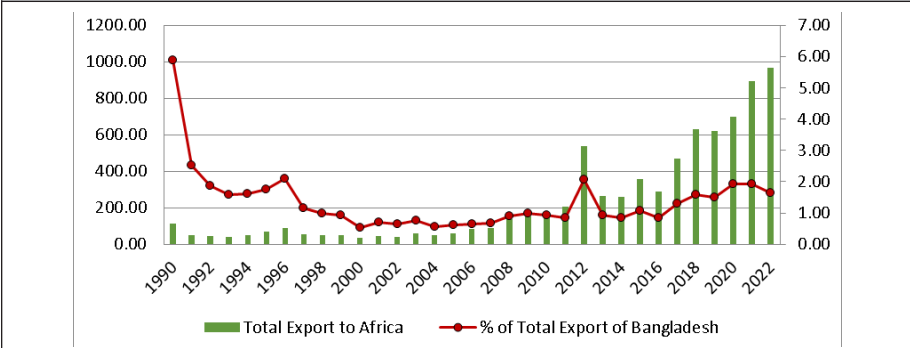
**Trade Pattern of Bangladesh.** Bangladesh's export destinations and products are both highly concentrated to a few countries. In 2020-21, over 71% of Bangladesh's exports were limited to only 10 countries. At the same time, Bangladesh's export basket is limited with heavy dependency on a few products such as RMG, pharmaceuticals, fish, etc (Dhaka Tribune, 2022) (Figure 3). Even though over the years Bangladesh's exports to Africa increased in volume, but it remained insignificant as a share of the total global exports of Bangladesh reaching only 1.63% in 2022 (DOTS Database, 2023) (Figure 4).

**Figure 3: Major Export Products of Bangladesh, 2020-21**



Source: Sourcing Bangladesh, 2023

**Figure 4: Bangladesh Export to Africa 1990-2022 (Million USD) and % Share in total export**



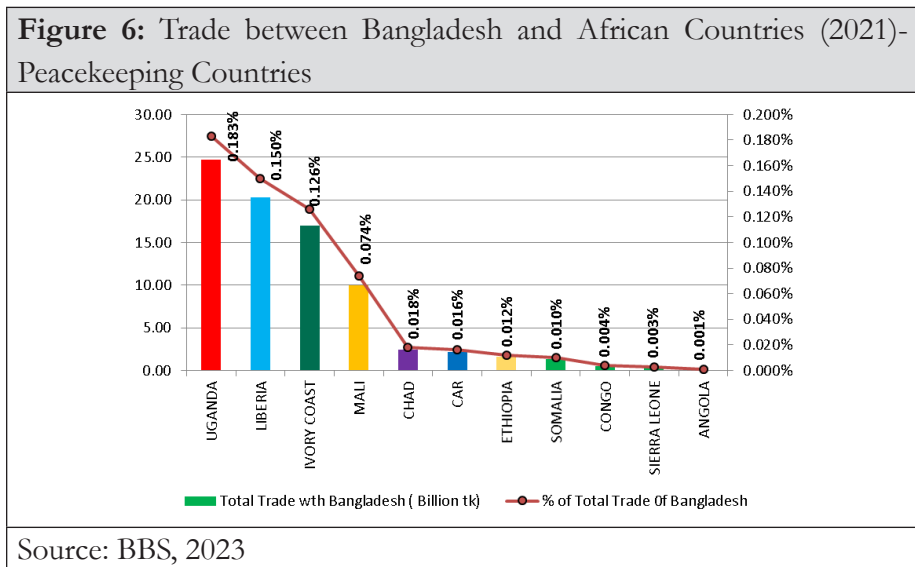
Source: Authors calculation from IMF Data, 2023

## Dynamics of Bilateral Relations between Bangladesh and African Countries

The research shows that, the relations between Bangladesh and 10 African countries selected for research is asymmetric across all 8 factors (Figure 5). This demonstrates absence of structured or well-planned approach in fostering bilateral relations. Out of these 10 countries, bilateral relations only with Algeria, South Africa, and Kenya have shown somewhat positive signs. Only with South Africa and Nigeria, all 8 factors were of somewhat satisfactory standard.



Extensive involvement in UN peacekeeping operations across Africa for over three decades has earned Bangladeshi Peacekeepers respect for their discipline, professionalism, neutrality, and positive conduct. Evolving from peacekeeping to peace enforcement and peacebuilding, Bangladeshi peacekeepers engage with host communities, fostering positive relations. However, Bangladesh has not fully capitalized on this opportunity to extend relations beyond peacekeeping. Trade relations with African countries hosting Bangladeshi peacekeeping troops, except for Uganda and Liberia, remain negligible (Figure 6).



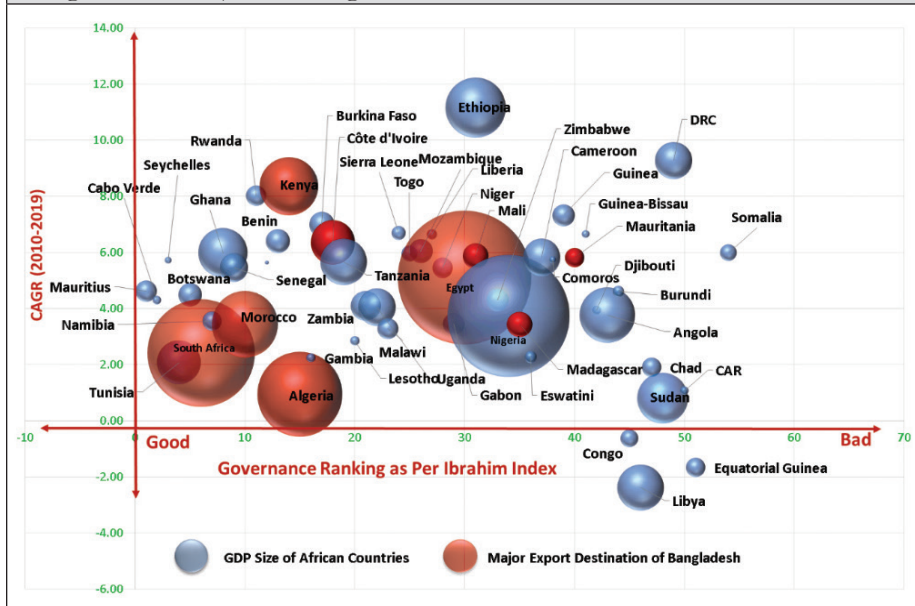
## Analysis of the Result

**Asymmetry in Bangladesh-Africa Relations.** Severe asymmetry characterizes current relations between Bangladesh and African countries, signaling a need for strategic recalibration. Existing ties with selected African countries lack structure and planning, hindering comprehensive engagement. Clear policies and strategies are absent, impeding broader collaboration. The influence of Bangladeshi embassies on trade relations should be reassessed, with a focus on utilizing multilateral forums. Defense cooperation, a significant aspect, can serve as a foundation for

broader collaboration beyond security, urging a comprehensive approach to Bangladesh-Africa relations.

**Factors Influencing Bangladesh-Africa Trade.** Bangladesh’s exports to African nations hinge on local business atmospheres and governance standards. A positive link exists between Bangladeshi exports to Africa and the World Bank’s ‘Ease of Doing Business Index’ for those nations. Yet, despite conducive environments, trade with Mauritius, Rwanda, Botswana, Ghana, Lesotho, Namibia, etc., remained limited. Evaluation of the ‘Ibrahim Index of Governance’ and Compound Annual Growth Rate (CAGR) showed that Bangladesh’s major trade partners in Africa, other than Sudan, are countries with good governance, but not with very high growth rate (Figure 7). This highlights untapped potential for Bangladesh in trading with nations boasting both strong growth and governance.

**Figure 7: Ibrahim Index of Governance, CAGR (2021-2019) and Bangladesh’s Major Trading Partners**



Source: Authors calculation from World Bank Data, 2023

**Impact of PKO Contribution of Bangladesh in Africa.** Bangladesh's significant contributions to PKO in Africa, while commendable, are yet to translate into broader bilateral strategic engagements. Often referred to as 'soft warriors,' Bangladesh's peacebuilding approach presents unique opportunities for expanding relations beyond the PKO framework. However, political instability, security concerns, bureaucratic sluggishness and the lack of a diplomatic presence in conflict-prone nations have impeded efforts to diversify and deepen ties. The absence of a detailed National Peacekeeping Policy and limited participation of all stakeholders contributed to the challenge of extending Bangladesh's influence beyond PKO.

**Bangladesh and South-South Cooperation.** Bangladesh attached high importance to South-South Cooperation. Emphasized in a 2017 Ministry of Finance report (MoF, 2017), Bangladesh acknowledges recent development in SSC in the form of increased volume of trade, flows of FDI, regional integration, technology transfers, sharing of solutions and expertise, and other forms of exchanges. Despite potentials and opportunities presented by Africa under the overall framework of SSC on a mutually beneficial partnership, no concrete steps have been undertaken by Bangladesh in this regard.

**Outcome of the Gravity Model Analysis.** Table 1 exhibits the results estimated from the Gravity Model where the coefficients took the expected sign. It was revealed that GDP of Bangladesh, Population of Bangladesh and partner country, distance, and common religion do not turn out to be statistically significant factors, but GDP of the partner country, WTO membership, common colonial history, presence of Bangladeshi Peacekeepers and embassies turned out to be statistically significant factors in determining Bangladesh export potential to Africa. It is found that Bangladesh has untapped potential in 42 out of 54 African Countries totaling an amount of 634 million USD per year. Gain from Algeria, Angola, Egypt, Ethiopia, Ghana, Kenya, Libya, Nigeria, and Tanzania – these 10 countries stood at \$512 million. The summary is presented in Table 2.

**Table 1: Result of Maximum Likelihood Estimate of Stochastic Frontier Gravity Model**

Dependent Variable: LN_EXPBD Method: Panel Least Squares Date: 09/06/23 Time: 15:21 Sample: 2000 2022 Periods included: 23 Cross-sections included: 53 Total panel (balanced) observations: 1219				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_EXGDP	0.769979	0.784332	0.981700	0.3264
LN_EXPOP	-0.492667	6.988469	-0.070497	0.9438
LN_IMGDP	1.111997	0.132171	8.413332	0.0000
LN_IMPOP	-0.155209	0.128212	-1.241768	0.2146
LN_DIST	-0.912098	0.543647	-1.677738	0.0937
SIBLING_EVER	-0.489733	0.246502	-1.986733	0.0472
WTO_MEMBER	0.889855	0.306959	2.898938	0.0038
COMRELIGION	0.310588	0.358801	0.865627	0.3869
BD_PKO_PRESENCE	1.366799	0.285782	4.782654	0.0000
BD_EMBASSY	1.649107	0.366673	4.497484	0.0000
C	-14.78481	111.7551	-0.132297	0.8948
R-squared	0.290781	Mean dependent var	11.74787	
Adjusted R-squared	0.284910	S.D. dependent var	4.328724	
S.E. of regression	3.660499	Akaike info criterion	5.442059	
Sum squared resid	16186.30	Schwarz criterion	5.488132	
Log likelihood	-3305.935	Hannan-Quinn criter.	5.459401	
F-statistic	49.52818	Durbin-Watson stat	0.371875	
Prob(F-statistic)	0.000000			

Source: Authors own construct from Gravity Model

**Table 2: Summary of Export Potentials of Bangladesh to Africa Estimated using Gravity Model**

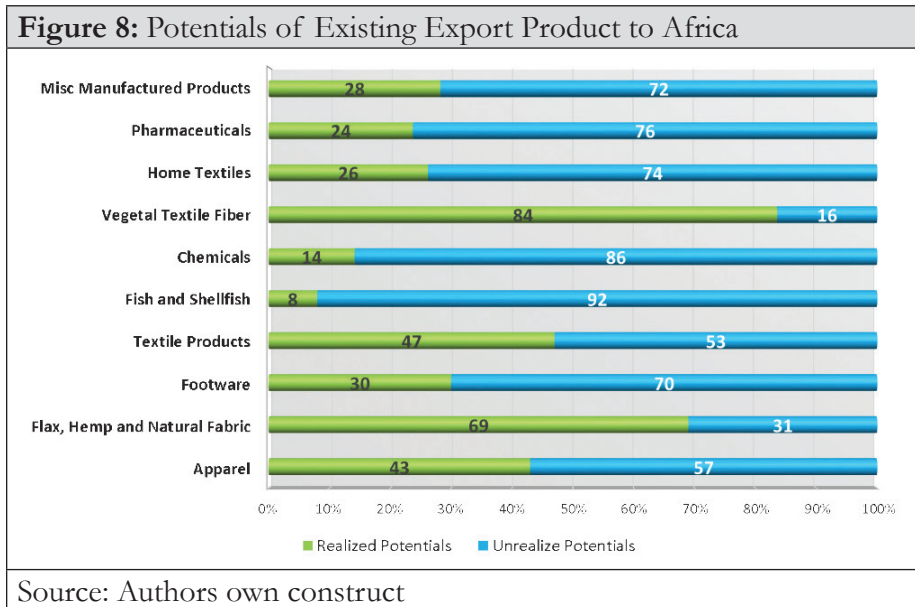
Country	Export Potentials (USD)	Actual Export (USD-2022)	Potential Gain (Million USD)	Country	Export Potentials	Actual Export (USD-2022)	Potential Gain
Algeria	70627111.14	31018241.00	39.61	Liberia	1050968.03	21594680.00	-20.54
Angola	34869530.90	1251470.00	33.62	Libya	21227865.65	1927310.00	19.30
Benin	5229967_19	945000_00	4.28	Madagascar	5425101_25	19644641_00	-14.22
Botswana	8685385_64	39591_00	8.65	Malawi	4524732_07	256356_00	4.27
Burkina Faso	5197419_62	235952_00	4.96	Mali	4894046_53	1252419_00	3.64
Burundi	984273_09	1080000_00	-0.10	Mauritania	3100654_19	108897_00	2.99
Cabo Verde	760245_04	28800_00	0.73	Mauritians	8291124_00	26521804_00	-18.23
Cameroon	14256947_93	5299117_00	8.96	Morocco	44258552_48	58307575_00	-14.05
CAR	777834_52	277740_00	0.50	Mozambique	5283585_29	1812142_00	3.47
Chad	4133195_43	0_00	4.13	Namibia	4795635_45	1262976_00	3.53
Comoros	619008_24	165060_00	0.45	Niger	3782678_02	3809379_00	-0.03
DRC	15746490_11	5314566_00	10.43	Nigeria	133742982.18	343296.00	130.31
Congo	5322349_26	607_00	5.32	Rwanda	5046926_57	186819_00	4.86
Cote D'Ivoire	20420524_39	34448054_00	-14.03	Sao Tome	218184_50	37776_00	0.18
Djibouti	2296451_34	1477897_00	0.82	Senegal	7306116_85	1177904_00	6.13
Egypt	229537016.71	57022296.00	172.51	Seychelles	1459801_54	231708_00	1.23
Equatorial Guinea	4988721_02	848465_00	4.14	Sierra Leone	953687_18	2855838_00	-1.90
Eritrea	1174946_37	171876_00	1.00	Somalia	3602523_79	13424102_00	-9.82
Eswatini	2075786_29	942720_00	1.13	South Africa	148402380_91	145576534_00	2.83
Ethiopia	53025705.84	9526404.00	43.50	Sudan	21537379_72	53485625_00	-31.95
Gabon	8889306_02	2352699_00	6.54	Tanzania	28286249.64	2770533.00	25.52
Gambia	612597_42	107799_00	0.50	Togo	2367845_51	138120_00	2.23
Ghana	21521928.89	1379950.00	20.14	Tunisia	19363382_48	13739943_00	5.62
Guinea	5689318_14	1709780_00	3.98	Uganda	17055475_00	7085000_00	9.97
Guinea-Bissau	442688_55	1643986_00	-1.20	Zambia	10418100_94	1237468_00	9.18
Kenya	48114164_54	21594680.00	26.52	Zimbabwe	7288552_95	0_00	7.29
Lesotho	871740_59	1329343_00	-0.46	South Sudan	3116143_40	0_00	3.12

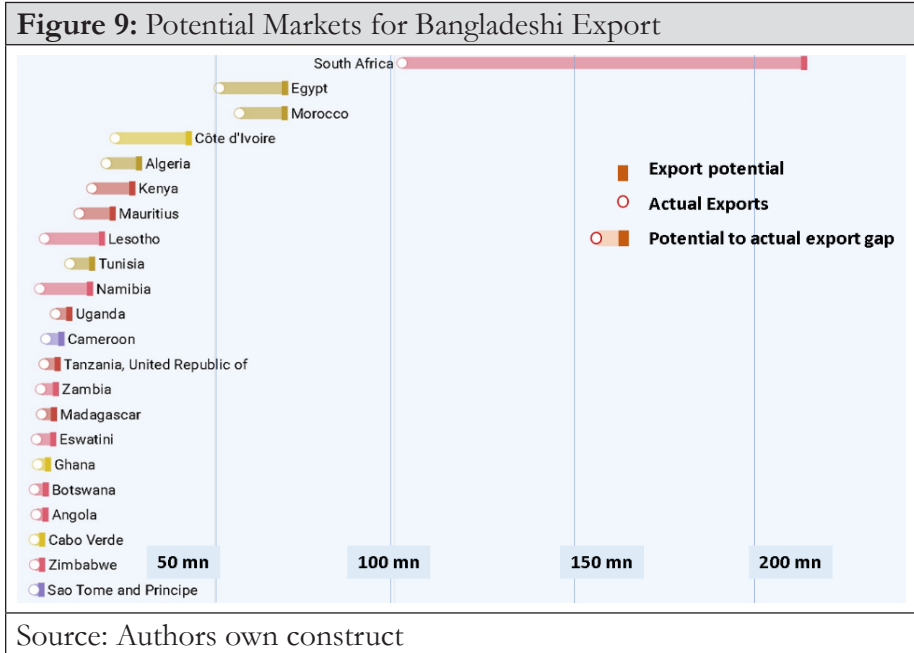
Source: Authors own construct from Gravity Model

## Opportunities of Collaboration

The research found trade, agriculture and agro-processing, pharmaceuticals, manpower export, halal industry, backward linkage industry, energy, RMG, development aid, investment, technology transfer etc. as opportunities of collaboration.

**Trade (Bangladeshi Products and Export Market).** Simulation run through ITC Export Potential Map reveals among the existing products only 43% export potential of Apparel, 30% of Footwear, 14% of Chemical, 8% of Fish and shellfish have been tapped in the case of Africa (Figure 8). Bangladesh’s best options for export diversification in Africa are Ferro-nickel, Tunas, Coffee, Single Yarn, Broken Rice, Crude Palm Oil, Electrical Equipment, Cotton, and Combed Fibers. South Africa, Morocco, Egypt, Cote d’Ivoire, Algeria, Kenya, Lesotho, Mauritius holds the promise (Figure 9).

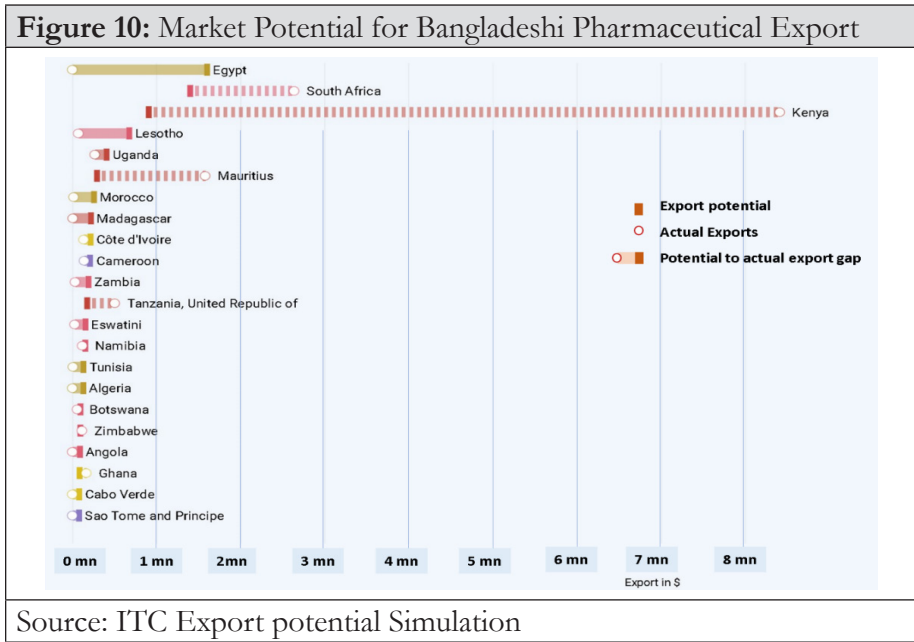




**Agriculture (Joint Venture Farming).** Bangladesh holds substantial potential for Joint Venture Farming in African countries. Kenyan authorities expressed interest in leasing 1,000 acres for cotton cultivation by a Bangladeshi company (The Business Standard, 2021). Exploring joint ventures in countries like South Sudan, Algeria, Mozambique, Zambia, South Africa, Liberia, Senegal, Sierra Leone, and the DRC, known for favorable soil and weather conditions, offers opportunities for agro-food processing industries' investment in Africa as well.

**Backward Linkage Industry (Cotton Import).** Africa offers attractive opportunities for a Backward Linkage Industry product, cotton, which is crucial for Bangladesh's garment industry. Many African countries in East and West Africa also have abundant cotton production, appealing for Bangladeshi investors to establish manufacturing facilities there. Bangladesh can invest in cotton industries in these countries and send back the fiber to Bangladesh as input to RMG industry (Mahmud, 2012).

**Pharmaceuticals.** Africa relies heavily on import of 70-90% of pharmaceutical products (\$14 billion worth) mostly from the EU, India, and China (Holtz, 2021). In contrast, Bangladesh has transformed its pharmaceutical industry into an export-oriented sector, exporting to 151 countries, including the EU, Africa, and the US (The Daily Star, 2023). The “Free Friday Clinics” being run by the Bangladeshi Peacekeepers had a profound impact on orienting Bangladeshi pharmaceuticals to Africans (Ehsan, 2023). Egypt, Angola, Madagascar, Lesotho, Zambia, Algeria, Morocco and Tunisia hold the best potential for Bangladeshi Pharmaceutical market (Figure 10).



**Manpower Export.** Bangladeshi manpower exports to key markets, such as Saudi Arabia and the UAE, fell substantially in early 2023 (Business Post, 2023). Africa can be the next destination for our manpower export. Investing in African agriculture and pharmaceutical industries could enable Bangladesh to open avenues for exporting its workforce to these sectors. Moreover, African nations have a growing demand for technical manpower, such as doctors, engineers, and healthcare experts, to drive their economies forward.

**Halal Industry.** Valued at \$2.3 trillion, the global halal food sector is growing at 20% annually, with countries like South Africa and Nigeria aiming to tap into this market (Africa Business Pages, 2021). Bangladesh has the potential for joint ventures halal products in Muslim-majority African countries like Egypt, Algeria, Morocco, Senegal, Sudan, and also with South Africa.

**RMG.** Unlike Bangladesh, African cotton apparel products enjoy a 20% duty waiver under the USA's AGOA, and non-cotton products get 30% waiver. Similar trade preferences exist in the EU through the EBA policy. Investing in Joint venture RMG industries in West African countries with high cotton production, such as Benin, CAR, Côte d'Ivoire, Mali, Niger, Nigeria, and Senegal, could capitalize on duty-free access under AGOA and EBA. Investing in African SMEs, a significant part of the \$31 billion African Fashion Industry, offers another avenue for Bangladesh's expansion.

**Development Aid.** Bangladesh could consider providing smaller-scale aid (\$1 to \$2 billion) to select African countries like Uganda, Liberia, Ivory Coast, and Sierra Leone with minimal conditions. This aid, even though small in quantity will help build a positive image of Bangladesh and facilitate other investment ventures (Kabir, 2023).

**Fulfilling Energy Needs.** In comparison to China, India, Pakistan and even Sri Lanka, Bangladesh imports very less quantity of energy from Africa. In 2022, Bangladesh imported only 0.85% of petroleum products from Africa in comparison to 9.28% by India, 7.28% by Sri Lanka, 7.76% by China and 6.59% by Pakistan (ITC Database, 2023). Bangladesh depends on more traditional markets of the Middle East. However, importing energy from non-traditional market such as Nigeria can help address Bangladesh's energy needs in terms of cost and source diversification.

**Technology and Knowledge Transfer.** Technology transfer is integral to South-South Cooperation (SSC), and Bangladesh can play a vital role in this regard with Africa. Direct technology transfer possibilities include sectors like education, health, telecommunications, pharmaceuticals, and transport. Bangladeshi telecom operators could invest in Africa's growing telecom sector, predicted to reach USD 78.09 billion in next five years

(Mordor Intelligence, 2023). Furthermore, Bangladesh's expertise in agro-processing and small farm mechanization aligns with Africa's agricultural needs, representing an avenue for indirect technology transfer.

**Collaboration in Security.** Bangladesh has the opportunity to enhance the security cooperation with African countries in the form of Joint Venture in Peacekeeping as Gambian joint declaration to deploy troops together with Bangladesh in UN missions. Bangladesh can adopt a focused approach towards capacity building of African armed forces and police personnel through institutions such as NDC, DSCSC, BIPSOT. Conducting regular joint exercises focusing on counter-terrorism, naval operations, and disaster response with African nations, enhancing mutual understanding and image building.

## **Challenges of Sectoral Collaboration between Bangladesh- Africa**

**Lack of Political Stability and Volatile Security Situation.** Political instability resulting from authoritarian governance, human rights violations, inter-ethnic conflicts, refugees, and extreme poverty significantly impede a conducive investment environment in Africa. These instability and insecure conditions pose serious challenges to development and investment. Nonetheless, as peace is gradually restored and prolonged civil conflicts conclude, investors are revisiting countries like the DRC, Liberia, Ivory Coast, and Sierra Leone.

**Inadequate Infrastructure.** Infrastructure shortcomings, particularly in power, logistics, and communication, hinder productivity similar to governance issues, with indirect costs being a major burden for firms in poor African countries (Eifert, et al., 2008). Poor infrastructure, adding 30% to 40% to trade costs among African nations, hampers private sector growth and FDI (RSM, 2022).

**Weak Financial Institutions.** Experts contend that African Financial Institutions face significant obstacles including insufficient funding, governance issues, political interference, and a tendency to deviate from their intended purposes (Jerving, 2020). Less than one in five households in Africa has formal banking access and the regulatory framework is

lacking in financial sector (WB, 2007). High costs, interest spreads, and overheads contribute to an underdeveloped and inaccessible financial sector, hampering domestic savings and foreign capital attraction for investment (Omoruyi, 1991).

**Lack of Political Engagement and Diplomatic Reach.** With only 10 diplomatic missions in Africa, Bangladesh lacks sufficient representation for robust bilateral relations. Diplomatic presence in Africa is skewed towards North Africa, hindering engagement with other regions. Countries hosting Bangladeshi embassies exhibit improved relations and trade partnerships. Lack of diplomatic contact complicates visa procedures, discouraging business exploration in Africa (Azim, 2023). Political engagement with African countries remains minimal.

**Negative Image Issue.** Limited information and biased media contribute to the stereotype of Africa as ‘The Dark Continent,’ hindering Bangladeshi businesses from exploring opportunities. Despite these perceptions, feedback from Bangladeshi peacekeepers and businessmen operating in Africa contradicts this negative notion.

**Policy Barrier.** African countries’ stringent tariff rules, market protection, and import restrictions hinder trade with Bangladesh. The Foreign Exchange Regulation Act (FERA) of the Bangladesh Bank constrains overseas investments. The lack of a financial protocol between Bangladesh and African nations, combined with local regulations, may complicate joint investment efforts (Mahmud, 2012).

**Cultural and Language Barrier.** In terms of cultural demographics, Africa’s population can be classified into three distinct categories: traditional Africans with limited modernization, transitional Africans, and modern individuals (Ravindran, 2016). Cultural diversity is a central part of the African collective identity which is different from that of Bangladeshi culture and act as barrier towards enhancing cooperation. The languages in Africa are so very diverse hampering cooperation.

**Africa’s Dependency on the Global North.** Africa heavily depends on the Global north, mostly former colonies, for its economic survival.

The political, diplomatic, military and development connectivity between Africa and the Global North is a challenge in forging new partnerships by countries like Bangladesh. Moreover, the developed countries have aligned their regulations in such a way that benefits Core-Periphery trade rather than Periphery-Periphery trade.

## **Mitigation Measures-Towards Africa Bangladesh Enhanced Cooperation**

Bangladesh needs to carefully craft both its economic and public diplomacy and identify priorities in Africa. A three-pronged approach may be undertaken to mitigate the challenges in Bangladesh-Africa relations - Policy Formulation, Strategy Implementation and Enhancing Engagement.

### **Policy Formulation**

- **Realign ‘Look Africa Policy’.** Bangladesh should tailor a focused ‘Look Africa’ policy. The policy should incorporate short, mid, and long-term goals, regional engagement strategies, priority sectors, partnership preferences, and incentives for private sector, etc. Relevant government agencies and private sector groups like FBCCI, BGEMA, academia, and others should be consulted to prepare strategies for implementing the policy’s objectives.
- **Addressing Policy and Legal Barriers.** Regarding investing in Africa, an essential step is amending the FERA 1974 and bolstering relevant financial entities. Furthermore, legal frameworks and bilateral agreements must be established between Bangladesh and target nations regarding reinvestment of capital, dividend returns, and financial regulations. Establishing Bangladeshi financial institutions in key destinations is vital.
- **Comprehensive Peacekeeping: Formulating National Peacekeeping Policy.** In line with the government’s ‘Look Africa’ policy, a comprehensive National Peacekeeping Policy may be invoked that would be centered on decision-making, capacity building, military diplomacy, regional collaboration, and peacebuilding. A National

Task Force, composed of MoFA, MoD, AFD, MoHA, Ministry of Commerce and Bangladesh Police, may coordinate and implement this policy and look beyond peacekeeping initiatives in deployed countries.

## Strategy Implementation

- **Adopting a Selective Approach.** 54 nations of Africa exhibit significant diversity in terms of population, developmental stages, growth rates, stability, etc. Bangladesh needs to choose carefully with whom to engage. Bangladesh should strategically prioritize countries to effectively access markets, considering the stability of those markets and growth potentials. Priorities may be given to countries where Bangladeshi peacekeepers have been involved.
- **Selecting Gateway Countries.** South Africa (SA) has marketed itself as a gateway to Africa and could play a pivotal role for Bangladesh as the gateway for the movement of goods, commodities to SADC, EAC, and COMESA blocks. Similarly, Egypt, Kenya, Nigeria, Senegal and Morocco could act as regional gateways. Bangladesh should connect with these countries to secure entrance to the RECs.
- **Forge Joint Venture Partnerships and Strong Local Teams.** To safeguard investments, access local markets, and mitigate risks, joint ventures are preferred. Bangladeshi enterprises require African partners to navigate diverse African markets and regulations. Such alliances ensure that local instability doesn't hamper trade and investment. Success hinges on nurturing local talent, requiring substantial investment in strong local marketing and sales teams.
- **Encouraging Private Sector involvement.** Various incentives can be provided to inspire private sector to engage with Africa. Market in any one African country is small but entry in one market will create opportunity for entry in multiple countries. Private sector needs to understand the peculiarity of Africa and build specific business model to go well in Africa.
- **Building a Positive Image of Africa in Bangladesh and Vice Versa.** Positive campaigns by the Bangladeshi media highlighting

Africa's positive aspects and its fastest-growing economies can make a significant difference. Industry leaders, students, artists, writers, civic society leaders may be taken to African countries to get a firsthand experience of African richness.

- **Promoting Private-Public Partnership.** Given the challenges of investing in Africa, PPP ensures efficient resource allocation, cost savings, improved service delivery, and timely project completion. This model ensures Long-Term Commitment, Enhanced Accountability, and access to Financing. Sharing risks in PPP projects reduces the burden on both sectors, creating a balanced risk profile.
- **Trade Agreements and Exploiting Trade Blocs.** As the PTAs in the US and European markets are ending due to LDC graduation, the Ministry of Commerce should initiate talks for bilateral FTAs and PTAs with various African countries to boost trade and investment. Bangladesh should also explore opportunities for PTA/FTAs with African RECs and AfCFTA which could also provide access to multiple countries within those blocs.
- **Addressing Infrastructure, Supply and Distribution Challenges.** In some African regions, supply and distribution systems face challenges due to regulations, transport infrastructure, and lead times. Strategies include placing assets in stable countries, outsourcing supply chains, collaborating with China for infrastructure and collaborating with local logistics for efficient routes.

## Enhancing Engagement

- **Enhancing Political Engagement.** Strengthening political ties with Africa is vital. Regular reciprocal state visits by Bangladeshi and African leaders will significantly enhance bilateral relations fostering new agreements and MoUs. Like India's 'Africa Outreach' initiative of 2016, Bangladesh should actively engage in well-planned high-level state interactions with African countries.

- **Enhancing Diplomatic Outreach.** A comprehensive network of diplomatic missions would deepen representation, enabling regional and global cooperation and local community engagement. The absence of diplomatic missions in Central Africa warrants two embassies in Angola, DRC or CAR. Strengthening ties with the AU could involve appointing a special representative to the AU HQ in Addis Ababa and encouraging the AU to establish a front office in Dhaka.
- **Enhancing Public Diplomacy and Cultural Promotion.** Bangladesh and Africa should prioritize public diplomacy and cultural promotion to counter negative image. Interactions among think tanks, universities, business forums, civil society, and media are vital. Involving the diaspora, sports like football and cricket, and hosting cultural events can strengthen connections, promote Bangladeshi products, and improve relations. Collaboration in arts, music, sports, education exchanges, scholarships for African youth, and African Studies Centers will enhance ties.
- **Enhancing Security Cooperation.** Strengthening partnership requires consistent engagement centered around shared security objectives such as climate change, counter-terrorism, peacekeeping, and women's security which aligns with AU's Agenda 2063. Collaboration should also involve AU and its RECs, following the Banjul Formula. Security cooperation can focus on the African Peace and Security Architecture implementation roadmap, spanning conflict prevention, crisis management, and post-conflict reconstruction.

## **Recommendations**

- Bangladesh may develop a tailored 'Look Africa' policy focusing on short, mid, and long-term goals.
- Government might adopt a 'Whole of Government' approach involving ministries, academia, forums, and NGOs for implementation of 'Look Africa' policy.
- Establish 5 embassies in DRC, Senegal, Sierra Leone, Mozambique, and Tanzania, offering incentives for reciprocity.

- Initiate PTA/FTA talks with chosen African nations and conclude pending MoUs within 1-2 years.
- Create a National Peacekeeping Policy aligning with ‘Look Africa’ strategy for UN PKO engagement.

## Conclusion

Africa, rich in resources and potential is undergoing a transformative phase toward prosperity. Despite shared history, Bangladesh-Africa relations lack substantial diplomatic, economic, and socio-development ties. Limited connectivity, unawareness of African markets, and rhetoric overshadow the political willingness for engagement. It was evident through Gravity Model analysis that \$634M export potential, mainly in ten countries, remained untapped. Favorable business environment and good governance in African counties impacted Bangladeshi exports to Africa.

Bilateral relations between Bangladesh and Africa lack uniform strength across factors such as political relations, trade, people-to-people connectivity, etc indicating an unplanned approach. Bangladeshi trade concentrates in 10-12 African countries, showing limited export diversification. Higher trade occurs where Bangladesh has embassies. Bangladeshi peacekeepers contributed positively to Africa, but Bangladesh is yet to capitalize on these relations. Limited diplomatic presence and initiative hinder further exploration. Exploring Bangladesh-Africa collaboration highlights untapped opportunities through South-South Cooperation. Diversifying exports like ferro-nickel, tunas, and coffee, investing in African agriculture, and exploring pharmaceutical, halal, and RMG, manpower sectors can boost ties.

Challenges like political instability, security issues, governance issues, poor infrastructure, and limited connectivity hinder Bangladesh-Africa relations. Policy, language barriers, and inadequate financial systems also impede economic partnership and trade between the regions. Mitigating Bangladesh-Africa challenges involves policy, strategy, and enhanced engagement. A ‘Look Africa Policy’ with regional strategies, private sector involvement, and a detailed National Peacekeeping Policy can boost

ties. Tailored strategies, PPPs, and joint ventures aid effective economic collaboration. Strengthening political engagement, diplomatic outreach, trade agreements, and cultural connections foster positive bilateral relations. Strengthening security cooperation aligned with shared objectives is crucial.

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# **CIVIL MILITARY COLLABORATION FOR EFFECTIVE FLOOD CONTROL MANAGEMENT IN BANGLADESH: A CASE STUDY**

**Brigadier General Md Mahbubur Rahman, ndc, afwc, psc**

## **Introduction**

Disaster is part of the environment in which we live and is faced by nearly all the countries of the world. USA, UK, India, China, Pakistan, Bangladesh and many countries of the World are badly affected by floods. Bangladesh is prone to natural disasters like storm, flood, cyclone, earthquake, drought, river erosion etc due to its geographical location. Being situated in the largest delta in the world, formed by the Ganges, Brahmaputra, and Meghna (GBM) rivers and their tributaries, flood is the most frequent threat that Bangladesh faces. The recent flash flood of Sunamganj and Netrokona in the month of June-July 2022 caused significant sufferings to general mass. Devastating flash floods that started in May 2022 with a 2nd wave starting around 15 June 2022 spread to nine northeastern districts of Bangladesh, including Sylhet, Sunamganj, Moulvibazar, Habiganj, Kishorganj, Netrokona, Brahmanbaria, Mymensing, and Sherpur, severely affecting an estimated 7.2 million people (UN RC Bangladesh Press Release, 2022).

Ministry of Disaster Management and Relief (MoDMR) of Bangladesh is the lead agency and Bangladesh Armed Forces (AFD) among other stakeholders is one of the major contributors for flood control management. Army takes part in saving victims of disasters and supplying them with necessary relief materials and emergency medical care including post flood rehabilitation initiatives. On the other hand, civil administration plays an instrumental role to help the local people with the assistance of military.

The practical experience dictates harmonious Civil-Military collaboration to handle any crisis situation. Comprehensive formation training, guidelines/SOPs/ROE, Seminars/ Workshops etc. for civil and military officers need adequate consideration. As such, to increase an effective civil military collaboration for flood control management, its existing practice demands necessary discussion to find out ways to improve future collaborative efforts.

## **Literature Review**

There is no specific research on Civil-Military Collaboration for effective Flood Control Management in Bangladesh. However, to understand about Civil-Military Collaboration and Flood Control Management, it is necessary to understand the Civil-Military Relations (CMR), its importance for any nation's security and development issues, military's involvement in Disaster Management (DM) in general and flood in particular. According to Huntington, "Civil-Military relations is the principal institutional component of military security policy" (Huntington, 1957, p.83).

According to the instruction of People's Republic of Bangladesh on 'In Aid to Civil Power', success of all military measures depends upon the co-operation between the civil and military authorities. Successful cooperation is only achieved when there is mutual confidence and understanding. Therefore, it is imperative for the officers of civil administration and Army to know each other and have knowledge of their duties. Plans to meet likely contingencies should be prepared by the local civil authorities and the local military commanders in fullest collaboration" (In Aid to Civil Power, p.3).

In India, the central Govt usually ensures deployment of Armed Forces for disaster management. The civil administration requests the support of Indian Armed Forces only when the crisis is beyond their capacity to handle (National Policy on Disaster Management of India, 2009, p.12-13). Regular civil-military liaison conferences are conducted by several states to discuss inter alia issues of preparedness for disaster response. Pre-monsoon preparedness meetings are held in a number of states with

National Disaster Response Force (NDRF), Coast Guard, Army, Navy, and Air Force (Disaster Risks and Resilience in India: An Analytical Study, 2019, p.196).

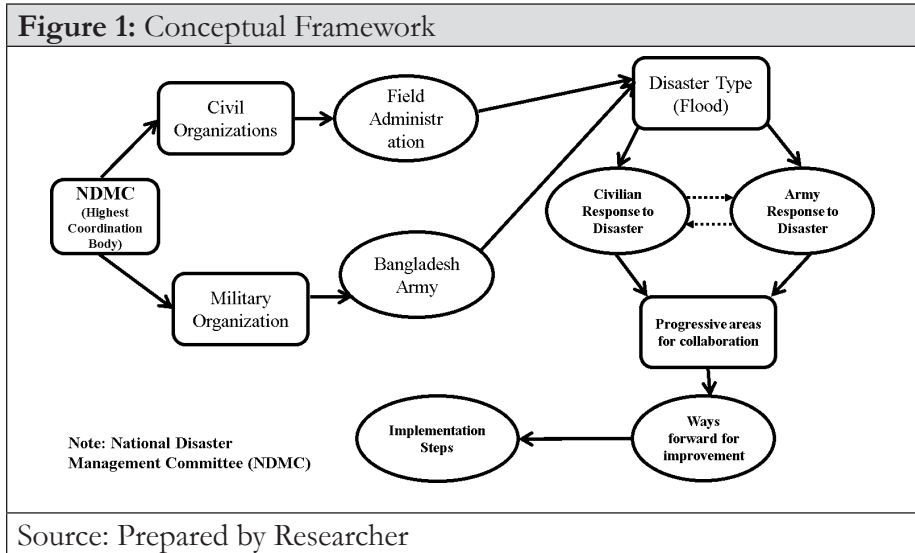
In USA, supporting flood risk management efforts in urban and rural areas across the nation has been one of the U.S. Army Corps of Engineers' main responsibilities since the Flood Control Act of 1917 took effect. (Army Civil Works Flood Risk Management Mission, 2017). In UK, planning and responding to any major emergency is generally the responsibility of local organizations. No responsibility is vested upon Defence. However, in the event of a civil crisis, the MOD recognizes that it may receive requests for assistance if the crisis is beyond the capability of civil authorities. (The National Flood Emergency Framework for England, 2014, p.8-9).

The collaboration between the nation's civilian authorities and its Armed Forces is a determining index to ascertain the strength of its tethering to democratic values. (Chandrashekhar 2017, p.xi). Raza (2020) emphasizes that although collaboration is nothing new, it is crucial to emphasize the value of communicating with other stakeholders and appreciating what they can bring to the table in terms of mission success. He further stressed that leaders at all levels must realize that Civil-Military relationships are collaborative in nature.

## **Research Methodology**

The research is a qualitative research. However, survey was conducted to get some quantitative data that assisted the research. Purposive sampling technique was used for data collection. Both primary and secondary data were used for study. Primary data were collected by conducting interviews, FGD, personal observations, expert opinions of senior officials etcetera. In addition, two cases of floods in the month of June-July of 2022 of Sunamganj and Netrokona were studied. Content analyses were done for secondary data. Online seminar and journal publications, website publications, online pdf documents, newspaper articles, reports (both local and international), public policy documents, etc. were used as secondary data.

**Conceptual Framework.** Below is the conceptual framework of the research:



### Objectives of Research

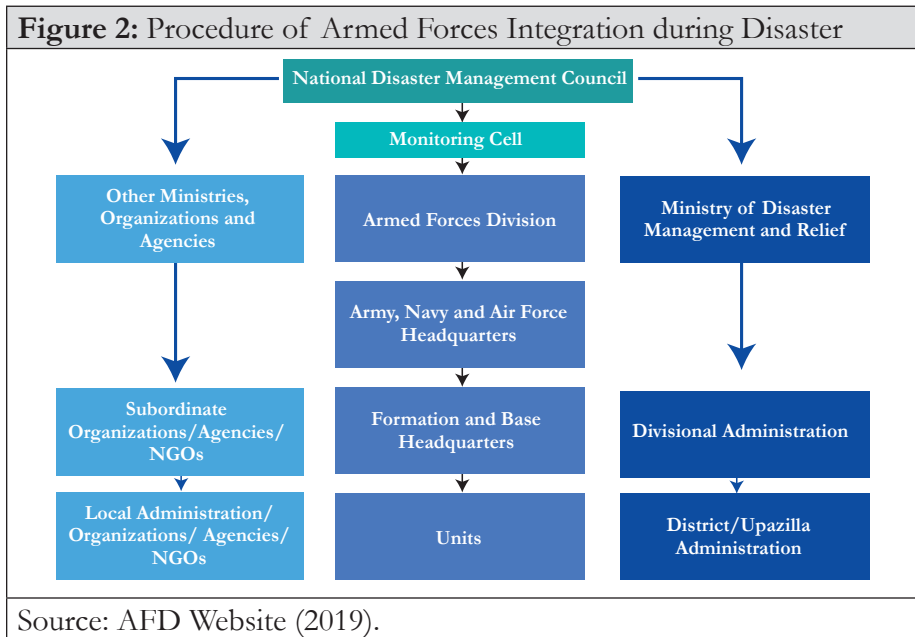
- To study existing practices of flood control management jointly performed by Civil Administration and Bangladesh Army.
- To discuss the scenario of recent cases of Civil-Military collaboration for flood control management in Bangladesh.
- To find out gaps of Civil-Military collaboration for flood control management in Bangladesh.
- To suggest ways to develop Civil-Military collaboration for effective flood control management in Bangladesh.

**Limitations of Research.** Disaster Management (DM) is a vast area which comprises earthquake, floods, draughts, cyclones, storms, fire hazards, river erosions etc. Flood being the regular phenomenon has been selected as area of research. Two cases of recent flood at Sunamganj and Netrokona have been taken as study area to depict overall scenario of the country. Only officers of Bangladesh Army and Civil Administration who were directly involved in recent flood control were considered as target group of research. However, senior officers of Bangladesh Army and civil

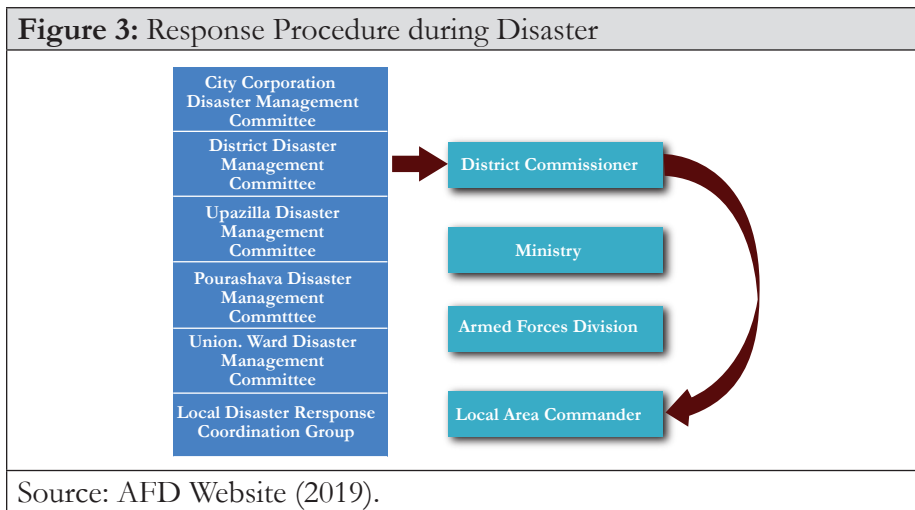
administration were considered as respondents. A survey on a group of officers is assumed to be the opinion of all officers of Bangladesh Army.

## Existing Practices of Civil-Military Collaboration for Effective Flood Control Management at Home and Abroad

**Bangladesh Context.** The people of Bangladesh have demonstrated their resilience over the years and Bangladesh has become role model for others in DM. With the lead ministry MoDMR, AFD continues to have strong civil-military collaboration and is always prepared to help the country in any crisis situation. According to the DM Act and Standing Order on Disaster (SOD), in case of any fatal disaster situation or in respect to worry of any deadly disaster, when necessity of Armed Forces assistance become essential, the National Disaster Response Coordination Group (NDRCG) recommends the government for collaboration of Armed Forces. The government issues instructions to AFD for military support to civil administration upon receiving recommendation from NDRCG.



Working of the district or division body with the lead ministry, MoDMR is shown in Figure 2 and Figure 3. Once involved, the AFD’s vertical and horizontal coordination is depicted in the center, and on the left, the working methods of other ministries are displayed. At Division level, the formation or base headquarters coordinates with the local administration and similar is done at the district level and below. DC may seek cooperation directly from local Armed Forces authority. In such scenario he would inform this matter to MoDMR and AFD as soon as possible through a written, fax or e-mail.



### Cases of Other Countries

**USA Framework.** According to Federal Emergency Management Agency (FEMA) under US Department of Homeland Security, “The authorization and establishment of Federal Interagency Floodplain Management (FIFM) Task Force was done by Congress in 1975. The Task Force is responsible to prepare required proposals for a Unified National Program for Floodplain Management. Department of Army (The Corps of Engineers) is one of the core members of FIFM Task Force” (FIFM Task Force, 2022). Army Corps of Engineers support flood risk management activities both in urban and rural areas throughout the country (Army Civil Works Flood Risk Management Mission, 2017).

**UK Perspective.** According to the National Flood Emergency Framework for England, local organizations, operating both individually and collectively through Local Resilience Forums (LRFs) and Strategic Coordination Groups (SCGs), are in charge of preparing and implementing any significant emergency response. No responsibility is placed on Defence in the event of a civil crisis, yet MOD recognizes that it may receive requests for assistance once it is beyond the capability or capacity of the civil authorities. (The National Flood Emergency Framework for England, 2014, p.8-9 & 35-36).

**Indian Context.** Several States have regular civil-military liaison conferences, which discuss inter alia issues of preparedness for disaster response. Joint coordination exercises are conducted in many hazard prone Border States where the Armed Forces have a strong presence. Several States conduct pre-monsoon preparation meetings with NDRF, Coast Guard, Army, Navy and Air Force stationed in the State” (Disaster Risks and Resilience in India: An Analytical Study, 2019, p.196). The Central Govt takes measures for the deployment of the Armed Forces for disaster management. Indian Armed Forces form an important part of the Government’s response capacity and are immediate responders in all serious disaster situations. (National Policy on Disaster Management of India, 2009, p.12-13). Below are few pictures of such humanitarian assistance and training.

**Picture 1:** Indian Army Southern Command in Flood Relief Operations in Maharashtra in July 2021



Source: <https://pib.gov.in/PressRelease> accessed on 09 August 2023.

## **Case Study of Civil Military Collaboration for Flood Control Management at Sunamganj and Netrokona Districts**

**Brief Overview.** Bangladesh is the largest catchment area in this subcontinent. Amongst other divisions, Sylhet is located just on the downhill of Meghalaya, and very close to Cherrapunji of India that draws one of the highest rainfalls in the world. Sylhet division is the largest catchment area of Bangladesh. The magnitude of flood, and its associated devastations vary proportionately with the amount of upstream precipitation and is further aggravated by some man-made factors. Devastating flash floods that occurred in May 2022 with a 2nd wave starting around the 15 June 2022 and spread to nine northeastern districts of Bangladesh, including Sylhet, Sunamganj, Moulvibazar, Habiganj, Kishorganj, Netrokona, Brahmanbaria, Mymensing, and Sherpur, severely affecting an estimated 7.2 million people. (UN RC Bangladesh Press Release, 2022).

The researcher who was directly involved in flood duty of Netrokona district had deliberate discussion with AFD and Military Operations (MO) Directorate of Bangladesh Army regarding flash flood of Sunamganj and Netrokona districts. The operation was conducted under the code name Operation Plabon-2022. After getting necessary request from civil administration of Sylhet Division and Netrokona district, 17 and 19 Infantry Division were deployed on 17 June and 18 June 2022 respectively.

### **Causes of Flash Flood**

**Highest Rainfall in Cherrapunji.** Sylhet is located just on the downhill of Meghalaya, and very close to Cherrapunji of India that draws one of the highest rainfalls in the world. In 2022, Cherrapunji had received one of the highest rainfalls of last 122 years. Through the natural course, major of this precipitations drain as surface runoff through major river system originated in the Himalayas. However, due to sheer volume of downpour, the flash-flood took place.

**Table 1: Monthly Precipitation Graph of Cherrapunji (in mm)**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
49 Year Average (1973-2021)	13.5	70.1	316.6	855.2	1284.0	2472.4	2963.4	1795.7	1201.6	503.4	53.4
2022	24.8	63.0	385.4	2008.9	2402.4	5343.4	892.0				
2021	12.2	5.0	160.8	342.6	811.3	2546.6	1211.7	2471.6	226.3	306.0	0.0
2020	30.2	41.0	27.2	428.6	1866.1	3236.9	3811.0	1398.5	2438.5	687.1	29.2
2019	0.0	48.8	40.1	360.3	1262.9	2196.2	2946.3	881.4	1184.4	655.2	25.4

Source: Resume of Flood (AFD and MO Directorate Bangladesh Army 2022).

**Shallow Depth of the Rivers and Canals.** Over time, due to continuous siltation and lack of dredging, the river beds have been raised, making the rivers considerably shallow. Besides natural causes, anthropological or man-made changes on the drainage pattern has also considerable impact contributing towards the flooding at the time of monsoon.

**Waste Dumping in Surma and Kushiara Rivers.** Rapid modernization has resulted increased waste dumping across the water channel system, which is connected with the major rivers Surma and Kushiara. This increased waste dumping on river system has not only contaminated the water flowing downstream but also has reduced the depth of the channel and the river beds causing inundation during heavy rain.

**Land-Filling of Haors.** Haors become enormous expanses of water during the monsoon when they receive surface excess from rivers and canals. Various types of infrastructure have been constructed in haors like unplanned roads, dams, sluice gates etc. This has obstructed the flow of water causing flood.

## Impacts of Flood

**Damages and Deaths.** Two rounds of flood occurred in the year 2022 due to excessive rainfall had completely ravaged the public infrastructure

system. People were stranded in water along with crops and livestock. More than 4.3 million people were affected by the sudden flash flood and water congestion.

**Damages of Road Network, Infrastructure and Communication System.** Flash flood and torrential rain had cut off almost all the road networks. Mobile and land phone communications were disrupted due to the inundation of base transmitting station. Power stations collapsed as water found its way inside the compounds.

**Devastation on the Agriculture Sector.** In Sylhet-Sunamganj area, about 75000 hectares of paddy and 30000 hectares of other crops including maize and vegetation critical to the nutrition were damaged. In Netrokona district, the agricultural damage was also enormous due to sudden flooding.

**Health Risk and Environmental Degradation.** Although there had been speculations of a widespread outbreak of water-borne diseases, the Army teams deployed found the magnitude to a manageable limit. During flood and post flood scenario, civil administration and Army conducted massive medical campaign including supply of pure drinking water in both Sunamganj and Netrokona districts.

## **Tasks Performed by Army with Civil Administration**

**Troops Deployed.** 17 Infantry Division responsible for Sylhet and Sunamganj was beefed up with the elements of Bangladesh Navy, Bangladesh Coast Guard, and reinforcements received from other Army garrisons/outfits, on the other hand 19 Infantry Division operated with their integral resources. The details are in following table:

<b>Table 2: Troops Deployed under 17 and 19 Infantry Division</b>					
Ser	Unit	Strength			Rmks
		Officer	JCOs	Other Ranks	
17 Infantry Division (Sylhet and Sunamganj)					
1.	17 Infantry Division	91	84	1651	
2.	Engineer Elements from other Formation	3	7	172	
3.	Para Commando Brigade	5	5	94	
4.	BD Navy	9	0	160	
5.	BD Coast Guard	3	0	58	
Total		111	96	2135	
19 Infantry Division (Netrokona)					
1.	19 Infantry Division	19	17	441	
Total		19	17	441	
Grand Total		2819			
Source: Resume of Flood (AFD and MO Directorate, Bangladesh Army, 2022)					

**Rescue Operation.** The rescue operation commenced immediately after deployment, and its nature and intensity varied with time. Protecting various facilities like hospitals, medicine stores, mobile towers, KPIs etc were done. Rescuing 15 students of MIST from Sunamganj Sadar, 21 students of Dhaka University from Derai/Doarabazar, and around 50 students/faculty from Sylhet Osmani Medical College and Hospital were praise worthy effort of Bangladesh Army.

<b>Table 3: Rescue Operation under 17 and 19 Infantry Division</b>			
Ser	Formation	Rescued Persons	Rmk
1.	17& 19 Infantry Division	13,200+15341	Total: 28541
Source: Resume of Flood (AFD and MO Directorate, Bangladesh Army, 2022).			

**Picture 2: Rescue Operation by Army at Sunamganj-Netrokona Districts**



Source: Internet, Collection from MO Directorate, Bangladesh Army and Collection of Researcher.

**Distribution of Relief to Affected People.** This was the most significant, prolonged, and effort-demanding part of Operation Plabon-2022. It commenced at the very initial days and continued almost till the end.

**Table 4: Distribution of Relief Materials by Army at Sylhet, Sunamganj and Netrokona Districts**

Ser	Items	No	Value
1.	Food	3,07,541 Packets (Approx 4000 MT)	16,40,74,107 tk
2.	Water Bottles	Approx 2.5 lac bottles, Approx 9.5 lac ltrs through water purification plants	44,28,270 tk (bottles only)
3.	Cows	108	73,50,000 tk
4.	Various Clothes	-	10,00,000 tk
Total			23,62,52,377 tk

Source: Documents of AFD and MO Directorate

**Picture 3: Relief Distribution by Army at Sunamganj-Netrokona Districts**



Source: Internet, Collection from MO Directorate and Researcher.

**Medical Support to Flood Affected People by Army.** Medical support commenced in parallel to rescue and relief operations and teams were embedded with deployed camps. Medical support was provided in two forms: static medical campaigns at different schools, community centres, UZ health complex etc, and door-to-door medical support by boats and vehicles. A total of 68137 persons of Sunamganj and 27205 persons from Netrokona were treated by medical teams of Bangladesh Army (Documents of AFD and MO Directorate Bangladesh Army, 2022).

**Repair and Reconstruction of Roads and Bridges.** Due to excessive rise of flood water, most of the roads remained submerged causing severe damage to the existing roads, bridges and culverts. Engineer Teams of both the divisions were deployed to repair the damaged roads, bridges/culverts etc. The team repaired more than ten local roads and two main artery roads in Sunamganj, Sylhet and Netrokona districts. In addition, 60&80 ft Bailey Bridges were constructed at Sylhet and Sunamganj.

**Picture 4:** Repair and Reconstruction of Roads and Bridges by Army



Source: Internet, Collection from MO Directorate, Bangladesh Army and Collection of Researcher.

**Post Flood Rehabilitation Support.** Thousands of people lost their homes completely and many houses were either washed away or severely damaged. Total 36 new houses were constructed for affected families of Sylhet and Sunamganj districts, and 1242 families were given tins to repair their houses. Total 50 houses were repaired/constructed and 26 tube wells were distributed to poor people of Netrokona District by Army.

## **Analysis of Flood Control Management of Sunamganj and Netrokona Districts**

### **Survey and Interview Findings**

The researcher visited both Sunamganj and Netrokona Districts for field survey and interview. A total of 254 Army and Civil Govt Officers participated in the survey. Officers including senior officers from both Civil Administration and Army were interviewed to get their ground experience on flood of Sunamganj and Netrokona Districts.

### **Survey Findings**

**Is Civil and Military Collaboration the key for Handling Disaster specially for Flood Control?** 74.0% of respondents think that smooth, civil-military collaboration is the key to successfully handling a disaster, especially flood.

**Attitude of Civil Administration to Military (Army).** 77.0% of respondents think the attitude of civil administration towards the military (Army) in handling the flood is very positive and positive and 18.0% think that the attitude is satisfactory.

**Adequacy of Civil-Military Collaboration.** 39.0% of respondents think the existing civil-military collaboration is adequate whereas 34.0% opined that it is inadequate. However, 17.0% think that it is somehow adequate and 9% think that it is not adequate combining 60% respondents are in favor of improvement.

**Is Existing Civil Military Collaboration Sufficient?** 35.1% of respondents think the existing formal or institutional training (Army training institutions/ formations and BPATC) is sufficient for collaborative efforts between Civil and Military Administration, whereas 41.2% opined it to be inadequate and 22.7% are in favor of enhancing constituting almost 64% respondents are in the opinion of insufficiency.

**Are other forms of learning like seminars/workshops/ short training package beneficial in addition to formal/institutional training?** 56.0% of respondents strongly agree and 34% agree constituting 90% to increase collaborative efforts besides existing formal or institutional training (Army training institutions/ formations and BPATC). 49 % respondents strongly agreed and 38% agreed combining 87% for the proposal of periodic organizing of seminars/ workshops/ short training packages by MoDMR, AFD and concerned stakeholders.

**Other Findings of Survey.** Some respondent opined that flood control management is the secondary role of military. Army may not engage in all steps of disaster like dredging, construction of embankment etc. Military engagement may be the last resort to respond to any disaster like other foreign countries and for short period. Respecting each other's differences, culture and being flexible in mind are very important to accommodate as the goal is same for both.

### **Interview Findings**

A good number of senior officers both from Civil Administration and Army were interviewed to know their views about civil military collaboration for flood control management. Division commissioner of Sylhet during flood at Sunamganj was interviewed to get his experience. Additional secretary of MoDMR, closely associated with AFD was interviewed to get his expertise. FGD was conducted at DC Office of Sunamganj and DC Netrokona was also interviewed to get her experience working with Army during flood of June-July 2022. Very senior army officers of the rank of lieutenant general, both the General Officer Commanding and Area Commanders of 17 and 19 Infantry Division, DMO of Bangladesh Army, Commander of 11 Infantry Brigade who was responsible for providing Army assistance to Sunamganj and few junior officers who directly worked with UNOs and local leaders were interviewed to get their views. Findings/ outcomes of the interviews are appended in subsequent paragraphs:

All the interviewees opined that the existing civil military collaboration for flood control management has improved a lot than before. Bangladesh Army ensured continuous communication including providing internet facilities with district administration to all UZs (UNOs) by establishing VSAT and Bangladesh Army Net (BANet) during flood control of Sunamganj in 2022. University students were evacuated during one of the rescue operations at Sunamganj district by Army which was praise worthy. It was opined by senior army officers that there may not be any new inclusion of training curriculum on flood control management. However, out of four 9 weeks training cycles of Bangladesh Army, two weeks are kept for Military Operations Other Than War (MOOTW) where a good number of events are included on disaster. These two weeks can be made more effective for DM especially flood where civil-military collaboration can be enhanced. Brigade level study periods may be organized where local civil officers may participate. All the respondents had same view of organizing more number of seminars/ workshops/ short training packages in flood prone areas both by Civil and Military organizations including increased interaction by invitation to various programs to enhance civil military collaboration for effective flood control management.

Few respondents opined that there should be a clear, written and specific functional guideline/policy/SOP on rules of engagement from the Govt so that misunderstanding may be minimized while working. Participation of more no of Army officers in courses run by BPATC and courses run by Armed Forces Institutions may help better understanding. There may be some modifications in training of BMA for civil officers so that the relation and collaboration become durable.

It was opined that the first and foremost thing required for collaboration is mutual respect and understanding between the military and civil counterparts. Besides, pro-activeness to the given task, visiting the affected people on ground by the field commanders, visiting the troops who are working for the affected people day and night and possessing positive attitude were a few important issues which may help building better collaboration. During

FGD and interview with some senior civil officers, it was felt that Army may be deployed as per UZs in small groups to assist better. Once goal of civil and military is same, ego should not get indulgence. Both the organizations should work together with flexible mind.

Anticipating the occurrence of flood in areas/districts, relief materials may be sent early for efficient management. Important communication gadgets like VSAT may be placed in near vicinity so that it can be made functional whenever necessary. There may be Army representative in the district disaster management committee for better collaboration.

DC Netrokona expressed with appreciation that one of the significant collaborative efforts was repair of a broken bridge of Kalmakanda UZ connecting almost 50000 people of either side of the bridge. The officer responsible for Kalmakanda UZ quickly coordinated with UNO and his team, local leaders and repaired the bridge within shortest possible time. DC Netrokona also appreciated the presence of Army during rehabilitation period which stopped criminal activities in the area.

## **Recommendations**

The existing practice of civil military collaboration for flood control management in the country, study of foreign countries, the case study, analyzing the outcomes of survey and interviews below are few recommendations that may enhance collaborative efforts for effective flood control management in future:

- Collaboration, trust building and mutual respect between civil and military may be enhanced by organizing more number of seminars/workshops and short training package both at civil and Army arena. In addition, interactions can also be increased by invitation to various programs at both ends.
- A working guideline or SOP or ROE to be prepared by appropriate authority may be by MoDMR and AFD for both civil and military personnel for flood control management.

- Presence of Army representative in District Disaster Management Committee (DDMC) may ensure better collaboration.
- Ensuring adequate emphasis on flood control management including conduct of brigade level study period during MOOTW cycle of formation training.
- Ensuring continuous communication including providing internet facilities during flood with district administration to all UZs (UNOs) by establishing VSAT and Bangladesh Army Net (BANet).
- A training module at BPATC to be conducted with increased no of military participants having more no of seminars/workshops which may help building better civil military collaboration for flood control management.

## **Conclusion**

The experience of frequent flood control management by civil and military specially Army dictates the importance of collaboration for effective control. Bangladesh due to climate change is very susceptible to various natural disasters and flood is the most common hazard that people experience every year. Due to the sudden heavy rainfall in Cherapunji of India, the flash flood of Sunamganj and Netrokona in the month of June-July of 2022 affected approximately 7.2 million people with unbearable sufferings. Upon the call of civil administration, Army was deployed in Sylhet-Sunamganj and Netrokona districts. In addition to classical tasks of rescue operation, relief distribution, medical treatment etc; rescue operation of students of universities by Army, repair of bridges of Sunamganj and Netrokona, establishing communication with VSAT and protection of power station were notable actions during the flood control management.

The study of flood control management of USA, UK and India advocates that involvement of Armed Forces (Army) comes as the last resort to meet any emergency situation. Involvement of Army is more conspicuous for flood control in India. Indian Army takes part in joint exercises and deploys almost every year in flood prone areas in collaboration with civil

administration and other agencies. It was found through case study, survey and interviews that the existing collaboration with civil administration and Army has improved a lot than earlier. However, there are scopes for improvement to enhance better collaboration in future.

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# **CLIMATE REFUGEE: A CHALLENGE FOR LIVELIHOOD SECURITY WITH REFERENCE TO BANGLADESH**

**Brigadier General Mohammad Shofiu Azam**  
**SUP, PPMS, ndc, afwc, psc**

‘Our world is facing a refugee crisis of a magnitude not seen since the Second World War. This presents us with great challenges and many hard decisions.’

-Pope Francis

## **Introduction**

Bangladesh, one of the world’s most densely populated nations, grapples with staggering population density, notably in Dhaka, experiencing a yearly increase of 3.39%. Coastal regions like Khulna face environmental strain compounded by negative growth rates (Nishat, 2023). Dhaka confronts a daily influx of three to five thousand homeless individuals, intensifying resource stress (Opu, 2022; Islam, 2023). The crux of the issue lies in the impact of climate change, rendering millions of climate refugees. The Bangladesh government estimates that one in seven individuals will be displaced due to climate change, affecting around thirty-five million from coastal districts (Government of Bangladesh, 2021).

The term ‘climate refugee’ is debated; international law defines refugees as those unable or unwilling to return due to persecution [United Nations High Commissioner for Refugees (UNHCR), 2009]. ‘Environmental migrants’ are compelled to leave due to environmental changes [International Organization for Migration (IOM), 2009]. A ‘climate refugee’ permanently leaves due to climate-induced natural calamities. Projections indicate over 19 million internal climate refugees in Bangladesh by 2050, constituting more than half of South Asia’s anticipated total (TBS Report, 2021). The

global scale of climate-induced migration, estimated at 150 million to 1 billion by 2050 (Perkiss and Moerman, 2018), presents a severe threat to humanity (Rajan, 2022).

The research underscores climate change's long-term effects on Bangladesh's fundamental requirements and livelihood security (Rajan, 2022). Rising sea levels, saline water encroachment, and resource scarcity threaten national growth. The relationship between security and development, as articulated by Robert McNamara, becomes evident-security is contingent on development, and climate change hampers both (McNamara, 1968). Resource scarcity intensified by climate refugees may impede Bangladesh's progress in poverty reduction and economic growth achieved over the past two decades.

In light of these challenges, the research calls for proactive measures, anticipating impacts on economic and social development, emphasizing the potential hindrance to Sustainable Development Goals (SDGs) and national security. The findings aim to guide stakeholders in formulating action plans and policies to address security challenges posed by climate refugees. The research fills knowledge gaps, providing valuable insights for academics and fostering awareness among government and non-government organizations. It advocates for a prompt intervention strategy to safeguard Bangladesh's future economic prosperity and the well-being of its citizens in the face of climate refugees.

## **Literature Review**

The literature review navigates through a diverse array of sources to provide a comprehensive understanding of climate refugees, climate change, migration, and security, particularly in the context of Bangladesh. The terminology surrounding environmentally induced migration is explored, encompassing 'environmental migrants,' 'Internally Displaced Persons (IDPs),' and the debated concept of 'climate refugees.' The lack of universal recognition for the term 'climate refugee' is highlighted

(IOM, 2009; UNHCR 2009; UNHCR, 1951). Displacement in Bangladesh, exacerbated by tidal floods, riverbank erosion, and climate change, is projected to affect one in seven people by 2050. The impact of sea-level rise alone may force up to 18 million people to relocate (TBS Report, 2021). Bangladesh faces an influx of climate refugees moving to Dhaka to escape coastal flooding. With over 10 million climate refugees in a country of 168 million, approximately 2,000 people migrate to Dhaka (Daily Sun, 2022). The impact of climate change on the daily lives of coastal residents in Bangladesh is discussed, emphasizing the socio-economic security consequences for the nation (Shahabuddin, 2021). Critiques of the term ‘climate refugees’ is presented, addressing concerns about its broad amalgamation of various displacement causes. Proposals for alternative terms like ‘ecological displacement’ are introduced to encompass a broader range of factors (White, 2019; Hiraide, 2022). Specific studies delve into the consequences of climate-induced migration in Bangladesh, examining decision-making dynamics, governance systems, gendered insecurities, challenges in urban slums, and the impact of COVID-19 on migrants (Parves, 2021; Naser, 2019; Khanom, 2018; Khan, 2022). Urban conflicts, floods, and security threats arising from climate change are analyzed, emphasizing the importance of effective monitoring systems and stakeholder integration to minimize adverse outcomes (Castells, 2022; Kisinger, 2021; Mahmood, 2017). National-level plans, such as the National Adaptation Plan and few others are critiqued for their limited emphasis on migration, refugees, and their consequences, indicating gaps in policy frameworks (NAP, 2022 and MCPP, 2021).

In summary, the literature review provided a rich tapestry of insights into the multifaceted aspects of climate-induced migration, climate refugees, and its security implications. Top of Form Climate migration is undeniable in Bangladesh, yet precise numbers of climate refugees are undocumented. The term ‘climate refugee’ lacks legal recognition, requiring a person to be outside their country of nationality. Various terms are used, demanding international recognition and governance mechanisms. Bangladesh, vulnerable to climate change impacts, faces socioeconomic challenges, with coastal and riverbank

communities suffering the most. Climate change severely affects Bangladesh's economy and spurs rapid urbanization, complicating the terminology for relocated individuals. Negative population growth in coastal areas contrasts with rapid urban growth, indicating migration-related security challenges in destination areas.

## **Research Objectives, Methodology & Analytical Framework**

### **Research Objectives**

The research aims to explore the link between climate refugees and national security, analyzing theoretical concepts, legal frameworks, and gaps, understanding the causes of migration and climate refugees, examining security challenges on livelihood, and proposing measures to enhance livelihood security resilience.

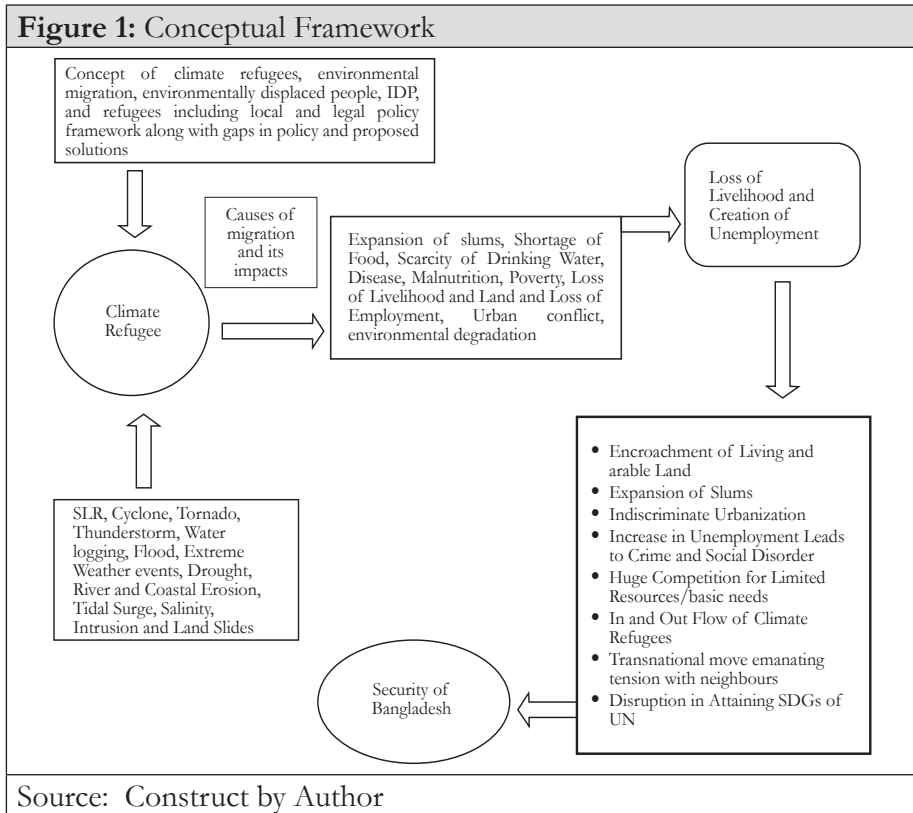
### **Research Methodology**

The research was an explanatory and descriptive study following an inductive approach. Utilizing quantitative and qualitative methods, including Key Informant Interviews, the study explores the concept of climate refugees, their causes, and the resulting security challenges in Bangladesh. Statistical data from reputable sources like IDMC, BBS, DoE, NGOs, BRAC, and BIIS supplements the analysis. The research focuses on the impact of climate refugees on livelihood security, validated through expert interviews, and identifies associated challenges. The findings culminate a set of recommended options to mitigate the impacts of climate refugees on Bangladesh's livelihood security, offering practical solutions.

### **Conceptual/ Analytical Framework**

In the research, the independent variable is identified as climate refugees. Consequences of climate change, including SLR, cyclones, and other disasters, results in land and livelihood loss, unemployment, food and water

scarcity, illness, and poverty. These effects disrupt UN SDG achievement, fueling tensions, security concerns, and illegal transnational migration, negatively impacting national security and socioeconomic development (Figure: 1).



## Concept of Climate Refugees and Causes of Migration

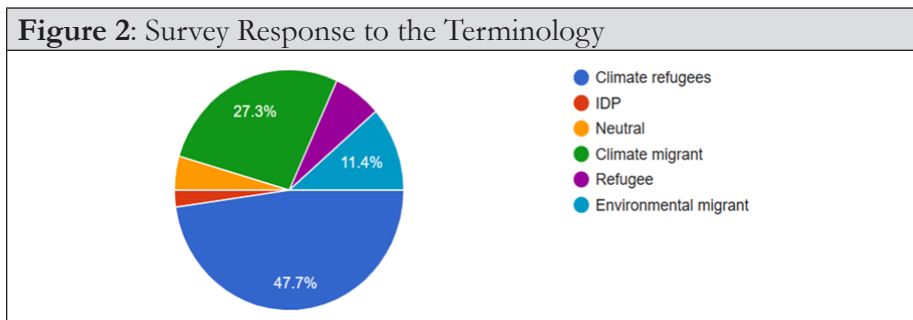
### Concept of Climate Refugees, Barriers, and Probable Solutions

The term ‘climate migrants’ lacks consensus, with alternative phrases like climate refugees, environmental migrants, eco-refugees, and environmentally displaced persons. (Benoit Mayer, 2011; Hussen, 2019). According to Article 1, Section 2 of the 1967 Protocol to the UN Convention, a refugee is someone who: ‘Owing to a well-founded fear of

being persecuted for reasons of race, religion, nationality, membership in a particular social group, or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; is unwilling to return to it.’ Under the Refugee Convention (1951), A person must be outside of their country of nationality or previous place of residence to qualify as a refugee. They must also have a well-founded fear of being persecuted because of their race, nationality, religion, membership in a particular social group, or political opinion.

In 1985, Essam El-Hinnawi, an expert on the Environment, coined the term ‘climate refugees,’ in public discourse:

‘... those people who have been forced to leave their traditional habitat, temporarily or permanently, because of marked environmental disruption that jeopardized their existence and seriously affected the quality of their life’. 47.7% of respondents opined that permanently displaced people are climate refugees (Figure: 2).



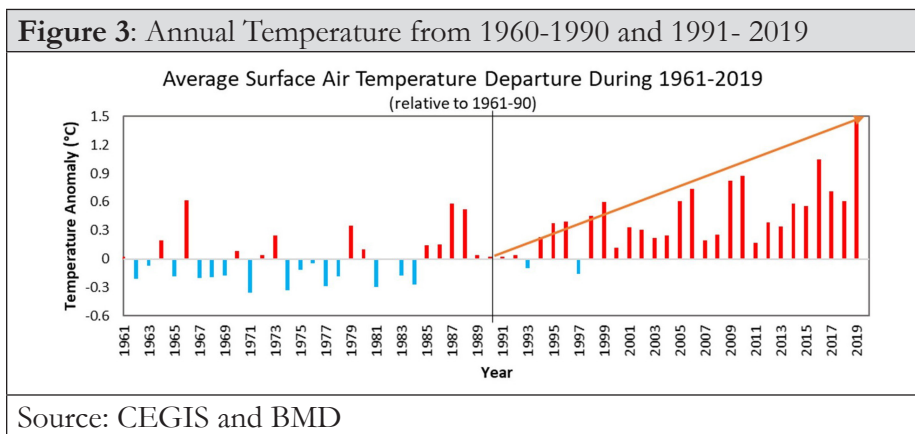
The complexity arises in defining ‘climate refugees,’ impeding the safeguarding of those displaced by climate change. The UNHCR fears the potential consequences of including ‘environmental refugee’ as a legal category (Nina Höing, 2012; UNHCR Forty-Fourth Report, 1993). International refugee law and human rights law, face gaps in addressing climate refugees. The restrictive definition of a refugee and the absence of institutional safeguards hinder effective protection (McAdam, 2012; Ben

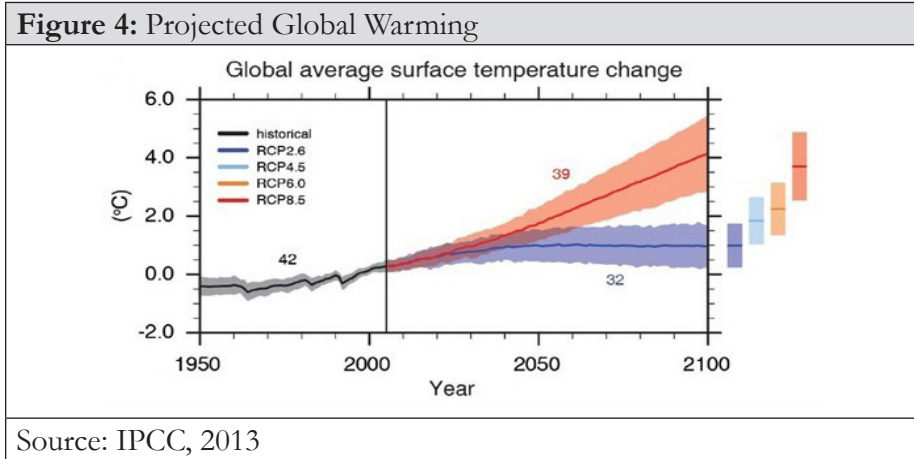
Saul, 2010; Khalid & Andrew, 2010). The 1998 UN Guiding Principles on Internal Displacement fall short, applying only to victims who stay within national borders (Hussen, 2019).

Proposed solutions recognize the need for adequate institutions, and call for a new international legal framework. Suggestions range from expanding the 1951 Refugee Convention to regional agreements and soft law frameworks. The regional approach gains traction due to the likelihood of displacement occurring regionally (Docherty and Giannini, 2009; Walter kalin and Nina Schrepfer, 2012). Soft law frameworks emerge as flexible alternatives (Benoit Mayer, 2011; Xing-Yin Ni, 2018). Collaboration between regional and international communities, drawing relevant laws from states, and determining the global community’s stance on climate migrants are crucial (Hussen, 2019). The multifaceted nature of the protection issue demands a holistic approach, involving regional, international, and hard and soft law remedies.

## Causes of Migration and Climate Refugees

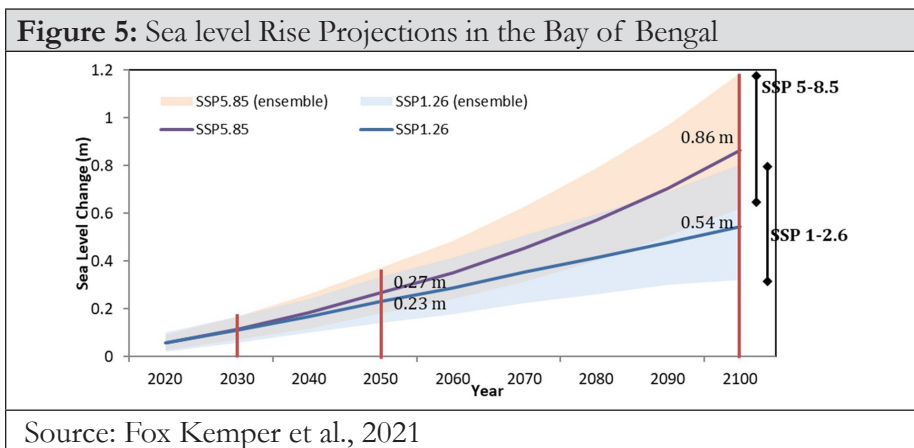
**Temperature Rise and Change of Rainfall Patterns.** Temperature escalation is evident, with a staggering rise of 1.06°C between 2011 and 2019 (CEGIS, 2022). Projections by IPCC signal an increase of 1.5°C to 4.4°C by the end of the century, fostering adverse consequences on crop production and migration (IPCC, 2021), (Figure: 3 and 4).





Rainfall patterns undergo fluctuations, with increases in post-monsoon and monsoon seasons and reductions in winter and pre-monsoon periods affecting food production (Rahman et al., 2015).

**Riverbank Erosion, Sea-level Rise and Salinity Intrusion.** Riverbank erosion exacerbates, displacing 25,000 people annually, and sea-level rise threatens 18% of the coastal region (Figure: 5). Salinity intrusion affects 30% of cultivable land in the coastal zone (NWMP, 2001; SRDI, 2010; CEGIS, 2021).



**River and Coastal Flooding, Flash Floods, and Urban Floods.** River flooding is a recurring challenge, submerging vast areas and causing infrastructure damage, while flash floods disrupt agriculture and displace populations (CEGIS, 2021). Urban floods afflict cities, notably Dhaka, affecting millions and highlighting the growing urbanization vulnerability.

**Drought, Cyclone, Tornado, and Storm Surges** Droughts, especially in April and May, coupled with extreme heat waves, induce agricultural losses and health risks (CEGIS, 2013; Nishat, 2017). Cyclones, tornadoes, and storm surges occurring with increasing frequency pose severe threats (IFRC, 2021; BBS, 2022).

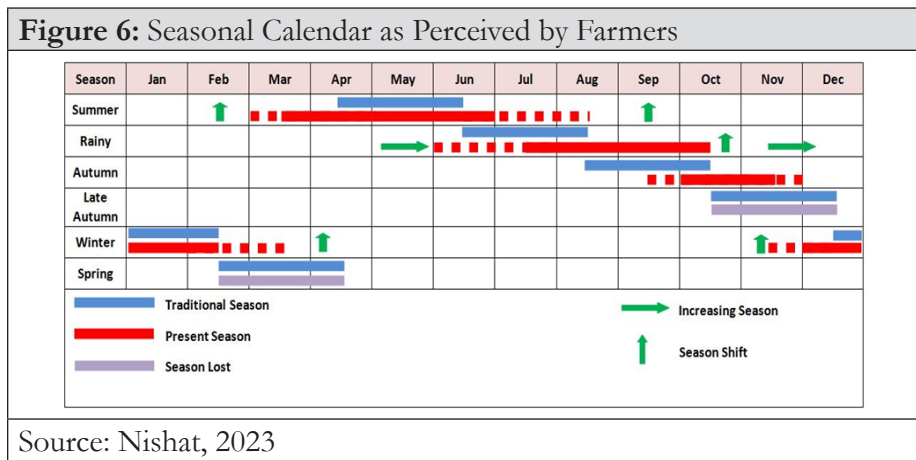
**Sea Surface Temperature (SST) and Ocean Acidification.** Sea surface temperature rise and ocean acidification adversely affect fish ecology, impacting economy and nutrition (Sridevi and Sarma, 2021; Hossain et al., 2021).

**Loss of Land and Material Goods.** Land and material losses due to riverbank erosion threaten islands like Hatiya, Swandip, and Bhola, potentially displacing entire populations (Sahabuddin, 2015). Table: 1 lists the lost between 2009 and 2014 in the hazard zones.

<b>Table 1: Distribution of Damage on Dwelling House, Kitchen, Cowshed, and Homestead Forestry</b>			
District	Total Value (in Million Tk)	Residence, Kitchen, Cowshed Value (in Million Tk)	Affected Homestead Forestry Value (in Million Tk)
Coxs' Bazar	991.94	702.91	289.03
Patuakhali	5647.95	3748.5	1899.45
Bagerhat	1947.48	761.58	1185.90
Khulna	2283.70	1700.07	583.63
Satkhira	2195.96	1871.11	324.85
Nilphamari	531.01	480.06	50.95

Source: BBS, 2015

**Food Security.** The food production of Bangladesh would be severely impacted by a 4°C temperature increase, with wheat and rice production declining by 28% and 68%, respectively. Figure: 6 shows the seasonal variation, unusually Rainy seasons and Summer prolonged thereby, farmers suffer substantial losses and uncertainty (Nishat, 2023). Higher temperatures have a range of detrimental effects on plants and their products.

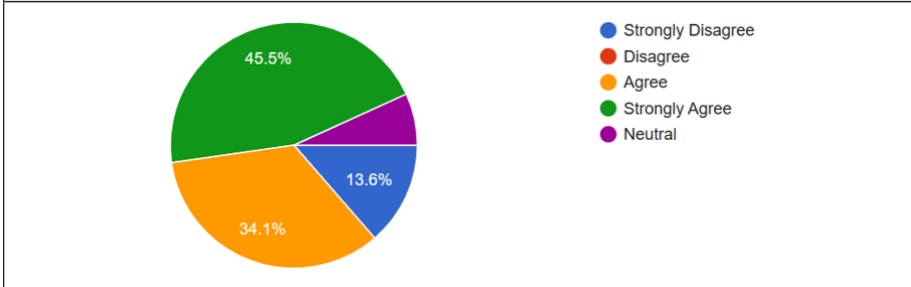


**Livestock and Fishing.** Extreme temperatures and erratic rainfall have a direct impact on fish physiology, growth, mortality, reproductive systems, feeding behavior, and production, in both inland and coastal areas (Hossain et al., 2021). Heatstroke, disease outbreaks, changes in regenerative processes, and decreased milk, meat, and egg production are the effects on livestock.

**Increased Unemployment.** Many individuals lack the economic means to support themselves as a result of land loss and degradation, which raises unemployment and leads to the creation of refugees.

**Survey Response.** 80% of respondents agreed that climate change effects are causing migration worldwide (Figure: 7).

**Figure 7: Survey Response on Migration**



**Key Informant Interview (KII) Khulna Division and Korail Slum, Dhaka.** Interview with KI opined that they migrated due to the climatic hazards and described the sufferings. Most of them lost everything and had to leave their home for better livelihoods.

**Threats to Communities and Livelihoods.** Estimated damages reached BDT 18,425 crore between 2009 and 2014 (BBS, 2016). By 2025 and 2050, coastal zones predict 7 million and 13 million people at risk (Karim and Mimura, 2008). Climate change impact is set to double storm surge and cyclone losses, reaching \$9.16 billion, constituting 0.6 percent of GDP by 2050 (World Bank, 2010). The potential effects are shown in Table 2.

**Table 2: Potential Impacts and Risks for Communities and Livelihoods**

Climate signal and hazards	Potential impacts	Risk level	
		SSP1-2.6	SSP5-8.5
Excessive rainfall	<ul style="list-style-type: none"> <li>• Hampered water and food security</li> <li>• Malnutrition and health problems</li> <li>• Loss of livelihoods; increased poverty</li> <li>• Economic losses</li> <li>• Disrupted urban economy</li> <li>• Ecosystem degradation</li> <li>• Gender and domestic violence</li> <li>• Social inequality</li> <li>• Internal displacements</li> <li>• Hampered sustainable development</li> </ul>	++	+++
Extreme heat		++	+++
Cold spells		++	+++
Frequent river floods		++	+++
Early or frequent flash floods		++	+++
Severe droughts/water scarcity		++	+++
Frequent lightning		++	+++
Frequent landslides		++	+++
Increased salinity		++	+++
Frequent cyclones and storm surges		++	+++
Sea-level rise		++	+++

Source: Author

## Impact of Climate Refugee on Livelihood Security

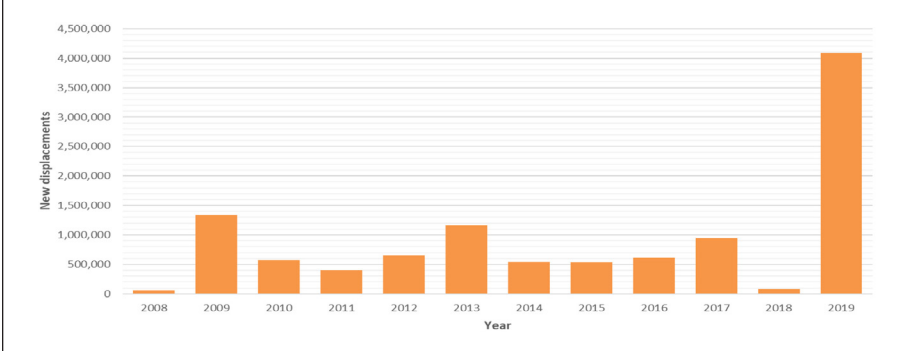
**Assessing Environmental Migrants and Types of Migration.** Climate change-induced displacement projections for 2050 range from 50 million to 1 billion people (Stern, 2007). Norman Myers estimated 200 million in 1995 and 2000, while Christian Aid forecasts 1 billion, categorized into 250 million from climate events, 50 million from disasters and conflicts, 50 million from natural catastrophes, 5 million as refugees, and 645 million due to development initiatives (Kate Burrows, 2016). Migration types include Environmental Emergency Migrants, Environmentally Forced Migrants, and Environmentally Motivated Migrants. Typically, environmental migrants seek employment in nearby cities and often stay within their home nations, concentrating in urban areas (Smith, 1996; Kayastha, 1985; Naik, 2007; Khatun et al., 2021) as seen on Hurricane Andrew in Florida and the Ghaghara floodplain in India (Smith, 1996; Kayastha, 1985). Similarly, migration to urban areas was observed in Sri Lanka, Thailand, and Indonesia (Naik, 2007).

**Migration as Adaptation and a Catalyst of Conflict.** Migration is a recognized coping strategy, contributing to resilience and community well-being (Kate Burrows, 2016). The terms ‘adaptive migration,’ ‘maladaptive migration,’ and ‘survival migration’ capture its complexities (Homer-Dixon, 1999; Weiner, 1983; Nishat, 2023). The ‘neo-Malthusian’ theory warns of heightened resource competition and violence (Kate Burrows, 2016), raising concerns about potential conflicts over resources, employment, and space (Alam, 2003).

**Climate Migration in Bangladesh.** Due to natural disasters in Bangladesh, hundreds of thousands of climate migrants are created each year (Priovashini and Mallick, 2021; McDonnell, 2019). Bhola Island experienced flooding twice, in 1995 and 2005, displacing over 500,000 people (Wikipedia, 2017). According to IDMC 2021, more than 35 million people from coastal regions will be relocated by 2050. More than 4 million climate migrants were triggered by cyclones Fani and Bulbul in 2019,

average displacement rate of 915,083 per year, Figure: 8. The types and patterns of migration are rural and urban (Table 3).

**Figure 8:** Annual disaster displacements in Bangladesh (2008–2019)



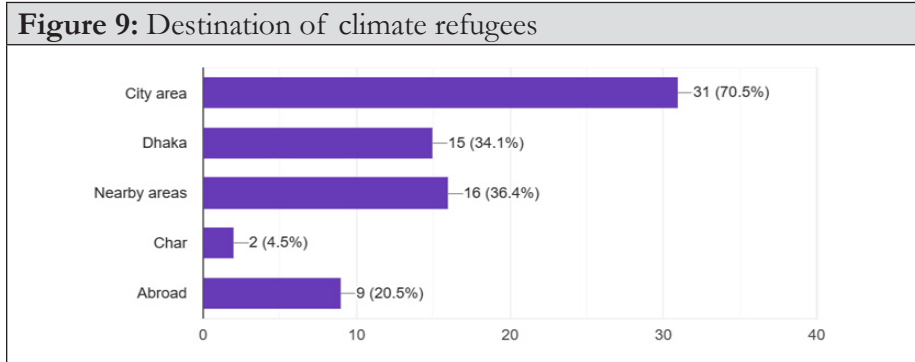
Source: IDMC 2021

**Table 3:** Categories of Internal Migration (per 1000 population), 1991–2011

Destination	1991	2004	2011
Rural Destinations	45.2	33.7	57.2
Rural to rural	34.2	29.9	52.6
Urban to rural	11.0	3.8	4.6
Urban Destinations	561.5	312.0	267.3
Urban to urban	43.6	47.9	44.4
Rural to urban	517.9	264.1	222.9

Source: UNFPA, 2016

70% of respondents opined that the destination of climate refugees is in the city area (Figure: 9).



**Origin of Slum Residents.** According to Ayatullah Khan (2022) the bulk of people living in various City Corporation slums moved from nearby districts. Like, as Khulna City (containing the districts of Khulna, Satkhira, and Bagerhat), Barishal (covering the districts of Barishal, Barguna, and Pirojpur), and Dhaka (comprising all the districts) (Khan, 2022).

## Climate Refugees Impacts on Livelihoods

**Expansion of Urban Slums.** The number of people living in slums in Bangladesh was 30.4 million, sixth in the world (Davis, 2006). There were 13,938 slums in 2014 (BBS, 2015) and this was 2991 in 1997, distribution in Table: 4. The percentage of people living in slums is highest in the Dhaka division (46.56%).

**Table 4: Distribution of Slums in Bangladesh**

Division	Total slums	Percentage of slums
Barisal	205	1.47
Chattagram	3305	23.71
Dhaka	6489	46.56
Khulna	1684	12.08
Rajshahi	421	3.02
Rangpur	422	3.03
Sylhet	1412	10.13
Total	13,938	100

Source: BBS, 2015.

Approximately 300,000 to 400,000 migrants arrive in Dhaka each year, making it the greatest population growth worldwide. 37% of Dhaka’s population resides in slums (CUS, 2006) with 5.1% of land area (Table: 5).

<b>Table 5: Growth of Slums in Dhaka</b>			
Year	No. of slums and squatters	Population size	Percentage of total urban population
1974	NA	275,000	13
1991	2156	718,143	10
1996	3007	1.5 million	20
2005	4966	3.4 million	37.40

Source: Parves, 2021

The World Bank (World Bank, 2007) predicted that over the following ten years, there would be 8 million people living in Dhaka’s slums.

**Effects on Urban Services and Infrastructure.** The massive influx of migrants raises the demand for urban infrastructure and services.

**Health and Educational Resources.** 52% of the males (aged 15 and above) are literate, compared to 33% of the females (World Bank 2007; Hossain 2001). 12% of young migrants continue their education to the graduate level. In Dhaka, less than 54% of families have access to medical care (World Bank, 2007).

**Poor Housing.** Over 87% of people live in kachas and wooden structures which are not healthy (CDMP, 2014). The slums have very limited access to social services as well (Parves, 2021).

**Water Supply.** In Dhaka’s slums 70%, grapple with inadequate and poor-quality water supply, often relying on unregulated sources like wells, ponds, and rivers. The majority lack access to piped water, resorting to private water vendors despite higher costs (World Bank 2007).

**Latrine and Electricity.** 20% of urban poor have access to sanitary latrines (Hossain, 2006). According to CUS 33% of Dhaka’s urban poor lack access to electricity, whereas 67% of them utilize it.

**Gas Facilities.** 72% of urban poor cook with traditional fuel, and 22% of them have access to gas facilities (CUS, 1996). 89% of respondents agreed that climate refugees are facing difficulties with basic needs in their destination.

**Urban Governance Issues and the Growth of the Informal Economy.** Urban authorities in Bangladesh face challenges in managing the informal sector's expansion, ensuring access to services, and addressing the plight of slums. Climate-related refugees strain governance, hindering effective urban management (Hossain, 2012).

**Environmental Issues and Social Insecurity.** Climate refugees forced into slums on low-lying government land, endure social and environmental insecurities, compounding their struggles. (Khan, 2022).

**WASH-Related Difficulties.** Urban slums grapple with severe water, sanitation, and hygiene (WASH) issues. Lack of drinking water, restricted access to WASA due to the absence of holding numbers, and stringent regulations on tube well installations pose challenges. Inadequate restroom facilities shared latrines among multiple families, and the absence of separate bathrooms for women, affecting menstrual hygiene management, highlight pressing concerns (Khan, 2022).

**Risks and Vulnerabilities for the National Economy.** According to Ahmed et al. (2014), an estimated \$12 billion in economic losses was incurred last 40 years which reduces GDP by 0.5 to 1% yearly. A 2°C temperature increase will result in a 2 percent yearly GDP loss by 2050 (Ahmed et al., 2014). By 2100, average yearly economic losses are predicted to be 9.4% (MoEFCC, 2018). Disasters caused by climate change accounted for an average 1.32 percent of annual GDP loss from 2016 to 2021 (BBS, 2022).

**Security Threats Due to Refugees.** Sea level rise in Bangladesh, affecting 15% of the population and 16% of land, poses a socio-economic disaster. Large-scale inland migration intensifies population density, raising security concerns. 64% of respondents fear climate refugees turning to extremism due to unemployment and basic needs.

**Security Threat Induced by Unemployment.** Climate refugees, seeking livelihoods in saturated job markets, face competition. Limited job opportunities, reliance on informal sectors, and strained finances contribute to tensions (KII; Khan, 2022). 88% of respondents acknowledge employment competition, raising concerns about social unrest and security implications.

**Traditional and Non-traditional Security Threats.** Climate refugees, facing loss of livelihood and uncertainty, may turn to aggression, and join in extremism, arms smuggling, and drugs posing challenges for destinations. 73% of respondents opined climate refugees are involved in unethical crimes and non-traditional security threats.

**Threats to Food Security.** Agriculture will be severely impacted by land loss, saline intrusion, floods, droughts, and other factors. Food security in the nation will be impacted by the decline in food production (Khan, 2022).

**Key Informant Interview (KII) Korail Slum, Dhaka.** The maximum of the population migrated due to Cyclone Aila (2007) and Sidr (2009). They have an average of 5 to 7 family members. Some migrated due to push and pull factors. Many of them lost their family members and farmland. Due to the intrusion of salt water, the agricultural lands become unfit for cultivation. In cities, high living costs, housing, sanitation challenges, and inadequate facilities compound their difficulties. Government relief, though minimal, lacked equitable distribution, fueling dissatisfaction among affected people. Limited skills hinder immediate employment, who resort to odd jobs to survive. Necessities like healthcare and education remain inaccessible. The influx of migrants is a daily occurrence, with the number steadily increasing.

**Key Informant Interview (KII) Khulna.** Lost livelihoods in fishing, farming, and agriculture, cows died, fish cages destroyed, and saline intrusion rendered agricultural land useless. Despite local support, high living costs, and initial job challenges, migrants prefer city life. Lack of

skills leads to odd jobs, but opportunities exist. Though living in low-cost, shabby conditions, they avoid returning home. Some faced issues in neighboring countries due to the Citizenship Amendment Act (CAA) 2019, prompting their return.

**Focus Group Discussion (FGD).** In the FGD the causes of migration, the origin of migration, the destination of migration, the category of people migrating, and the security consequences of migration were identified. It was established that climate change is the major cause of migration. Migrants normally move to nearby cities initially then go far flank and abroad. Unemployed, needy, and homeless people are migrating and are involved in odd jobs, due to a lack of skills and training, sometimes they are involved in harmful activities which in turn affect national security.

## **Ways Forward for Bangladesh**

### **Short-Term Measures**

**Central Data Base and Monitoring System.** Cause-specific comprehensive central database to be prepared, maintained, and monitored for migration causes, destinations, and origins, enhancing traceability and enabling tailored protection measures.

**Forming Mitigation and Adaptation Policies.** A comprehensive migration, relocation, and urban policy with an affordable action plan needs to be made involving all stakeholders with the MoEFCC as the head, for addressing refugees and migration.

**Conduct Research.** More theoretical and practical research on climate refugees, migration, poverty, and insecurity may be undertaken. A Center for Research and Knowledge Management on Climate Change may be established to provide global insights and monitor nationwide climate effects.

**Protection of River Coastal Zones and Ecosystem.** Embankments, elevating polder heights, dykes, and coastal barriers may be constructed to safeguard rural poor settlements. Engage communities in regular maintenance.

**Climate Refugee Needs Attention in National Policies and Programmes.** Integrate climate migration into key policy documents like in NAP, MCPP etc.

**Local Government's Active Participation.** Local government's active participation in implementing training, awareness campaigns, diverse livelihood options, community-led resource management, and effective disaster risk management for resilience and sustainability.

**Climate Smart Alternatives and Crop Diversification.** Climate-smart options may be encouraged like cultivating salt-tolerant agricultural products, and fish to adapt to coastal fishing and farming. Crop diversification and seed banks may be created to reduce climate change impacts.

**Create Job Opportunities.** Implement policies for technical and vocational training, recognizing refugees' rights to employment and social security. Foster linkages between training providers and potential employers.

**Project to Rehabilitate Climate-Affected Areas.** Enforce the right to appropriate housing for permanent relocation, aligning with the International Covenant of Economic, Social, and Cultural Rights (ICESCR). Initiatives like Gucchogram, Multistoried Abason projects, Asrayan, cyclone shelter, Khurushkul Special Ashrayan Project, etc. for resettlement, and fostering sustainable rehabilitation.

## **Long-Term Measures**

**Recognition of 'Climate Refugees'.** Efforts may be taken to acknowledge the terminology 'Climate Refugee' for forced migration. On a global scale, this might contribute to a better understanding and assistance for climate refugees.

**UNFCCC to Address ‘Climate Refugees’ Effectively.** The UNFCCC has to coordinate and address the climate refugees by adopting a more comprehensive strategy.

**Development Project.** Government-led initiatives may be conducted like multi-story low-income housing and employment opportunities prioritizing resettlement and job prospects for climate refugees.

**Raising Voice in International Forums.** Advocate in international forums for recognizing environmentally displaced people as ‘Climate Refugees’ with refugee status and support. This strategic move, is supported by 73% of survey respondents.

**Approaching Global Communities.** Collaborate with partner nations to raise migration, adaptation, mitigation, technology transfer, and financing issues in international forums. 89% of respondents agreed that developed countries should take responsibility for rehabilitating climate-induced migrants.

**Regional Cooperation.** Formulate a regional environmental policy and mitigation strategy, emphasizing cooperation and sharing expertise. Strengthen the role of regional organizations like SAARC, AU, ASEAN, QUAD, NATO, and G20 for effective environmental solutions.

**Modification to the Land Use and Forestry Sector.** The outdated Forest Act of 1972 needs to be revised to protect the country’s forest resources to minimize the consequences of climate change effects.

**Program for Community Responsiveness.** Conduct mass awareness campaigns on climate change and refugee effects, focusing on coping mechanisms through leaflets, posters, print and electronic media, NGO meetings, and environmental clubs in schools.

**Health.** Promote public health safety with widespread awareness of water-borne diseases at all levels. The involvement of NGOs is necessary in community awareness efforts.

**Strengthening Capacity.** Enhance local government capacity through institutional, scientific, organizational, and technological building.

**Financial Consequences.** Proactive measures are required to secure pledged funds from developed countries and urgent implementation of loss and damage, ensuring a just transition is very much necessary.

**Separate Organization for Dealing Climate Refugees.** Climate refugees-related organizations may be developed to deal with climate refugees like IOM.

## **Recommendations**

### **At the Local Level**

- Maintain cause-specific migration databases for tracing refugees and implementing protection measures.
- Educate residents on environmental issues to foster conservation.
- Empower local government authorities to document and identify victims, implementing comprehensive adaptation and mitigation plans to address migration and refugees.

### **At National Level**

- Establish a central database and monitoring center for climate refugees, detailing migration causes, destinations, and origins. These data can be focused on appropriate forums to get facilities for the displaced people.
- Advocate for comprehensive migration policies involving stakeholders and led by MoEFCC.
- Develop a well-planned relocation policy, prioritizing proximity and demographic considerations. Implement large-scale initiatives like multi-story low-income housing and employment for refugees, emphasizing vulnerable groups.

- Create skill-development programs with diverse employment options, fostering linkages with potential employers. The survey underscores the urgency, with 89% agreed for proper attention.
- Advocate in international forums for terming environmentally displaced individuals as ‘Climate Refugees’ with refugee status and support. Leverage this for international support, including authorized migration with livelihood assistance.

### **At Regional Level**

- Essential collaboration with neighboring nations facing similar threats.
- Develop a regional environmental strategy, fostering cooperation, sharing scientific knowledge and difficulties
- Strengthening the involvement of regional organizations like SAARC, AU, ASEAN, QUAD, NATO, G20, etc.

### **At the Global Level**

- Recognize climate refugees in international law. Establish organizations akin to IOM for climate refugees. Increase funds for climate change research.
- Developed nations must finance and reduce GHG emissions in vulnerable countries.
- Loss and damage, just transition to be implemented without further delay.

### **Conclusion**

Bangladesh faces a formidable challenge with climate change-induced migration and refugees, particularly in coastal districts and city areas. The absence of precise migration data hampers planning, hindering cause-

specific accounts. Despite lacking legal recognition, the term ‘climate refugee’ is a stark reality. Proactive measures are vital, urging nations to press developed countries for carbon emission reduction.

Urban slum expansion, driven by climate refugees, worsens living conditions, environmental problems, and social conflicts. Job competition and market saturation aggravate hostility between migrants and residents. Loss of livelihood and refugees significantly impact food production, agriculture, fisheries, the environment, human health, usable land, and the economy. Predictions indicate a 3.1% annual reduction in agricultural GDP, costing \$36 billion by 2050. Climate refugees may fuel conflicts, leading to violence and unrest. Government rehabilitation efforts are lacking, risking exploitation by vested groups and potential involvement in extremism.

Cooperation between developed and developing nations is crucial to avoid environmentally risky projects. Policies prioritizing land and resource management are essential. A national-level plan is needed, encompassing comprehensive policies, monitoring systems along with short and long term measures. The study recognizes climate refugees as a growing national security risk, emphasizing the need for policymakers to understand migration patterns. Measures supporting resettlement, return, reintegration, and assimilation into new locations should be integrated into national policies. In conclusion, the study underscores the urgent need for a holistic approach to address the complex challenges posed by climate-induced migration and refugees in Bangladesh.

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Brigadier General Mohammad Shofnul Azam, SUP, PPMS, ndc, afwc, psc was commissioned with 34 BMA Long Course on 7 June 1996 in the Corps of Engineers. He has completed both a Bachelor of Science and a Master of Science in Civil Engineering from the Military Institute of Science and Technology (MIST). He is a graduate of the Defence Services Command and Staff College (DSCSC), Armed Forces War Course and National Defence Course from the National Defence College (NDC), Mirpur.

He got his Masters's in Defence Studies and Masters in Social Studies from Bangladesh University of Professionals (BUP). Besides military courses at home, he did Engineer Captain Carrier Course in the United States of America (USA). Despite serving in various Engineer Regiments, he also served in Head Quarters Rapid Action Battalion as Deputy Director of Interrogation, Brigade Major of the 14 Independent Engineer Brigade, Commanding Officer 12 Engineer Battalion, Grade I Staff Officer in the Army War Game Center (AWGC), Colonel Staff 19 Infantry Division, and Design and Drawing Team Incharge and Project Coordinator of Padma Bridge Rail Link Project (PBRLP). He also served under the blue helmet twice as a contingent member and as Engineer Staff Officer in Force Headquarters respectively in UNOCI (Ivory Coast). He visited a few countries including Ivory Coast, UAE, KSA, Egypt, France, USA, South Korea, India, Thailand, Oman China, and Japan. In personal life, Brigadier General Azam is happily married to Mrs. Sunjina Jarin Tuli and blessed with a son and a daughter.

# **POLLUTION IN THE BAY OF BENGAL: IMPACT ON BLUE ECONOMY OF BANGLADESH**

**Commodore Faisal Mohammad Arifur Rahman Bhuiyan  
(G), BSP, PPM, ndc, afwc, psc, BN**

## **Introduction**

The oceans are essential for survival on earth. The largest ecosystem in the world is the marine environment, which is two thirds of the world. The Bay of Bengal (BoB) is one of the 64 bays in the world which is in the midst of South and Southeast Asia. Bangladesh is bestowed with more than 118,813 square kilometers (sq km) of waters, including a 200 nautical mile Exclusive Economic Zone (EEZ) and territorial sea. Additionally, it possesses unquestionable sovereign rights over 354 NM (nautical miles) from Chattogram coast, the whole seabed in the BoB, including all living and non-living resources (Dhaka Tribune, 2016). The hub of Bangladesh's Blue Economy is the BoB and the coastal regions. They hold significant quantities of resources, including both living and non-living resources, various flora and fauna species, gas, oil, and other natural resources. The enrichment and pollution of these places are significantly impacted by waves, tides, and upstream freshwater flows. The coastline of Bangladesh is known for being a place with a variety of potential and hazards. The coastal region of Bangladesh has an dweller of about 50 million people.

There are numerous elements that either directly or indirectly contribute to the contaminated maritime environment in Bangladesh. The two main sources of pollution are terrestrial and aquatic, with terrestrial sources alone responsible for 80% of all aquatic contamination (National Oceanic and Atmospheric Administration, n.d.). Both land-based and marine-based sources contribute to microbial pollution, which puts the coastal and marine habitats in danger. Microbial contamination is caused by a variety of

sources, including industrial waste, inappropriate sewage systems, coastal development, illogical population growth in coastal areas, and others.

The “Blue Economy” concept, coined at the 2012 Rio Summit (Rio+20), promotes ocean-based economic development while safeguarding marine ecology. Bangladesh’s vast resources offer opportunities for economic growth and improved livelihoods but face challenges like pollution. To meet SDG-14.1, the goal is to reduce marine pollution by 2025, aligning with the Blue Economy’s sustainability aims (UN SDG, 2015). Bangladesh must address pollution to safeguard its Blue Economy. Pollution, among other challenges, hinders the potential of the Blue Economy and the utilization of marine resources. It adversely affects living resources, aquatic life, human well-being, water quality, and services, collectively known as marine environment pollution. This pollution jeopardizes Bangladesh’s Blue Economy, which could otherwise generate foreign currency and meet citizens’ needs. A well-preserved Blue Economy can directly boost GDP, enhance nutrition, create jobs, and improve livelihoods. However, pollution, whether land-based or from the sea, is depleting BoB species, significantly impacting Bangladesh’s Blue Economy.

## **Review of Literatures**

For the purpose of this research, many books, articles, journals were reviewed and discussions have taken place with concerned competent authorities. Recent research (Biswas, et al., 2021) highlights global marine pollution, impacting biodiversity and health. It examined sources, dispersion, hotspots, challenges, and policies in Bangladesh, noting heavy metal accumulation but omitting Blue Economy impacts. The policy paper (Failler, et al., 2021), examines the Blue Economy of Bangladesh, outlining opportunities, challenges, and actions for sustainable growth, but provides limited discussion on critical ocean health aspects. In another research, there is a consolidation of Blue Economy theory and practice for Bangladesh, providing a framework to evaluate its potential (Patil, et al., 2018), where the government emphasizes oceanic territory for economic growth. But it lacks analysis on safeguarding the Blue Economy from pollution.

**Comment.** The reviewed literatures focus on Blue Economy policy, ignoring ocean health in Bangladesh. Despite existing regulations, enforcement is weak. Studies highlight the Blue Economy's benefits but lack effective pollution control strategies. Assessing the Blue Economy's contribution to GDP and establishing robust regulatory mechanisms are essential.

## **Methodology**

The character of the problem demands a combination of research methodologies. The study was based on both primary and secondary sources of data and was explanatory in nature. The scope of collecting original data was constrained for this study. Consequently, secondary sources were heavily utilised. However, in addition to desk research, there were also interviews, questionnaires, Interviews with subject-matter experts were used to gather pertinent data for the study. The collected information and data were evaluated in the research.

## **Blue Economy of Bangladesh and Pollution at Bay of Bengal**

### **Blue Economy Concept in Bangladesh**

Bangladesh's Blue Economy promotes responsible and equitable utilization of oceanic resources for economic growth, better living standards, and environmental preservation. Its coastal location near the BoB presents opportunities for sustainable development, job creation, poverty reduction, and environmental sustainability. The Blue Economy covers sectors like fisheries, aquaculture, maritime transport, offshore energy, tourism, coastal agriculture, and coastal restoration (Table 1).

**Fisheries and Aquaculture.** The fishing industry in Bangladesh contributes significantly to the country's economy by creating jobs, supplying food, and generating foreign exchange earnings. In 2018, it accounted for about 3.61% of the GDP and 25.30% of agricultural GDP (FAO, 2020). Both the coastal and inland fisheries of Bangladesh have potential for further improvement and growth.

**Renewable Energy.** The Blue Economy also encompasses the potential for renewable energy development, particularly offshore wind and tidal energy. As of 2021, these sectors were still in the exploratory stage in Bangladesh, but they offer promising potential for sustainable energy generation (ADB, 2015).

**Maritime Tourism.** The extensive coastline of Bangladesh, along with its unique marine biodiversity, offers significant potential for the development of sustainable maritime tourism. The mangrove forest of Sundarbans and Cox's Bazar beach are the notable examples (Hossain, et al., 2018).

**Sustainable Shipbuilding and Ship Recycling.** Being among the leading countries in the world for shipbuilding, Bangladesh can enhance sustainability in its shipbuilding industry. Similarly, the country's ship recycling industry, one of the largest globally, needs to adopt environmentally friendly and safe practices (World Bank, 2010).

## **Sources of Pollution at BoB**

The coastline of Bangladesh is known for its diverse potential and vulnerabilities. This region is crisscrossed by principal rivers and lakes. The BoB has historically experienced pollution from several sources which includes:

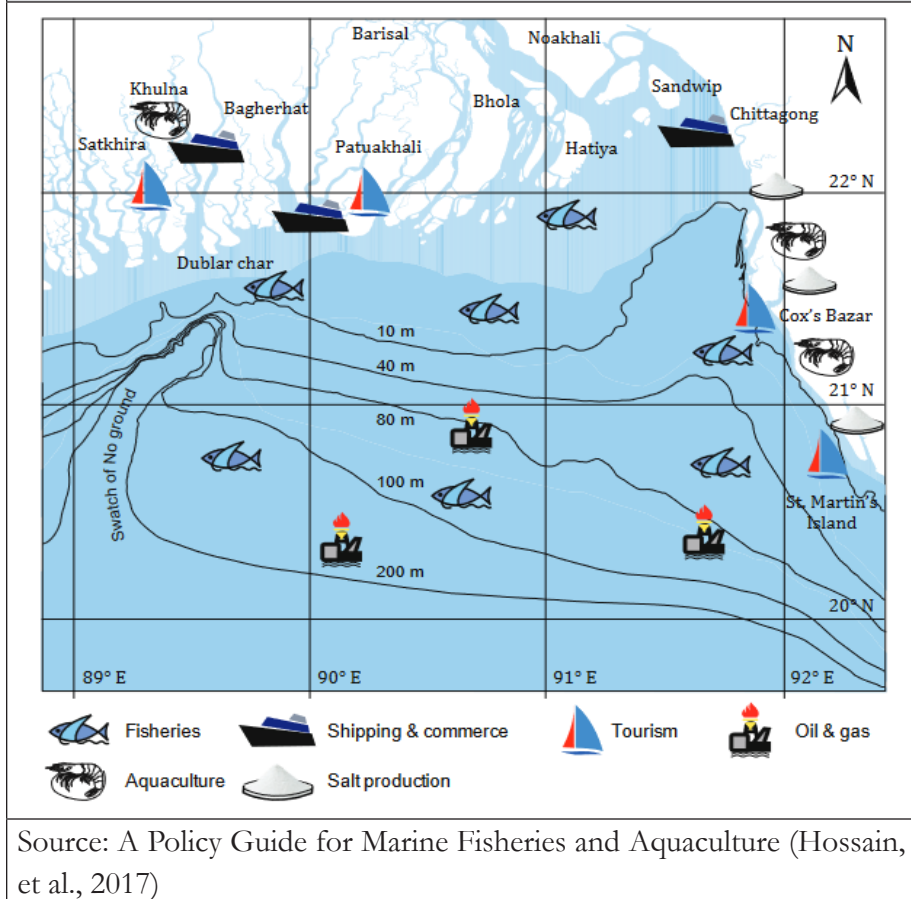
**River-Borne Pollution.** Numerous significant rivers, including the Ganges, Brahmaputra, and Ayeyarwady (Irrawaddy River of Myanmar), flow into the BoB through Bangladesh's Padma, Meghna, and Jamuna. These rivers carry with them pollutants from human activities upstream, including industrial waste, sewage, pesticides, and fertilizers. The BoB faces pollution from multiple sources, including industrial waste, agricultural runoff, untreated sewage, and improper disposal of solid waste, endangering marine life and ecosystems. Additionally, solid waste, including plastic, is often improperly disposed of in rivers, posing a significant urban pollution problem (Billah, et al., 2019).

<b>Table 1: Components of the Blue Economy</b>			
<b>Type of Activity</b>	<b>Ocean Service</b>	<b>Industry</b>	<b>Drivers of Growth</b>
Harvest of Living Resources	Sea Food	Fisheries	Food Security
		Aquaculture	Demand for Protein
Extraction of Non-living Resources, Generation of new Resources	Marine Biotechnology	Pharmaceuticals., chemicals	R&D for healthcare and Industry
	Minerals	Seabed Mining	Demand for Minerals
		Energy	Oil and Gas
	Renewables		
Commerce and Trade in and around the Oceans	Transport and Trade	Desalination	Demand for Freshwater
		Shipping	Growth in Seaborne Trade, International Regulations
	Tourism and Recreation	Port Infrastructure and Services	
		Tourism	Growth of Global Tourism
Response to Ocean Health Challenges	Coastal Development	Coastal Urbanisation	
		Domestic Regulations	
	Ocean Monitoring and Surveillance	Technology and R&D	R&D in Ocean Technology
	Carbon Sequestration	Blue Carbon	Growth in Coastal and Ocean Protection and Conservation Activities
Waste Disposal	Coastal Protection	Habitat Protection and Restoration	
		Assimilation of Nutrients and Wastes	

**Maritime Pollution.** The BoB, a vital maritime trade route, faces pollution from maritime activities, including oil spills, waste dumping from ships, invasive species introduction via ballast water discharge, and ship-breaking, especially at the Port of Chittagong. Fishing activities generate debris and

habitat damage, while offshore oil and gas operations pose oil spill risks and discharge pollutants like drilling mud and produced waters. Deliberate or accidental oil spills from shipping or oil transport further threaten the Bay of Bengal’s environment.

**Figure 1:** Blue Economy Activities in the Coastal and Maritime Zones of Bangladesh



**Atmospheric Deposition.** Air pollution from various sources in Bangladesh and neighboring countries, including coal-fired power plants, vehicles, open burning, industries, and biomass burning, settles into the BoB via atmospheric deposition. These pollutants, including sulfur dioxide, nitrogen oxides, and particulates, contribute to the BoB’s

pollution. Urban areas like Dhaka are significant contributors, with wind patterns transporting vehicle emissions to the BoB. Additionally, emissions from neighboring countries, such as India and China, further add to the atmospheric deposition in the BoB, originating from coal-fired power plants and industries.

**Plastic Pollution.** Plastics and non-biodegradable waste frequently enter the BoB, causing severe harm to marine life and the environment. This includes wildlife entanglement, chemical contamination, and habitat damage. Improper disposal in urban areas, particularly single-use plastics like bags and bottles, leads to this pollution. Industries, notably textiles and garments, release microplastics and plastic fibers into water, which are harmful when ingested by marine organisms. Inadequate waste management in Bangladesh results in a significant portion of waste, including plastic, ending up in the BoB through river transport. Plastic usage in agriculture, such as plastic-coated materials, can also contribute to pollution if not properly controlled.

**Coastal Activities.** Coastal activities like aquaculture and tourism contribute to pollution through waste release and habitat damage. In Bangladesh, they notably contribute to river and BoB pollution. Coastal tourism leads to litter and sewage pollution. The ship-breaking industry in Chittogram adds oil, heavy metals, and other pollutants. Coastal development for housing, industry, and infrastructure releases pollutants through habitat destruction and facility operation.

## **Importance of Blue Economy and Pollution Control in Bangladesh**

### **Blue Economy Awareness in Bangladesh**

Bangladesh is exploring the Blue Economy concept, harnessing its vast coastline and maritime resources for sustainable economic activities that balance resource utilization, environmental preservation, and social inclusion in sectors like aquaculture, fishing, marine transportation, and coastal tourism.

**Government of Bangladesh.** The GoB has been actively promoting the Blue Economy as a strategic development approach. The Ministry of Fisheries and Livestock, Ministry of Environment, Forest and Climate Change, and Ministry of Shipping have been particularly involved in formulating policies and implementing programs related to the Blue Economy. These efforts are aimed at achieving sustainable development, poverty reduction, and conservation of marine resources.

**Bangladesh National Sustainable Development Strategy (2017-2021).** The Blue Economy is recognized as a key component of the Bangladesh National Sustainable Development Strategy. The strategy document highlights the potential of the country's maritime resources and emphasizes the need to adopt sustainable practices for economic growth and poverty alleviation (Planning Commission, Government of Bangladesh).

**Blue Economy Cell (BEC) of Bangladesh.** The Bangladesh Government has formed the BEC within the Energy and Mineral Resources Division (EMRD) to oversee the responsible use of natural and mineral resources in the BoB (Dhaka Tribune, 2016). The BEC's duties include sustainable fishing, hydrocarbon exploration, and tourism prospects assessment, serving as a hub for information sharing and stakeholder cooperation.

**Policy and Institutional Framework.** Bangladesh has established a comprehensive institutional and policy framework to support the Blue Economy. The guiding concepts, goals, and tactics for sustainable marine resource management and commercial activities are outlined in the "National Ocean Policy" and the "Blue Economy Policy".

**Research and Capacity Building.** Bangladeshi academic and research institutes are actively examining the opportunities of the Blue Economy and making policy recommendations. The Bangladesh Agricultural University, Institute of Marine Sciences and Fisheries, and Bangladesh Marine Fisheries Academy are a few of the organizations doing studies, providing specialized training, and running awareness campaigns about the Blue Economy.

## Contribution of Blue Economy to the GDP and Economy of Bangladesh

The Blue Economy tackles poverty, food security, climate change, and livelihoods. Pollution affects various maritime activities except trade, renewable energy, oil, gas, and minerals. Bangladesh's extensive coastline contributes significantly to its economy through marine resource utilization, with fisheries being a major part of agriculture. In FY 2021-22, total fish production was estimated at 46.64 lakh MT (Finance Division, MoF, 2022). In 2014-15, the Bangladeshi economy gained over US\$6 billion from the BoB, with marine fisheries and aquaculture leading at 22%, followed by transportation at 22%, energy at 19%, ship and boat building/breaking at 9%, and minerals at 3% (Karim, 2021). Quantifying the full economic impact of the Blue Economy including ecosystem services, remains a challenge.

<b>Table 2: Gross Domestic Product (GDP) at Current Market Prices</b>							
							<b>(In Crore Taka)</b>
<b>Industrial origin sector</b>	<b>2015-2016</b>	<b>2016-2017</b>	<b>2017-2018</b>	<b>2018-2019</b>	<b>2019-2020</b>	<b>2020-2021</b>	<b>2021-2022*</b>
A. Agriculture	279505	301167	329380	353443	380446	410661	439834
1. Agriculture, forestry and fishing	279505	301167	329380	353443	380446	410661	439834
a) Crops & horticulture	138280	148669	162333	173378	186116	199631	211886
b) Animal Farmings	46655	49516	53186	56290	59715	63293	67189
c) Forest and related services	37188	39864	43563	46639	50399	55916	62577
d) Fishing	57382	63118	70298	77136	84216	91822	98182
B. Industry	644940	726306	844106	969620	1043451	1176120	1354114
C. Services	1062983	1194320	1343117	1500780	1633150	1811038	2023549
							*Provisional.
Source: Bangladesh Bureau of Statistics (BBS)							

**Table 3: Sectoral Growth Rate of GDP at Constant Prices (Base Year: 2015-16)**

						(In Percentage)	
Industrial origin sector	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022*	
A. Agriculture	3.20	3.54	3.26	3.42	3.17	2.20	
1. Agriculture, forestry and fishing	3.20	3.54	3.26	3.42	3.17	2.20	
a) Crops & horticulture	2.22	2.75	2.07	2.5	2.29	1.06	
b) Animal Farmings	2.77	2.90	3.01	3.19	2.94	3.10	
c) Forest and related services	5.00	5.08	5.13	5.34	4.98	5.08	
d) Fishing	4.73	4.93	4.99	4.4	4.11	2.08	
B. Industry	8.27	10.2	11.63	3.61	10.291	10.44	
C. Services	6.37	6.55	6.88	3.93	5.73	6.31	
						*Provisional	
Source: Bangladesh Bureau of Statistics (BBS)							

**Fisheries and Aquaculture.** Bangladesh is a leading fish producer, with the fishery sector accounting for approximately 3.57% of its GDP in 2018-19, according to FAO. The shrimp industry supports millions of small-scale farmers and workers. Bangladesh receives around 660 thousand MT of fish from the BoB, contributing to about 16% of the world’s total fish production. Marine fisheries make up 15% of Bangladesh’s fish production and employ 0.5 million people, reflecting limited capacity for deep-sea resource extraction (Ministry of Planning SDG Bangladesh Progress Report, 2022).

**Maritime Shipping and Port Activities.** The shipping industry and port activities in the BoB are key contributors to the national economy. The Chattogram port is one of the busiest in South Asia, supporting international trade.

**Oil, Gas, and Minerals.** Bangladesh's territorial waters hold oil and natural gas reserves, while the continental shelf has significant mineral resources. Rear Admiral Md Khurshed Alam (Retd), Secretary (Maritime Affairs Unit) of the Ministry of Foreign Affairs, noted that the shore's sand contains important heavy minerals like zircon, rutile, limonite, leucoxene, kyanite, garnet, magnetite, and monazite from Patenga to Teknaf. Proper mineral extraction could support local industries, such as welding electrodes, paper, glass, chemicals, and ceramics (The Business Standard, 2021).

**Tourism.** The world's largest mangrove forest at Sundarbans, and the world's longest sea beach at Cox's Bazar, offer considerable tourism potential.

**Renewable Energy.** The country's coastal regions have the potential for renewable energy generation, particularly wind and wave energy.

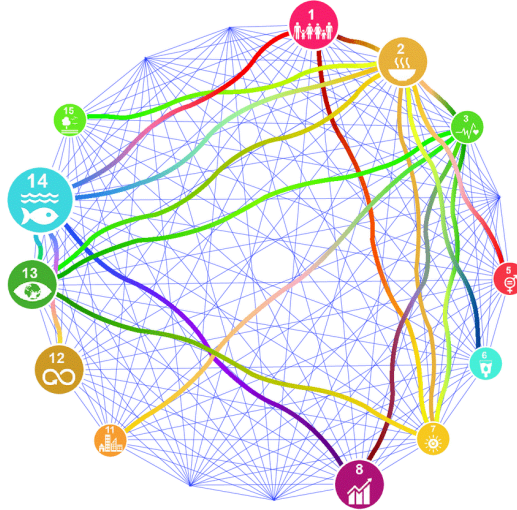
## **What Opportunities We Get or Loose?**

The Blue Economy in Bangladesh taps vast resources and a large Bay of Bengal area to reduce poverty, ensure food security, and create jobs, fostering sustainable ocean resource use for economic growth. It offers innovative careers, including fishing, sea salt production, shipping, marine transportation, tourism, recreation, and oil and gas exploration. Sustainable blue growth promotes a healthy ocean environment, providing nutritious food and clean water. Bangladesh's extensive coastline and waterways offer ample potential for Blue Economy-driven livelihoods.

## **Dependency of SDGs on Pollution Control of SDG 14**

SDG 14, part of the UN's 17 Sustainable Development Goals for 2030, focuses on ocean development, addressing ocean health and biological resources through ten targets. In Bangladesh, sustainable ocean resource development is crucial, as two of its three most populated cities are coastal, with 35 million people. SDG 14 aims to prevent and reduce marine pollution, emphasizing the protection of marine and coastal ecosystems for sea health and productivity, including resilience-building measures.

**Figure 2:** SDG 14 and its linkages to the Blue Economy and other SDGs



Source: The International Council for Science (ICSU), 2017

## Action Plan of Government of Bangladesh in Response to SDG 14

The 2030 Agenda for Sustainable Development represents a collective blueprint for achieving global peace and prosperity, both now and in the future. Bangladesh has created a 7th Five-Year Environmental Sustainability Plan to create a 500-meter-wide green belt and protect the coastline, develop ecotourism in at least 20 protected areas and ECAs, and implement land zoning for sustainable land and water usage (7th Five year Plan, 2016).

**7<sup>th</sup> Five Year Plan.** The capacity of Bangladesh will be determined by how quickly its development progresses in the future in discovering the untapped resources. In this regard, Bangladesh shall effectively and sustainably explore the utilization of maritime resources within the 7th Five Year Plan (2021–2025) to ensure its long-term growth (Bangladesh Planning Commission, Ministry of Planning, 2022).

**Maritime Spatial Plan.** The BoB provides a major resource for Bangladesh while also facilitating global commerce and trade. The Blue Economy

considers oceans and seas as ‘Development Zones,’ where sustainable energy production, oil and mineral extraction, conservation, and sustainable use of living resources, bioprospecting, maritime transportation are all incorporated into Maritime Spatial Plan.

**Phase wise Development Plan.** Bangladesh fully embraces the Blue Economy to promote sustainable, inclusive, and employment-driven maritime development, integral to its maritime strategy (Bangladesh Planning Commission, Ministry of Planning, 2022).

**Human Resources Development.** The project explicitly intends to build synergies and favorable regulatory framework that enable certain activities on maritime economy and related value chains, with Bangladesh’s main issue being the development of trained human resources, performing institutions, and sustainable technologies.

## Challenges and Effect of Pollution

### Effect of Pollution at Sea

The BoB, shared by India, Bangladesh, Myanmar, and Sri Lanka, is crucial for the regional Blue Economy. Pollution from various sources, including industry and ship waste, affects Bangladesh’s coastal areas, threatening the Blue Economy (Habiba, 2022).

**Impact on Fisheries.** Pollution affects the health of fish and other marine creatures. Toxic substances can bioaccumulate up the food chain, affecting larger predatory fish (Rahman & Bhuiyan, 2016).

**Threat to Tourism.** Coastal areas in the BoB, like the Andaman and Nicobar Islands, attract tourists, but pollution, notably plastic pollution, harms their appeal and health, potentially impacting the tourism sector at destinations like Saint Martin’s Island and Cox’s Bazar (Sharif & Tabassum, 2017).

**Degradation of Mangroves and Impact on Shrimp Farming.** Mangroves provide vital coastal protection, support fish breeding, and sequester carbon. Pollution, especially from land-based sources, can harm mangroves, diminishing their value for disaster protection, tourism, and

economic activities like shrimp farming in the Sundarbans, the world's largest mangrove forest in Bangladesh (Alongi, 2002).

**Impacts on Shipping and Port Activities.** Marine pollution, including oil spills, disrupts shipping routes, raises maintenance costs, and poses navigation hazards. Ports like Chittagong, vital for Bangladesh's BoB trade, may face operational challenges due to pollution, impacting navigation and vessel safety (Hossain, 2013).

**Loss of Biodiversity.** Continuous exposure to pollutants can lead to the loss of biodiversity, making the marine ecosystem more vulnerable and less resilient to other challenges. It is not only a loss but also affects industries such as pharmaceuticals which might be looking at marine organisms for new drugs (Venkataraman & Wafar, 2005).

**Impediments to Aquaculture.** Aquaculture, a key Blue Economy element, can suffer from pollution-induced diseases, reducing yield and quality, particularly in regions like the BoB, including Bangladesh, with substantial shrimp farming. Pollution, especially from pesticides and industrial waste, can harm farm produce, compromising safety and export potential (Ahmed & Thompson, 2019).

Besides, there are few other impacts like degradation of coral reefs, health hazards for coastal communities, challenges for seaweed farming, deter investment in offshore energy exploration are mentionable.

## **Challenges to Combat Pollution**

BoB is a critical marine ecosystem that sustains the livelihoods of millions of people in the neighboring nations. Due to increasing anthropogenic activities and lack of proper management measures, this region has faced considerable pollution. However, pollution in the BoB poses significant challenges for ambitions of Bangladesh in this area.

**Transboundary Pollution.** Pollution in the BoB isn't solely caused by one country. Multiple nations contribute to the pollution, making it a transboundary issue (D'cruz & Menon, 2004). Pollution doesn't recognize

borders. Activities in neighboring countries also contribute to the pollution in the BoB, requiring transboundary management solutions (UNEP, 2002).

**Rapid Population Growth.** The countries bordering the BoB, particularly India and Bangladesh, have witnessed rapid population growth. This leads to increased waste generation and puts pressure on already strained waste management systems (Kundu, 2012). The increasing population in coastal regions exacerbates the pressure on already limited resources and increases waste generation.

**Rapid Urbanization and Industrialization.** The rapid growth of urban centers and industries near the coastline has resulted in increased waste discharge into the BoB (Rahman, et al., 2012). Coastal urban and industrial growth, particularly in cities like Chittagong, increases waste discharge into the BoB (Khan, 2008).

**Unregulated Fishing Activities and Destructive Fishing Practices.** Overfishing and harmful fishing practices, like using bottom trawlers, can disturb the seabed and disrupt the marine ecosystem, leading to indirect forms of pollution result in increased sedimentation and habitat degradation (Bhathal, 2005).

**Inadequate Waste Management.** Many regions, especially in developing nations around the Bay, lack proper waste management systems, leading to direct disposal of waste into the bay. In different parts of Bangladesh lack the necessary infrastructure to treat sewage and industrial waste, leading to pollutants entering the bay directly.

**Agricultural Run-off.** The use of pesticides and fertilizers in agriculture, especially in the Ganges-Brahmaputra-Meghna delta, can lead to harmful run-offs into the bay (Akter & Ali, 2011). Intensive agriculture in the coastal zones and hinterlands results in harmful runoff, that eventually makes its way to the BoB.

**Industrial Discharge.** Numerous industries discharge untreated or partially treated effluents into rivers that ultimately flow into the BoB, causing severe pollution.

**Ship Breaking Activities.** Bangladesh is a major hub for ship-breaking, especially near Chittagong. The ship-breaking sector discharges various pollutants, including heavy metals, oil, and asbestos into the bay (Hossain, 2013).

**Lack of Public Awareness.** There is often a lack of understanding and awareness among the general public about the detrimental effects of pollution on the marine ecosystem (Hossain & Islam, 2017).

**Lack of Resources, Monitoring Infrastructure and Enforcement.** Limited resources make it challenging for Bangladesh to develop and maintain adequate pollution monitoring systems and enforce regulations consistently (Rahman & Bhuiyan, 2016). Despite having rules and regulations in place, inadequate resources and infrastructure often hinder monitoring and enforcement.

**Ineffective Blue Economy Cell.** The Blue Economy Cell struggles with implementing its strategy due to legal limitations, coordination issues with stakeholders, and a lack of good governance principles in existing laws.

**Lack of Professionals.** Bangladeshi seafarers face challenges such as inadequate training facilities, fake documents, a poor reputation, and lower training levels compared to sailors in developed nations. Limited technological resources further hinder their career advancement (Hossain & Islam, 2021).

Climate change effects and ocean acidification, limited research, etc. are also some mentionable challenges for Blue Economy of Bangladesh.

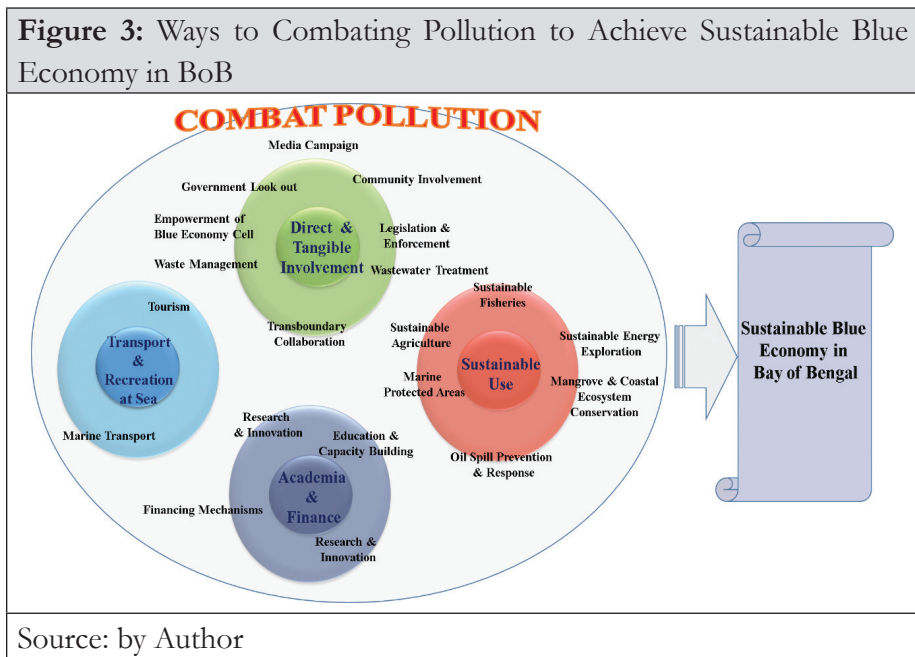
## **Way Ahead to Combat Pollution in Bolstering Blue Economy**

Bolstering the Blue Economy of Bangladesh in the face of pollution requires a comprehensive approach that encompasses various key components.

**Direct and Tangible Actions.** These actions can be taken within the shortest possible time; within 3-5 years. This includes media campaigns,

government lookouts, community involvement, waste management, empowerment of Blue Economy Cell, legislation and enforcement, wastewater treatment and transboundary collaboration. The concerned ministries like Ministry of Information and Broadcasting, Ministry of Power, Energy & Mineral Resources, Ministry of Environment, Forest and Climate Change should take necessary actions in stipulated time.

**Sustainable Use.** Ministry of Fisheries and Livestock, Ministry of Agriculture, Ministry of Energy and Mineral Resources, Ministry of Environment and Ministry of Environment, Forest and Climate Change should promote sustainable fishing practices, sustainable agriculture and sustainable energy exploration, prevention of oil spill and response, and conservation of mangrove and coastal ecosystem in short term, at least within 5 years’ time. Either jointly or independently the Ministry of Fisheries and Livestock and Ministry of Environment and Forests should establish and maintain Marine Protected Areas to safeguard critical habitats and marine biodiversity in the long term, i.e.10 years’ time.



**Transport and Recreation at Sea.** Ministry of Tourism and Civil Aviation and Bangladesh Inland Water Transport Authority should develop eco-friendly tourism and encourage cleaner and more efficient marine transport options in short term time frame.

**Academia and Finance.** This can be in long term plan, within 10 years of time with gradual response. Research and innovation, education and capacity building, financing mechanisms, etc. are to be well planned by the academic institutions through University Grant Commission (UGC) and Ministry of Finance.

## **Conclusion**

Pollution in the BoB poses significant challenges to Blue Economy of Bangladesh, impacting industries like fishing, maritime transport, tourism, and offshore energy, all vital to the country's economy and marine ecosystem health. Industrial and agricultural pollutants can harm marine life, endangering seafood safety and fish populations, affecting livelihoods and food security. Pollution harms key ecosystems like coral reefs, mangroves, and seagrass beds, which support fisheries and protect coastlines. Oil spills are a major threat, harming marine life and communities and causing health issues, translating to economic costs. Persistent pollution can harm Bangladesh's seafood exports and limit Blue Economy diversification. Addressing BoB pollution is vital for sustainable economic growth, livelihoods, food security, and the well-being of coastal communities. Bangladesh needs to invest in marine environment restoration, biodiversity recovery, and sustainable resource management to preserve the ocean and ensure a clean marine ecosystem. Pollution in the BoB obstructs the Blue Economy objectives, necessitating a coordinated national effort. Proper management of marine resources is crucial to aligning with the broader vision Bangladesh for advancing national development. This necessitates efficient ocean use while safeguarding ecosystem health. Further research is essential to assess the Blue Economy's potential and achieve a balance between economic growth and environmental preservation. Collaborative

efforts involving government and non-government organizations are crucial for proper resource utilization and ecosystem protection, aiding Bangladesh in achieving its economic objectives. Combating pollution in the BoB in Bangladesh involves a multi-faceted approach that encompasses policy, technology, community involvement, and regional collaboration. By adopting these measures and fostering a culture of marine conservation and sustainable use, Bangladesh can protect its Blue Economy assets, ensuring continued economic benefits from the BoB while preserving its ecological integrity. Despite having lot of challenges, it's crucial for Bangladesh to prioritize the protection of the BoB from further pollution. Investing in sustainable practices, regulation, and cleanup operations will ensure the long-term viability of the nation's Blue Economy.

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## Author



Commodore Arif, commissioned in the Executive Branch of Bangladesh Navy in 1993, has held various Command and Staff roles, including commanding Special Forces and 3 Guided Missile Frigates. He served in different capacities, including Secretary to the Chief of Naval Staff and Director, Personnel Services. He has received Bishishto Seba Padak (BSP) and the President Police Medal (PPM) for his extra ordinary contributions in his service. He attended courses at home and abroad, including Army Commando and Special Warfare training in Turkey. He served as Operations Officer under UNMIS in 2007-2008 and Contingent Commander at UNIFIL in 2020-2021. He graduated from Defence Services Command and Staff College and is a NDC alumni, having undergone the Armed Forces War Course in 2013 and NDC in 2023. He is married to Sanji and has two sons, Ilham Nur and Yash Nur.

# **ECONOMIC SECURITY AMIDST USURIOUS MONETARY SYSTEM AND PROFIT SHARING AGREEMENTS**

**Air Commodore Muhammad Mushtaqur Rahman**  
**BSP, BPP, ndc, afwc, psc, M Phil**

## **Introduction**

This research monograph is theorized under the premise that interest, a reward for idle money, is a rival to interactive markets and industry investment. This monograph also theorizes that the currency system of modern capitalism is such that assets will lose their significance in the face of unseen money values. The research area would be the changing nature of the world economic order, which would be indicative of the economic security of Bangladesh.

## **Problem Statement**

The game of finance and credit and the practice of interest have fostered economic and financial malady. A modern economist, Margrit Kennedy, has labeled interest “cancer” after explaining the exponential growth of idle capital that troubles the just monetary system (1995:19–20). More so, interest-based financial systems create disparity in society by producing labourless, guaranteed profiteers. Instead of post facto profit sharing preset interest has set across a strange modernity. Its modernity conceals the fact that today’s bank interest is functionally the same as of medieval usury, with far more thievery.

One of the earliest manifestations of asset manipulation was that the value of money and the legitimacy of community transactions began to decline. Soon, the concept of poverty without scarcity emerged.

## Review of the Literature

**Key Extracts of Review.** Silvio Gesell, a well-known German businessman turned economist, developed a theory of economics in his book *The Natural Economic Order* (1929) at the end of the 19th century. His concern about monetary corruption through technical interest is evident today: “Money is not the key that opens the gates of the market but the bolt that bars them” (p.228). John Keynes, *The authorities of modern economics*, in his book *The General Theory of Employment, Interest and Money* (1936) has broadly discussed the interrelationship as well as interdependence on employment and financial arrangement. Keynes had also advocated the USA government to apply ‘moral Law’ against interest (p.351). Anwar Iqbal Qureshi in his book *Islam and the theory of interest* (1945) bears the entire picture of Europe’s conceiving the ‘interest’ (p. 154). In his book *The Clash of Civilization and the Remaking of World Order* (1996), Samuel Huntington could hardly see economic development beyond power mongering by states (pp. 102-3). However, the book seems biased against Bangladesh only because being ‘rising Muslim nation’, and thereby he went into clash with Islamic values in many places of the book (pp.111, 115, 209-18, 254-58), random. ‘*The Gold Diner and Silver Derham: Islam and the future of Money*’ (2007) by Imran Nazar Hosein forms the basis for unveiling the state of the art in legalized theft through the introduction of fiduciary monetary arrangements. In the text book ‘*Economics*’ (2010), Paul Samuelson and William Nordhaus have presented the present value of asset quite deliberately (p.285-6). However, they made only a silver lining between the rate of interest and the rate of capital investment (p.284).

**Research Gap.** Only a few well-known literary texts address the simple problem of divergent investment and interest rates, to say nothing of their immoralities. Yet, there are still some literary masterpieces, which cast a dimmer light on these crucial gaps. Majority of the literatures have no contemporary reference of Bangladesh.

**Area for Further Research.** The metaphysical and intangible aspects like ethics, morality and faith will entail the overall scope of the research. For

earning optimum efficacy of this research value, the case of Bangladesh will be highlighted.

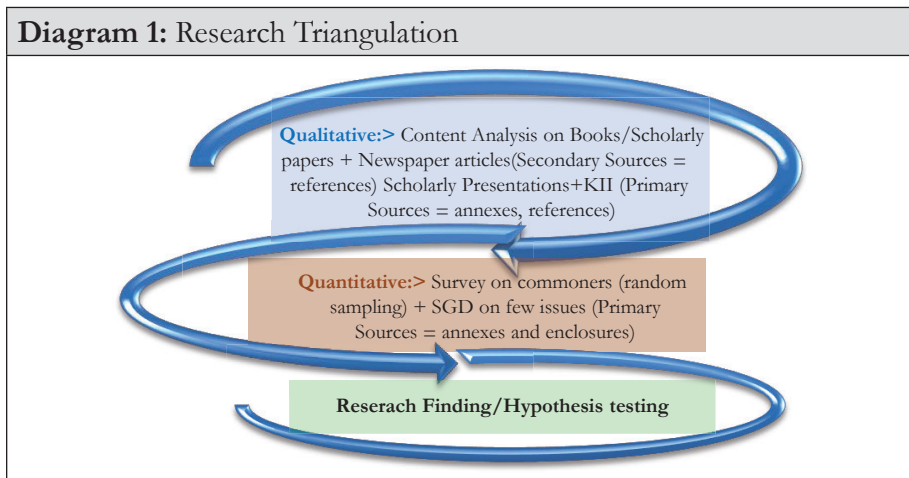
**Research Objective.** To understand how far the usury is triggering financial insecurity.

**Primary Question.** What is the global and Bangladeshi state of economic security under usurious order?

**Hypothesis.** The Hypothesis statement was placed as ‘The world’s usurious monetary system is causing economic disaster, including that in Bangladesh.’ Here, ‘Usurious monetary system’ is the independent variable, ‘Economic Disaster’ is the Dependent variable; and ‘Bangladesh’ is the Intervening Variable.

## Research Methodology

**Design.** It adhered to a structural methodology. Gradually, it was more of deductive rather than inductive.



**Data Sources.** Secondary sources include content analyses of books related to economics, security and finance. Data derived from latest news (both domestic and foreign sources) are linked to this research. Primary data were collected through e-survey, key informant interview (KII),

small group discussion (SGD) and presentations delivered by specialists, corporate executives and academic consultants.

**Approach.** A qualitative heavy triangulation method was used (Diagram 1). Nonetheless, quantitative analysis availed through deliberate e-survey might embrace the qualitative content analysis.

**Survey Sampling.** A self-administered questionnaire mostly relating to Bangladesh was distributed through e-survey to professionals and commoners. A cluster sampling was done with a target group of 120 from undefined population.

## **Olden Usury into Modern Interest: Impact on Just Economic Order**

### **Evolution of Usury into Interest**

Usury was an ancient financial practice. Jain (1929) estimated that usury dated back about four thousand years ago and the practice of usury has been constantly denounced, outlawed, derided, and restricted throughout its history, primarily on moral, ethical, religious, and legal grounds (Wayne 1998; 8:2). The institutions of Hinduism, Buddhism, Judaism, Christianity, and, most clearly and vocally, Islam have opposed it. When the Holy Qur'an mentioned the condemnation of usury practices of Jewish people in the early 7<sup>th</sup> century (Al Qura'n 4:161), the Jews of Madina were well indulged in it. European Jewish traders chose to sneak through England, one of the most prominent kingdoms in the world. The Anglo-Jewish riots in London in the 12<sup>th</sup> century were more economic than ethnic. In 1290, King Edward the 1<sup>st</sup> had eradicated the Jewish traders from England, and with royal decrees he had prohibited interest (Yusfuddin 2005:23-32). But the story of the sixteenth and seventeenth centuries was otherwise; it would be famous how usury took charge in Europe. The Latin Jews incepted 'banco' (benches), lately renamed 'bank' in Europe. William Shakespeare framed his unique classic 'Merchant of Venice' at this time (1596-97); the character of Jewish usury trader Shailok, was representative of European Jewish usurious practices.

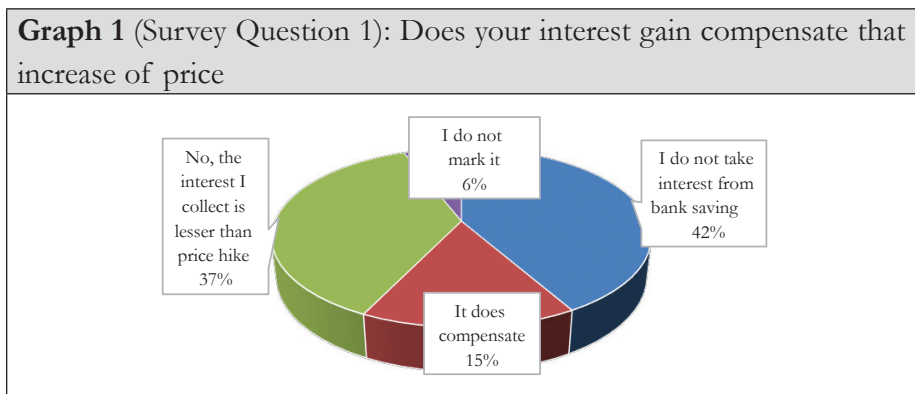
In 1694, “Bank of England” was established with a visionary aim of abolishing gold and silver coins. In 1697 formal paper notes were printed and distributed by the “Bank of England” inscribing the images of King William and Queen Mary as “King and Queen of Usury”. referred these images as the by modern historians. According to Green (1989:33) many of the powerful Roman Catholic lords in the English Parliament had money in the (Amsterdam) Wisselbank, which was used to finance the inglorious (usury) revolution of 1688. Qureshi (1945) has painted the picture of next three centuries in Europe as:

‘The Imperial democracy that ruled the world, from the Senators with illustrious names down to the meek tillers of the soil, from Julius Caesar down to the smallest shopkeeper in a back street of Rome, according to his literary assertion, was at the mercy of a small handful of usurers.’ (pp.154-55)

## **Economic Modernity to Embrace Interest: Counter Logics**

**Cover for Inflation.** Economists classically blame supply-demand imbalances for inflation. Instead, many people hold the view that inflation is not always a natural outcome of a free market economy. What is correct is to understand inflation unmistakably as it manifests in economic order. It is simply the community’s added burden when purchasing a commodity or service. ‘Clinically’ it is manifested through the fall of local currency value, and the Consumer Price Index (CPI). And it appears “too many dollars are chasing too few goods.” Fredricks (2002:97) finds that when governments increase the supply of money then the purchasing power of that money drops, that is, the price of all goods rise. Instead of compensation of inflation, interest rather has contribution to inflation; which is academically defined as: ‘A persistent increase in the level of consumer prices or a persistent decline in the purchasing power of money, caused by an increase in available currency and credit beyond the proportion of available goods and services.’ (The American Heritage®, 2000). The fact is that the greatest bad effect of interest lies silently. Kennedy (1995) had referred to a letter of “economic historian’ John L. King; as the latter ‘links inflation to the

interest paid for the “credit balloon” (p.31). If the loss in purchasing is really to be compensated, it should be done according to the loss suffered by the individual saver. And this is impossible. The Research survey on does the interest gain compensate that increase of price; a good number of respondents disagrees that interest collected on savings is lesser than the price hike; and almost a similar number of respondents has expressed that they do not take even interest from savings (Graph 1).



The Interest in Modern Bank is much more moderate than the Interest (Riba) Prohibited in Islam. The functional process and the applied impact of this ‘interest’ defined at both the individual and societal levels are far more excruciating than those of the riba, or usury, when it was declared prohibited in Islam. We understand what the Riba al Zahiliyya (usury in the dark days of Arabs) from following transmission:

Malik related to me that Zabir said, “Usury in the zahiliyya was that a man would give a loan to a man for a set term. When the term was due, he would say, ‘Will you pay it off or increase me?’ If the man paid, he took it. If not, he increased him in his debt and lengthened the term for him.” (Al-Muatta Hadith 31.84)

Is current bank interest “more moderate’ than that of the past usury system that Islam has prohibited, or is it unkindier than that? Banks impose interest right away from day one; whereas the riba al zahiliyya was initially interest-free for a term, and on failing to pay, interest started to be

charged thereafter. It was like credit card. Nevertheless, in both cases, the calculation of interest, wherever from it incepts, follow the same process: they are not different.

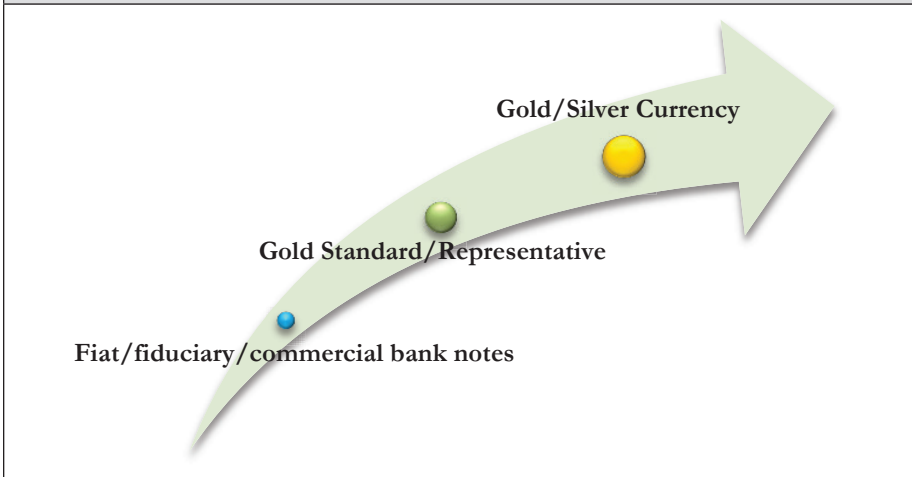
## **Asset Value Dynamism: A State of Art Interest in name of 'Devaluation'**

**Standard to Non-standard:** What had taken place in Breton Woods's city in the USA in 1944 was forthcoming. Sufferings brought by the western world between two world wars were too high to pay, particularly the loss of lives and property. Thereby, in the name of "recovery from recession," a currency was set to represent only 1 part of 35 parts of it [1 oz@\\$35], referring to 1 oz as being equal to .029 of a unit, a devaluation of 97%. Actually, this 'devaluation' has not taken place in a day; this process took place from 1787, when the USA Congress took over the overwhelming authority of money value by law, to 1934. Fredericks (2002:87) finds, through this a dollar-based global economic system was established. The Breton Woods Conference was still credible as it somewhat associated the value of money with gold, but Nixon could not have any more patience. Besides exiting 'a humiliating, exceptionally expensive, and probably unnecessary American defeat' in Vietnam (Gropman 1996:33), he had to negotiate an economic war at home. Nixon suspended gold convertibility in August 1971. Raimondo (2002) has blamed Nixon: "It was Richard Nixon, a republican war-hawk, who finally decoupled our money from gold and introduced wage and price controls during the Vietnam era." Today's introduction of crypto-currency is far more sprite play: you can conceal information with technology and cipher, but how do "block-chains" reproduce money with fiat? Can invisible coins increase assets without agriculture, industry, and services? Notwithstanding anything, it is imperative to unravel the fiduciary theft therein with regards to the process by which money is generated and reproduced.

**Recession or Devaluation?** Devaluation is actually technical theft. On January 21, 1981, the first day of Ronald Reagan's presidency, the US dollar

entered another severe recession. The dollar's value against gold price rises from \$35 to \$380 per ounce within nine years by 1981. The Shi'a Islamic Revolution in Iran made the USA handicapped when Iran stopped oil exports to the USA and other allies as the USA imposed a trade embargo on Iran. (Hosein 1997:134). At the International Conference on Gold Diner Economy 2007, Malaysian Premier Mahathir Mohamad reasserted his call on the Islamic world to embrace the use of the gold diner for international trade and as an alternative to US dollar reserves in central banks (Bhal 2007). The State Government of Kelantan, the northeast Sultanate of Malaysia, has officially adopted the Islamic Diner as its economic policy. [Islamic Mint, (chiefacoins.com)] Prophet Muhammad, peace be upon him, who has numerously warned us against riba, has clearly given us a prophecy regarding the value of precious metals.

**Diagram 2:** Suggested Monetary Roadmap



**Monetary Roadmap.** With the introduction of 'fiat' and later 'fiduciary' currency, today's 'riba' has earned 'wings of freedom', beyond any bar of numerical percentage or annuity. Interesting to commensurate that Fiat is the Latin word for 'let it be done' (vocabulary.com). Modern economists seems silent on these revolutionary changes, rather they have accepted the inevitability the way 'invisible hand' works. If gone are the days of return to the metallic mint age, let us return to 'gold standard' or 'representative

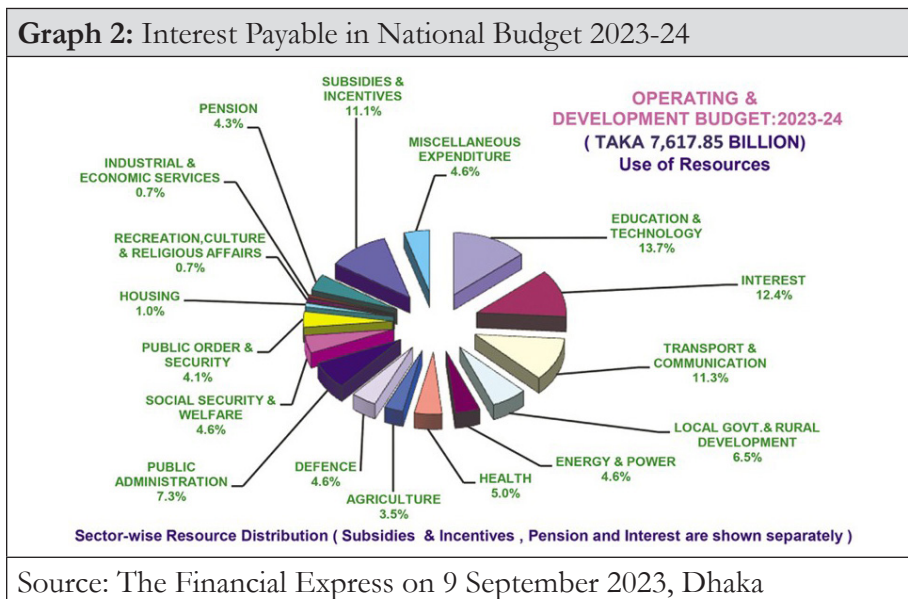
value'; unlike 'fiat,' 'fiduciary,' or 'commercial bank' notes, it is possible because it existed less than a century ago. Through the study on both classical bank interest and money value manipulation, it is prescribed that 'natural money network' [Suhr (1990:5.1-2)] may be taken into an applied sense, which includes Bangladesh context as well.

## **Effect of Interest Based Commerce in Bangladesh**

### **Credit Operations and Interest**

Loans are taken owing not only to its necessity of running the state affairs but also to finance development and infrastructural projects. While sketching monetary management for inflation control and stable growth mechanisms, the Nations Perspective Plan has conceded the 'evolution of debt' that requires 'close watch' and 'precautionary steps' (2022:31). Anwar finds that public debt remains a negative dementia in globalized perception (2023:16). Although the debt-to-GDP ratio in 2022 is claimed to be one of the lowest in South Asia, it was 30.56% according to Ministry of Finance calculations, and 37.5% according to the IMF. [Mavis (August 2023)]. CEIC Data (October 2023) refers that Bangladesh foreign debt in nominal GDP percentage has been increased fourfold within a decade: from 1.127 to 4.481 by the end of 2022.

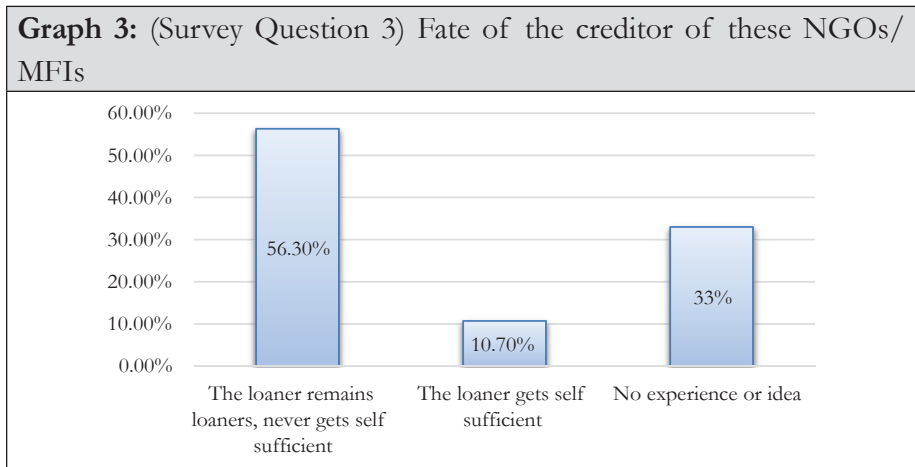
Bayron (March 2023) refers official figures that the government's expenses on interest payments rose more than 22 per cent to Tk 40,792 crore in the first six months of the FY 2022-23 owing largely to higher expenditures on treasury bills. According to the Ministry of Finance, the government has allocated Tk 80,375 crore for the interest payment in the budget of the current financial year. This year, Mostafa (June 2023) found, in National Budget of 2023-24, 12.4% is kept on interest payments that was shown in Graph-2 (Abdul Jabbar, September 2023). Earlier it was correctly forecasted by Mahmud (May 2023) that out of this amount Tk 7.69 trillion for the coming financial year 2023-24, more than Tk 1 trillion should be allocated for interest expenses.



## Modes of Interest Operations by NGO/MFIs

Few decades ago, microcredit operations started to operate in Bangladesh, and the general public welcomed them because of their proactive responsibilities and comparably better self-employment possibilities. However, this system fully benefits from people's helpless worldview, which has been suppressed for ages by interest-based social anarchy. When the interest rate levied by these NGOs is looked at: it is enormous and inhumane. Two decades ago, an independent NGO monitoring forum, upon surveying 61 leading MFIs and NGOs, had found that more than 50% of them charge interest rates of 40% and above. It refers to the fact that out of 61, 33 MFIs/NGOs charge a 40% to 42% interest rate, whereas around 11 MFIs/NGOs charge 36% to 38%, 15 MFIs/NGOs charge 32% to 34%, and only 2 MFIs/NGOs are charging 11% to 12% (Khalili 2004:12). In Bangladesh, people took the interest offers of NGO/MFIs because they were helpless, and it is advertised that it changes society widely; however, this cannot be reflected in the realistic situation of poverty alleviation or improve a single economic determinant, despite the fact that

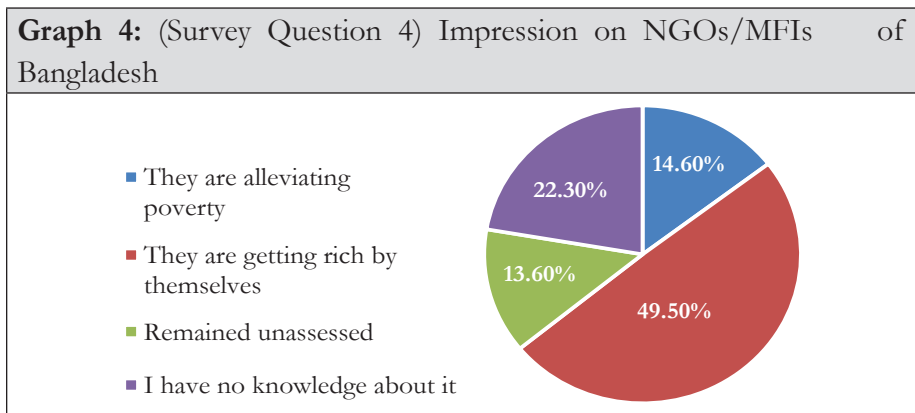
this operation is allowed without any hindrance; it can only improve the promoters’ personal reserve. Ashraf Ali (2014) asserted that many of the impoverished in Bangladesh are nevertheless poor-often even poorer-trapped in a cycle of NGO-provided loans despite the prevalence of microcredit NGOs there and the engagement of the poor in microcredit initiatives. (Cons and Paprocki 2010; Karim 2011).



MFIs and NGOs have strong management and governance structures. Why are these “goods” used in the Mahajoni-styled interest system, which charges interest regardless of the outcome of trade? Why are these “goods” not distributed in a participatory manner that benefits both the financiers (NGO/MFI) and the community? In economic terms, such microcredit loans are non-interactive and non-participatory. For this reason, neither the individual can ever become solvent, nor does the community gain any purchasing power. A survey of this research finds that under these usurious MFIs and NGOs, debtors can never get solvent (Graph 3).

It is critical to understand how NGOs/MFIs view their credit bearers, who are mostly women. NGOs use a group of women to shame the loan defaulter and her family to collect the outstanding loans. Fearing their loss of honour and dignity, the borrowers comply with the NGO’s fiscal discipline. Asharf Ali (2014:180) has quoted Karim, who terms this the “economy of shame” (2011: xviii); that is “..... If the woman gets publicly

shamed, the family is dishonoured. In a face-to-face society, men and their families try to maintain the sanctity of their family honour by observing the honour of their women.”[2008:10–11]. Ashraf Ali finds that significant knowledge gaps exist regarding the reasons why local NGO officials justify their forceful loan recovery methods, and how NGOs provide the poor with unequal development prospects. His study demonstrates, in severe situations, these techniques have driven some poor borrowers to commit suicide (2014:181). Regrettably, veteran and elite NGO women leadership [Rasheda (February 2023), Nadia (March 2023)] seems indifferent on these issues as they deliver their lectures at National Defence College.



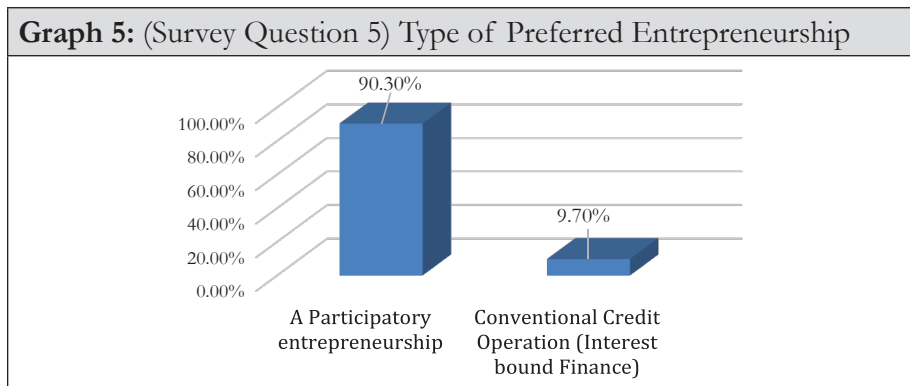
This discussion does not mean to begin participatory entrepreneurship outright by conventional banks, but wishes those NGO/MFIs, which are claimant of ‘participatory loans’, should not be bound to interest based SME. In a survey when half of the respondents believe that instead of alleviating poverty, these interest trader NGO/MFIs are getting rich by themselves (Graph 4)

## Frame and Mode of A Participatory Economy

### Interest based Finance vis a vis Participatory Entrepreneurship

The major distinction of participatory entrepreneurship, with Interest or *riba*, lies in its post-facto outcome rather than the present margin imposed before the business starts. Most of the surveyed of this research has

overwhelmingly chosen participatory entrepreneurship rather than interest bound credit (Graph 5). Khurshid (1992) puts it very plainly: Islamic law forbids any fixed interest rates, whether the loan is used for consumption or for productive purposes. Islam mandates that the principle of a loan be preserved and forbids any additional payments. Legally and morally, the lender has no right to impose a fixed rate of interest on the loans that are made, not even on profitable ones. In the case of participatory entrepreneurship, this component comes into play. Today, people even say “interest” is also business,” despite their far wider difference than that of trade; it is nothing new, in the dark age people did comment same that “Trade is like usury” but Allah hath permitted trade and forbidden usury. (Al Qur’an 2:275). In business, or more profoundly, in “entrepreneurship”, profit emerges from partnership or sharing in terms of earnings per share (EPS), where interest is attributed even before the business is incepted. An interest-based credit will push more than the natural margin with monopoly, but finance by profit sharing remains with the investment projects throughout for what it needs, and its outcome benefits naturally from the market economy.



### **Capital between Profit and Interest: Islamic Purview of Entrepreneurship**

Interest can never be the reward for trade or business; this is a standard, accepted fact of economics. The reward against four factors of production, as prescribed in the conventional market economy.

<b>Table 1: Rewards of the Factors of Production</b>		
Factor of Production	Reward	Qualification as Business
Land	Rent	√
Labour	Wage	√
Capital	Interest	×
Entrepreneurship	Profit/Loss	√

Out of the outcomes of these four factors, Islam agrees with the gains of three, as shown in Table 2. Usmani (2008) found that the basis of Islamic finance always depends on an illiquid asset. As a result, in business, assets with actual value and inventories of commerce come into existence (pp. 21–22). In contrast, Capital is laid down in an interest-based system without being purified through land, labour, or entrepreneurial processes. Simply put, interest advocates “labourless earnings” rather than “disrupting earnings through labour”. The fact that Islamic finance is “asset-backed financing” is one of its key characteristics. A loan with interest and finance through a joint venture between labour and financiers (Mudarabah) differs too much as to economic fairness. Qureshi explains this very simply: If the banks instead of allowing loans to the industry become its partners, share the loss and profit with it, there is no objection against such banks in the Islamic system (1945:161).

Islam has a distinctive viewpoint on ownership, trade, finance, and profit sharing. In Islam, partnership and profit sharing are straightforward; one earns participation only through the variation of finance, labour, and expertise. Here, unlike typical banking systems, depositors (sahib-al-maal) keep their money in the bank (mudarib) as investments and receive a part of any profits or loss in addition or deduction to the principal. The principal is not guaranteed, though, and any losses must be paid proportionally by all investors to the fund. Rent, dividends, and other types of income are some of the ways that Mudarabah depositors benefit from their assets. The mudaraba depositors do not receive any of the non-investment income (commission, exchange, service fees, locker rent, etc.). Khafif explains

Mudarabah: whatever loss or deficiency occurs in entrepreneurship has to be distributed in accordance with the amount of capital invested (Siddiqi 1999:120). At present Islami Banks operates Ijara, modified as Higher Purchase Shirkatul Milk (HPSM), a sharaiah permissible mixture of renting and entrepreneurship (Raihan, June 2023). It allows a gradual transfer of ownership that endorses declining instalment (rent) payables with a real-time state of ownership.

**Nomenclature or Function.** Arguments of ‘Alternatives’ and ‘Exploitation’

**‘Alternative to Interest?’** In some circles, there is a propagandistic as well as ignorant assumption that Musharaka and Murabaha are simply alternatives to conventional interest. Such guess-makers neither consult historical sources nor try to know the function, mechanism, or method of interest itself. Actually, these entrepreneurship of Musharaka and Murabaha are quite natural to human life that Islam has formalized with the frames and dictations of valid sales and partnership. The Qur’an allows lawful joint ventures by agreement (4:29). Musharaka and Murabaha existed in Makkah and human societies long before the Dutchman William the Orange, who became King of England, invented the bank of usury in the Middle Ages.

**Prospect of Islamic Finance in Bangladesh.** Islam allows, or rather encourages, microcredit with the PLS system; it is not opposed to that as portrayed; rather, Islam is in enmity with interest-based lending. The usurious, crooked group wishes to confront Islam instead of modifying microcredit in participatory mode. It is not so simple in Bangladesh to uplift or introduce participatory finance in the face of cruelly high interest rates by NGO/MFIs/MLMs. Rather, empathy for entire populace, their wellbeing, and equity of their progress are imperative in all these poverty alleviation projects. In that accordance, the frame and mode of a participatory economy relates to broader economy of ‘Shared Prosperity’ (The World Bank Brief, 30 April, 2023).

## Consolidated Research Findings

**Key Finding from Content Analysis (Qualitative).** There is divergence in the contents being analyzed in understanding the prohibition of interest, to the extent of including the idea of any reasonable rate of interest. A number of contents refer that 'Profit sharing agreement' is only reasonable thereby, which believes in realistic outcomes, not preset speculation.

**Objective Research Finding (Quantitative).** A summary of findings from e-responses of six survey is appended:

- In the 1st question, does your interest gain compensate that increase in price? A greater number opined that they do not take interest from bank savings (41.7%), whereas a closer number opined that the interest they collect is less than the price hike (36.9%). In both connotations, the maximum number of respondents denied any role that interest against savings plays in compensating price hike.
- In regards to the 2nd question, either the bank balances loss of investment or not was dispiritedly diverse. They find that either no bank agrees to that (44.7%) or they have the aspiration that it would be good if they paid less than capital as the bank shares the loss (40.8%). Only a meager portion considers that the way the bank is charging is okay (14.6%). It refers to the majority of the respondents (>15%) liking profit and loss sharing agreements.
- Responding to the 3rd question, Do Banks charge additional interest than that agreed upon? Most of the responses have alleged banks to take more than promised; a majority brand it as 'hidden charges' (53.4%), while some say it in the name of 'clerical' (24.3%). However, some 22.3%, still rely on conventional banks accuracy in making promises.
- The Impression on NGOs/MFIs of Bangladesh as revealed through the responses on the 4th question is nearly majority believes that through these interest bearing micro finance operations these MFI/

NGOs are getting rich themselves (49.5%) rather alleviating poverty (14.6%) in Bangladesh.

- As the 5th Question asks on the fate of the creditor of these NGOs/MFIs, instead of the loaner gets self-sufficient (10.7%), majority believes that the loaner remains loaners, never gets self-sufficient (56.3%).
- When asked to choose between entrepreneurships, most of the respondents opted for participatory (90.3%), while a few, with less than 10%, opted for conventional (interest-bound) credit operations.

## **Validation Test of Hypothesis**

All above modest findings regarding the validity of the initial hypothesis lead to alternate hypothesis (modified or alternative finding) as follows:

- Alternative Finding 1: ‘Along with other financial crimes, usurious monetary system is causing economic disaster in the world that includes Bangladesh.’ (Bi/multi-variant)
- Alternative Finding 2: ‘Usurious monetary system is causing economic Insecurity in the world that includes Bangladesh.’ (Uni-variant)

## **Recommendations**

The study recommends following measures:

- The ‘natural money network’ may be mandated by the nations and the populace under the new global order.
- ‘Shared Prosperity’ may be realized by reducing inequality, by equitable wealth distribution, and by sponsoring participatory entrepreneurship.
- Bangladesh Government may
  - Exercise caution in creating interest-bearing national/public debt; the debt to GDP ratio may be kept at < 30%.

- Curb the crooked usurious play of some of the NGOs, MFIs and MLMs.

## Conclusion

This research is undertaken in a prelude that in the legitimacy of interest-based financing and in the decaying of participatory entrepreneurship, individuals (micro) and states (macro) are in security scarcity of their assets and transactions. Nahid (July 2023) has hit the jackpot in terms of societally-related economic security: ‘We are yet to obtain a financially inclusive state system.....therefore, insecurity will remain as the formal sector fails to address the needs of individuals in need.’ Despite the evil mechanisms of the current economic order, this research nevertheless ends with hope. The sequel of this research has realized what natural economist Gesell (1918: preface to the third edition) had thought for: the liberation of economic forces and their free play, with the resulting increase in the offer of loan money, would remove interest and thereby cleanse the darkest plague-spot in our current economic system.

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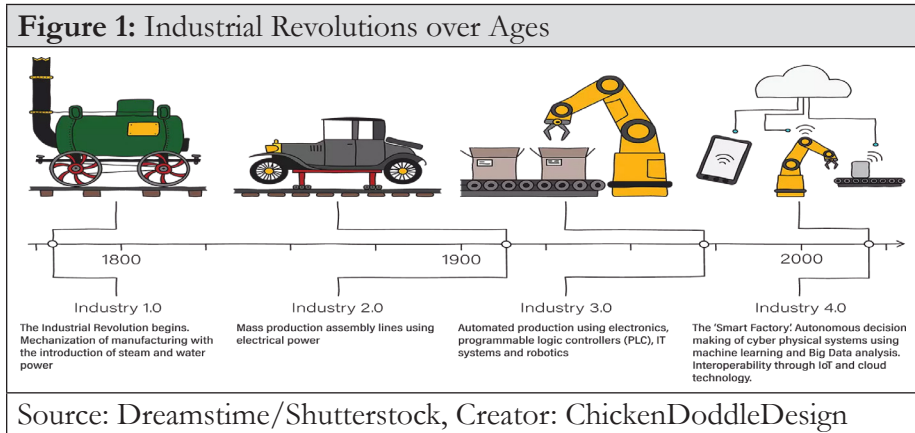
Air Commodore Muhammad Mushtaqur Rahman, BSP, BPP, ndc, afwc, psc was commissioned in BAF on 03 January 1991 in ADWC branch. Besides working as Chief Instructor at Fighter Controllers Training Unit and 2-I-C at Air Defence Operations Centre, he has commanded four AD Radar Squadrons, one BAF Radar Unit, and Air Force Command and Staff Training Institute. He has completed Air Staff course at DSCSC, Command and Staff course at Air Force Command College in Beijing, and AFWC and NDC, both from NDC at Dhaka. He has served as Directing Staff both at DSCSC and at AFWC Wing at NDC. He was Chief Inspector of BAF at Air Headquarters, Commander (Current Operations) at Air Command Operations Centre and DG Planning and Control at Bangabondhu Aeronautical Centre. He served in the Mission Air Operations Center of the UN mission in the DRC in 2005–06. He has completed an MBA from IBA at Dhaka University, an MDS from National University, and an M.Phil. (Part-II) from BUP. At present he is working as Director of Project at Air Headquarters. He is happily married and blessed with two daughters.

# **FOURTH INDUSTRIAL REVOLUTION AND DIGITAL LITERACY: AN ANALYSIS FROM WOMEN EMPOWERMENT PERSPECTIVE**

**Joint Secretary Salma Siddiqua Mahtab, ndc**

## **Introduction**

The world is undergoing a rapid technological transformation, impacting manufacturing and industrial processes and all aspects of human life. This shift is recognized as a technological/industrial revolution following three previous industrial revolutions. Klaus Schwab, Chairperson of the World Economic Forum, coined the term 'Fourth Industrial Revolution (4IR)' in 2016, while the concept of 'Industry 4.0' was introduced in Germany in 2011 to describe intelligent factories (Lavopa and Delera 2021). 4IR represents significant changes and transitions in manufacturing and industrial processes, incorporating innovative technologies like artificial Intelligence (AI), blockchain, nanotechnology, Internet of Things (IoT), quantum computing, 3D printing, and virtual/augmented reality. So, predicting and preparing for the transition is crucial. It is imperative to develop skills, update the education system, and have the capacity to leverage evolving opportunities. Disruptive technologies and technological advancement open the avenue of a new literacy era, usually known as Digital Literacy (DL). It has been found that education is a crucial instrument that has the power to bridge people in the workplace and provide employment opportunities (Gwata 2019).



The United Nations Children’s Fund (UNICEF) (2023) defined digital literacy as knowledge, skills, and attitudes that allow someone to be safe and empowered in the digital world. Digital literacy will facilitate women with access to information, economic empowerment, social empowerment, and access to education through online courses and resources and ensure personal safety (World Pulse 2015). UN Women (2023) states that worldwide women’s internet access is 63%, slightly lower than the men which is 69% and, 53.3% of the global population is online, but there is a gender gap in internet access between women and men.

Women’s empowerment can be defined as the method through which women obtain the power and authority to govern their lives and the capability to make pivotal decisions (EIGE 2023). Women must have the right to have and determine choices and access to opportunities and resources. It is essential to examine how new information and communication technologies impact women’s social and economic empowerment (Davidson 2012 and Lechman 2021).

Bangladesh’s government recognizes the importance of addressing the challenges posed by 4<sup>th</sup> Industrial Revolution (4IR) and sees women’s empowerment, particularly through digital literacy. This study aims to explore the impact of digital literacy on women’s empowerment in the context of 4IR, focusing on women entrepreneurs.

## Problem Statement

The World Economic Forum (2023a) predicts that future jobs that do not exist today will require new knowledge, education, and skills, potentially exacerbating women's vulnerability due to their often-limited education, especially in Information and Communication Technology (ICT).

Historian Yuval Noah Harari highlighted the adverse effects of the Fourth Industrial Revolution (4IR) on labor, particularly in countries like Bangladesh, where low-cost laborers may struggle to adapt to new technologies (Intelligence Squared 2023).

Women in Asia and the Indian subcontinent are underrepresented in Science, Technology, Engineering and Mathematics (STEM) fields, crucial for adapting to 4IR, and there is a significant digital gender divide (ILO 2022). In Bangladesh, only a small percentage of women use the internet and are computer literate (Khatun et al. 2022 and BBS 2021).

Women's low participation in STEM and technology fields, fueled by affordability and accessibility issues and cultural discouragement from pursuing these areas, remain significant challenges (OECD 2018).

## Literature Review

The relevant literature focuses on the implications of the 4IR and emerging technologies, gender equality and women empowerment:

**Economic Impact and Gender Inequality.** Emerging technologies are expected to boost innovation, efficiency, and productivity, fostering economic growth, and creating high-skill jobs. However, they may also lead to income inequality among genders and reduce low-skill jobs (Schwab 2016a).

**Gender Parity in Employment.** Due to the underrepresentation of women in the high-growth sector, the World Economic Forum (2017) highlights the importance of addressing specific dynamics that hinder gender parity, such as social, economic, cultural, and societal barriers.

**Societal and Ethical Challenges.** Schwab (2016b) has stated that 4IR will change society and individual identities, including privacy, ownership, consumption, and relationships. Emerging technologies may increase inequality and pose ethical dilemmas, especially in biotechnology.

**Digital Literacy and Women's Empowerment.** The lack of digital literacy, access to technology, gender gap in STEM fields, and tech careers for women in developing countries poses significant challenges for women's empowerment (OECD 2018). Initiatives like the 'Women Weave The Web' campaign aim to improve women's digital empowerment and literacy (World Pulse 2015).

**Challenges in the Tech Industry.** There's a gender disparity in the tech industry, with women being underrepresented in STEM professions and leadership roles. The challenges include job displacement, cybersecurity risks, and the need for new approaches in education to respond to societal changes (WWE 2023b and OECD 2018).

**Gender Barriers and Access to Technology.** Women and girls in rural areas face multiple barriers to accessing education, employment, and technology. Initiatives to enhance digital literacy and provide equal access to technology are crucial for achieving gender equality and empowering women (Chopra and Purohit 2022, Razak and Jah 2021).

**Government and Policy Responses.** Governments are encouraged to use emerging technologies to render essential services to underserved communities, reducing poverty, and fostering sustainable development (Micheni et al. 2021 and Islam, Awal, and Zaman 2022). Policies should focus on bridging the digital divide and promoting gender equality in the tech workforce.

**Economic Empowerment through Technology.** Access to digital platforms and mobile technology can enhance women's economic empowerment and financial inclusion (Hall and Krueger 2015 cited in OECD 2018, Goldin 2014, and Etsy 2015). A significant part of the

female labor force may face job displacement due to automation requiring initiatives to enable women to transition to high-skill jobs (MGI 2019).

**Barriers to Women's Progress.** Women face challenges in reskilling and employment due to unpaid care work, mobility constraints, and disparities in access to digital technology and STEM fields (Kamberidouli and Pascall 2020). GSMA (2023) found that while mobile internet usage among women in low- and middle-income countries has increased, adoption is slowing, and substantial gender disparities persist.

In summary, while 4IR presents opportunities for innovation and societal advancement, it poses significant challenges regarding gender inequality, job displacement, and ethical dilemmas. Addressing these issues requires a multifaceted approach involving education, policy reform, and targeted initiatives to empower women and ensure equitable participation in the evolving digital landscape.

## **Research Methodology**

### **Research Method**

This study was exploratory in nature and based on data from primary and secondary sources. The study adopted a qualitative research method to meet the research objectives.

### **Data Collection**

Purposive sampling was used for this qualitative study. The research process involved acquiring and analyzing the received data. The research report critically explored the prospects and challenges of 4IR and benefits of digital literacy on women empowerment in Bangladesh. Key Informant interviews (KII) with open-ended semi-structured questionnaires, Focus Group Discussions (FGD), and Case Studies were conducted in this research project.

The participants of KII were ICT industry leaders, relevant government officials of the ICT Division, and Women Entrepreneurs, including e-commerce entrepreneurs.

**Focused Group Discussion (FGD).** In this study, 2 (two) focus group discussions were conducted. The first was conducted with women entrepreneurs working in ICT fields, and the second was conducted with readymade garment female workers.

**Case Studies.** Two case studies of this research include a woman working in digital content creation and another who got training in freelancing. Their journey to success was recorded for analysis.

**Data Source.** Data were collected from both primary and secondary sources.

## **Data Analysis**

Thematic analysis was conducted to obtain interview themes according to the study's objectives. Vaismoradi et al. (2016) reported that 'theme,' which is used as an attribute, concept, descriptor, or element, is the most significant thing in data analysis that generates practical results of the study and helps the researcher to answer the research questions. All pertinent data were combined into themes according to the research objectives. To interpret the data, the findings from the gathered data were summarized and compared to the relevant literature findings.

## **Overview of 4IR, Digital Literacy and Women Empowerment**

### **Fourth Industrial Revolution**

The Fourth Industrial Revolution (4IR or Industry 4.0) represents the fusion of smart systems across physical, digital, and biological domains,

distinct from previous revolutions (Schwab 2016a). It emphasizes AI, robotics, IoT, autonomous vehicles, nanotechnology, biotechnology, quantum computing, machine learning, and other disruptive technologies, reshaping how we live and work.

## Features of 4IR

The Fourth Industrial Revolution melds the physical, digital, and biological realms, altering how we live and work. Its distinctive speed and scope promise to transform all facets of society and the economy. Researchers and scholars have identified different features of 4IR, which are as follows:

**Cyber-Physical Systems (CPSs).** CPSs are smart synergized systems with cyber and physical components that connect the real world of information processing with the virtual world of the physical world using for instance, sensors, actuators, robots, and embedded systems. It can be broken down further:

- **Robotics.** Robotics is the junction of technology, science, and engineering to design and manufacture machines, often called ‘robots,’ autonomous systems existing in the physical world, perceiving their surroundings, and acting in response to them (Mataric 2007).
- **Artificial Intelligence.** Artificial Intelligence (AI) is one of the scientific innovations that replaced human’ manual work in various fields. It is a system that mimics various functions that a human can do. AI uses external data like big data to perform tasks well (Anjila 2021).
- **Internet of Things.** The Internet of Things (IoT) concept involves the interconnection of computing devices. It is characterized as the interaction and communication of intelligent machines with other innovative machines, objects, surroundings, and infrastructures. (Karimi and Atkinson 2013 and Hossain 2023).

- **Machine Learning.** Machine Learning (ML), a subset of AI, automates analytical model building through algorithms that learn from data (Mitchell 1997). It comprises three types: supervised learning with known outputs, unsupervised learning without specific direction, and reinforcement learning via trial and error to meet an objective.
- **Big Data Analytics.** Big data refers to high-volume, high-velocity, and high-variety information assets, which call for new, cost-effective information processing methods that enhance insight and decision-making (Gartner, 2023).
- **Additive Manufacturing.** The concept of additive manufacturing (AM) or 3D printing, which is the subsequent development or direction of contemporary production, gains significance.
- **Biotechnology.** The integration and advancement of biotechnologies is another key feature of 4IR. From genomics to synthetic biology, these technologies are pushing the boundaries of healthcare, agriculture, and environmental sustainability (Schwab 2016a).

## **Prospects and Challenges of 4IR on Women Empowerment**

The Fourth Industrial Revolution (4IR) offers mixed prospects for women. It promises more job opportunities, especially in healthcare and professional roles, driven by an aging population, rising care costs, and the need for advanced skills. On the other hand, women face significant challenges, with an estimated 40 to 160 million needing to switch occupations by 2030. This shift necessitates new skills, yet barriers like unpaid care duties, limited mobility, and less access to technology and STEM education make it difficult. Overcoming these structural and societal obstacles through reskilling and education is crucial for women to adapt and thrive in 4IR-driven job markets (MGI 2019, Taiyeb 2020).

## **Digital Literacy**

Digital literacy is evolving as Information and Communication Technologies (ICT) integrate into our lives, changing the way we interact with information and each other. Warschauer (2009) notes that this integration is transforming literacy studies, while Martínez-Bravo et al. (2021) define digital literacy as a fusion of cognitive, critical, technical, and social skills enabling collaboration and participation through ICT. Eshet-Alkai (2004) and Aviram and Alkai (2006) elaborate that digital literacy involves more than just using software and devices; it encompasses complex cognitive, motor, sociological, and emotional skills for effective functioning in digital environments. They identify five key literacy skills: photo-visual, information, branching, and socio-emotional literacy, each playing a distinct role in interpreting, navigating, and critically engaging with digital content. Martínez-Bravo et al. (2021) propose a holistic approach to digital literacy, encompassing nine competencies, including direct competencies like information and data, communication, collaboration, and technical skills, as well as transversal competencies like problem-solving, global citizenship, interpersonal skills, future and creative thinking, and critical thinking. These competencies and skills are essential for adapting to and thriving in the rapidly evolving digital landscape.

## **Women Empowerment**

Women empowerment is a dynamic, multifaceted process that enables women to realize their full potential in all aspects of life (Sahey 1998). It involves the transfer of power over time, enhancing women's access to opportunities, resources, and knowledge. Empowerment includes psychological, physical, social, and cultural aspects and aims to expand the power base of women in low-powered groups (Mandal 2013).

Women empowerment includes recognizing their contributions, building self-esteem, achieving financial independence, and reducing household workloads, and having the freedom to form associations and organizations (Mandal 2013).

Naila Kabeer (1999) emphasized that empowerment centers on the power to make choices involving resources, agency, and achievements. Chutia (2022) defines empowerment as encompassing economic, social, political, and other life aspects. The Bill and Melinda Gates Foundation (2021) views economic empowerment as crucial for effective market participation and decision-making control.

The United Nations (2001 cited in Garz et al. 2020) outlines five components of women empowerment: self-worth, decision-making rights, access to opportunities and resources, control over their lives, and the ability to influence social change.

### **Existing Initiatives regarding 4IR, Digital Literacy, Women Entrepreneurs, and Women Empowerment**

The Bangladeshi government and various ministries, non-government organizations, and international organizations have taken multiple vital initiatives, including skill development training in ICT and other areas provided by the National Skill Development Authority and various ministries such as the ICT Division, Ministry of Women and Children Affairs (MoWCA), and Ministry of Youth and Sports (MoY&S).

Efforts are also focused on supporting women entrepreneurs, especially in Small and Medium Entrepreneurships (SMEs). The Ministry of Industries, through BSCIC, enhances women's leadership skills and enterprise capacity. The Bangladesh Institute of Management improves women entrepreneurs' productivity and management capabilities. Additionally, the Board of Investment encourages investments in women-led industries.

The MoCWA played a significant role in policy development for women empowerment and employment opportunities. Different ministries/divisions/Agencies of the government such as the ICTD, MoWCA, MoY&S, TMED, Ministry of Expatriates' Welfare & Overseas Employment (MOEWOE), Ministry of Information (MoI) and various non government organizations provide ICT-based training to women and girls.

Furthermore, financial support is provided by PKSf, SME Foundation, and the Startup Company Limited, offering funding, credit support, and reduced interest rates for women's initiatives. Other services include mentoring, networking, legal and IP support, and coworking spaces, aiming to empower women and promote gender equality in Bangladesh.

## **Analysis of Data, Results, Findings and Discussion**

### **Profile of the Participants**

The total number of participants of the study was 25 and their profiles are: Women e-commerce entrepreneurs, teachers of universities, member of the relevant trade bodies, ICT industry leaders and experts, and officials of ministries. Male participants were 64% and female were 32%.

### **Thematic Analysis**

Six (6) themes were formed according to the similarity of information. Then, several sub-themes were extracted from interview data. Sub-themes have been reported under the broad themes in this section. The following are the broad themes:

- Fourth Industrial Revolution (4IR)
- Digital Literacy
- Women Empowerment
- Contribution of Digital Literacy to Women Empowerment
- Gender Gap
- Other Critical Factors

## **Theme 1 - Fourth Industrial Revolution (4IR)**

### **Perception of 4IR**

Most of the participants (95%) are aware of 4IR. The participants think that 4IR is the ongoing transformation with the help of frontier technologies like AI, robotics, autonomous vehicles, 3D printing, IoT, blockchain, etc of how we live, work, and learn in our society through technological advancements. It is an opportunity for significant progress with the potential to improve quality of life and create new job opportunities.

### **Challenges of 4IR for Women**

Most of the participants are aware of the challenges of the fourth industrial revolution. They think the challenges depend on the user level, such as students, homemakers, and professionals. According to the participants, the challenges include: skill mismatch and skill development, privacy and security concerns, lack of inclusivity in STEM education, limited access to connectivity, gender based digital divide, stereotypes and biases.

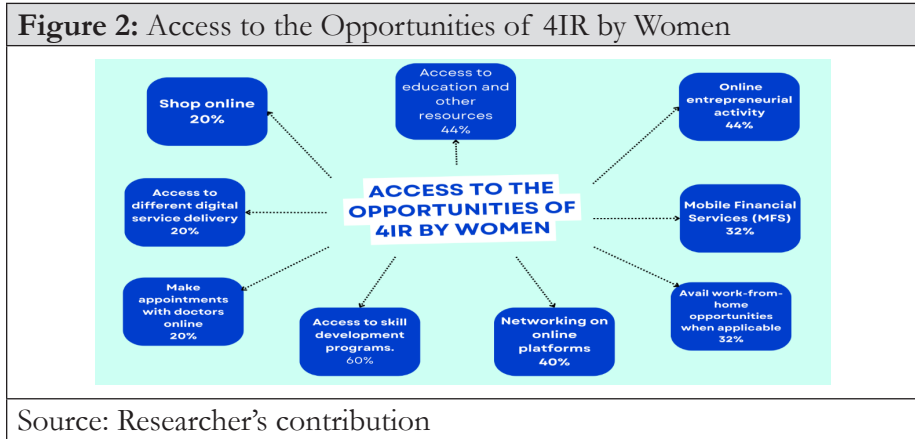
### **Opportunities of 4IR for Women**

The participants think that 4IR has brought many opportunities for women. One of the female participants said that 4IR created many windows of opportunity for women. Based on the responses of the participants, the opportunities of 4IR for women are: voice and participation, entrepreneurship and innovation, skill development, access to empowering resources, job creation, economic opportunities, safety and security, work life balance and networking etc.

### **Access to the Opportunities of 4IR by Women**

The participants believed that the level of the benefits that women accrue from 4IR depends on their socioeconomic, educational status, and digital

engagement. It also depends on the type of devices they have access to. Based on their responses, access to opportunities of 4IR by women has been depicted below:



## Job Loss Due to 4IR and Preparing Women for New Jobs

The participants think that a section of women employed in the ready-made garment (RMG) sector needs to be appropriately upskilled to fit in the new automated ways of production. They said it is essential to divert most of the workforce to the next promising sector – the ICT sector. They also expressed that the government needs a proper plan to equip women with in-demand skills, with a need assessment of the industry and estimated cost.

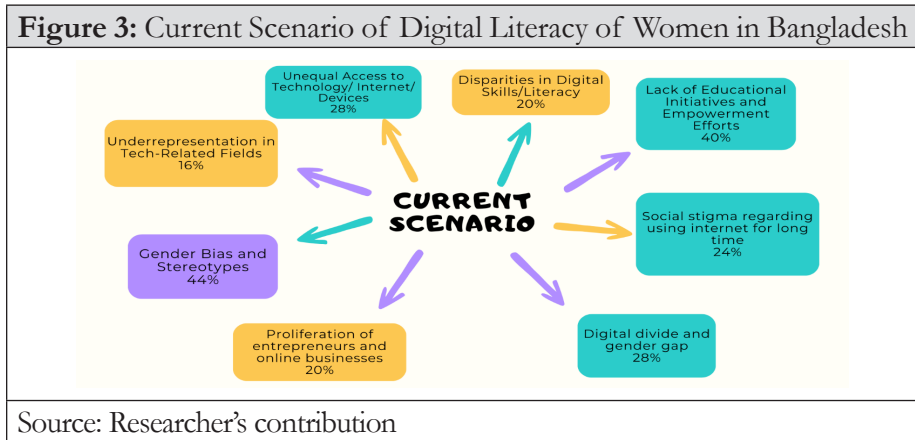
## Theme 2 - Digital Literacy

### Digital Literacy and Its Importance

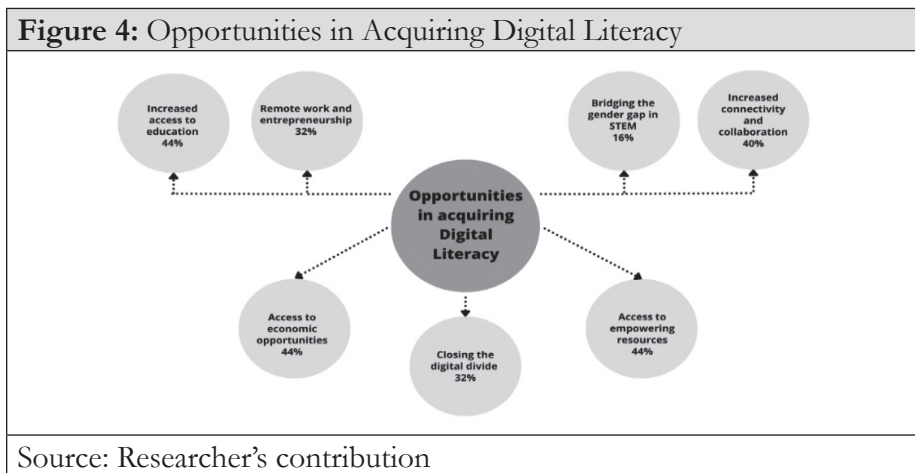
Entrepreneurs who participated in this study think that using social media, content creation for Facebook posts and marketing strategy for e-commerce is also included in digital literacy. They conceived that it includes a range of skills, knowledge, and attitudes necessary to navigate the digital world and make informed decisions using digital tools and resources.

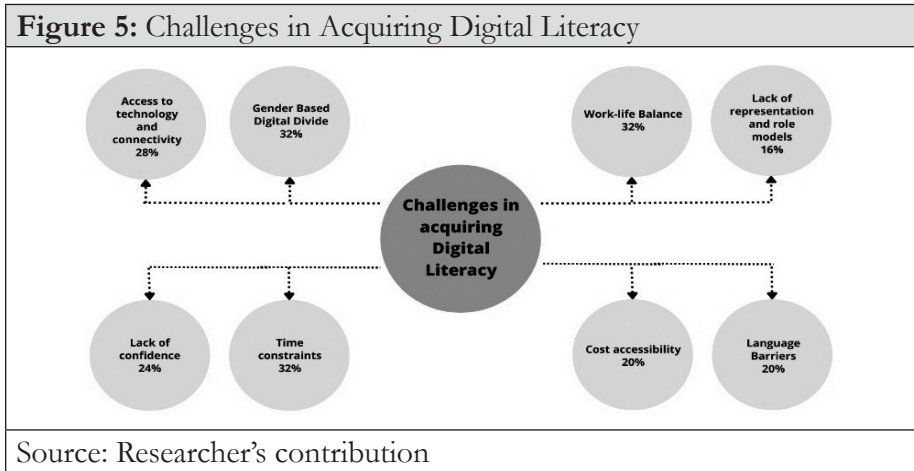
## Current Scenario of Digital Literacy of Women in Bangladesh

The current scenario of digital literacy among women in society varies across different regions and socioeconomic backgrounds. The responses of the participants are shown in the figure below:



They believed that the rate and level of digital literacy is meager among the women in the disadvantaged section of the society compared to their male counterparts. There is the rural-urban digital divide. Based on the responses of the participants, opportunities, and challenges in acquiring digital literacy have been depicted below:





## Social and Cultural Barriers to Acquiring Digital Literacy

The summary of the participants' views on barriers to women's engagement in digital literacy initiatives is as follows:

**Cultural and Social Norms.** Prevailing social perceptions and cultural norms significantly hinder women's participation in digital literacy initiatives.

**Parental Encouragement and Investment.** There is a tendency for parents to encourage their sons over their daughters in pursuing ICT careers. This is often coupled with a reluctance to finance higher education in ICT for daughters like less willingness by parents to invest in necessary devices like laptops and smartphones for their daughters.

**Gender Stereotypes and Biases.** Gender stereotypes and biases perpetuate the idea that technology and digital literacy are more suited for men and discourage women from pursuing digital skills.

**Caregiving and Household Responsibilities.** Cultural expectations often prioritize women's roles in caregiving and household responsibilities, limiting their time and opportunities to engage in digital literacy activities.

**Lack of Female Role Models and Mentors.** The absence of visible female role models and mentors in the field of digital literacy and technology can demotivate women from pursuing these paths.

**Device Accessibility.** In many families, men typically own digital devices, leading to restricted access for female family members. Women and girls often have to rely on using a male family member's mobile phone or computer.

In summary, cultural, and social barriers, gender stereotypes, and limited access to educational resources and technology significantly impede women's engagement in digital literacy and technology fields. These challenges contribute to a gender gap in digital literacy and ICT careers.

### **Way Foreword in Addressing the Challenges Faced by Women in Acquiring Digital Literacy Skills**

The participants think that,

- The government can collaborate with the hardware and software industry to supply devices on a promotional basis at subsidized rates for female students at school.
- Digital literacy training should start from primary school. Schools can run campaigns for parents of daughters to encourage them to invest in devices for learning purposes.
- Identify gaps and demands based on social divides, geographical divides, etc.
- Identify ratios of best approaches and ineffective approaches for promotion and awareness.
- Incentive programs to attract more users for adapting to necessary 4IR-tech methods.

## **Theme 3 - Women Empowerment**

### **Women Empowerment**

Women's empowerment is a core issue of contemporary development. It underscores that women are active agents, not passive recipients of development outcomes.

Based on the responses, it has been found that compared to the situation at independence, Bangladesh has made applaudable progress in terms of women empowerment mainly through increasing their participation in education and the workforce.

The participants believe that empowerment facilitates women's full and effective participation in political, economic, social, and cultural life, making them stronger and more confident to take control of their actions and lives. They think it encourages women to demand equality in their relationships with men within their families and society. However, violence, social norms, and cultural barriers continue to affect women's empowerment in Bangladesh, as stated by them.

## **Theme 4 - Contribution of Digital Literacy to Women's Empowerment in the Context of the Fourth Industrial Revolution**

According to the participants' responses, digital literacy and, ultimately, digital engagement of the women enables women to participate in the workforce more through remote work opportunities.

Furthermore, digital literacy enables women to access many online information and resources, acquire knowledge on various subjects, and pursue careers in technology, break through traditional gender barriers, and access higher-paying positions. The participants said, this may empower women to make decisions, expand their horizons, and broaden their perspectives.

Based on the observation, it has been found that digital platforms allow women to express their ideas, opinions, and experiences. Through social media and other digital platforms, women can share their perspectives and contribute to public discourse equally. They said it is essential to ensure that digital literacy initiatives are accessible, inclusive, and responsive to women's specific needs and contexts.

## **Theme 5 - Gender Gap**

### **Gap in terms of Digital Literacy**

According to the responses, men generally have better access and exposure to digital devices and relevant tools from early life. As stated by the participants, digital literacy advantages or disparities between men and women can vary depending on the context and region. While significant progress has been made in narrowing the gender gap in digital literacy, there are some advantages that men may enjoy over women in certain situations.

### **Bridging the Gender Gap in Digital Literacy**

The participants said that the private sector and technological companies are crucial in bridging the gender gap in digital literacy. Vocational training institutes can design demand-driven programs (for different skill levels) to train young women. The government, technology-based companies can collaborate with educational institutions to develop digital literacy programs targeted at girls and women. Private sector organizations can engage in corporate social responsibility initiatives and training and mentorship programs focused on promoting empowerment through digital literacy for women.

## **Theme 6 - Other Critical Factors**

**STEM Education.** The participants stated that the girls in our country are not encouraged to study STEM. As a result, in the higher management of the ICT sector, the representation of women is lower.

**Gap Analysis.** The participants think that to provide need based digital literacy to women, it is necessary to determine the gap between general and digital literacy, and to differentiate the females who will not be in the workforce and cannot absorb training.

**Market Research.** The respondents believe that they need the ability and skill to explore the market of their products and services. They want to do it on an online platform, which requires digital literacy.

**Delivery System.** The entrepreneurs expressed their concern about the delivery system. They intend to deliver their product everywhere in this country as well as all over the world. It is crucial to develop a robust delivery system using emerging technologies.

**Social and Family Support.** The participants report that family support can foster a congenial and encouraging environment for women to access the internet, information, and other empowering resources. Society and family often opined that those women may be derailed if they spend too much time on online.

**Financial Support.** Many women have the desired digital literacy and knowledge and are willing to acquire new knowledge or want to start their own business, but funding crisis discourages them from doing it, as reported by the participants. But, the need for male guarantors' bureaucratic or lengthy process, requirement of so many documents often hinder women's access to funding opportunities.

**Increased Family Violence.** Many women are increasingly using digital technologies for e-commerce and managing businesses, leading to more time spent in professional roles. However, this can lead to domestic issues, including violence, especially without family support. Concerns also

arise that women's increased screen time could negatively impact their children's health, education, and mental well-being. Consequently, this has led to increased domestic abuse by male family members, a significant observation reported by female participants in the study.

**Female Technology Hub.** Often, women are not encouraged to participate in training on digital literacy and skill development training with males. A female technology hub can help women acquire knowledge and skills without any problem. This is one of the critical expectations of the respondents of the study.

**Common platform for Women.** The participants expressed that they need a common platform to promote their initiatives and learn how to develop business, marketing strategy, market research, and other relevant skills and build a strong network. They can share their views, ideas, joys, sorrows, and agonies and get help and suggestions from their peers.

**Economic Contribution to the Society.** Women e-commerce entrepreneurs are making significant impacts after gaining digital literacy. These entrepreneurs believe they positively impact the economy, contributing to improvements in food, health, and education sectors. Their success inspires other women, fostering societal and national growth, a key observation noted by the study's participants. Their ventures not only boost self-confidence but also create job opportunities in various sectors.

**Safe Transport Service for Women.** The participants believe there is a lack of safe, affordable, and frequent 24/7 transport services for women in our country. Recently, crimes against women in transport have created a panicky situation. Cases were reported of rapes and murders by the staff of the buses when women were returning from work at late hours.

## **Discussion**

The study reveals awareness among participants about the Fourth Industrial Revolution (4IR) and its opportunities and challenges, particularly for women. The challenges include a gender gap in internet and digital device

access, underrepresentation in technological fields, and social stigmas against women in technical studies, particularly in STEM, which is fundamental to 4IR.

Women often learn through networks, peers, and family members, and utilize resources like Union digital centers for government e-services. Emerging technologies are creating job opportunities and providing access to empowering resources, enabling work from remote areas and work-life balance.

The study highlights that the empowerment of rural, marginal women and those in the informal labor sector is lacking. Many women still face issues like economic dependence, lack of decision-making power, susceptibility to domestic violence, and lack of access to financial services. The study also suggests the need for providing women with digital devices, connectivity, empowering resources, marketing and research skills, and funding support.

## **Conclusion**

Integrating emerging technology into manufacturing, industry, and daily life is crucial yet complex, as the Fourth Industrial Revolution (4IR) brings unpredictable changes. These technologies can exacerbate inequality, create class conflicts, and pose ethical dilemmas, particularly in biotechnology, and may be manipulated for special interests (Schwab 2016b).

Disruptive technologies and globalization are transforming the job market, accelerating job creation, displacement, and skill gaps. In Bangladesh, although women's educational participation is rising, their representation in leadership and the gender gap in the workforce remains a challenge. The global digital gender divide is driven by affordability, lack of digital proficiency, and sociocultural barriers, especially in rural areas of developing countries (OECD 2018). Gender disparities also exist in online learning, affecting access to future skills and opportunities.

Despite challenges, women are increasingly enrolling in skill development programs to adapt to technological changes (Coursera 2021). However, the Bangladeshi government needs support to address these multifaceted issues.

## Recommendations

Based on this study, the report intends to make the following recommendations:

**Gender-Responsive Skills Development.** Develop digital literacy and skill development programs tailored to women's needs and challenges. These programs should enable women to acquire relevant digital skills for the 4IR and promote a culture of continuous, lifelong learning, upskilling, and re-skilling.

**Collaboration and Networking Platforms.** Create platforms and networks for women to collaborate, share knowledge, and support each other in acquiring digital literacy. Encourage successful women in technology to mentor and inspire others. Establish a Common Female Technology Hub as a centralized space for collaboration, innovation, and accessing technological and entrepreneurial resources.

**Awareness Programs.** Conduct awareness programs to encourage girls to pursue STEM education and careers, and educate them about personal and digital safety, including cybersecurity and privacy. Promote inclusive practices and diverse representation in technology fields and raise awareness about the effects of domestic violence.

**Conducive Environment for Women.** Foster an entrepreneurial mindset among women by providing resources, training, and mentorship for digital ventures. Support women-led startups with access to funding, credit, and business development, including seed funding without male guarantees. Implement safe transport services for women.

**Private Sector Collaboration.** Partnership with private sector companies to design and deliver digital literacy programs. Engage technology companies in providing resources, mentorship, internships, and employment opportunities for women.

Implementing these measures can significantly enhance women's digital literacy and participation in the 4IR, contributing to a more inclusive and

equitable digital future. However, further research in various contexts is needed to maximize the benefits of digital literacy for women's empowerment and building an inclusive society.

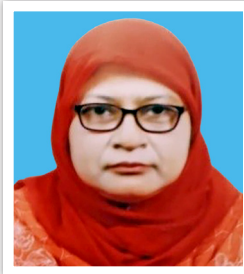
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Joint Secretary Salma Siddiqua Mahtab started her career as a civil servant with the Bangladesh Civil Service Administration Cadre as Assistant Secretary in 2001 with the 20<sup>th</sup> batch. Before that, she served as Production Officer at Beximco Pharmaceuticals Limited in Basic Chemical Plant, a renowned pharmaceutical company. She graduated in Applied Chemistry and Chemical Engineering from the University of Dhaka, later obtaining her Master's in Public Policy and Management from the University of Melbourne and Business Administration with a focus on Management Information Systems from the University of Dhaka. She has completed Basic foundational prerequisite professional courses from the Public Administration Training Centre and other institutes. She has also attended several professional courses abroad.

She served in multiple District Commissioner's offices in executive and magisterial roles. She served with the Ministry of Social Welfare, Ministry of Health and Family Welfare, and Information and Communication Technology Division of Post, Telecommunications, and Information Technology Ministry. She successfully represented Bangladesh in multiple Workshops, Seminars, and International Conferences of national interest. She represented the ICT Division at the 6<sup>th</sup> TICFA conference in the USA. She also participated in the critical bilateral dialogue with South Korea in Dhaka on the digital economy and ICT Industry. She also attended Third Ministerial Conference on Regional Economic Cooperation and Integration in Asia and the Pacific organized by ESCAP held in Thailand.

# **IMPACT OF ETHNIC-BASED POLITICS TOWARDS NATIONAL STABILITY: A MALAYSIAN PERSPECTIVE**

**Captain Syanaz bin Ibrahim, ndc**

## **Introduction**

On 19 November 2022, a significant event occurred in Malaysia's history as the country experienced its first hung parliament since independence. The general election concluded with none of the coalition parties being able to win the majority of seats in the parliament, which consists of 222 seats. This outcome resulted in the need for collaboration among the political parties that participated in the recent election to form a unity government. Finally, after five days of a hung parliament, on 24 November, the Yang Dipertuan Agong (Supreme King of Malaysia), being satisfied that the coalition of Pakatan Harapan (PH) had received enough support from the member of parliaments, appointed Dato' Seri Anwar Ibrahim as the 10th Prime Minister of Malaysia to lead the nation's first unity government. Becoming the pioneer prime minister in Malaysia to lead a unity government entails a daunting responsibility since Malaysia has never witnessed governance under such an arrangement. A noteworthy segment of the political factions within this coalition primarily consists of parties that are centred around ethnicity emphasizing their individual party's objectives rather than those of the nation, thereby rendering his task even more difficult. Moreover, the opposition poses a formidable challenge by possessing almost 34% of the parliamentary seats.

Since attaining independence, Malaysia's political arena has been dominated by a singular coalition party, the Barisan Nasional (BN), which had succeeded in attaining a parliamentary majority in each general election until its loss in the 2018 election after more than six decades in power. This marked a significant milestone in Malaysian politics, as it was the first instance in which the opposition coalition, Pakatan Harapan, had garnered the majority

of parliamentary seats and given the mandate to form a new government. Unfortunately, the reign of Pakatan Harapan was terminated after a period of 18 months, consequent to the withdrawal of support from other factions (Malay political parties) in its coalition owing to the contentiousness of certain governmental policies which were perceived to be adverse to the interests of the Malay people and the Islamic faith. However, the current election climate presents a different challenge for Pakatan Harapan as the number of seats they have won, while being the most, is inadequate for forming a government. Consequently, the only way to establish a government was for Pakatan Harapan to form a novel unity government by collaborating with external, ethnic-based political parties that were initially their contenders during the recent election. In Malaysia, following independence, various political parties have emerged to represent different ethnic groups and religions. Currently, 64 political parties are registered under the jurisdiction of the Registry of Societies of Malaysia and the Electoral Commission of Malaysia (en.wikipedia.org, no date). Of these, 55 are considered to be ethnic parties permitting membership exclusively to designated ethnic individuals. This has resulted in political polarization as ethnic groups become more firmly entrenched in their positions and less likely to engage in compromise (Bradley and Chauchard, 2022).

Given the prevalence of this trend, it is feared that the political stability of Malaysia may be further eroded if such practices are continued over an extended period. This ethnic polarization not only creates political instability but also has the potential to impede economic development and hinder the country's aspirations towards building a one-nation country, known as *Keluarga Malaysia* (Malaysian family). While Malaysia remains relatively peaceful, there are concerns regarding the ethnic political issues rooted in race and religion. Prompt action is required to address potential problems that could further destabilize the country's political stability. Therefore, this study aims to examine the underlying causes of political polarization in Malaysia, with a particular focus on ethnic politics, which has recently caused the formation of a new unity government to rule the country instead of a coalition government.

## **Significance of the Research**

This study is significant in providing a comprehensive understanding of the potential impacts of ethnic politics on the political stability of a country, with a focus on Malaysia. As a nation comprised of a diverse ethnic population and recognized as a 'Truly Asia' country, it is imperative for Malaysia to avoid any form of political polarization based on racial and religious conflicts. It is crucial to ensure that incidents of racial conflicts, such as the tragic event that occurred on 13 May 1969, are not repeated in Malaysia. This is vital to uphold the country's political stability which can be greatly undermined by interracial strife. This study will serve as a valuable resource for every political and ethnic group in Malaysia as they re-evaluate their political agenda with a focus on promoting unity among the diverse ethnic and religious populations in the country. Additionally, this research will also provide a useful reference for other scholars in the field of ethnic politics and its impact on a nation's stability.

## **Objectives of the Research**

The primary objective of this research is to investigate the underlying factors that give rise to ethnic politics in Malaysia, and how this affects the stability of the country. Furthermore, this study aims to assess the success of the national unity government's power-sharing arrangements. Additionally, this study aims to provide initial recommendations to prevent future escalation of these issues. The specific objectives of the research are listed below:

- To identify the fundamental factors that contribute to the prevalence of ethnic politics in Malaysia.
- To examine the adverse effects of ethnic politics on the political stability of Malaysia.
- To evaluate the extent to which the implementation of power-sharing within a national unity government can effectively tackle political polarization.

- To propose measures that can be taken to alleviate the impact of ethnic politics in Malaysia

## **Research Questions**

The following are the research questions that this study will address:

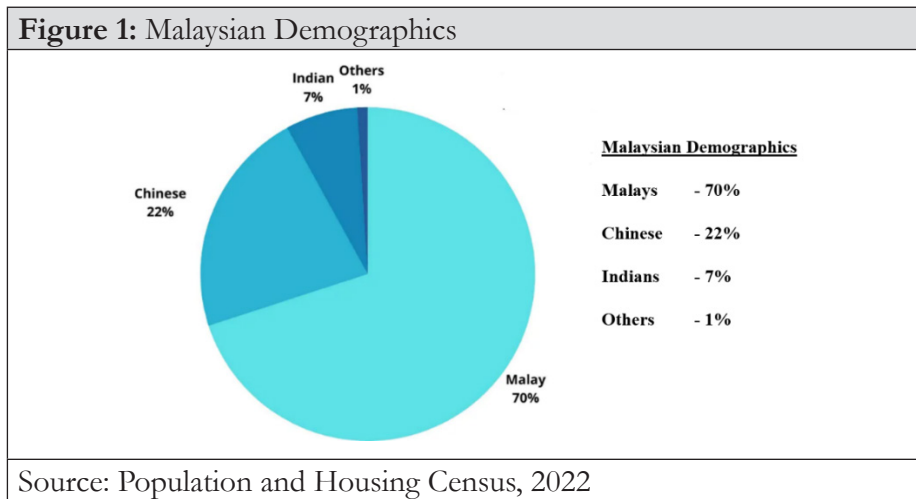
- What are the fundamental factors that contribute to the prevalence of ethnic politics in Malaysia?
- What are the adverse effects of ethnic politics on the political stability of Malaysia?
- To what extent can the implementation of power-sharing within a national unity government effectively tackle political polarization?
- What measures can be taken to alleviate the impact of ethnic politics in Malaysia?

## **Review of Literature**

The term 'ethnic politics' is used to refer to political activity that is based on ethnicity, which can include the formation of political parties, voting patterns, political alliances and conflicts (University of Cologne Forum, 2015). According to Wimmer, et al. (2004), ethnic politics were used by politicians as a means of gaining political power or influencing political decisions. In many cases, ethnic groups are mobilized by politicians to gain support or win elections which can lead to the creation of divisive political systems that are often characterized by inter-ethnic tensions and conflicts. Ethnic politics can have a profound impact on the stability and development of a country, and it is a topic that has been widely studied in the field of political science.

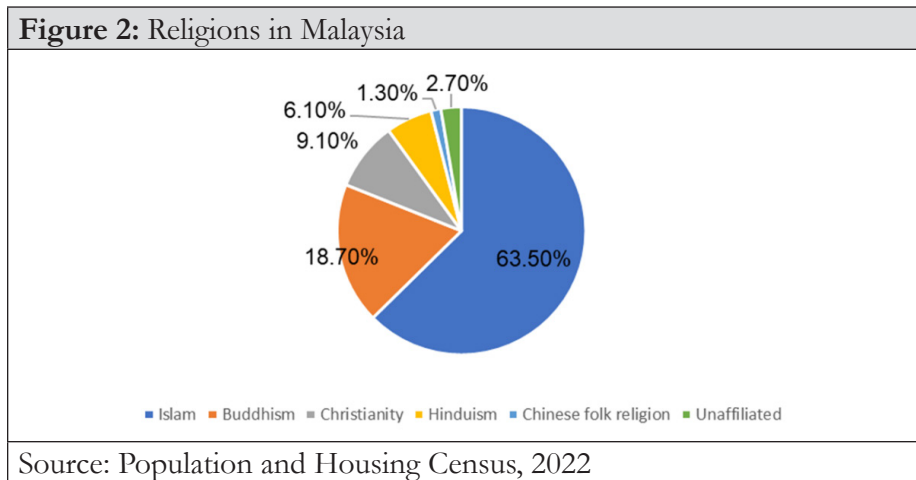
In the scope of Malaysia, the politics of ethnicity has been widely studied and debated in both academic and political circles. Being a multi-ethnic country with a diverse population of 33.5 million people as shown in Table 1, Malaysia has been long plagued by ethnic tensions since its independence

in 1957, which have resulted in various conflicts, including the 1969 race riots (Carothers, 2020). In Malaysia, ethnic politics is closely linked to the issues of identity, religion, and economic disparities. One of the main factors of Malaysia's ethnic politics is the country's colonial legacy, which created and exacerbated ethnic divisions by classifying different groups according to their ethnicity. The British colonial government in Malaysia implemented a strategy called 'divide and rule,' which led to ethnic divisions and started ethnic conflicts. (Christopher, 1988). As a result of this policy, the Malays were predominantly settled in rural areas as farmers and fishermen, while the Indian population was largely confined to working in estates, and the Chinese population concentrated in urban areas due to their business acumen (Evers, 1977). This policy had the indirect effect of exacerbating economic inequality and disparities between the three major ethnic groups.



After independence, the Malay-dominated government put into effect a policy that helped the Malays. This policy was called the New Economic Policy (NEP), and it was implemented in 1971 to reduce economic inequality among the ethnic groups. The NEP granted preferential treatment to Malays and other native communities in the areas of education, employment, and entrepreneurial prospects. (Jomo and Sundaram, 2004). The policies were aimed at addressing the economic disparities between Malays and other ethnic groups. Nonetheless, this particular policy has faced criticism for

its categorization as a variant of affirmative action, which has resulted in the marginalization of other ethnic groups, specifically the Chinese and Indians. (Gomez and Saravanamuttu, 2013). Apart from its multicultural composition, Malaysia upholds religious freedom among its populace, with Islam being the predominant faith embraced within the nation. In addition to race, Milne (2019) suggests that religion, specifically Islam, has also significantly contributed to the worsening of Malaysia’s ethnic conflicts. The government which is Malay-dominant, has used Islam to legitimize its rule and strengthen its support among the Malay population. The dominance of Islam in Malaysia has led to the marginalization of other religious groups, particularly the Chinese and Indian minorities, who feel excluded from mainstream society (Shaari, Ngu and Raman, 2006). Islamist political groups have grown in popularity in recent years and have advocated for a more strict interpretation of Islamic law and a greater role for Islam in Malaysian society. This has led to a greater emphasis on Islamic identity and values, which has contributed to the marginalization of non-Muslims and non-Malays in Malaysia. Therefore, it can be argued that besides ethnic identity, religious identity has also been a significant catalyst for tension between the Malay and non-Malay communities in Malaysia.



According to the study by Nazeer and Masih (2017), ethnic politics in Malaysia has negatively impacted the country’s political stability, socio-

economic development, and democratic processes. Politically, ethnic politics have led to the supremacy of the United Malays National Organisation (UMNO), Malaysia's main Malay political party that has been in power since the country's independence. UMNO has historically relied on the support of the Malay-Muslim community and has implemented policies that favour Malays over other ethnic groups. This has contributed to the marginalization of non-Malays in Malaysian politics and has led to tensions between ethnic groups (Chin, 2016). Economically, ethnic politics has played a role in shaping Malaysia's socio-economic development (Pepinsky, 2013). The government has implemented policies favour to Malay-owned businesses and industries including the Bumiputera policy, which favours Malays in education, employment, and commercial prospects. While the policy was initially intended to address economic disparities between Malays and non-Malays, it has been criticized for perpetuating inequality and hindering Malaysia's economic growth. At the same time, it has created a sense of mistrust and suspicion among different ethnic groups, resulting in social fragmentation and political instability.

To mitigate the impact of ethnic politics, scholars have suggested various measures. Some have called for a more inclusive approach to governance, with policies that benefit all ethnic groups (Kaur and Shapii, 2018). Other scholars have proposed that Malaysia adopt a consociational approach to politics involving power-sharing among different ethnic groups (Horowitz, 2014; Weiss, 2015). This approach is consistent with the concept of a unity government, which has been implemented in Malaysia, and it holds promise for mitigating the issue of political polarization in the country. According to Cheeseman and Tendi (2010), a unity government has the potential to establish a more inclusive political system that accommodates different ideologies and ethnic backgrounds. Through this approach, a diverse representation in government can be achieved, and it can provide an opportunity for all voices to be heard. This helps to break down the traditional power structures that have been responsible for the marginalization of certain groups, and it allows for a more equitable distribution of resources and opportunities. At the same

time, a unity government can help reduce the level of political polarization because it works towards a common goal, which requires parties to put aside their differences and work together towards a shared vision. This can lead to greater cooperation and compromise between political parties and increased stability and predictability in government.

Nonetheless, a unity government also presents challenges that must be addressed. One significant challenge is the potential for internal conflicts among the coalition parties due to differing interests and agendas, leading to instability and gridlock in government decision-making processes (Adili and Linke, 2016). Another challenge is the possibility of one party dominating the coalition resulting in an uneven distribution of resources and opportunities that may lead to feelings of marginalization and disenfranchisement among certain groups. Such feelings of inequality can ultimately cause the dissolution of the coalition (Chigora and Guzura, 2011). However, there is a lack of existing literature that specifically examines the concept of power-sharing in unity government as a means of addressing ethnic politics in Malaysia. At the same time, The new unity government of Malaysia, which came into power in November 2022, is still in its early stages. Therefore, the efficacy of power-sharing and inclusivity in addressing ethnic politics remains uncertain and untested. This research aims to explore the potential of the unity government to reduce political polarization in Malaysia by fostering unity among diverse ethnic groups towards shared objectives that contribute to national stability.

## **Methodology**

This research was conducted as a qualitative study on the impact of ethnic politics in Malaysia. It will use primary and secondary data sources to comprehend the underlying causes of ethnic polarisation in Malaysia and how it affects the nation's political stability, socio-economic development and democratic process. The research is a descriptive study that seeks to answer the research question by analysing and synthesizing existing secondary data sources. This approach is chosen because of its focus on

collecting and analysing data that already exists, rather than collecting new data through primary research methods.

The data collection process involved collecting primary and secondary data from interviews and written sources such as academic journals, government reports, policy papers, and other relevant sources. The data collected include both qualitative and quantitative data, such as historical background, government policies, economic indicators, and social indicators related to ethnic politics in Malaysia. The data sources were used by systematic search techniques including electronic databases, academic libraries, and other online resources. The data analysis process involved a thematic analysis of the collected primary and secondary data organized into themes related to the research question. The analysis focuses on identifying patterns, trends, and relationships between different variables related to ethnic politics in Malaysia.

This research used secondary data sources that were publicly available, however, it is essential to ensure that the data used is accurate, reliable, and obtained from credible sources. Therefore, the data sources were critically evaluated for their credibility, reliability, and accuracy. Consequently, the study's findings should be interpreted with caution and verified by further research that utilizes a quantitative research method.

## Conceptual Framework

The elements of discussion in this research is based on the following variables which have been derived from the above conceptual framework:

- **Ethnic Identity.** Examining the significance of ethnic identity in Malaysian politics, with a special emphasis on race and religion, and how it shapes political attitudes and behaviours.
- **Political Power.** Analysing the relationship between ethnicity and political power in Malaysia, and how political power is distributed among different ethnic groups.

- **Ethnic Bias Policy.** Examining the impact of ethnic bias policies on Malaysia's political stability, socio-economic development, and democratic process.
- **Power Sharing.** Evaluating the effect of power-sharing by bringing together representatives from different political parties to work together towards common goals and addressing long-standing issues of political polarization and ethnic tensions within a country.
- **Inclusiveness and Equality.** Examining the impact of policies that promote inclusiveness and equality in Malaysia, and how they can mitigate the impact of ethnic politics on the country's stability, socio-economic development, and democratic process.
- **Political Instability.** Determining the impact of socioeconomic disparities, the fragility of democratic processes, and the decline of nationalism among the three distinct ethnic groups on the country's political stability.

## Result and Discussions

**Fundamental Factors Contributing to Ethnic Politics.** The prevalence of ethnic politics in Malaysia can be attributed to several fundamental factors. These factors, which have influenced the country's political landscape, include:

- **Historical Context.** Malaysia's historical legacy, particularly its colonial past, has played a significant role in shaping ethnic politics. The British introduced policies that emphasized ethnic divisions and created a framework of separate identities and interests for different ethnic communities.
- **Affirmative Action Policies.** The implementation of affirmative action policies, such as the New Economic Policy (NEP), aimed at addressing economic imbalances and reducing the socio-economic disparities among ethnic groups. However, these policies have also

contributed to the perpetuation of ethnic politics by creating a sense of competition and unequal distribution of resources.

- **Political Parties.** Political parties in Malaysia often adopt ethnic-based platforms and cater to specific ethnic groups to gain support and electoral advantage. These parties mobilize along ethnic lines, highlighting communal issues and advocating for the interests of their respective ethnic constituencies.
- **Education and Language Policies.** Malaysia's education and language policies have contributed to the prevalence of ethnic politics. The existence of vernacular schools, which cater to different ethnic groups and emphasize their respective languages and cultures, reinforces ethnic identities and can contribute to a sense of separatism.
- **Socio-economic Disparities.** The socio-economic disparities among ethnic groups have fuelled ethnic politics in Malaysia. These disparities, which are partly a result of historical factors and affirmative action policies, create a fertile ground for the mobilization of ethnic sentiments and demands for greater representation and rights.

**Adverse Effects of Ethnic Politics on National Stability.** Ethnic politics in Malaysia indirectly created several adverse effects on the national stability of the country. Some of these effects include:

- **Divisiveness and Fragmentation.** Ethnic politics often accentuates divisions among different ethnic communities in Malaysia. When political parties and leaders prioritize ethnic interests over national unity, it can lead to fragmentation and a sense of 'us versus them' mentality undermining social cohesion and political stability.
- **Polarization and Social Tensions.** The emphasis on ethnic identity and competition for resources can lead to increased polarization and social tensions. Ethnic politics may amplify existing prejudices and stereotypes, exacerbating interethnic conflicts and widening the rift between different ethnic communities.

- **Erosion of Trust and Confidence.** Ethnic politics can erode trust and confidence in political institutions and leaders. When citizens perceive that political decisions and policies are driven primarily by ethnic considerations, it undermines their faith in the fairness and impartiality of the political system, leading to disillusionment and decreased political stability.
- **Economic Consequences.** The prevalence of ethnic politics can have economic implications. Policies driven by ethnic considerations, such as affirmative action programs, may create inefficiencies and distortions in the economy. This can hinder economic growth, discourage investment, and exacerbate socio-economic disparities, further undermining political stability.
- **Political Instability.** Ethnic politics can contribute to political instability by heightening tensions and creating a volatile political environment. Ethnic-based mobilization, protests, and conflicts can disrupt governance, lead to policy gridlock, and undermine the stability of government institutions.
- **Impediment to National Development.** The focus on ethnic interests can impede comprehensive national development initiatives. When political debates and policies revolve around ethnic considerations, issues such as infrastructure development, education reform, and economic diversification may receive less attention, hindering overall progress and stability.

**Prospect of Power-Sharing Arrangement in NUG in Tackling Political Polarization.** The implementation of power-sharing within a national unity government has the potential to address political polarization in Malaysia to some extent. However, its effectiveness depends on various factors and cannot be guaranteed as a solution for all polarization-related challenges. The extent to which power-sharing can tackle political polarization in Malaysia can be evaluated considering the following points:

- **Inclusivity and Representation.** Power-sharing arrangements can ensure that different ethnic and political groups are represented in the government. By including representatives from diverse backgrounds, power-sharing promotes inclusivity and provides a platform for different voices and perspectives. This can help mitigate polarization by fostering dialogue, negotiation, and compromise among various stakeholders.
- **Balancing Interests.** Power-sharing within a national unity government allows for a more equitable distribution of power, resources, and decision-making authority. It enables different ethnic and political groups to have a stake in governance, reducing the perception of marginalization and addressing grievances. Balancing interests can help alleviate polarization by promoting a sense of fairness and ensuring that all segments of society have a say in decision-making processes.
- **Consensus Building and Collaboration.** Power-sharing arrangements encourage consensus building and collaboration among different political actors. By fostering dialogue and cooperation, power-sharing can facilitate the development of shared goals and policies that transcend narrow ethnic or party interests. This collaborative approach can help bridge divisions and reduce polarization by focusing on common challenges and finding mutually acceptable solutions.
- **Building Trust and Confidence.** The implementation of power-sharing within a national unity government can contribute to building trust and confidence among different ethnic and political groups. By providing avenues for meaningful participation and influence, power-sharing demonstrates a commitment to inclusivity and fairness. This can help bridge divides, foster interethnic understanding, and enhance trust in the political process.
- **Political Will and Cooperation.** The success of power-sharing depends on the willingness of political actors to collaborate and transcend narrow interests. If political leaders prioritize partisan or ethnic considerations over the broader national interest, power-sharing arrangements may face resistance and hinder effective governance.

## Recommendations

Based on the analysis of the collected primary and secondary data, several recommendations are proposed to mitigate the impact of ethnic politics in Malaysia and to increase the national stability which is important to drive Malaysia to achieve the Vision 2030. These recommendations also aim to answer the 4<sup>th</sup> research question as stated in this study. These are:

- Implement inclusive policies and ensure fair resource allocation among its diverse population regardless of the ethnics and religions.
- Reform education policy and conduct more inter-ethnic dialogues to promote inclusivity and interethnic understanding.
- Strengthen democratic Institutions and encourage the formation of multi-ethnic coalitions.
- Encourage media to represent diverse voices and minimize divisive narratives that perpetuate ethnic politics perspectives.
- Promote civic education and encourage citizens to participate actively in the national integration programs.

In a nutshell, addressing the impacts of ethnic politics in Malaysia, which have persisted since independence, is a complex and time-consuming task. Uniting a diverse population with varying cultures, religions, and beliefs is challenging, as seen in other multi-ethnic countries as well. It is essential for political leaders to prioritize the nation's interest over ethnic interests and refrain from manipulating ethnic issues for their own gain. Government initiatives aimed at uniting citizens should be embraced as efforts to achieve the Shared Prosperity Vision 2030 emphasizing national unity and cooperation. It is not appropriate for a new government leader to abolish such unity campaigns merely because they were initiated by the previous government.

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Captain Syanaz bin Ibrahim, Royal Malaysian Navy, born on 10 September 1972 in Sungai Petani, Kedah, Malaysia, began his illustrious career when he was commissioned as a Sub Lieutenant into the Royal Malaysian Navy's Logistic Branch on July 4, 1992. Over his dedicated 31-year tenure, Captain Syanaz has held a multitude of crucial roles. Notable appointments include his tenure as the Commanding Officer of the Naval Ammunition and Explosives Depot and his esteemed position as Director of Audit and Inspectorate at the Royal Malaysian Navy Headquarters.

Captain Syanaz's commitment to academic excellence is reflected in his impressive qualifications. He holds a Master's degree in Management from the University of Malaya and a Master's degree in Strategic and Defence Studies from the National University of Malaysia.

# **APPLICATION OF INDIRECT APPROACH IN WARFARE: BANGLADESH ARMED FORCES PERSPECTIVE**

**Lieutenant Colonel G M Rakibur Rahman, afwc, psc, Signals**

“In all fighting, the direct method may be used for joining battle, but indirect methods will be needed in order to secure victory”

-Sun Tzu (5<sup>th</sup> Century BC)

## **Introduction**

Since the ancient days, ‘direct approach’ has been practiced and adopted by great generals in the history of warfare to achieve decisive outcomes. While the direct approach focuses on attacking enemy’s center of gravity from unexpected directions and time, indirect approach seeks to avoid enemy’s critical capabilities or strength and exploit critical vulnerabilities or weaknesses exposed by the enemy (Army, Operations of War, Volume One, 2006). Although not mentioned explicitly as indirect approach, Chinese great military general, strategist Sun Tzu, in his magnum opus ‘The Art of War, has theorized avoiding the enemy’s strength and attacking his weakness instead. However, military historian and theorist Sir B.H. Liddell Hart was the first to coin the term ‘indirect approach’ taking into cognizance the dictums of Sun Tzu. While theorizing indirect approach, Hart has also outlined ‘surface and gap’ concept which aims at avoiding direct confrontation with the enemy’s strongest defence and instead targeting their vulnerabilities.

Indirect approach aims to achieve an objective by surprise involving unexpected strategies or manoeuvres that catch the enemy off guard, disrupt their plans, and force them to respond to unexpected threats. Therefore, indirect approach in warfare can have a significant psychological

impact on the enemy, as it creates uncertainty and confusion, and can undermine their morale and will to fight. Warfare is characterized by the interaction of both physical and psychological elements. While the physical characteristics of war are easily quantifiable, psychological characteristics are intangible and difficult to measure, making it a major component of indirect approach. Yet, psychological factors exert a remarkable influence on the nature and outcome of war. Therefore, any doctrine or theory of warfare that undermines the psychological factors of war, ignores the significant part of the nature of war. Although BDAF has underpinned 'indirect approach' as one of the key concepts of operational art, rarely this concept has gained prominence while formulating operational art and design, let alone applying this concept in the operational plan.

## **Literature Review**

Myriad books and articles have been published highlighting the importance of indirect approach in warfare. While mentioning about indirect approach, the military theorists in the early days as well as recent scholars have mentioned about various concepts. While the ancient military theorists have professed about tools like intelligence and deception, gaining positional advantage, surprise, modern days military theorists have postulated tools like guerrilla warfare, domination of information space, creating asymmetric conditions as prime elements of indirect approach. There are very limited number of literatures available in BDAF where indirect approach has been described in details. However, there are many literatures where concepts like deception, manoeuvre, surprise have been deliberately covered. While formulating an operational plan, nowadays, commanders at various levels also take these concepts into cognizance. Nevertheless, newer concepts of indirect approach like unconventional warfare, information warfare, autonomous systems, creating asymmetric condition as tools of indirect approach has not been explored enough. As such, a deliberate study is essential as to how the concept of these tools can be applied as part of the indirect approach in the warfare strategy

of BDAF. Therefore, this research has the potential of contributing in the policy formulation in applying indirect approach in warfare, and thus bridging existing knowledge gap.

## **Research Methodology**

This is a descriptive research on selected sample. This research is primarily qualitative in nature. However, for analyzing the data, mixed-method approach (combination of both quantitative and qualitative data analysis) has been followed. In this research, non-probability sampling method was followed while selecting the samples. However, for obtaining required data, purposive sampling was done considering that there were limited number of officers and their expertise. For qualitative data analysis, to analyse the non-numerical or unstructured data from Key Informant Interviews (KII), Focus Group Discussion (FGD), document study, and NVivo has been used. For quantitative data analysis, Statistical Package for Social Science (SPSS) version 24 has been used. Apart from these, Analytic Hierarchy Process (AHP), and Multi-Criteria Decision Making (MCDM) have been utilized to further validate the findings of this research.

## **Evolution of Theories and Tools of Indirect Approach**

The application of indirect approach has evolved significantly with the transformation of generations of warfare. Military theorists from different generations have underlined the concept of indirect strategy in warfare from different perspective. Although the basic concept of indirect approach, as espoused by military theorists is almost constant or unchanged, application techniques of various tools have been evolved significantly as the time has progressed.

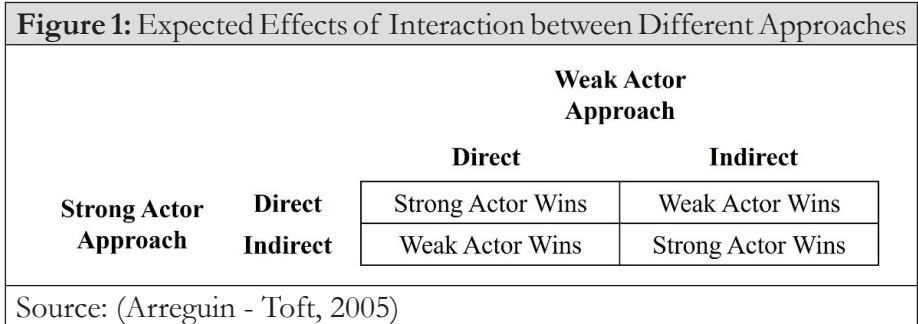
## Evolution of Theory of Indirect Approach: Military Theorists' Perspective

**Sun Tzu.** Ancient Chinese military thinker Sun Tzu (453 to 221 BCE) advocated for the use of deceit, intelligence and surprise to achieve victory in his magnum opus – ‘The Art of War’. He reckoned subduing the enemy without fighting is the acme of skill. He also advocated to exploit enemy’s weakness in both time and space dimensions (Tzu, 1981).

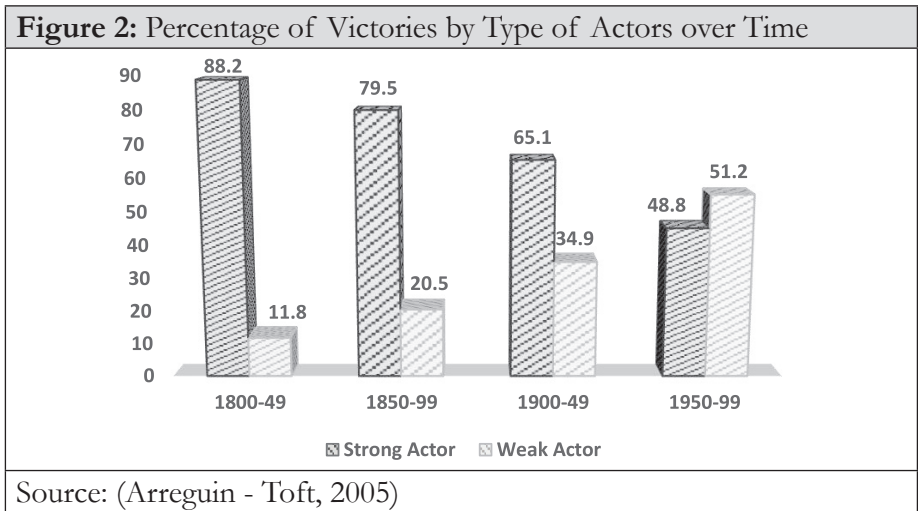
**Niccolò Machiavelli.** Italian diplomat, and philosopher Machiavelli’s seminal work ‘The Prince’ in 1532 marked a transition from ancient warfare to medieval political thought. He emphasized on the importance of psychological factors by instilling fear in the enemy and using deception without necessarily relying on direct force (Freedman, 2013).

**Sir B.H. Liddell Hart.** In contrast to Clausewitz’s strategy for the use of concentrated force at the decisive point to destroy the enemy’s main forces, British military strategist Liddell Hart espoused not to seek a decisive battle until the enemy has been thrown off balance – as in ‘jijitsu’. For that, the line of effort is to be directed to the line of least resistance (Bowdish, 2017). Hart’s ‘Strategy The Indirect Approach’ in 1967 conceptualized that the best way to defeat an enemy is to dislocate their psychological and physical balance, rather than to destroy them by force.

**Ivan Arreguin-Toft.** In his book ‘How the Weak win Wars’, Toft (2005) has explored the logic of four distinct strategic approaches and their interaction between any two. He argued that the outcome of this interaction can be predicted with the help of defensive and offensive strategies of two belligerents (strong actor and weak actor). According to Toft, the relationship between different types of strategies and their outcome can be summarized in figure 1. Considering the type of actors and their adopted strategies, expected winners have been placed inside the cells. For example, if the weaker actor adopts indirect approach whereas stronger actor adopts direct approach, Toft argued that weaker actor shall win the conflict.



Toft in his book has shown an analysis of roughly 200 years’ military history in which; strong actors were victorious at an overwhelming percentage prior to 1950. However, weak actors have won with increasing frequency over time, more specifically after 1950, as shown in figure 2 (Arreguin - Toft, 2005).



### Tools of Indirect Approach in Present Context

Considering the inevitable transformation in the types of approach in warfare and its impact in leveraging physical, psychological, and cognitive domains, it is, therefore essential to ascertain various tools of indirect approach in present context. While determining various tools of indirect approach in the present context, document study, KII, and survey responses have been considered.

**Manoeuvrist Approach.** Manoeuvrist approach is an indirect approach to operations that applies strength against identified vulnerabilities, including predominantly indirect ways and means of targeting the intellectual and moral component of an opponent's fighting power (AJP-5, 2019). In WW II, the Blitzkrieg (lightning war) strategy by German forces bypassing the heavily fortified, and impregnable Maginot Line during the invasion of France could severely affect Allied intellectual component by achieving tactical surprise. This manoeuvre could also degrade moral component of Allied forces as they were overwhelmed and unable to mount an effective resistance leading to the fall of France in a matter of weeks.

**Unconventional Warfare.** Usually, unconventional forces are employed to strike at the enemy's decision cycle and his logistics, and thus create fluidity in battlefield through non-linear engagements with whatever weapons and means available (Kibria, 2023). As the time progressed, this method of warfare was successfully employed during Chinese Revolution under Mao Zedong, Vietnam War against superior US forces, and by Afghan Mujahedeens against Soviet forces. Bangladesh also has its own glorious history of fighting such warfare in the great War of Liberation in 1971. Most of the respondents (90.9%) opined to consider it as one of the tools.

**Information Warfare.** Modern warfare depends heavily on information warfare, which are now more significant than ever in contemporary battles. The information environment consists of different information related capabilities or elements (JP 3-13, 2012). However, for this research, elements like cyber operations, electronic warfare, and psychological operations will be explored and analysed. Majority of the respondents (93.3%) opined to consider information operations as one of the tools of indirect approach in warfare.

**Unmanned Systems.** Unmanned systems offer multiple opportunities of conducting military operations, although achieve the same effect expected by deploying conventional means. The Nagorno-Karabakh conflict in 2020, and ongoing Russia-Ukraine conflict have seen the advent of different types of unmanned systems that need to be reckoned (Zaman, 2023). Comparing unmanned systems to conventional manned platforms,

there is significant advantages in regard to cost, and ease of deployment. Considering all these, 82.1% respondents agreed to consider unmanned systems as one of the tools of indirect approach.

## **Effectiveness of Various Tools of Indirect Approach in Warfare: BDAF Perspective**

In the annals of theory of warfare, application of tools of indirect approach has evolved throughout military history by proving their significance in fast changing environments of battles. The succeeding paragraphs examine the effectiveness of various tools of indirect approach in warfare as determined in the preceding paragraphs. In doing so, the effectiveness will be initially validated based on the survey responses followed by Analytic Hierarchy Process (AHP) to determine the priority of tools.

**Manoeuvrist Approach.** As a concept, manoeuvrist approach is still valid but not much essential for BDAF. However, for small scale and limited period, this approach should be integrated even in defensive posture (Tariq, 2023). Respondents were divided with their opinion while considering effectiveness of manoeuvrist approach for BDAF where 50% respondents consider this to be less effective.

**Unconventional Warfare.** Bangladesh, with its diverse geography and population, provides ample opportunities for unconventional warfare. BDAF, by leveraging its understanding of the local terrain, and networks, can conduct operations that capitalize on these factors. This will surely increase the effectiveness of military operations as these operations have a significant psychological impact on both the adversary and the local population (Hakimuzzaman, 2023). The BDAF's ability to effectively integrate unconventional operations can undermine the adversary's confidence, create a sense of insecurity, and erode their will to fight. From the survey, 80% respondents opined that unconventional warfare is highly effective in warfare strategy of BDAF.

**Information Warfare.** Different elements of information warfare, as explained in the preceding paragraphs, will enable BDAF to identify and

exploit vulnerabilities in the adversary’s information systems, networks, and psychological state (Zaman, 2023). By exploiting these vulnerabilities, BDAF can create uncertainty and confusion in the minds of adversary’s commanders, disrupt adversary’s decision-making processes, and gain an operational advantage. However, most of the respondents opined for cyber operations, and electronic warfare to be effective than other elements for BDAF.

**Unmanned Systems.** Unmanned systems have become integral part of modern-day warfare as they offer unique opportunities of performing ‘Intelligence, Surveillance, Target acquisition, and Reconnaissance’ capabilities and even weapon delivery. Therefore, BDAF may integrate different types of unmanned systems considering their capabilities and psychological impact they create on adversary (Hakimuzzaman, 2023). Out of different types of unmanned systems, most of the respondents (84%) opined for UAV as effective tool of indirect approach for BDAF.

### **Prioritization of Tools of Indirect Approach for BDAF Using Analytic Hierarchy Process (AHP)**

Analytic Hierarchy Process (AHP) is a structured and systematic approach to decision-making and problem-solving that helps researchers to evaluate a set of alternatives or criteria by making pairwise comparison and then generate a priority ranking. In ascertaining the priority ranking, each factor is compared with the others and given a score between 1 to 9 based on ‘Saaty’s Scale’ (Saaty, 1987) as shown in table 1. This is referred to as pairwise comparison.

<b>Table 1: Saaty’s Scale of Significance</b>		
<b>Intensity of Significance</b>	<b>Definition</b>	<b>Explanation</b>
1	Equal significance	Two activities contribute equally to the objective
3	Weak significance of one over another	Experience and judgment slightly favour one activity over another
5	Essential or strong significance	Experience and judgment strongly favor one activity over another
7	Demonstrated significance	An activity is strongly favoured and its dominance demonstrated in practice
9	Absolute significance	The evidence favoring one activity over another is of the highest possible order of affirmation
2, 4, 6, 8	Intermediate values between two adjacent judgments	When compromise is needed

Source: Saaty, 1987

**Different Elements of Information Warfare.** As shown in table 2, cyber operations (0.39) have the greatest significance followed by psychological operations (0.28) than other two factors.

Table 2: Different Elements of Information Warfare						
Elements of Information Warfare	Cyber Operations	Electronic Warfare	Psychological Operations	Media Campaign	Root Mean Product	Significance Vector
Cyber Operations	1	2.33	1.40	2.33	1.66	0.39
Electronic Warfare	0.43	1	0.60	1	0.71	0.17
Psychological Operations	0.71	1.67	1	1.67	1.19	0.28
Media Campaign	0.43	1	0.60	1	0.71	0.17

Source: Researcher's Construct Based on AHP

**Different Types of Unmanned Systems.** According to AHP, unmanned aerial vehicle (UAV) has got the greatest significance (0.37) followed by unmanned combat aerial vehicle (UCAV) (0.26). Other two factors uncrewed surface vessel (USV) and unmanned underwater vehicles (UUV) have received equal significance whereas unmanned ground vehicle (UGV) has got very less significance in the warfare strategy of BDAF, as shown in table 3.

Table 3: Different Elements of Information Operations							
Types of Unmanned Systems	UAV	UGV	USV	UUV	UCAV	Root Mean Product	Significance Vector
UAV	1	2.33	2.33	7	1.40	2.22	0.37
UGV	0.14	1	0.33	0.33	0.20	0.32	0.05
USV	0.43	3	1	1	0.60	0.95	0.16
UUV	0.43	3	1	1	0.60	0.95	0.16
UCAV	5	1.67	1.67	0.71	1	1.58	0.26

Source: Researcher's Construct Based on AHP

### Application of Selected Tools of Indirect Approach in Warfare: BDAF Perspective

Throughout history, weaker forces have effectively utilized the Indirect Approach to overcome seemingly insurmountable odds. The Tet

Offensive by the Viet Cong and North Vietnamese forces in 1968, Afghan Mujahedeens against Soviet Forces in 1989, Azerbaijan forces against superior Armenians in 2020 are notable examples. These instances demonstrate how a weaker force can leverage different indirect strategies to outmanoeuvre and defeat stronger opponents.

### **Case Studies of Past Conflicts Considering Indirect Approach: A More Comprehensive View**

**Vietnam War (1955-1975).** During Vietnam War, the Viet Cong and the North Vietnamese forces employed guerrilla tactics to wear down US forces. The ‘Cu Chi tunnels’ were made as a complex network of tunnels built by the Vietnamese military to stockpile weapons and supplies, and execute surprise attacks from these tunnels. Moreover, general mass from all spheres assisted Viet Cong in transporting supplies. At the end of the war, strong US forces withdrew its troops from Vietnam without decisive victory.

**The Liberation War of Bangladesh 1971.** During Liberation War, being a weaker actor in the conflict, several indirect strategies were adopted by Bangladesh. The prime strategy was employment of unconventional warfare forces (UWF). The UWF could cause substantial loss to Pakistan occupation forces by damaging/ destroying their key logistic and communication installations, command and control nodes. These cumulative actions of UWF could successfully break the backbone of Pakistani forces. Thus, simultaneity of operations by UWF across the area of operations paved the way for Allied Forces to achieve end state quickly.

**Soviet-Afghan War (1978-1989).** During this conflict, the Afghans utilized full potential of the complex nature of terrain in their advantage to offset numerical, technological superiority of Soviet forces (Crile, 2003). To make the things more complex, Afghans adopted guerrilla warfare tactics to harass the Soviets. Gradually, Soviet casualties were mounting and Afghans in their plain cloths continually inflicted damage to Soviet troops. Ultimately, Soviets had to withdraw its forces following an embarrassing defeat.

**Nagorno-Karabakh Conflict 2020.** During this conflict, both Azerbaijani and Armenian forces have employed drones for reconnaissance, surveillance, and even for targeted strikes. Azerbaijan has shown a remarkable revolution in aerial warfare by employing unmanned systems, especially Turkiye built drone Bayraktar TB-2 and loitering munitions instead of manned aerial platforms in the war (Kochashvili, 2022). After 44 days of fierce engagements, the cease fire came into effect on 09 November 2020 with Azeri Forces' decisive victory over Armenia.

**Analysis of these Conflicts.** The foregone case studies serve as stark reminder as to how weaker forces have achieved victory over stronger forces by adopting different tools of indirect approach. Unconventional or guerrilla tactics transforming into total war of the entire people by numerically inferior Viet Cong during 'Vietnam War'; guerrilla operations by Bangladesh Mukti Bahini during the Liberation War of Bangladesh, utilization of difficult, rugged, inaccessible terrain by Afghan Mujahedeens against superior Soviets, and use of unmanned systems by Azerbaijani forces exemplify the significance of various tools of indirect approach in deciding outcome of these conflicts.

### **Strategy Options for BDAF for Application of Selected Tools**

To derive future strategy options, SWOT matrix has been developed. In this matrix, all plausible combinations; strength-opportunities (SO), strength-threat (ST), weakness-opportunities (WO), and weakness-threat (WT) have been deduced where the combinations illustrate following explanations:

- **SO Strategy:** Utilize strengths to take advantages of opportunities.
- **ST Strategy:** Utilize strengths to avoid/ deter/ defeat threats.
- **WO Strategy:** Overcome weaknesses by taking advantage of opportunities.
- **WT Strategy:** Avoid threats until weaknesses are overcome.

**SO Strategy.** SO strategy options that may be adopted by BDAF are:

- Conduct psychological operations and propaganda campaign about adversary's war fighting capabilities.
- Procure advanced and state of the art weapon systems or platforms as a means of deterrence.
- Put emphasize on indigenous production capability by transfer of technology or joint venture.
- Integrate IT experts from different spheres and train them to develop joint cyber operations capabilities.

**ST Strategy.** ST strategy options for BDAF are as:

- Utilize UCW tactics to utilize them as force multipliers.
- Enhance cybersecurity of BDAF.
- Improve domestic defence industries focusing on cost effective solutions tailored for BDAF and reduce reliance on foreign military equipment.

**WO Strategy.** WO strategy options that may be adopted by BDAF are:

- Equip BDAF with technologically advanced unmanned systems.
- Invest in research and development to bridge technological gap.
- Invest in training on cybersecurity to develop cyber operations capability.

**WT Strategy.** WT strategy options for BDAF are as following:

- Organize regular orientation training for UWF personnel to strengthen command and control systems.
- Conduct extensive psychological operations depicting UWF as volunteers for fighting against adversary.
- Increase cyber training and strengthen cybersecurity measures for critical infrastructures.

## Impact on Various Domains

Considering the complex terrain features, and geography as well as unique linguistic, cultural, and ethnic homogeneity as force multiplier for BDAF during any conflict, the subsequent paragraphs shall explore how UWF, unmanned systems, and cyber operations can create impact in various domains. In doing so, in case of any conflict, the application of tools of indirect approach for BDAF shall mostly focus on combined effect of UWF, unmanned systems, and cyber operations as these tools are cost effective and asymmetry can be created by applying these tools.

**Physical Domain.** UWF as one of the potent elements can cause damage in adversary's physical domain. Once employed, adversary may be compelled to commit more forces against this force for success in each sector, thus expose his vulnerabilities of logistics elements, command and control nodes. To materialise this concept, required training must be organized during peacetime. In addition, unmanned systems may be provided to BDAF for better target acquisition and hit probability.

**Psychological Domain.** Possession of state of the art unmanned systems can create significant psychological effect in the minds of adversary. Nagorno-Karabakh conflict 2020, and ongoing Russian-Ukraine conflict have proved the utilization of unmanned systems attaining significant impact (Rahman M. G., 2023). Information operations can also have significant psychological influence by decapitating utility services, and swaying public opinion.

**Cognitive Domain.** The adversary's cognitive domain can be seriously strained by activities of UWF (Hasan, 2023). The objective is to influence their decision-making by innovative tactics, unorthodox techniques that suits the ground. Moreover, cyber operation techniques can corrupt adversary's information systems, impact cognitive processes, and influence decision-making (Rahman B. G., 2023).

## Conclusion

The concept of indirect approach has evolved greatly over time; from Sun Tzu's emphasis on exploiting the enemy's weaknesses to Liddell Hart's focus on throwing the enemy off balance. Today, advancements in technologies, information, cyber and space domain have revolutionized warfare; making indirect methods more important than ever. Side by side, avoiding surfaces and exploiting gaps, engaging in non-contact warfare, and affecting the CG by exploiting CVs are considered as various strategies of indirect approach.

Drawing lessons from the great War of Liberation, UWF as a tool of indirect approach has demonstrated significant effectiveness in BDAF warfare strategy. If trained properly and methodically, this force can augment the efforts of BDAF in many ways. Unmanned systems have proved to be one of the important elements in present day context. Hence, it must be considered as one of the effective tools to support the forces following both direct and indirect approaches because, irrespective of the methods or approach being followed, the role and employment of unmanned systems would be similar. The rise of cyberspace has transformed the characteristics of warfare, one that is unlike any other domain of conflict. It is essential to realize that it presents host of newer opportunities in the form of deterrence.

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# **TECHNOLOGICAL PREPAREDNESS FOR SECURED AND SUSTAINABLE COMMUNICATION FOR BANGLADESH ARMY: TRANSFER OF TECHNOLOGY VIS A VIS INDIGENOUS COMMUNICATION INDUSTRY**

**Lieutenant Colonel Mohammad Manzur Hossain**  
**afwc, psc, Signals**

## **Introduction**

The most crucial components of national security of a nation are its sovereignty, territorial integrity, and interests. For which an Armed Forces is created as a symbol of sovereignty and building a nation's capacity to produce war supplies is no longer a luxury in the 21st century. Including the developed countries like United States of America (USA), Russia, China, United Kingdom (UK), and France, the developing nations like Turkey, Iran, India, Pakistan, Thailand, and Malaysia started off with relatively limited infrastructure and got success (Ahmed, 2013). Given this context, it is problematic for Bangladesh Armed Forces (BDAF) to continue to rely on foreign sources for military hardware and technology. Though it is articulated in the defence policy about the modernization and due emphasis should be given on research and development to acquire indigenous capability (Defence Policy, 2018) yet BDAF have not been developed to meet future demands by developing its own military capabilities.

Future wars and conflicts are likely to be more complicated and intense, and communication will continue to have a significant influence on both the conduct of battle and the decisive outcome of the war and communication has always been most important for the decision maker and commanders (Tamjid, 2023). So, in both peace and warfare, communication hardware is crucial for any armed forces as military communication has always been a security-sensitive issue in terms of electronic protection and electronic attack. Through an open tendering process, the BDAF acquire their

communication equipment from foreign countries. Such a technique increases reliance on foreign hardware and maintenance assistance. Moreover, a considerable amount of foreign exchange is drained annually for such purposes. Side by side, dependency on vendor as well as foreign supplier in terms of supply of spares, major repair, and maintenance raise question regarding its sustainability. It substantially impairs our operational capacity during times of crisis (Moin, 2018). So, capacity building regarding communication equipment has functional effects on the security and self-sustainment of the BDAF. To advance and achieve self-sufficiency, BD must either introduce an Indigenous Communication Industry (ICI) or make an endeavor for Transfer of Technology (TOT) from reputed industrialized nations to produce her communication devices with own patent (Iqbal Ahmed, 2023). However, both processes have numerous pros and cons. As a 3rd world country, introducing the ICI along with technology may pose difficulties in terms of finance, market, infrastructure, time management, and technological cognizance. On the other hand, TOT may also be ineffective due to geographical constraints, organizational structure, finance, and lack of self-reliance. Number of studies identified that countries like Japan, South Korea, Malaysia, and USA had positive impacts of TOT. Whereas country like Vietnam, Singapore etc. shown their tremendous expertise on indigenous production. So, its cannot be said that only TOT or indigenous production will make our communication sector self-sustained. Figure-1 shows the schematic to find out the suitable approach for producing communication hardware.

Bangladesh Army (BA) has been attempting to envision domestic manufacture of military communication hardware for the past few years. Proposals from numbers of renowned vendors and manufacturers from different countries have been received and our top leadership has also given due attention. But still, progress has not gone to a certain level from where it can be started. One of the main reasons might be the selection of the most suitable course of action among TOT and ICI. So, to analyse the justification and rationale for proposing the notion of building a military communication industry, as well as to determine its scope and

assess its possibilities, a detailed perspective analysis is felt necessary. The author's prime objective in this instance will be to further contrast and compare TOT and ICI, find all relevant advantages and disadvantages, and choose the optimal course of action for the BA's secure and sustainable communication system. Thus, research is primarily focused on identifying the best method from TOT and ICI to produce Wireless Radio Set and its accessories only.

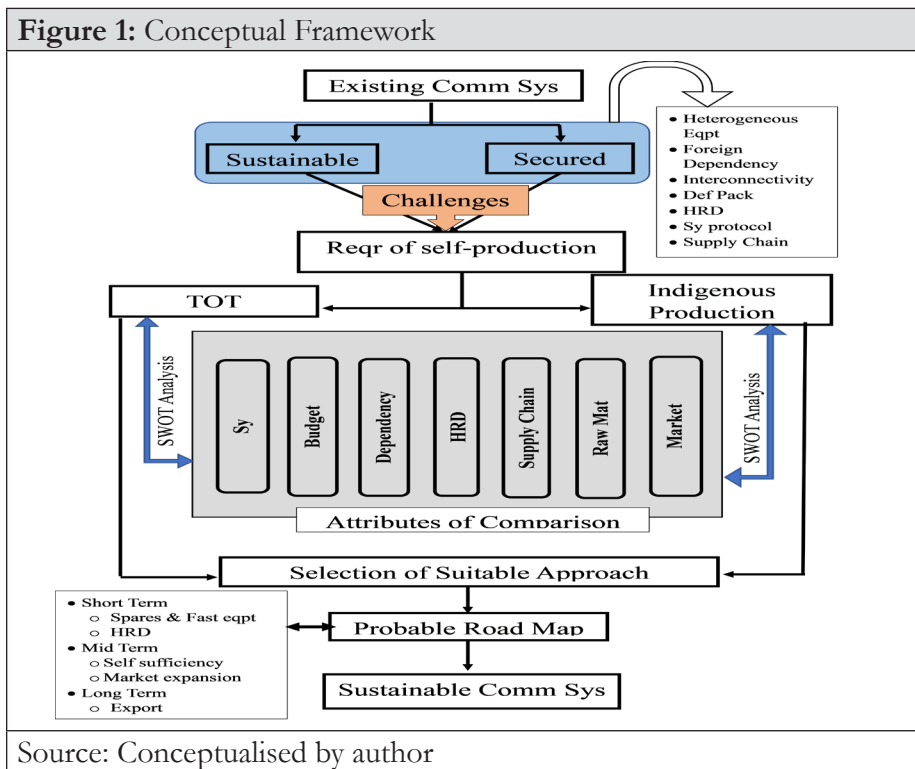
## **Review of the Literature**

Military communication is a topic that receives a lot of attention, especially when it has proven to be effective in boosting the economy and ensuring self-sufficiency. Many attempts have also been made using pens and paper to evaluate TOT and ICI in tandem to manufacture communication devices. While reviewing the literature for the research, a comprehensive study on wide range of references available at National Defence College (NDC) Library (including e-Library), Defence Services Command and Staff College (DSCSC) Library, research works previously conducted by the course members of National Defence Course & Armed Forces War Course, and views of the senior leadership of BD AF were consulted. But very few studies exclusively focused on the communication hardware business that did exist were wise enough to emphasize the ideas being explored by other researchers in related domains. In one of the significant research projects, (Moin, 2018) came to the conclusion that Bangladesh may have an industry controlled by the military considering raw material, production methods, and infrastructures. Other maximum research mainly focused to the defence industry where communication devices were not that much highlighted.

## **Methodology**

Through a cross-sectional study, the research drew a causal relationship between two independent variables (Transfer of Technology and Indigenous Communication Industry) with the dependent variable (Sustainable Communication System of BA). The research gathered both qualitative and

quantitative data and followed a mixed-method approach for collecting data and analysed the data through SPSS version 24 and Quantitative Strategic Planning Matrix (QSPM). Besides for qualitative data analysis NVIVO software had been used. The sample size for the research was 200. Besides, Focused Group Discussions as well as key informant interviews were also conducted. The conceptual framework of the research is shown as figure 1.



## Result

Considering all factors, suggestions, and analysis, the result of the research has been stated as a broad strategy. The strategy focuses on acquiring technological capabilities in manufacturing military communication devices in phases to attain a degree of operational security and self-reliance. In doing so, BA may follow a balanced approach that combines the advantages of both TOT and ICI. One will expedite access to advanced technologies,

while the other will ensure sustainable solutions. As such, an apex body needs to be formed under Armed Forces Division (AFD) to coordinate both. Several policies like TOT Policy, Industrial policy, Import/Export Policy need to be modified. R&D framework of the country will also be addressed to have adequate technological advancement. It was also found that being a third world nation having less economic strength, BA may not buy new wireless sets for next 8/10 years and start the production for become self-sustained. And after that they can generate revenue by exporting after fulfilling the demand of other organizations.

### **Challenges of Existing Radio Provisioning Landscape**

Modern digital radios, which offer many great capabilities like selective calling, text and data transmission, frequency hopping, encryption system, etc., have gradually replaced BA's analog radios. HF radio, being a non-LOS communication system used for tactical and operational communication cannot be contained within any geographical boundary. Thereby, it increases the probability of interception. VHF radio set is used at tactical level with relatively shorter range. But it suffers from range limitations, attenuation, and is affected easily by electromagnetic interference. However, UHF radios have been found to be dependable and effective with relatively short ranges in urban, rural, forests and hilly regions of Bangladesh. Compared with the present EW threat maximum of the wireless communication equipment is not found operationally secured. There are a number of reasons behind it. Among those Absence of Encryption system and other Security features, Heterogenous Wireless Eqpt, Absence of Own Security Protocol, and Lack of tech skilled operators are most prominent. On the other hand, sustainability in terms of wireless set, its' spares and maintenance are fully foreign dependent. Thereby, it remains a great operational threat for the country during any conflict. Other reasons for lack of self-sustenance includes, dependency on foreign vendors, absence of own industry and own technology, absence of skilled repair & maintenance personnel etc. Achieving self-sufficiency and security through the country's own manufacturing industry of essential military communication equipment comes with many difficulties.

Some of the impediments/challenges are Incoherent Policies at Different Level, Poor technological R&D system, Dilemma to choose appropriate production method, Lack of skilled manpower, Supply- Demand Dilemma, and Absence of Apex Body.

### **Options for Having Secured and Self-Sustainable Communication Hardware**

Self-production approach for communication devices will carve the unauthorized manufacturing and use of wireless radio equipment as it can have governmental control over production. There are a number of options were found to have a secure and sustainable wireless communication which are listed in table 1.

<b>Table 1: Options for Secured and Self-Reliance on Communication Hardware</b>	
<b>Ser</b>	<b>Approaches</b>
1.	Adopting Transfer of Technology
2.	Through Indigenous Comm Industry
3.	Adopting Reverse Engineering process
4.	Joint venture with Foreign or National industries
5.	Present system can continue with own defined security coding
6.	Procurement of highly sophisticated gadgets and manufacturing of less sophisticated communication equipment
7.	Through Foreign Direct Investment (FDI)
Source: Through interview and Focus Group Discussion (FGD)	

### **Rational of Transfer of Technology and Indigenous Communication Industry for Producing Military Communication Hardware**

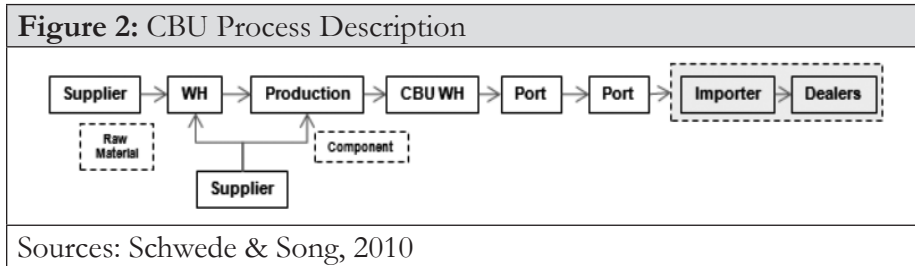
#### **Transfer of Technology**

TOT is the process of transferring technology from the provider to the recipient, encompassing knowledge and expertise (Khurana, December 1, 2014). It can also be defined as the act of moving (disseminating) technology from the person or organization that owns or holds it to another person or organization in an effort to turn inventions and scientific discoveries

into new goods and services that benefit society. It is closely related to knowledge transmission and might be viewed as a subset of that concept. There are different strategies involved with TOT based on the requirement and capabilities. Among many (Schwede & Song, 2010) described following different import strategies between and mother company in the industrialized country and a dealer within a developing market of a foreign country.

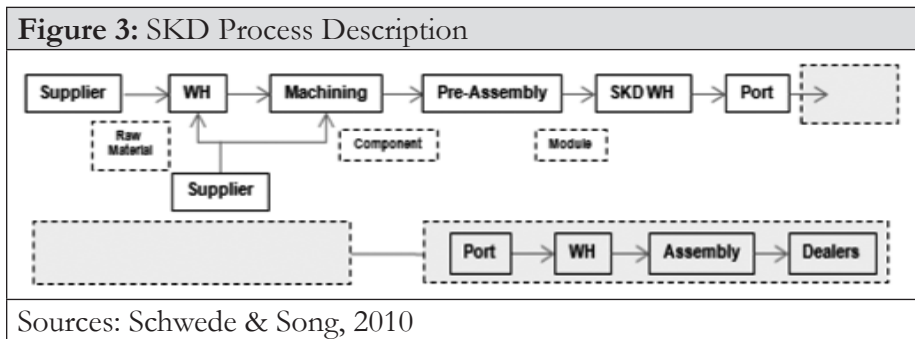
### Completely Build Up (CBU)

It refers to importing finished products. The products are fully produced and assembled in the country of origin and exported as a whole piece to the destination market. The import cost of such products increases due to the higher tax imposed by the Government.



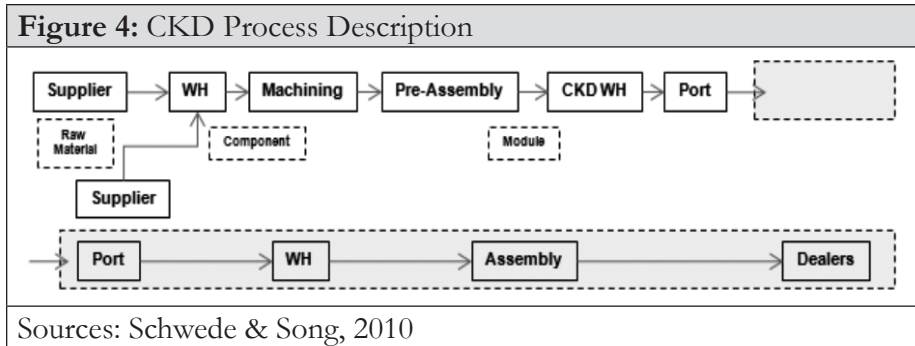
### Semi Knocked Down (SKD)

SKD, sometimes also known as Turn Screw Assembly, certain module of the complete products is imported like power supply module, microprocessor, hard disks and so on.



### Completely Knocked Down (CKD)

CKD products are imported as parts and are assembled at their destination. Here, local assembly activities are much more substantial than with SKD. This kind of import strategy helps local employment also.



### Advantages and Disadvantages of TOT

TOT can be a powerful tool for developing countries, as it can help them to acquire the knowledge and skills, they need to improve their economies and societies. But it has both pros and cons while to be followed by any nation listed in table 2.

Table 2: Advantages and Disadvantages of TOT		
Ser	Advantages	Disadvantages
1.	Improved defense capabilities	Security Issues
2.	Increased Management and Technological Skill	Dependence on Transferor Countries
3.	Enhanced Operational Readiness	High Budget
4.	Strengthened Research and Development	Disruption of Local Industries
5.	Increased Interoperability	Intellectual Property Issues
6.	Good Base for Further Development	
7.	Economic development	

Sources: Conceptualised by Author

## **Indigenous Communication Industry (ICI)**

An Indigenous Communication Industry can be defined as a platform for manufacturing communication devices using domestically sourced materials and technologies. This can be done by a country's own defense industry, or by collaborating with other nation owned companies those have the necessary expertise. It is also known as local or domestic industry, refers to the establishment and development of businesses within a country's border. Such industries tend to focus on producing goods and services for local consumption or for sale within the country's own market. Indigenous communication refers to the use of local languages, cultures, and media by marginalized communities to express their needs, aspirations, and rights. Though there is no specific classification of Indigenous Industries, but basing on mode and characteristics the classification of indigenous methods for manufacturing military communication devices can be divided into following categories:

- **In-house Development**

This involves developing the devices entirely within the country's own defense industry. This can be a complex and challenging process, but it can also give the country more control over the design and production of the devices. This can involve the development of new technologies, as well as the adaptation of existing technologies to meet the needs. It can help to ensure that communication equipment is culturally appropriate. It also can help to build capacity to manufacture and maintain their own communication equipment by reducing the cost of communication equipment. On the contrary, it can be time-consuming and resource intensive, difficult to find individuals with the skills and knowledge necessary to undertake the work. It will be also challenging to get recognized and accepted by mainstream institutions.

- **Joint Venture**

A joint venture in the communication sector may be with international manufacturing companies or with domestic manufacturers. This can be a

more efficient way to develop indigenous devices, but it can also reduce the country's control over the design and production process. Since it could result in security breaches and increase dependence on outside parties, many people oppose integrating local producers for this business.

- **Reverse Engineering (RE)**

It is the process of designing, manufacturing, and assembling products and systems. RE is the reproduction of already-existing goods. In general, RE is the replication of a product via examination of its components and design. RE technology is frequently used by the military as a production tool for defense. The RE approach is being used by several nations, including the USA, Russia, Germany, Turkey, Brazil, Pakistan, India, and Israel, to build their military applications and hardware (Fernandes, 2008).

### **Advantages and Disadvantages of ICI**

ICI is considered as the best method for any country to develop its communication sector, as it is an independent, secure, and nation building approach. It can play a significant role in economic development and growth for developing countries, leading to sustainable development, national security, and social benefits. But it has both pros and cons which are listed in table 3.

<b>Table 3: Advantages and Disadvantages of ICI</b>		
<b>Ser</b>	<b>Advantages</b>	<b>Disadvantages</b>
1.	Security	Challenges to Keep Pace with Fast Evolved Technology
2.	Economic development	Absence of Apex Body
3.	Resilience	Scarcity of Skilled Workers
4.	Enhance Human Resource Development (HRD)	Quality Control
5.	Own patent and module level repair	Initial High Cost
6.	Cost effective	Legal Challenges

<b>Table 3: Advantages and Disadvantages of ICI</b>		
<b>Ser</b>	<b>Advantages</b>	<b>Disadvantages</b>
7.	Enhance interoperability and Line for Multiple Product	Traditional Mindset
		Non-Availability of Raw Material
		Commercialization of Military Product
Sources: Conceptualised by Author		

### **Finding Most Suitable Approach for Communication Industry**

While a question was asked to the experts and key informant personnels, a mixed answers were found. Though in the survey question the result was positive towards TOT, but result seems different after analysing their answer pattern in terms of communication principle. At this backdrop, the researcher has taken the endeavor to find the most suitable approach for communication hardware production following three analysing methods which are described below:

#### **Analysis Based on Survey**

During the survey, a direct question was asked to the respondents to choose the most suitable option for secured and sustainable communication system for BA among TOT and ICI. While using Kolmogorov-Smirnova and Shapiro-Wilk method significance level comes as zero. Thus, the variables proved valid. Comparing with classification table value of block-0 the model Presently predicted 77.4% of the output in this dataset when both independent variables are involved and previously 70.2% of the output when no variables are included, indicating the model suited for the output prediction. Then after further analysis with 95% confidence interval EXP(B) comes 1.457 and 0.726 for TOT and ICI respectively. Thereby it can be said that TOT predicted output more accurately than ICI.

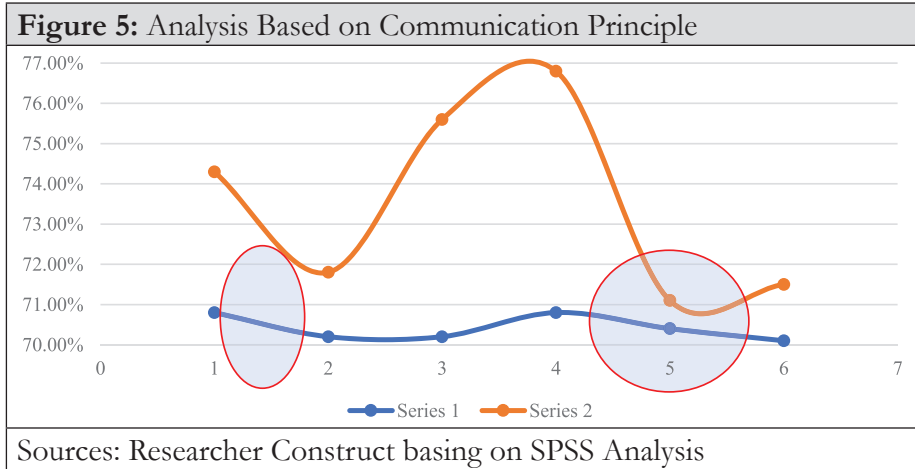
**Table 4:** Analysis Using SPSS for Variables Validation

Table 4: Analysis Using SPSS for Variables Validation								
			TOT			ICI		
Tests of Normality			Statistic	df	Sig.	Statistic	df	Sig.
Kolmogorov-Smirnova			0.147	174	0	0.136	168	0
Shapiro-Wilk			0.947	174	0	0.947	168	0
Variables in the Equation	B	S.E.	Wald	df	Sig. Lower	Exp (B)	95% C.I. for EXP(B)	
						Upper		
ToT Sum	0.377	0.07	27.14	1	0	1.457	1.265	1.679
ICI Sum	-0.27	0.07	14.62	1	0	0.761	0.662	0.876
Constant	-1.543	1.339	1.328	1	0.249	0.214		
Sources: Based on SPSS Analysis								

### Analysis Based on Communication Principle

Signal communication is normally provided based on the principle of communication. Therefore, those principles must also be qualified for the method to manufacture communication devices. Analysing the classification table for block-0 the model Presently predicted more or less 70% of the output when principle of communication was not included. But in the dataset when all the principles of communication were used as independent variables are involved then the predicted different values for different principles. But all the values indicating the model suited for the output prediction. After comparing and in-depth analysis, it was found

that for the Security, Reliability, and Integration the sensitivity was more than other three principles. Thereby it can be said that, based on Security, Reliability, and Integration SPSS is not indicating the model suited for the output prediction. The comparison is shown on figure 5.



### Cost-Benefit Analysis

Cost-effectiveness is one of the most important criteria to select any project, especially for a developing country. Similarly, it also affects TOT and ICI and plays a most significant role in the selection of the most suitable approach for BA. While doing the cost-benefit analysis some factors like cost of the technology, cost of infrastructure, cost of maintenance and repair, duration of contract, R&D, HRD, Cost and availability of raw material etcetera were considered. For this proposal of three vendors were analysed considering raw material, plant machinery, and installation cost, and Technology transfer cost (Signal Brigade, 2023) which is appended in table 6.

<b>Table 6: Comparison of Technical Proposals</b>							
Company	Space Reqr (Sq ft)	Time (month)	R&D	Initial Invest (Cr)	Private	Remote Support	Export Poss
Company-1	6000	15	Yes	46.88	Yes	Yes	Yes
Company-2	8373	16	No	45.55	No	No	No
Company-3	9700	18	Yes	42.72	Yes	No	No
Sources: Evaluation from Proposal given to Signal Directorate							

Producing communication devices through nation owned indigenous communication industry will be always the best option for any country. But considering the socio-economic environment, technological infrastructures, and commercialization, it will not be possible for BA to establish such an independent industry within a short time. A proposal was analyzed which was made for producing VHF radio set and total expenditure include Assembly plant machinery and installation cost, own patent of blueprint, Radio kit and other spares cost, Recurring cost (Signal Directorate, 2023). They considered at least 500 VHF radio sets, and 1000 Head-to-Head (H2H) communication sets will be produced at a first go.

<b>Table 7: Comparison of Financial Proposals following ICI</b>					
Company	High Frequency Set (Lacs)	Digital Mobile Radio (Thousands)	Man Pack (Lacs)	Vehicle Version (Lacs)	Base Station (Lacs)
Market Buying Price	65	55-60	11.5	25.3	25.3
Indigenous Radio Set	40	35-40	7.8	17	18
Sources: Evaluation from Proposal given to Signal Directorate					

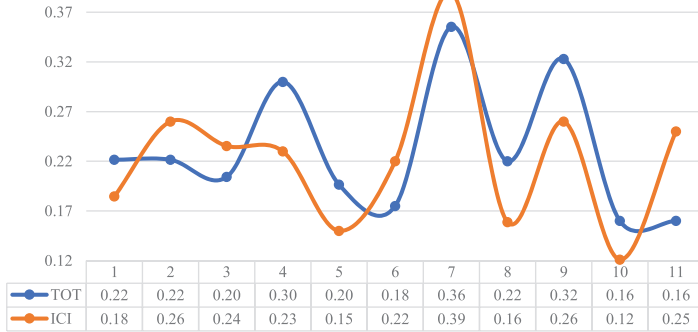
The comparative study is shown in table 8.

<b>Table 8: Overall comparison TOT vs ICI</b>		
Subj	TOT	ICI
Production Line	Only for VHF & H2H	Open for VHF, H2H, HF, Walkie Talkie, Battery, Network Equipment
Initial Investment	60 Cr	120 Cr (Further 110 Cr)
Future Expansion	Need additional investment and third party involvement	Same production line can be used
Dependency	Dependency on specific principal	Independent of principal
Modular level repair & Maintenance	Yes	Yes
Software	Customized software	Customized software and encryption
Devices patent	No	Own circuit design & PCB fabrication
Adaptation to New Technology	Easy	Easy
Total Time Frame	1.5 years	4 years
Reliability	More reliable	Less reliable
Sources: Conceptualised by Author		

## **SWOT Analysis on TOT and ICI**

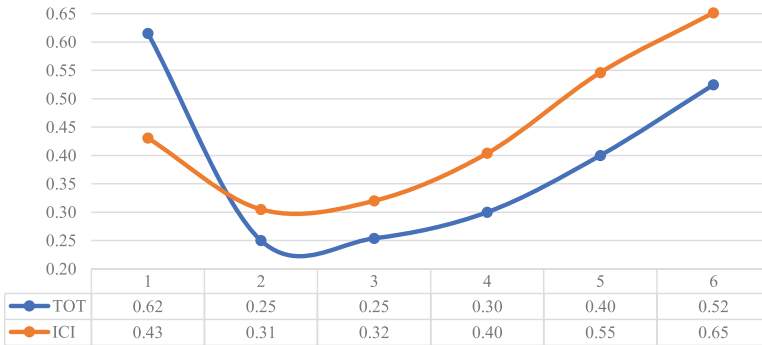
Through a SWOT analysis to take better decisions by understanding its internal and external environment. Each of the factors and weightage were selected based on the opinion of experts and senior leadership of BDAF. While of different factors using Quantitative Strategic Planning Matrix was used. After analysis it was found that different factors affect differently to both TOT and ICI. The details of the analysis are shown on the figure 6.

**Figure 6: SWOT analysis for the factor strength**



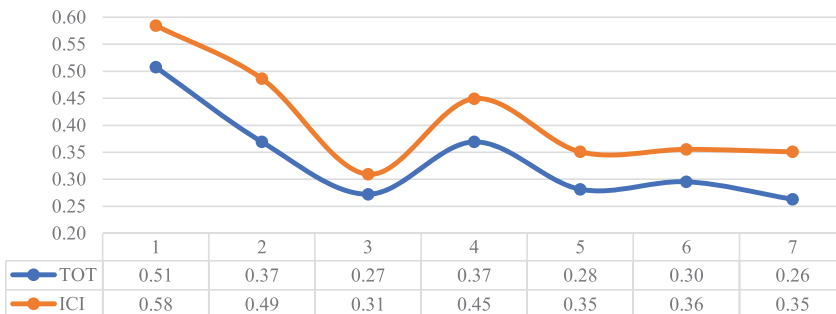
Source: Researcher Construct basing on Quantitative Strategic Planning Matrix

**Figure 7: SWOT analysis for the factor weakness**

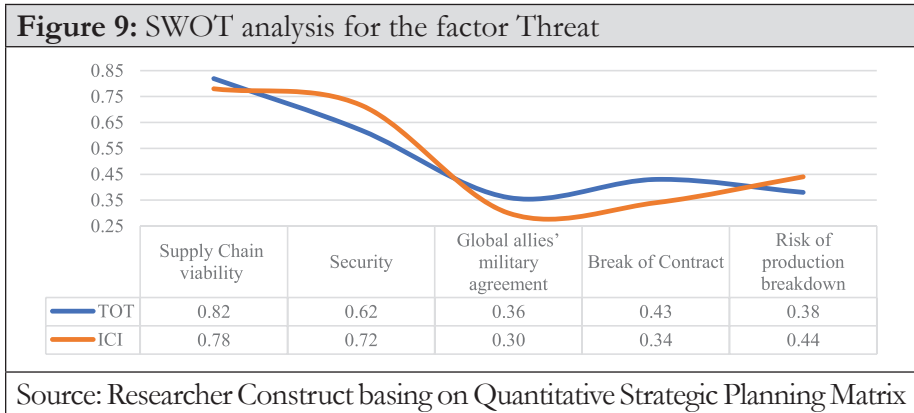


Source: Researcher Construct basing on Quantitative Strategic Planning Matrix

**Figure 8: SWOT analysis for the factor opportunity**



Source: Researcher Construct basing on Quantitative Strategic Planning Matrix



## Means of Formulating the Broad and Financial Strategies

### Strategic Directives and Policies

To create the road map for the manufacturing of communication devices inside BD, a strategic direction is required. The choice of how much BA should purchase and how much should be produced locally must be made before the sector can be developed. The Signals Directorate should do a thorough analysis focused on the potential of the communication industry for Bangladesh and contact the national strategic leadership. It is possible to create new capabilities if the government is willing to support this industry. Side by side to allow for private, foreign investment and export in the defense industrial sector, the current Industrial Policy, Import Policy, and Export Policy must be changed.

### Setting up Apex Body

To organize the many tasks related to the entire defense industry including communication industry, an apex body is required. Under AFD, an institution or body for coordinating and managing the defense industry may be developed. The coordination and management of all defense production, technology acquisition, standardization, and R&D operations will be handled by this organization. The apex body at the AFD should be comprised of members from all three services and members from related ministries.

## **R&D Framework**

By involving diverse national institutions in R&D focused on defense, national R&D capability may be utilized. All national technological universities by adopting RE technology. Reputed scholars and scientists may be accredited with defence R&D structure for innovation of new technology.

## **Defence Offset**

Simply put, an international player's commitment to support the domestic industry of the buyer country is what is meant by an offset. Since defense contracts are expensive, many governments want a portion of that money to support domestic business or advance technologies at home. BD does not currently have a defense offset strategy for the manufacture of defence. BD may choose to introduce defence offset for any upcoming purchases.

## **Conclusion**

Existing communication system of BA combines digital and analog services, relying heavily on imported gadgets from foreign countries. This approach raises concerns about operational security and sustainability during any conflicts. The HF/VHF/UHF wireless radio set used by BA is lack of security features which make the communication system more vulnerable to Electronic Warfare. Security Features in the purchased radio set might be useless due to the absence of own defined algorithm. Moreover, dependency on foreign suppliers in terms of supply of spares, major repair, and maintenance raise question regarding its sustainability. Therefore, it can be said that the military industry for communication hardware will be able to fulfill the requirement of BA in terms of security and self-sustenance. Achieving self-sufficiency and security through the country's own communication hardware industry comes with the difficulties like Incoherent Policies, Poor technological R&D system, Lack of Coordination, Dilemma to choose appropriate production method, Low Demand Cycle, Absence of Apex Body, and Lack of adequate budget. However, there are numerous options to consider, including joint ventures

with foreigners, public-private partnerships, and reverse engineering processes. To address these issues, BA has considered TOT and ICI as the most suitable options. However, progress has not been made in recent years, and the researcher aims to analyze the justification and rationale for building a military communication industry based on TOT and ICI.

An optimal plan of action for the secure and sustainable communication system of BA has been determined through different analysis. It uses the TOT and ICI ideas to estimate the industry's scope and potential. By using SPSS, the author at first analyses both the method based on survey and communication principles. Where it was found that TOT outperformed ICI in all aspects. But considering reliability, security, and integration, the gap between both methods was lesser compared to others. The author also conducted a cost-benefit analysis using secondary data from 86 Independent Signal Brigade and Army Headquarters (AHQ), Signals Directorate, and a SWOT analysis using survey, interviews, and literature. Both the analysis basically not directing towards any single method. Rather a mixed method was portrayed. After all these analyses the author summarizes several ways to enhance and develop military communication production, and a broad strategy is formulated to establish an industry for secure and sustainable communication systems. At last, a probable implementation plan and timeline for implementing the broad strategy was presented.

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## Author



Lieutenant Colonel Mohammad Manzur Hossain, afwc, psc, Signals was born on 31<sup>st</sup> December 1980 at Noakhali. He was commissioned from Bangladesh Military Academy with 44 BMA Long Course in the Corps of Signals on 17 June 2001. He commanded the specialized radio battalion of Bangladesh Army. He also served in a Division Signal Battalions and held all the regimental appointments within his capacity. He has served as an instructor class B at Bangladesh Military Academy and as an Instructor Class A at Signal Training Center and School. He is a Graduate of Defence Service Command and Staff College, Mirpur and also a Graduate Engineer from Military Institute of Science and Technology in Electrical, Electronics, and Communication Engineering discipline. He also completed Armed Forces War Course (AFWC) in National Defence College. He served twice under Blue Helmet as Contingent Commander of two Bangladesh Signal Company in Liberia and Mali. He is married and blessed with two sons. Presently he is serving as General Staff Officer-1 in Army Headquarters, Signals Directorate.

# **INTEGRATION OF DOMESTIC EXPERTISE FOR CAPACITY DEVELOPMENT: A ROADMAP FOR RESILIENT NAVY**

**Commander Anwar Hossain Manzoor, (E), afwc, psc, BN**

## **Introduction**

The Bangladesh Navy (BN), as the premier maritime force, is envisaged to shoulder the solely responsibility of safeguarding the sovereignty and security of Bangladesh (BD) at sea in times of peace and war. BN Fleet has been upgraded through inclusion of numerous medium and large platforms in last the decades. The future BN is envisioned as a resilient, all-weather, high-endurance, self-sustaining force, capable of delivering a powerful impact across extended ranges (DNP, Integration of domestic expertise, 2023). This transformation underscores the need for a holistic approach to national progress, where socio-economic development becomes a central pillar. To achieve this, national institutions and stakeholders must actively engage and collaborate, ensuring meaningful contributions to the comprehensive development of Bangladesh (Amanat, 2023). Such collective efforts will not only strengthen the Navy but also propel the nation toward sustainable growth and self-reliance. Hence BD ought to initiate her unaccompanied journey to reorganize and build her capability with native proficiency and resources. With the growth of the country's economy, BD positively will evade foreign backing by indigenous technological development steadily. The concept of resilient BN generally depicts the mental, physical, emotional, and behavioral ability to deal with possible adversity as well as adapt to change to recover, learn and rise from the setback. Hence, BN may opt for an innovative approach towards self-reliance with the collaboration of the domestic expertise of the country's technical universities and capable industries progressively over the course of time. The collaborative efforts between universities, industry, and the

navy are seen as mutually beneficial, contributing to industrial, educational, and technological advancement on a national scale.

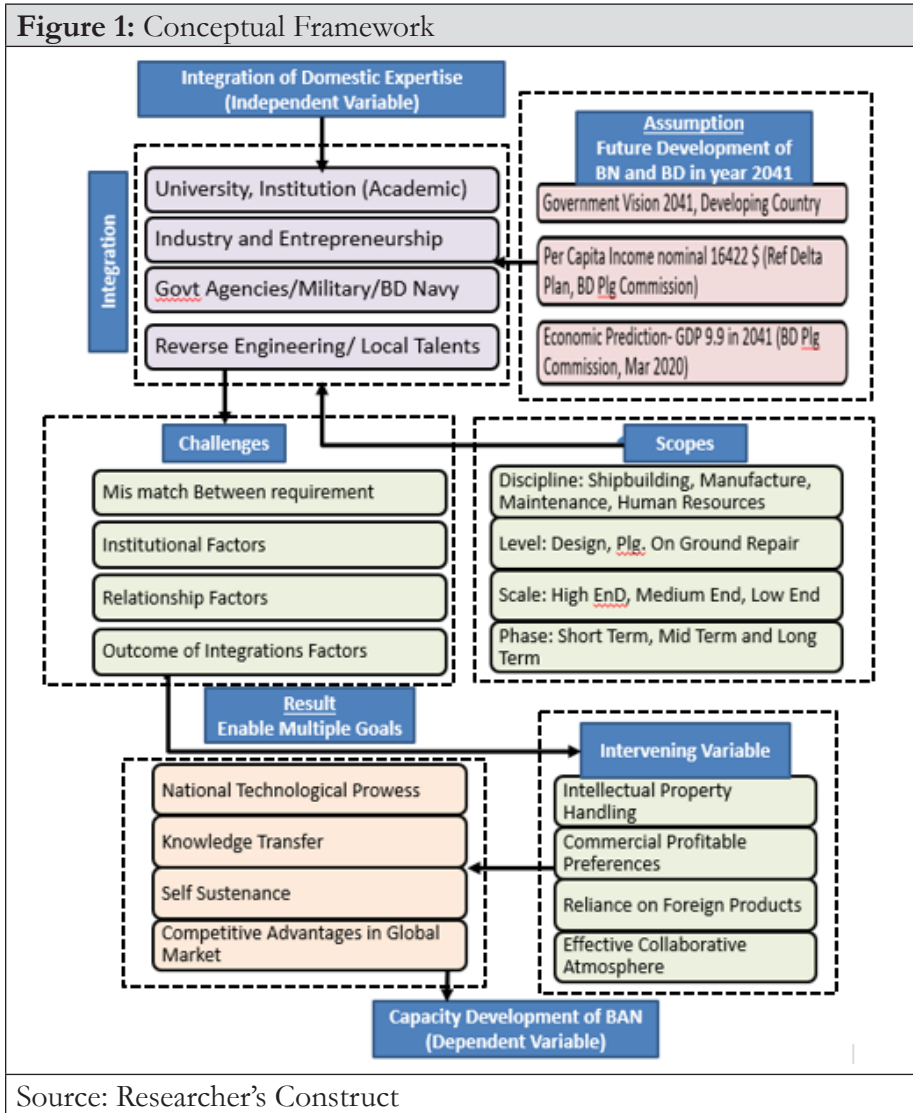
Notably, BN has already made significant development in the field of shipbuilding incorporating modern weapon and sensor systems. Moreover, the educated and energetic workforce of BD with their merit and initiatives can be patronized to leapfrog BD's aspiration to be a thriving industrial nation. It is worth mentioning that, the engineering universities of BD (BUET, CUET, KUET, MIST) are continuously cherishing expertise as researcher (teacher and student); who remain engaged with various scientific analyses and innovations throughout their academic sessions. However, despite their theoretical relevance to modern military applications, these academic studies have not made a substantial impact on the development of the Bangladesh Military, especially in the realm of naval advancements. Simultaneously, BD has achieved self-sufficiency in producing high-end innovative products with cutting-edge technology in different sectors like steel rerolling, shipbuilding, and manufacturing of many products. The contributing industries can be named as BSRM, BMTF, BITAC, Shipyards, Walton, Vision and RFL, etc. In addition, there are several domestic talents working with indigenous approaches ensuing reverse engineering as well as contributing to the light engineering sectors of the country (Karim, 2023). Unlike in many developing nations, the synergy among universities, industry, indigenous talents, and the Navy equally benefits all dimensions. This collaboration concurrently enhances industrial productivity, boosts educational efficiency, advances the Navy towards self-reliance and elevates nationwide technological prowess. However, it's worth noting that currently, there lacks a clear and efficient collaboration among the three dimensions (Military, Industry, University, and indigenous talents). Hence, it is believed that the synergy between knowledge within BD's universities and industries, along with the BN, can play a pivotal role in designing modern platforms, manufacturing equipment and sensors, as well as developing the BN into a more resilient naval force over time.

This research investigates challenges associated with external technology and proposes measures to integrate domestic expertise, providing insights for policymakers to enhance the development of the BN. The research advocates for a resilient BN, proposing a shift towards self-reliance through effective collaborations with technical universities, industries and local talents.

## **Methodology**

The study focuses on the integration of domestic expertise for the capacity development of the Navy. Domestic expertise includes national technical universities, potential industries of Bangladesh owned by private or government or military, and local talents. It has been assumed that, the success of the collaborative effort will be relied on the projected GDP growth and increased per capita income by 2041 as mentioned in the Perspective Plan 2041 (Bangladesh Planning Commission, March 2020). The research employs a mixed-methods approach, combining both quantitative and qualitative methods for data collection and analysis. The statistical analysis has been conducted, encompassing correlation, regression, and Chi-square tests, to validate hypotheses and evaluate interdependence among variables. Key Informant Interviews (KII) are conducted with distinguished individuals from industry, university, and the BN, ensuring insights from experienced experts in their respective fields. Focused Group Discussions (FGD) involve experts with over fifteen years of dedicated service, offering in-depth insights specific to their domains. A comprehensive field survey is conducted using secondary data, covering prominent institutions and industries such as Walton, Pran RFL Group, BUET, CUET, MIST, Dholaikhal, Zinzira, Boghura Motors, and various individual talented initiators in local field. Additionally, a case study examines the military, industrial, and educational sectors in the USA, India, China, Israel, and Pakistan. The research centers on BN officers who possess expertise in operational and maintenance aspects, and also harbor an interest in advancing current technology.

## Conceptual Framework



## Resilient Navy and Concept of Integration of Domestic Expertise

**Assumption on Future Technological Development.** Bangladesh aspires to become a developed country by leveraging technology,

innovation, and digital opportunities to accelerate growth. The country’s goals should encompass the following key assumption:

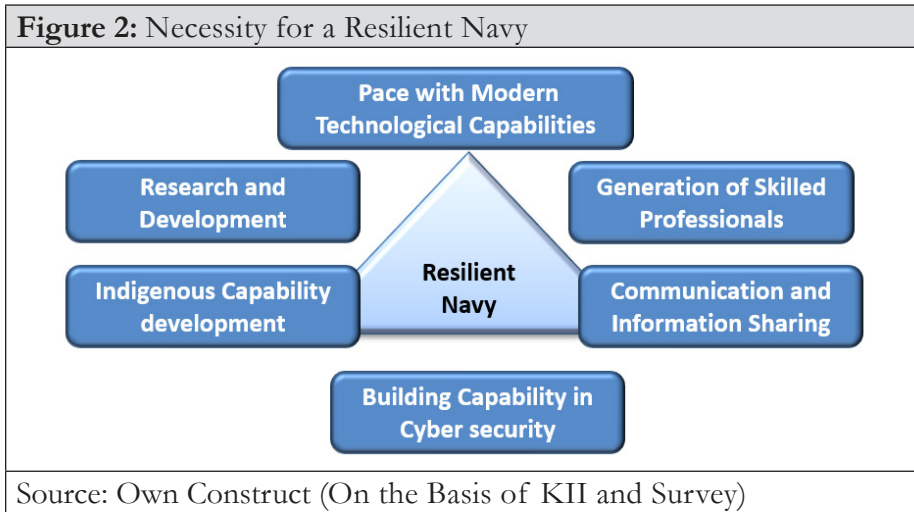
- **Assumption 1.** BD will be a developed country by 2041-2050, with per capita income of over USD 10,000-12,500 (dollar as valued in 2023).
- **Assumption 2.** The transformation involves inclusive growth, aiming to eradicate poverty, enhance productive capacity, establish an innovative knowledge economy, and ensure environmental protection. Specific growth and poverty reduction targets are detailed in the accompanying table:

<b>Table 1: Growth and Poverty Targets</b>			
<b>Indicator</b>	<b>Benchmark FY 20</b>	<b>Target FY 31</b>	<b>Target FY 41</b>
Real GDP Growth (%)	8.2	9.0	9.9
<b>Poverty indicators</b>			
Extreme Poverty (%)	9.4	2.3	<1.0
Poverty (%)	18.8	7.0	<3.0

Source: Bangladesh Planning Commission, March 2020

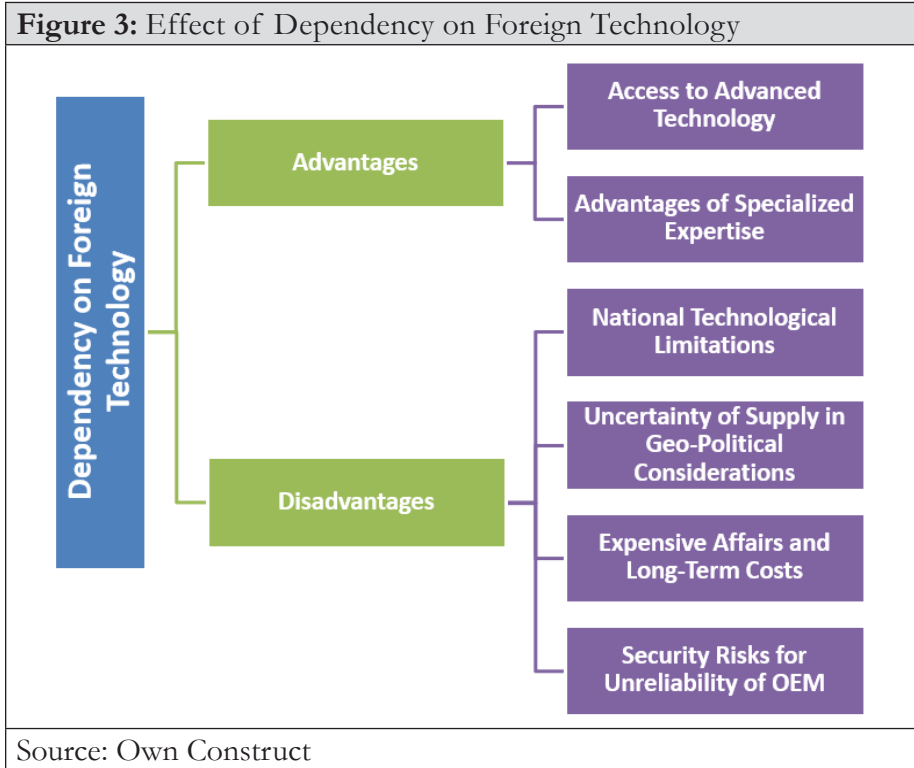
**Concept of Capable and Resilient Navy and Its Importance.** A capable navy refers to a naval force comprised with indispensable assets, capabilities, and required degree of operational readiness to carry out naval missions effectively. It encompasses other numerous capabilities like the use of technology, training status, military doctrine, logistics structure, and proficient officers and staff. In contrast, a resilient navy can be defined as a naval force that demonstrates the ability to adapt, recover, and sustain its operational effectiveness in the face of various challenges like disruptions, and adversities. Therefore, with the collective ability of numerous assets, a capable navy is reactive to resist and respond against potential threats at sea. The United States Navy (USN), Indian Navy (IN), China PLA Navy are widely regarded as capable navy due to their significant resources, advanced technology, and extensive operational experience. The USN

operates a diverse fleet of ships, submarines, and aircraft carriers, which are equipped with state-of-the-art weapons and systems (USN Navy, 2023). In the contemporary technological context, a resilient Navy is imperative for Bangladesh, requiring advanced capabilities in surveillance, radar networks, and maritime awareness technologies. Bangladesh Navy must prioritize robust cybersecurity measures to safeguard critical infrastructure, coupled with reliable communication systems and secure data transmission protocols. Staying abreast of technological advancements is vital, necessitating the integration of unmanned systems, autonomous vessels, and advanced weaponry will definitely will enhance the capability of Bangladesh Navy.



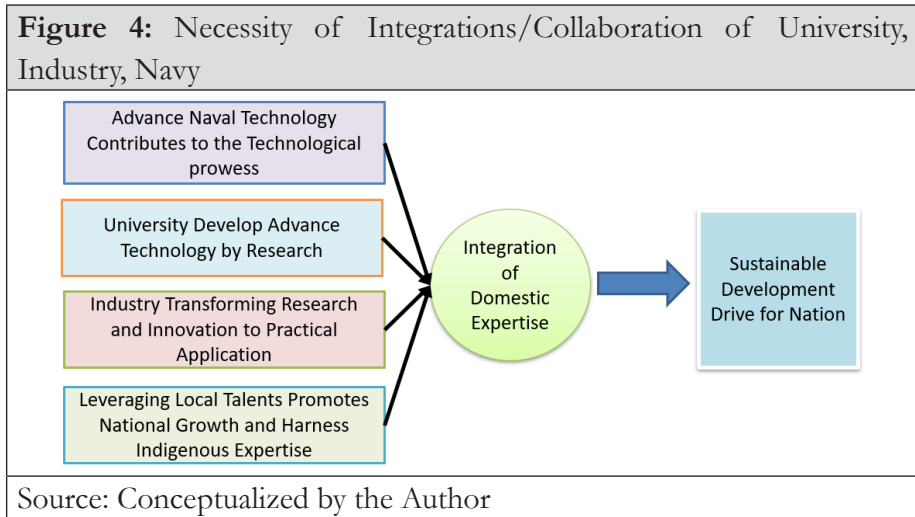
### Effect of Dependency on Foreign Technology

Relying on foreign nations for Bangladesh Navy’s arsenal brings advantages like enhanced proficiency and access to advanced technology but poses challenges in terms of self-capability, innovation, and geopolitical uncertainties, leading to potential disruptions and long-term costs. Relative advantages and disadvantages are shown in the Figure 4.



**Integrations/Collaboration of University, Industry, Navy Towards Sustainable Development Drive for Bangladesh.** Collaboration among universities, industries, and the navy facilitates knowledge exchange, aligning academic research with industry needs. This partnership accelerates innovation and technology transfer, fostering the development of new products and systems. It also enhances workforce development by aligning academic programs with industry requirements, improving employability. Ultimately, such collaboration drives economic growth and industry competitiveness by leveraging research expertise and the talents for enhanced productivity and innovation (Wark & Webbe, 2015), (Ulrichsen, 2019), (Gupta, J. Sergi, D. Tran, Nek, & V. Howieson, 2014) (Amanat, 2023). The incorporation of domestic expertise into naval platforms and crafts is expected to enhance existing technology practices. This advancement can serve as a valuable material for study and analysis by university students

and researchers. Consequently, the practical knowledge related to modern naval technology will be strengthened. These developments are anticipated to improve curricula, academic prospects, and production scope, ultimately contributing to the sustainable development goals for Bangladesh.



**Analysis of BD Industrial Capability.** Technologically advanced industries such as Walton, Pran RFL Group, BSRM, BD Machine Tools Factory (BMTF), BD Industrial and Technical Assistance Center (BITAC), and BN-owned shipyards like Khulna Shipyard Limited (KSY), Narayangonj Dockyard and Engineering Works Limited (DEW), and Chittagong Dry Dock Limited (CDDL) could play a vital role in contributing to the development of naval technology by leveraging their capabilities and expertise (Maksud, 2023). The Walton Group fosters innovation and experimentation in the electronics, IT, and related industries, earning recognition for its diverse product range, extensive R&D services, and knowledgeable staff (Uddin M. N., 2023). Pran RFL Group, a conglomerate with a notable presence in plastics, agro, and technology production, meets consumer expectations and expands into the IT and renewable energy sectors through brands like Vision Electronics. As a leading steel manufacturer, BSRM utilizes cutting-edge equipment and research funds to contribute to the construction of naval platforms. BMTF, as a state-

owned company, specializes in producing construction, agricultural, and defense-related machinery to bolster national security (Nafis, 2923). BITAC, a government entity, supports industry development and offers technical assistance through training, innovation, and research (Rana, 2023). The BN-owned shipyards efficiently build and repair navy vessels with sophisticated infrastructure and a highly qualified workforce, aligning with their objective of achieving self-sufficiency in naval capabilities and advancing Bangladesh’s maritime development as a whole.

**Table 2:** Potential Fields for Cooperation by Industries

Ser No	Field of Collaboration	Probable Industry for Integration	Scope for Participation
1	Design, construction of naval platforms	Private and BN shipyards	A field survey identifies research areas suitable for innovative and enhanced by BN backed studies
2	Shipborne Equipment and Machinery	Marine-type production has not commenced, but Walton and RFL have ventured into light electrical and electronic manufacturing	A field survey identifies research areas suitable for innovative university and BN backed studies
3	Spares for Equipment and Machinery	Walton and RFL (Light Mechanical and spares, Electrical and Electronic)	Bearing, Pump spares, Filters, PCB (Walton)
4	Repair and maintenance of naval platforms and equipment	BITAC, BSRM, Walton and Pran RFL, BMTF, Shipyards	Mechanical repair by providing Foundry support, Innovative software support from item providing technical expertise on designing PCB
5	Working on the Net Centric Warfare and producing con and monitoring sys of shipborne automation including weapon and communication sys, on to naval platforms	Walton and BITAC	Both the Industry has required manufacturing machine and Skilled manpower to design
6	Manufacturing critical materials and components for naval equipment and weapon sys	BITAC, BSRM, Walton and Pran RFL, BMTF, Shipyards	Special arrangements with the available plant facility may be made based on the BN requirement

Source: Extract from KII and FGD of the Research

**Analysis of University Research and Knowledge Sharing Capability.**

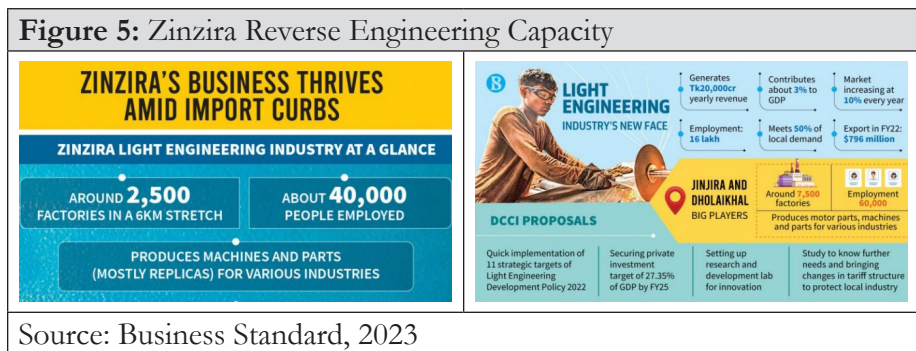
Technical universities of Bangladesh like BUET, CUET, MIST and RUET, in particular-have become renowned institutions valued for their research and capacity for knowledge exchange in the field of engineering and technology education (Amanat, 2023) (Chowdhury, 2023). These universities have highly skilled faculty with advanced degrees and significant research experience, offering a diverse array of undergraduate and postgraduate programs (Rabbi, 2023). Actively promoting information sharing through conferences and seminars both on and off-campus, they prioritize the development of research infrastructure, including well-equipped laboratories. Additionally, these universities strongly emphasize innovation and entrepreneurship, encouraging both staff and students to explore business opportunities and translate research findings into practical goods and services (Ref: Field Survey: Secondary Source).

**Table 3:** Contribution of the Universities in Naval Technological Development

Ser No	Field of Collaboration	Probable University for Integration	Scope for Participation
1	Conduct basic research on metallurgy, propulsion systems, ship borne equipment and on critical spares for naval platforms	BUET, CUET, MIST	Suitable research areas may be identified as required by BN in more specific innovative and indigenous design
2	Developing and designing control system software for naval applications	BUET, CUET, MIST	Capable of doing research by student of graduate level and Post graduate level
3.	EW system, Cyber warfare, C4ISR technology and systems for naval applications	BUET, CUET, MIST	Capable of doing research by student of graduate level and Post graduate level (Amanat, 2023)
4.	Research, Design, Planning as well as Consultancy on Jetty, Naval Berth construction, Installation and Dockyard Capacity Enhancement	BUET, CUET, MIST	Capable of doing research and Consultancy by group of Faculties
5	Assessing the capability of industries conduct appropriate R&D and design to enhance the productivity	BUET, CUET, MIST	collaborative learning can be effectively conducted using an integrated platform as its foundation (Rabbi, 2023)

Source: Extract from KII and FGD of the Research

**Exploration of Local Talents in BD.** Bangladesh stands as a reservoir of diverse and highly skilled talents poised to significantly impact naval technological development. From excelling in automotive and machinery through reverse engineering to showcasing expertise in drone design and UAVs, the country’s talents contribute notably in fields such as software development, AI, data science, e-commerce, digital marketing, hardware, renewable energy, mobile technology, and local industry. Skilled engineers and innovators such as Azizul Islam had developed VTOL drone and Raihan-Ul- has showcased his expertise in creating cutting-edge air craft and drones for diverse applications (Islam, 2023) (Robocon BD, 2023). The innovators in Bangladesh consistently demonstrate creativity and proficiency, marking the nation as a key player in global technological innovation across a wide range of industries. A few local industries like Bogra Motors in BD have shown capabilities in local industrial and manufacturing processes by casting foundry item (Ferrous and non-Ferrous) and Paper Filters for Engine. At the same time the by studying existing processes and systems, Zinzira is capable of designing metallurgical items with innovative approaches. This expertise contributes to efficiency improvements, cost reduction, and quality enhancement in manufacturing industries (Business Standard, 2023).



Source: Business Standard, 2023

**Table 4:** Contribution of the Local Talents in Naval Technological Development)

Ser No	Field of Collaboration	Probable Institute for Integration	Scope for Participation
1	Fabrication and Casting of Metallic Valves and Pump Impellers and casings	Bogra Local Industries, Zinzira Production, CTG local supplier	With Proper Guidance by University and BN
2	Manufacturing the Paper filter for Diesel engines and Prime Mover	Bogra Local Industries, Zinzira Production, CTG local supplier	With Proper Guidance by University and BN
3.	Production of Target Drone or surveillance Drone	May be manufactured by local talents	A fruitful understanding and cost benefit analysis
4.	Any software for control system and Psyops initiatives	Local talents may be involved	

Source: Extract from KII and FGD of the Research

**Capacity of National Research and Development.** The national-level Research and Development (R&D) landscape in BD is characterized by key organizations, including the BD Council of Scientific and Industrial Research (BCSIR) and the BD Institute of Marine Research and Development (BIMRAD). BCSIR, an autonomous body under the Ministry of Science and Technology, conducts scientific research across various fields but does not engage in defense-related initiatives. BIMRAD focuses on marine resource exploration but has not ventured into technological R&D since its inception. On the other hand, the Centre for Naval Research and Development (CNRD), established in 2014, is dedicated to enhancing fleet operations through research and development. CNRD’s responsibilities include maintenance, repairs, and the development of advanced technologies for fleet machinery, equipment, and platforms.

**Study of Foreign Country’s Navy in Collaboration Framework.** In the realm of global defense research and development, various countries employ distinct frameworks for innovation. India’s Defence Research and Development Organization (DRDO) has played a vital role in advancing

naval technology, collaborating with the Indian Navy on projects ranging from aircraft carriers to nuclear-powered submarines and supersonic cruise missiles (Arora, June 2023) (HINDUSTAN TIMES, 2020). The recent success of DRDO includes Brahmos supersonic cruise missile, ROVs and AUVs, the first indigenously built nuclear-powered submarine, INS Arihant, (HINDUSTAN TIMES, 2020) Advanced Light Torpedo (ALT), Sonar systems, AIP Technology in Submarine. In the United States, the Defense Advanced Research Projects Agency (DARPA) spearheads collaboration with defense contractors like Lockheed Martin and Boeing, utilizing Cooperative Research and Development Agreements (CRADAs) to adopt partnerships with universities and industry partners. Meanwhile, China's defense industry conglomerates, including the China Aerospace Science and Industry Corporation (CASIC) and the China Electronics Technology Group Corporation (CETC), engage in research partnerships with universities and government institutes. The "Military-Civil Fusion" bases in China promote the integration of defense and civilian technologies, exemplified by the collaborative development of the J-20, China's fifth-generation stealth fighter aircraft, through partnerships between the Harbin Institute of Technology and defense companies.

## **Field for Integration with Industry, University and Local Talents Towards the Innovation**

In delineating product categories, BN can strategically classify them into high-end, medium-end, and low-end segments, each with distinct research and development requirements. High-end products necessitate advanced military metallurgical and scientific expertise, while medium-end products involve significant research and innovation efforts spanning several years. Low-end products, requiring comparatively less research, offer an avenue to reduce foreign dependency and contribute to capacity building for the BN and other stakeholders. To expedite the development of indigenous production capabilities, the BN should prioritize the production of low-end military products as a foundational step. Subsequently, after establishing

a robust foundation, a feasibility study can guide the production of medium-end products. With self-reliance achieved through medium-end production, the BN can then explore manufacturing high-end products through technology transfer (ToT) within a short timeframe. This strategic categorization of products facilitates collaboration and ensures a systematic approach to enhancing the BN’s military production capabilities.

**Table 5: Integration of Domestic Expertise with Naval Technological Development**

Ser No	Products and Fields for Integration	Time Phase line	Actors for Collaboration	Scope for Collaboration
1.	Platform construction (Ship-Design), missiles, guns, equipment, spares, machinery, and weapon system design and hi-tech military metallurgical materials	Five to Ten years, varies upon the products	Universities, Private and BN owned Shipyards  BN, University and Industry like Walton for Weapon and any other Control system (5 to 10 Years)	Design and Drawing of war Ship, Metallurgical research with solutions, Design of Rockets and subsequently missile  Following a cost-benefit analysis, produce similar items for sale in the market
2.	Electronic control systems, machinery gadgets, propulsion and power generation systems, cyber capacity development, software design, and drone construction	Two to Four years, varies upon the products	BN, University and Industry like Walton for any other Control system.  Local talents may also be included on the basis of requirement	CNRD will collaborate and share innovative approaches with each other to develop the capacity to manage all control systems of BN internally
3.	Manufacturing of Valves, Pump Casings, Filters, Clothing, PVC tiles, paints, plastics, wooden items,	Within two years	BN should engage in collaboration and proactively take swift action to develop its internal	BN, the University, and local industries in places like Bogura and Zinzira could participate in nurturing indigenous production

Source: Extract from KII and FGD of the Research

## **Examining Current Bangladesh Navy Research Facilities and Exploring Integration Opportunities**

**Analysis of Present Technological Practices and Development of BN.** The Center for Naval Research and Development (CNRD) has been actively engaged in innovative projects since 2013, successfully completing over 100 tasks, including the development of crucial systems like TDS, Exhaust Temperature Monitoring, and Gun Control. Presently, CNRD is directing its efforts toward the design of a surveillance drone. Notably, the center has initiated an integrated project in collaboration with Chittagong University of Engineering and Technology (CUET), exploring joint research ventures in mechanical, electrical, and computer science domains. While formal projects with industries and universities are yet to commence, CNRD's ongoing studies with Walton for electronic PCBs and potential partnerships with local industries such as Berger, Ellite, and RFL Group underscore the center's holistic approach to advancing technology development through collaborative endeavors.

### **Challenges Involved for Developing Collaborative Platform**

**Categorizing of Specific field of innovation and Research.** The categorization of specific fields in naval technology research and innovation require thorough study and prioritization by stakeholders (ACNS(M), 2023). Additionally, it is crucial to ensure that the categorization framework remains flexible and adaptable, facilitating technology transfer and contributing to the capacity development of the BN while elevating the technological prowess of the country (DNP, 2023).

**Diversified Cultures and Objectives of the Actors.** The collaboration involves actors with distinct cultures and objectives, such as universities prioritizing academic research. The divergent priorities may pose contests in aligning potentials, affecting decision-making processes within the collaboration (ACNS(M), 2023) (DSB, 2023).

**Opportunities within the mindset for Technology Development.**

Diverse factors, including economic concerns about long-term investments in innovation and constraints imposed by limited resources and manpower, may present challenges for local businesses. (Amanat, 2023).

**Effective Resource Management and Funding Strategies.**

The innovation and indigenous production process in collaboration requires resources and appropriate funding for all actors (ACNS(M), 2023). In order to support capacity building for BN, a significant requirement is the availability of substantial financial resources.

**Challenges in Academic Research and Knowledge Transfer for Practical Application (Inherent Challenges of University).**

The gap between theoretical research and practical implementation in technical universities like BD BUET and CUET is evident, as research often neglects the needs of relevant national industries. Additionally, issues arise in knowledge transfer, as universities tend to consider gained knowledge as their intellectual property, potentially hindering crucial information-sharing. It is emphasized that universities should recognize the significance of innovative work in terms of national patents and credibility, when the research and projects are deemed essential for naval and national development purposes as well. (Amanat, 2023).

**Challenges in Defense Collaboration: Navigating Confidentiality, Motivation, and Personnel Constraints.**

The exchange of knowledge between universities, industries, and the naval/military sector requires strict confidentiality measures. Balancing the imperative for information sharing with the necessity for protection presents a formidable challenge. Furthermore, the limited availability of personnel interested in naval or military research within countries poses a significant obstacle, potentially impeding progress and leading to delays in project completion.

**Challenges in Local Talents' Innovation through Reverse Engineering.**

Local talents emphasizing innovation through reverse engineering face inherent limitations, including restricted access to advanced technology

affecting product quality, legal and ethical constraints, difficulties in bridging theoretical understanding with practical implementation, time-consuming trial and error processes, restricted contributions due to limited access, and the challenge of technology rapidly becoming obsolete.

## **Approach Towards Resilient Navy: Options and Implementation Framework**

**Buyer Navy to Builder Navy.** To establish a roadmap for defense production enhancement, Bangladesh must determine the balance between foreign acquisitions and local production. A comprehensive study by the military on indigenous defense innovation is vital where the government subsidies may aid for capability development. In this context, meticulous attention to foreign procurement policies is essential to safeguard the value of national indigenous products and maintain positive international relationships.

**Policy Revisions for Defense Industry Growth.** To promote private sector involvement and foreign investments, revisiting and revising Bangladesh's Industrial Policy 2016 and Export Policy 2018-21 is crucial. Currently prohibiting such participation, policy amendments could encourage defense industry development and identify potential export markets.

**Categorizing of Specific Field of Innovation and Research.** To enhance capacity development, the indigenous products need to be strategically categorized as high-end, medium-end, and low-end, aligning with specific research and development needs.

**Enhancing Collaboration Dynamics: Training and Strategic Mindset Shift.** Conducting training and orientation programs within a collaborative platform helps to address the cultural differences, promoting effective communication and trust-building. Simultaneously, nurturing a comprehensive national strategy and political will is crucial for advancing indigenous technology development. The acquisition of

advanced knowledge benefits all stakeholders and enhances the nation's technological prowess. A proactive approach by BN through coordination with the Armed Forces Division (AFD) and Ministry of Defense (MOD) in formalizing collaborative projects can contribute to their success (DIR CNRD, 2023)

**Organogram and Infrastructure Development.** A well-structured organogram with sufficient laboratory facilities for a common research platform is essential for effective collaboration. At the same time, a permanent infrastructure is to be raised for research work and allocated for CNRD in the dockyard premises.

**Professional and Expertise Development.** Addressing this challenge requires investing in specialized training programs, promoting interdisciplinary education, and establishing collaborations between academy, military, and industry to attract and retain talents. Additionally, developing a culture of continuous learning and providing ample opportunities for skill development are vital.

**Confidentiality and Security.** Maintaining confidentiality and security in collaboration with universities, industries, and local talents is crucial. To ensure safety, it is essential to establish clear data sharing protocols, enforce non-disclosure agreements, and implement robust cyber security measures. These measures may include encryption techniques, secure communication channels, regular data backups, and access controls. Furthermore, it is important to educate all collaborators on the significance of confidentiality and security, promoting a culture of responsible data handling.

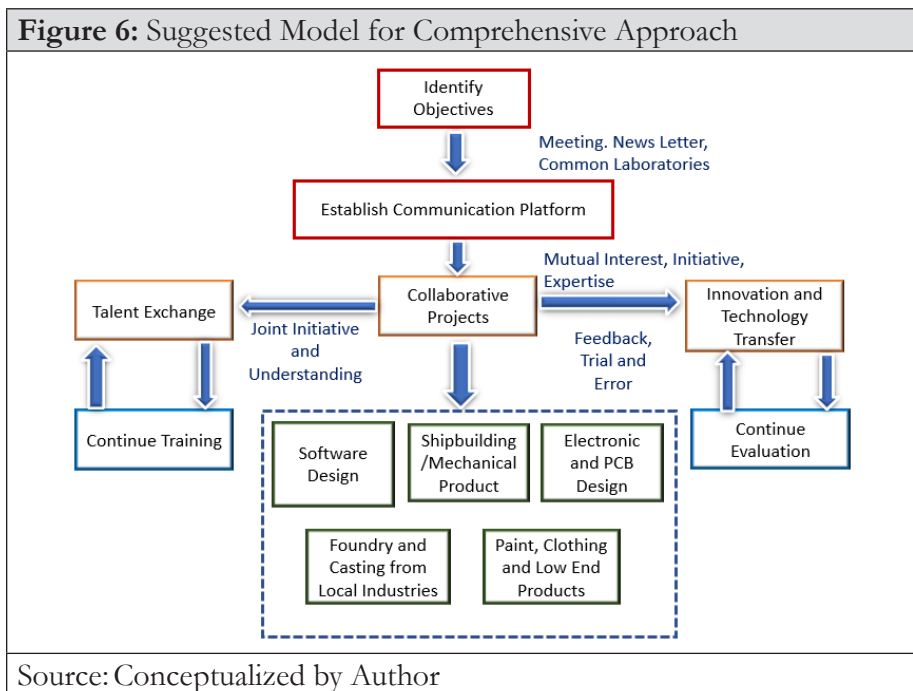
**Incentive and Motivation-Concept to Promote Research by University.** BN can support university researchers by annually funding BN-related projects, akin to scholarships, ensuring long-term sustainability. A cost-benefit analysis should precede financial commitments for mutual innovation.

**Enriching National Technological Prowess.** The transfer of knowledge between the navy, university, and industry plays a vital role in fostering the technological prowess of a country. Through collaboration and research, these entities can collectively address the challenges and requirements specific to naval operations. The navy brings practical insights and operational expertise, while the university contributes academic research and innovation capabilities (Amanat, 2023). The industry, with its technical know-how and resources, can transform research outcomes into practical solutions. By sharing advancements and expertise, the navy, university, and industry can collectively drive the development of cutting-edge technologies, resulting in enhanced capabilities for the country's defense sector. Furthermore, this collaboration can have ripple effects beyond the navy, leading to advancements in various industries, boosting economic growth, and positioning the country as a technological leader on a global scale (Rabbi, 2023).

**Suggested Model for Comprehensive Approach.** A model for comprehensive approach towards collaboration of BN, University, Industry, and Local Talents Group may be adopted step by step. The collaborative platform should determine primary objectives of the research and innovative work, such as the requirement of fabrication, uses and consumptions of artifact. Thereafter, an effective communication channels is to be established by BN to facilitate seamless interaction between, University, Industry, and local talents group. The communication medium in between the actors includes regular meetings, online platforms, and newsletters. Subsequently joint project or research may be taken into task on the basis of mutual interest and availability of expertise. BN should continue inspire joint initiatives involving experts from University, Industry, and local talents group. At the same time, to accomplish the project successfully, frequent educational programs, workshops for knowledge transfer are to be arranged. The facility to commercialization of research outcomes should be a motivation for university. However, the process should be continuing with further evaluation and improvement by seeking feedback and consecutively applying trial and error techniques.

## Suggestive Roadmap for Integration

**Time Bound Plan and Initiative.** Due to various challenges in the realm of BD, it may require ages to achieve a resilient navy by strengthening the indigenous capabilities of the nation. The roadmap has been unfolded in three time frames:



- **Short Term Plan and Initiatives (2-4 Years)**
  - **Common Research Platform Concept.** The initiation of a joint platform within CNRD to facilitate collaborations between BUET, CUET, KUET, and industries such as RFL and Walton, and the proactive search for talent (based on project needs) for integration should commence immediately. The task includes establishing project team, set objectives and goals of the project and conduct assessment of the project categorising for research.

- **Establish Theoretical Research and Control Laboratory.** A suitable location within the naval CNRD premises may be considered as the pivotal point for the research and control laboratory.
- **Arrange Training for Orientation with Naval Technology.** In this tenure, short-term skill enhancement programs, workshops, training sessions are needed to be arranged to orient with naval technology.
- **Acclimatization of Industry/University/Local Talents.** Training session, symposiums are to be arranged to motivate industry professionals and connect networks. Initial investment on the research of the 4<sup>th</sup> year student of BUET, CUET, KUET etc can be started.
- **Mid Term Plan and Initiatives (5-10 Years)**
  - **Integrated Case Study and Project Work.** In this stage the Integrated Case Study and Project Work needs to be started, with BN funding to the University for making design and patent in collaboration with production engineer from Industry.
  - **Innovation to Joint Project- Prototype and Modelling.** In this stage the innovative prototype model may be manufactured by and study of the feasibility may be carried out. A suitable location within naval CNRD premises or any suitable place may be used for modeling test of the project.
  - **Implement Reverse Engineering Project in Design and Patenting.** The reverse engineering project may be equipped with necessary tools and equipment. The effort may be taken to adopt new technology with the reverse engineering product process to uplift the technology.
  - **Industry Sponsored Project Work.** In this tenure, industry may sponsor the suitable project on the basis of the feasibility of the product.
  - **Limited Production and Scaling.** In this tenure, industry may start with limited production with trial and error and determine the scaling of the production with BN requirement.

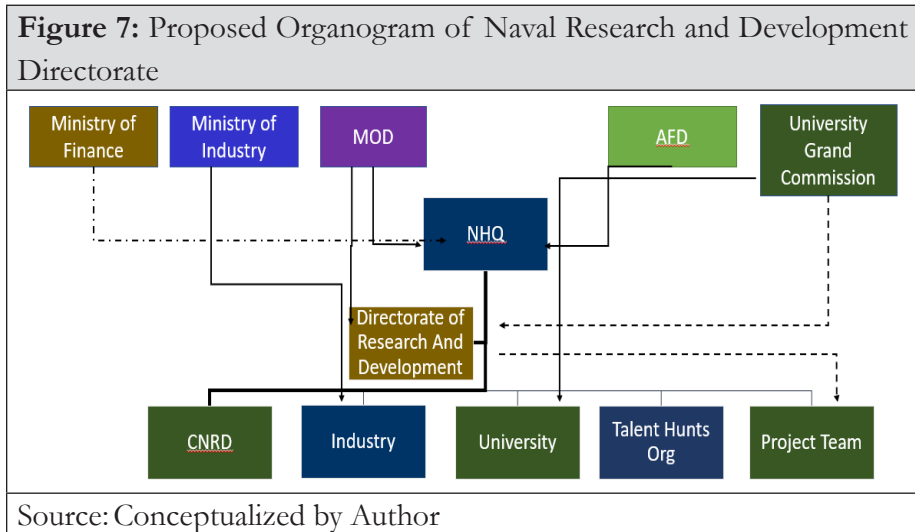
- **Long Term Plan and Initiatives (10-20 Years)**
  - **Induction and Implementation of Tested Project.** The feasibility tested project may be inducted with appropriate production process (as achieved from modelling and feasibility) and implemented with the production from Industry.
  - **Mass Production and Obtain Commercial Benefit.** The respective industries should go for mass production with an aim to meet BN as well as commercial requirement.
  - **Formulation of Policy and Regulation for Export and Meeting BN Requirement.** Necessary policy and regulation for export and for meeting BN requirement need to be formulated.
  - **Establishment of Armed Forces Joint Research and Development Centre and Program.** Building on the success of projects, and research and development, an initiative may be launched to incorporate the BDAF, paramilitary, and other shared national services. This aims to achieve an efficient economic production process.

## **Correlation Between the Short-Term, Mid Term and Long Term Plan**

Building upon the initial success of the research and control laboratory, it is essential to cultivate mutual understanding and trust among all stakeholders, as this will pave the way for collaborative efforts in future innovation endeavors. Within the mid-term plan spanning the next 5 to 10 years, as indigenous and innovative products continue to achieve significant milestones, BN will become eligible and well-positioned to engage in further collaborative research initiatives with industries and universities.

## Proposed Organogram of Naval Research and Development Directorate

To implement the roadmap roadmap for strengthening the resilience of the BN capacity, it is essential to establish a dedicated directorate. This directorate will oversee research planning in collaboration with relevant universities, industries, and talent search groups, and a specialized team should be formed for talent scouting. Furthermore, the Research and Development Directorate will maintain coordination with the Ministry of Industry, the University Grants Commission, the Ministry of Finance for budget allocation, as well as the Armed Forces Division and the Ministry of Defence. Each project should be managed by a distinct research group, which will assume full responsibility for carrying out the research while maintaining close coordination with the directorate.



## Recommendations and Conclusion

Bangladesh must prioritize socio-economic development, with a focus on sustainable industrialization to enhance self-sufficiency (Amanat, 2023). The Navy’s reliance on foreign sources prompts the need for a

resilient navy, and collaborative efforts with industry, universities, and local talent are crucial. The most common challenges include policy inconsistencies, cultural differences, infrastructure limitations, and the gap between theoretical research and practical implementation. To overcome, a strategic directive is proposed, advocating for informed decisions on defense equipment procurement, comprehensive studies on indigenous innovation, government subsidies, and a balance between self-reliance and international relationships. Effective communication, continuous learning, skill development, and security measures are recommended for successful collaboration. A comprehensive 40-year roadmap need to be crafted to systematically integrate university, industry, and local talent, fostering naval resilience. The step-by-step approach ensures the fulfillment of feasibility, coherence, and technical adaptability throughout the process. However, BN should establish a robust collaborative framework consisting of a Directorate in Naval Headquarters and Full-fledged research group with domestic expertise to nurture innovations. BN should Develop a policy framework that establishes a collaborative structure within the nation, ensuring the alignment of all stakeholders' needs. CNRD should be funded with adequate resources and facilities for continuing research and development projects, further strengthening and continuing the collaboration effort in the short term and long-term initiatives.

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# **IMPACT OF INTEGRATED COASTAL ZONE MANAGEMENT IN ACHIEVING SUSTAINABLE BLUE ECONOMIC GROWTH OF BANGLADESH: CHALLENGES AND WAYS FORWARD**

**Commander M Monzurul Islam, (TAS), NUP, afwc, psc, BN**

## **Introduction**

The Earth's oceans, covering 71% of its surface, profoundly influence mankind and global ecosystems (Alam, 2021). Ocean resources, utilized for centuries, significantly contribute to state economies, emphasizing their crucial role in coastal areas (Rahman, 2018). The Coastal Zone (CZ), an ecological interface of land and sea, represents highly productive ecosystems pivotal for Sustainable Economic Growth (SEG) (Telave & Chandarkar, 2020). With 35.1 million inhabitants globally, coastal areas face escalating anthropogenic pressures, necessitating protection for Sustainable Development (SD) (Ramesh & Senthil, 2011).

Integrated Coastal Zone Management (ICZM), a widely embraced approach, emphasizes sectorial management, productivity preservation, and coastal resource promotion (Portman, et al., 2012). Successful implementations in Sri Lanka and Xiamen, China, underscore its effectiveness (Rajarithna & Nianthi, 2019). Bangladesh's CZ, dominated by the Ganges, Brahmaputra, Meghna River system, and the Bay of Bengal, spans 47,201 square kilometers, covering 19 districts and 30% of cultivable lands (Minar, et al., 2013). Despite its significance, this region faces climate change hazards and anthropogenic challenges, requiring governance for vulnerability reduction (Ahmad, 2019).

The Government of Bangladesh (GoB) adopted the Coastal Zone Policy - 2005 and Coastal Development Strategy - 2006 to implement ICZM, aiming to develop coastal communities and the economy in line with Sustainable Development Goals (SDGs) (Islam, et al., 2009). Effective

ICZM governance is crucial for sustainable economic growth (SEG) and the burgeoning Blue Economy (BE), with the Bangladesh Navy playing a vital role. Despite threats to the Coastal Zone and the need for holistic management, a common sustainable governance structure is lacking. Thus, this paper will explore the current state, challenges, and future directions for ICZM and BE integration in Bangladesh.

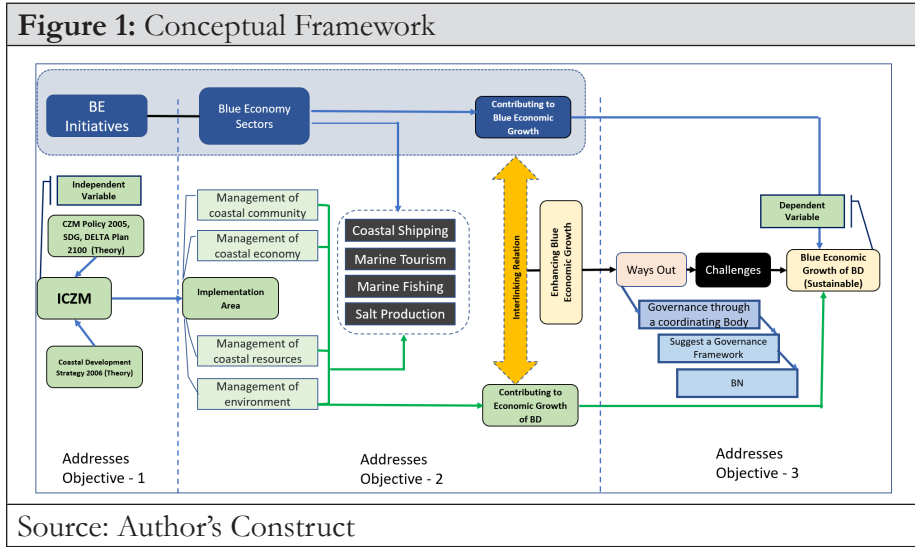
## **Literature Review**

The literature review of this research paper highlights the rapid economic growth of Bangladesh, aiming for developed status by 2041, and the need for sustainable economic growth through ICZM and BE initiatives. Key insights include the potential of marine and coastal resources, the necessity of human capital, and policy for SEG. Challenges include effective policy implementation, sectoral integration, and skilled manpower. The review also underscores the importance of SDGs, especially SDG-14 for marine resource conservation. It identifies gaps in governance, coordination, and specific strategies for ICZM and BE initiatives. The roles of marine fisheries, coastal tourism, shipping, and salt production in economic growth are noted, but challenges in governance, data accuracy, and sectoral integration remain inadequately addressed. Finally, the nexus between the Bangladesh Navy (BN), BE, and ICZM is recognized, yet literature lacks detailed connections, and implementation plans for holistic governance and sustainable economic development.

## **Research Methodology**

This exploratory research employed a mixed-method design to suggest policy guidelines for enhancing governance in ICZM in Bangladesh. A quantitative survey involving government officials, military personnel, and coastal area residents focused on four ICZM and BE sectors: Marine Fisheries, Marine Tourism, Coastal Shipping, and Salt Production. These sectors were chosen for their interconnectedness with ICZM and BE. The survey identified governance prospects and challenges, supported

by qualitative data from content analysis, interviews, and focus group discussions. Hypotheses were validated statistically using chi-square tests and SPSS. For better assimilation and understanding of the research and approach, a conceptual framework is given below:



## ICZM Plans and BE Initiatives in Bangladesh

### Concept of ICZM in Bangladesh Perspective

The CZ of Bangladesh are crucial to its geography and economy, spanning approximately 710 kilometers along the BoB (Hoque, 2022). Home to over 30 million people, these areas feature diverse ecosystems like mangrove forests, sandy beaches, mudflats, and coral reefs, supporting various flora and fauna (Alam, 2021). However, they face threats from natural disasters, climate change, and human activities such as overfishing, coastal erosion, and pollution. ICZM in Bangladesh promotes sustainable development while protecting the environment and reducing disaster vulnerability. It balances economic growth with environmental protection and social well-being through stakeholder participation, ecosystem-based management, and adaptive management, involving local communities, civil society, and private sectors in decision-making.

## BE Initiatives in Bangladesh

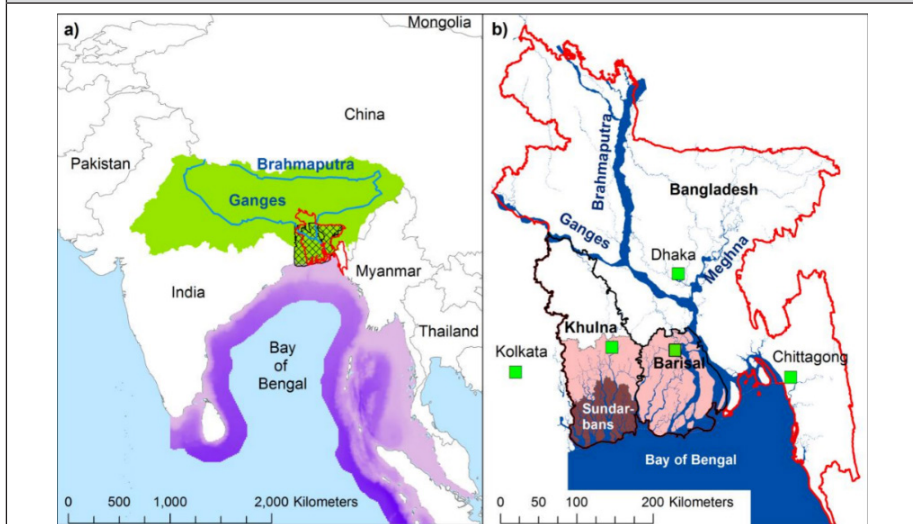
The BE is a sustainable economic development concept that promotes the sustainable use and management of ocean resources (Rahman, 2018). In Bangladesh, the BE initiative involves several sectors, including the following as given in the table below:

<b>Table 1: BE Sectors of Bangladesh</b>		
Serial	BE Sectors	Remarks
1.	Fisheries and aquaculture	Sustainable fisheries and aquaculture resource management and development, including the promotion of responsible fishing techniques, fish farming, and the creation of value-added fish products.
2.	Shipping and ports	Shipping and port infrastructure development, including the extension of existing ports, the construction of new ports, and the expansion of marine trade.
3	Marine renewable energy	The development of renewable energy sources such as offshore wind, tidal, and wave energy.
4.	Marine biotechnology	Development of biotechnology applications that exploit marine resources to create new products and services, such as new medications and pharmaceuticals.
5.	Marine tourism	Coastal tourism development, including the promotion of sustainable tourism practices and the preservation of cultural and natural heritage places.
6.	Ocean governance	The creation of policies, rules, and regulations to support the sustainable use and management of ocean resources, such as the creation of marine protected areas and marine spatial planning.
Source: Author's Construct Based on Interview and Consultation of Literatures		

## SDGs and Delta Plan 2100 in relation to ICZM and BE of Bangladesh

SDGs are a set of 17 global goals adopted by the United Nations General Assembly in 2015, aimed at ending poverty, protecting the planet, and ensuring peace and prosperity for all (Alam, 2019). Bangladesh is one of the countries that have committed to achieving the SDGs by 2030, and the government has taken several measures to implement the SDGs. SDG 14, also known as the Life Below Water goal, is dedicated to the conservation and sustainable use of ocean resources (SDG, 2023). Whereas, the Delta Plan 2100 is a long-term plan developed by the government of Bangladesh to address the challenges posed by climate change and other environmental issues in the country's delta region (Alam, 2021). The plan intends to assure the delta region's sustainable growth by 2100, while simultaneously protecting the lives and livelihoods of the people who live there. The map below depicts the extent of Delta in the Indian Ocean region.

**Figure 2:** The Extent of Delta in the Indian Ocean Region



Source: (Nicholls, et al., 2016)

The SDGs provide a framework for sustainable development and emphasizes the importance of integrated coastal resource planning,

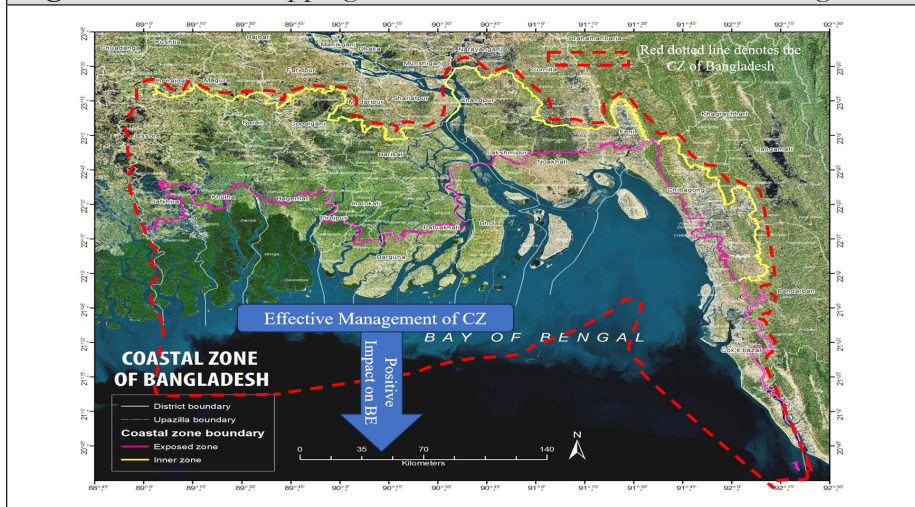
management, and development, including fisheries and aquaculture, tourism, and transportation. Hence, both BE and ICZM are the integral parts of the Delta Plan 2100 and SDG.

## Connection of ICZM and BE in Enhancing the BEG of Bangladesh

### The Connection of ICZM and BE

The CZ of Bangladesh is covering the land areas which is close to the sea water line and where the sea water influx is happening including sea areas close to the shore. Though both the areas of coastal land and sea portion are not clearly demarcated in Bangladesh, however; both are having equal influence to have good management through good governance in the CZ areas. Therefore, this CZ requires effective management through good governance which is having direct impact on the BE initiative. The below picture depicts the overlapping areas of the CZ and the sea which is having connection for well management of CZs and economic emancipation of the BE initiatives of Bangladesh.

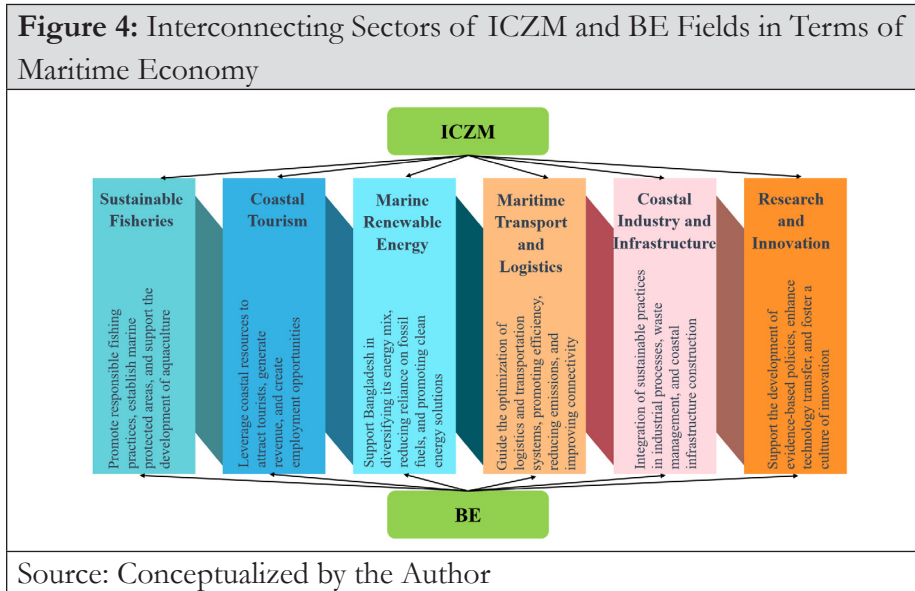
**Figure 3:** The Overlapping Areas of the CZ and the Sea of Bangladesh



Source: Conceptualized by the Author

## Scopes of Connection of ICZM and BE Initiatives in Terms of Maritime Economic Sectors of Bangladesh

The interconnecting sectors of ICZM and BE fields in terms of maritime economy can be drawn with a nexus as stated in the following figure:



## The Scopes of Connection of ICZM and BE Initiatives in Terms of Maritime Stakeholders of Bangladesh

There are several scopes of connection between ICZM and BE initiatives in terms of maritime stakeholders in Bangladesh. The following are the areas where ICZM and BE can be connected:

- Promoting exploitation of resources.
- Identify opportunities for sustainable economic activities in coastal and marine areas.
- Affected areas for climate change.
- Promoting the economic and social well-being of coastal communities.

## **How Integration of ICZM and BE will Enhance the Growth of Different Sectors?**

Integration of ICZM and BE will enhance the BEG of Bangladesh. This has been evidenced through the survey analysis as shown below. However, there are many sectors which will assist in positive growth of BE, but this research will focus only on four sectors (Marine Tourism, Coastal Shipping, Marine Fisheries and Coastal Agriculture i.e. Salt) to prove that the integration of ICZM and BE will enhance the BEG of Bangladesh. Subsequent paragraphs will provide explanation on those four sectors.

### **Marine Tourism in Bangladesh that Enhance the BEG of Bangladesh**

Marine tourism identified as a promising sector for Bangladesh's BEG. This sector not only has the potential to bolster the country's economy but also plays a crucial role in conserving and protecting the marine ecosystem and biodiversity. Key destinations such as Cox's Bazar, home to the world's longest natural beach, and the Sundarbans, the largest mangrove forest and a UNESCO World Heritage site, exemplify Bangladesh's appeal for marine tourism. Concurrent investments in infrastructure development, talent enhancement, and capacity building, along with the implementation of ICZM projects, will not only attract more tourists but also ensure the long-term sustainability of the marine tourism industry, significantly contributing to the GDP and overall BEG of Bangladesh.

### **Marine Fisheries in Bangladesh that Enhance the BEG of Bangladesh**

Marine and coastal fisheries are critical components of Bangladesh's BE, providing a source of livelihood for millions of people along the country's coastline (DOF, 2023). The fisheries sector in Bangladesh is highly diverse, with a wide variety of species being caught and traded (MFO, 2023). The government of Bangladesh has recognized the importance of the fisheries

sector and has taken steps to support its growth, which can contribute significantly to the country's BEG. One of the key initiatives taken by the Government of Bangladesh to enhance the BEG of the country is the establishment of coastal fishing communities (MFO, 2023). In addition, there is also declared marine protected area, however, needs to be brought under regulatory system (DOF, 2023).

## **Coastal Shipping in Bangladesh that Enhances the BEG of Bangladesh**

Marine and coastal shipping are important components of Bangladesh's BE, providing vital connectivity between the country's coastal regions and the global market (Maksud, 2023). Due to its strategic importance for shipping and trade, Bangladesh's government has recognized the potential of this industry to support the nation's overall economic growth. One of the key initiatives taken by the Government of Bangladesh to enhance the BEG of the country is the development of the seaports (Maksud, 2023). The country has great potential in river and coastal shipping which will have a positive impact on the national GDP. Thus, the coastal shipping routes need to be utilized very extensively to earn national revenue (Mostafa, 2023).

## **Salt Agriculture in Bangladesh Enhancing the BEG of Bangladesh**

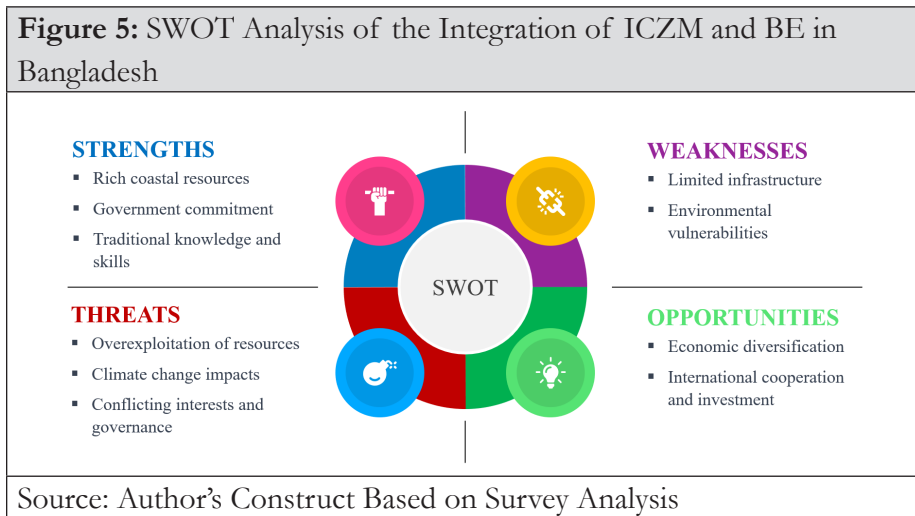
Salt agriculture is an important sector in Bangladesh's BE, providing livelihoods for thousands of people and contributing to the country's food security. The country has a long history of salt production, with salt being produced in the coastal regions using traditional methods such as evaporating seawater in shallow fields (Hassan, 2023). The Government of Bangladesh has recognized the potential of the salt agriculture sector to contribute to the country's BEG and has taken steps to support its development. One of the key initiatives taken by the government of Bangladesh to enhance the BEG of the country through salt agriculture is the establishment of modern salt production facilities (Hassan, 2023).

## Deduction on the Analysis of Four Sectors

Implementing the ICZM and BE initiative together can indeed enhance BEG in Bangladesh through marine tourism, coastal shipping, marine fisheries, and coastal salt production. These case studies underscore the potential of these four sectors in enhancing BEG of Bangladesh. The findings highlight the need for an integrated and sustainable approach to CZM. By effectively implementing ICZM and the BE initiative, Bangladesh can unlock the economic potential of its coastal areas while ensuring long-term sustainability and resilience.

## SWOT Analysis on the Integration of ICZM and BE in Bangladesh

The SWOT analysis carried out to evaluate the strengths, weaknesses, opportunities, and threats of the integration of ICZM and BE in Bangladesh:



## **Challenges and Ways Forward to Implement ICZM and Connect ICZM With BE of Bangladesh**

### **Challenges in Implementation of ICZM and BE Initiatives in Bangladesh**

**Increasing Public Awareness and Participation.** The challenge involves in enhancing knowledge and involvement of the public in ICZM and BE initiatives in Bangladesh, hindering effective coastal and marine development and sustainable goals.

**Limited Funding and Resources.** Limited financial resources impede the effective execution of ICZM and BE projects, affecting research, infrastructure development, capacity building, and enforcement efforts. The challenges may be articulated as mentioned below:

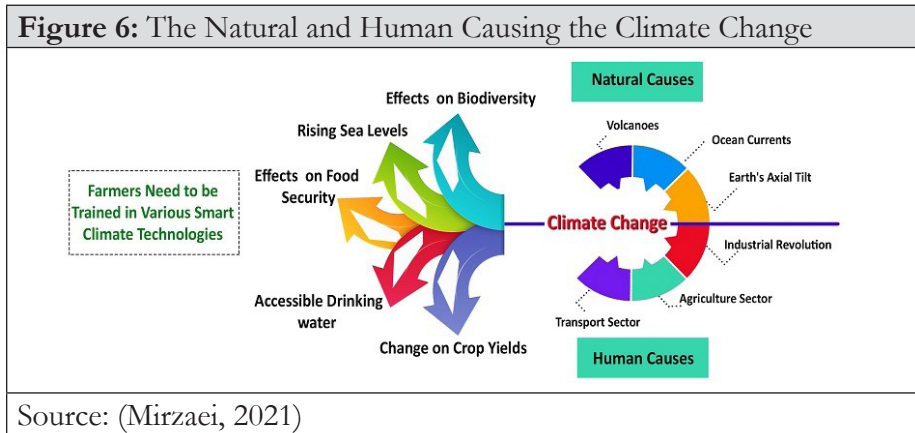
- Incomplete infrastructure development.
- Reduced capacity building.
- Slow progress in research and development.
- Inadequate monitoring and enforcement.
- Vulnerability to climate change impacts.

**Population Growth and Urbanization.** Balancing rapid population growth and urbanization along coastal areas poses a challenge to sustainable development in ICZM and BE initiatives in Bangladesh. The growing population and urbanization put pressure on the following aspects:

- Coastal resources.
- Habitat degradation.
- On sustainable resource extraction.
- Land-use conflicts.

**Climate Change and Sea Level Rise.** Negative effects of climate change, such as sea level rise and extreme weather events, impact the

implementation of ICZM and BE projects in vulnerable coastal areas of Bangladesh. The figure below shows the natural and human causing the climate change and the effect which going to be a challenge in future especially for Bangladesh:

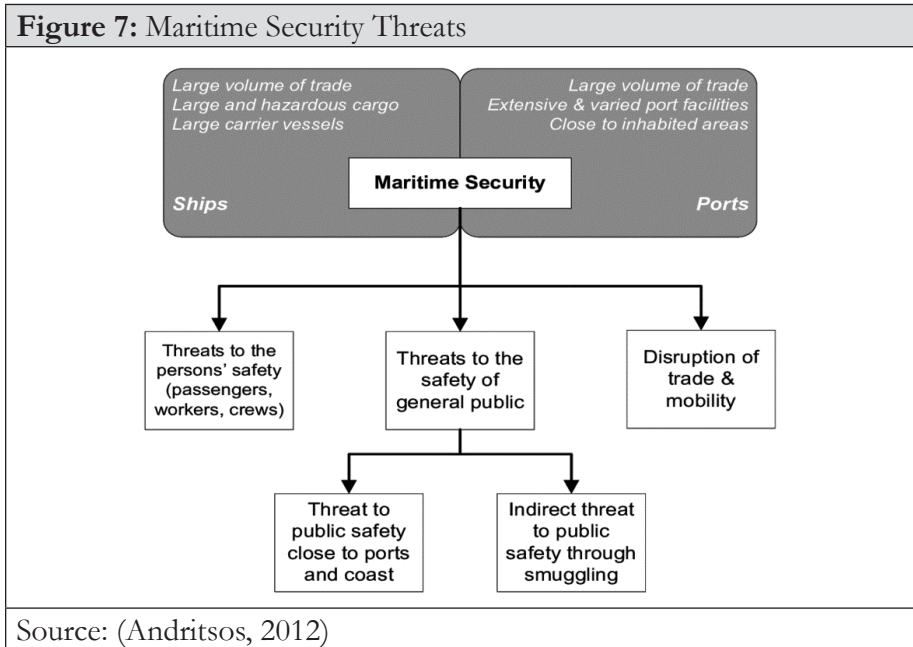


**Access to Data and Information.** Inaccessible data hamper decision-making and planning in ICZM and BE initiatives in Bangladesh, highlighting challenges in data collection and coordination among responsible institutions. Insufficient data and information hinder the following:

- Evidence based policy formulation.
- Resource management.
- Monitoring of coastal and marine activities.

**Prevailing of Different Maritime Threats.** ‘Prevailing Different Maritime Threats’ is the presence of various threats to the coastal and marine environment. Addressing these threats requires a comprehensive and integrated approach that involves multiple stakeholders and coordinated efforts. The threats can include the following aspects:

**Figure 7: Maritime Security Threats**



Source: (Andritsos, 2012)

**Shortage of Skilled Workforce.** The challenge of ‘Shortage of Skilled Workforce’ is the limited availability of trained and skilled professionals with the necessary expertise in coastal and marine management. This shortage of skilled manpower and lack of knowledge hampers the overall coastal development and effects in the sustainable development of the coastal regions (Alam, 2023).

## **Challenges in Integrating ICZM and BE of Bangladesh for Enhancing BEG**

**Enhanced Coordination and Collaboration among Stakeholders.** The challenge involves strong collaboration and coordination among stakeholders in Bangladesh’s integration of ICZM and BE initiatives. Fragmented governance structures and conflicting interests hinder effective integration, leading to inconsistent policies and inefficient resource allocation (BIMRAD, 2023).

**Increasing Awareness and Understanding of Different Government Bodies on Maritime Affairs.** Limited knowledge and understanding among government bodies about maritime issues and the potential of ICZM and BE constitute a challenge. Inadequate training and institutional capacity contribute to disjointed efforts, inconsistent policies, and missed opportunities for BE (Director, 2023).

**Sufficient Maritime Infrastructures.** Inadequate development and maintenance of essential maritime infrastructure, including ports, jetties, harbors, and navigational aids, hinder efficient coastal and marine activities. This shortage limits the movement of goods, transportation, logistics, and capacity for effective coastal management and monitoring (BIMRAD, 2023).

## **Ways Forward for Implementing ICZM Plans in Bangladesh**

There are numerous ways forward for implementing ICZM plans in Bangladesh. The following subparagraphs will focus on the ways that can assist in implementing ICZM plans. The ways forward are described in line with the strategies which can be the tools for sustainable implementation of ICZM plans in Bangladesh.

**Strengthen Institutional Capacity.** Strengthening institutional capacity is essential for effective implementation of ICZM plans in Bangladesh, involving government agencies, research institutions, and local communities to enhance efficiency.

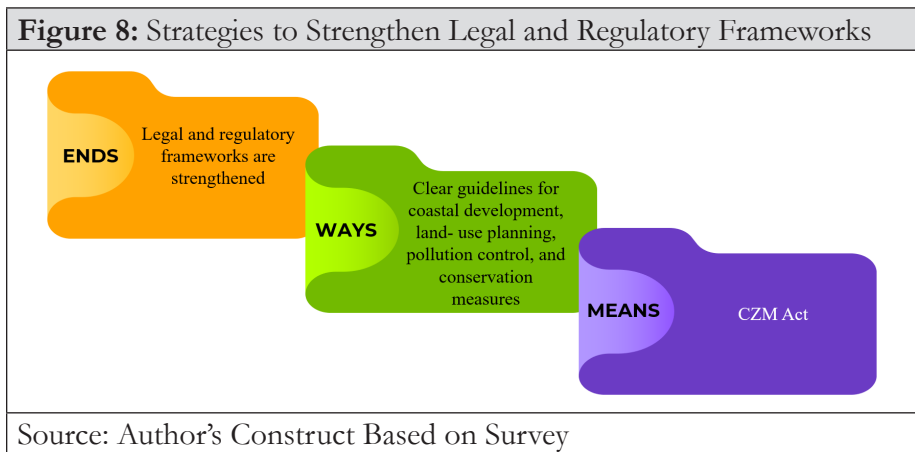
**Involve Local Communities Through Participatory Approach.** The participatory approach, involving local communities in decision-making, is critical for implementing ICZM plans in Bangladesh, integrating their knowledge, needs, and concerns for context-specific and sustainable coastal management.

**Improve Data Collection and Analysis.** Improving data collection and analysis is a vital strategy for implementing ICZM plans in Bangladesh, enabling informed and evidence-based choices for sustainable coastal management. The proper data collection and preservation will have optimization of coastal resources and will enhance more sustainable future of coastal community.

**Encourage Public-Private Partnerships.** Encouraging public-private partnerships is a valuable approach for implementing ICZM plans in Bangladesh, leveraging the strengths and resources of both sectors for effective coastal management.

**Promote Sustainable Livelihoods in the Coastal Areas.** Promoting sustainable livelihoods in coastal areas is a vital strategy for implementing ICZM plans in Bangladesh, focusing on enhancing economic opportunities while preserving the coastal ecosystem.

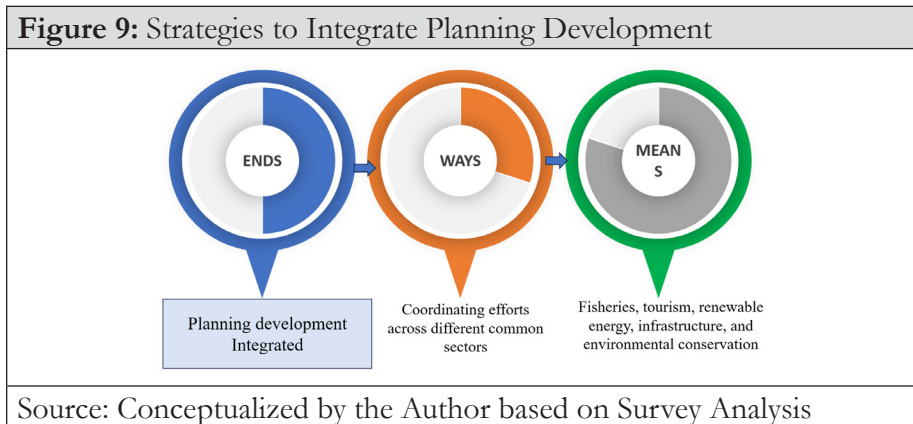
**Strengthen Legal and Regulatory Frameworks.** Strengthening legal and regulatory frameworks is a crucial strategy for implementing ICZM plans in Bangladesh, enacting and enforcing comprehensive laws to manage coastal resources effectively and ensure compliance with international standards. The strategy for strengthening legal and regulatory framework can be suggested as follows:



## Ways Forward for Integrating ICZM and BE in Bangladesh

There are few ways forward for integrating ICZM and BE in Bangladesh. The following subparagraphs will focus on the ways that can assist in integration of ICZM and BE plans. The ways forward are described in line with the strategies which can be the tools in achieving the objective of integration of ICZM and BE in Bangladesh.

**Integrated Planning Development.** Integrated Planning Development can be a way forward in integrating ICZM and the BE in Bangladesh. By adopting an integrated planning approach, the country can align its coastal management strategies with sustainable economic development goals. This involves coordinating efforts across different common sectors such as fisheries, tourism, renewable energy, infrastructure, and environmental conservation.



**Improved Coordination and Collaboration among Different Stakeholders Involved in ICZM and BE Initiatives.** Improved coordination and collaboration among different stakeholders involved in ICZM and the BE initiatives can be a way forward in integrating ICZM and BE in Bangladesh. This strategy can be implemented through fostering stronger partnerships between government agencies, private sector entities, and different research institutes by sharing information and resources.

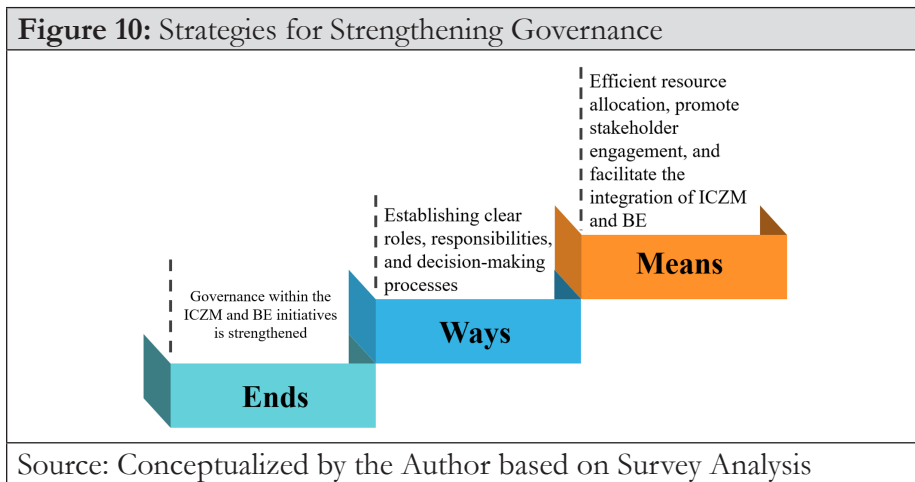
**Policy Coherence Related to ICZM and BE Initiatives.** Policy coherence related to ICZM and the BE initiatives involves aligning policies, strategies, and regulations across different sectors to ensure a cohesive and integrated approach. The strategy can be derived as follows:

**Table 2:** Strategies for Policy Coherence Related to ICZM and BE Initiatives

Ends	Ways	Means
Policy coherence related to ICZM and BE initiatives is achieved	Promoting coherence, potential conflicts and overlaps can be addressed, and synergies can be maximized	Close collaboration between relevant government ministries, agencies, and departments to harmonize policies and establish clear guidelines for sustainable coastal development

Source: Conceptualized by the Author based on Survey Analysis

**Strengthening Governance within the ICZM and BE Initiatives.** Strengthening governance within the ICZM and BE entails enhancing the institutional framework, improving coordination mechanisms, and ensuring effective implementation of policies and regulations. The strategy can be described under the following framework:

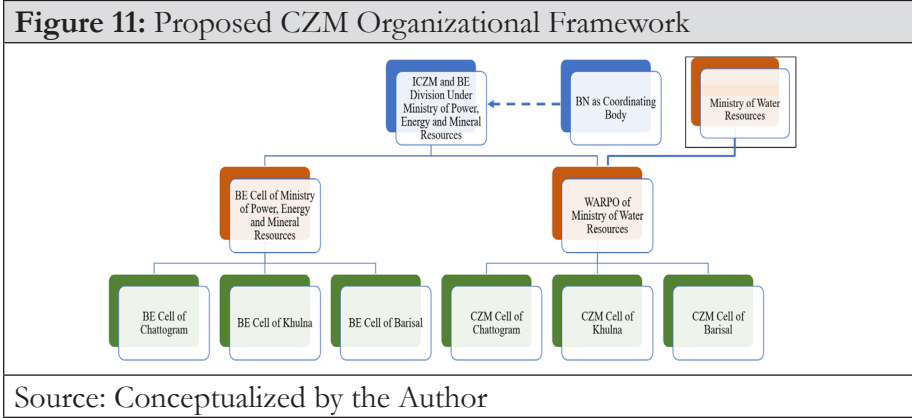


**Knowledge Sharing Between Different Stakeholders.** Knowledge sharing between different stakeholders involved in ICZM and BE initiatives will facilitate sharing of knowledge where many a times remain as individuals' discretion and most of the time has less coordination amongst the agencies.

**Monitoring and Evaluation Through Check and Balance.** Establishing robust monitoring and evaluation mechanisms ensures that the implementation of ICZM and BE initiatives is on track and aligns with sustainability goals. Regular monitoring allows for the assessment of progress, identification of gaps, and early detection of potential issues.

**Introducing a Separate Organization to have a Synergistic Effort for Implementing ICZM and BE Initiatives.** A separate organization would serve as a central coordinating body, bringing together various stakeholders, experts, and resources. It would facilitate collaboration, knowledge sharing, and effective decision-making across sectors. In this regard BN can be a coordinating body, who can monitor and ensure the governance between ICZM and BE. By having a dedicated organization, the integration of ICZM and BE initiatives can be streamlined, ensuring coherence, efficiency, and optimal resource allocation. In this regard a new organizational framework may be introduced for integration of ICZM and BE initiatives. The following organizational framework is proposed for inauguration by the government as CZM Organizational Framework for Bangladesh:

**Figure 11: Proposed CZM Organizational Framework**



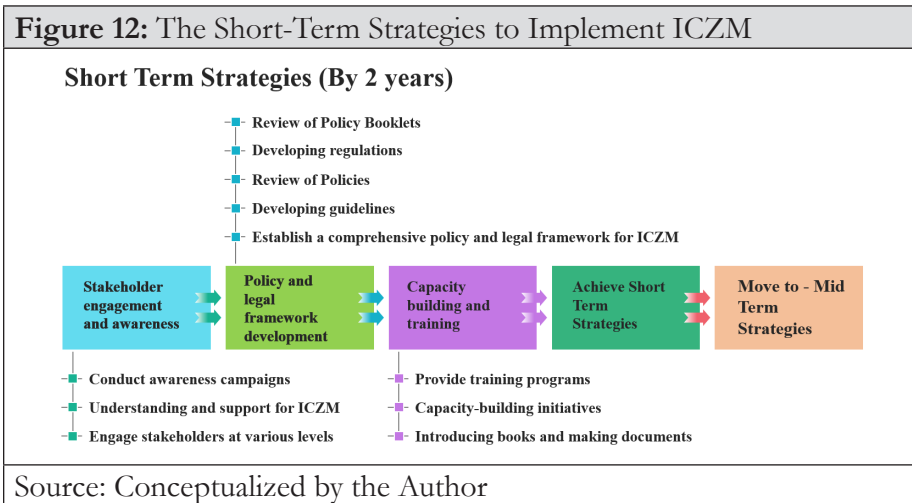
Source: Conceptualized by the Author

## The Strategies to Implement ICZM in Bangladesh

Implementing the short-term, mid-term, and long-term strategies will help Bangladesh effectively implement ICZM, enhance coastal management practices, and achieve sustainable development in its CZ. Therefore, the research proposes three time frame based strategies as presented in the subsequent paragraphs.

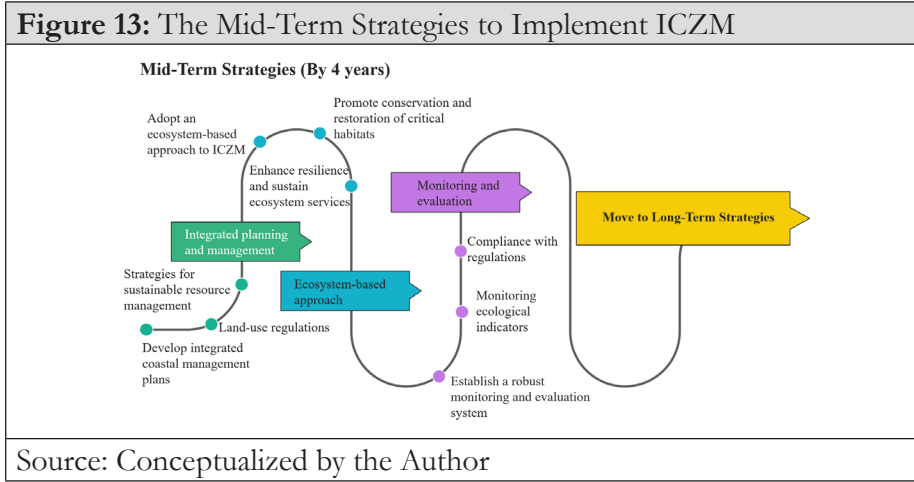
**Short-Term Strategies.** The short-term strategies may be achieved by next two years as per the following factors:

**Figure 12: The Short-Term Strategies to Implement ICZM**

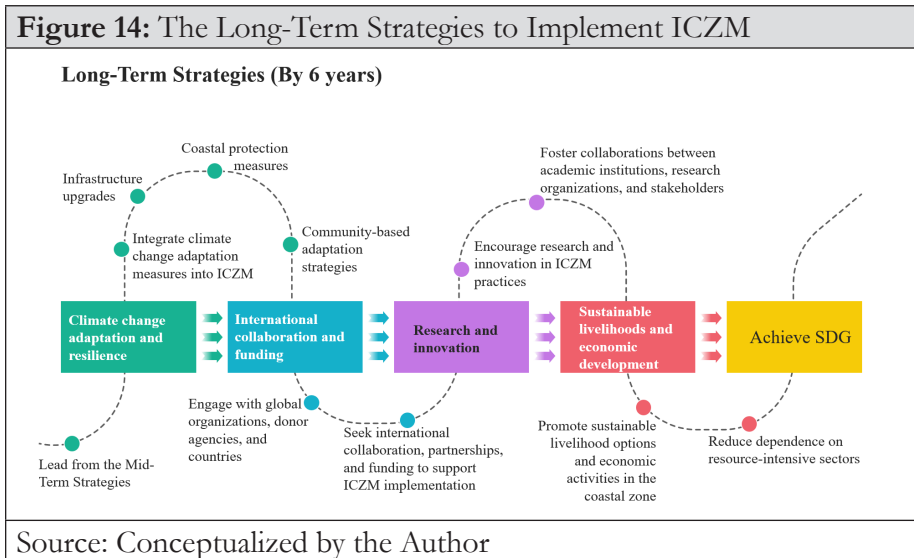


Source: Conceptualized by the Author

**Mid-Term Strategies.** The Mid-Term strategies may be achieved by next four years as per the following factors:



**Long-Term Strategies.** The Long-Term strategies may be achieved by next six years as per the following factors:



## **Contributing Factors that BN can Assist in Connecting ICZM and BE Initiatives**

The BN, as a leading maritime organization, plays a crucial role in connecting ICZM and BE initiatives for sustainable development in Bangladesh (Rahman, 2023). Primarily focused on maritime and coastal security, the BN contributes by providing security against threats and monitoring progress, though challenges exist (BIMRAD, 2023). Key areas of contribution include maritime and coastal security, where the BN ensures safety through patrols and Coordinated Patrols (CORPAT) with neighboring nations, coastal infrastructure development, and support in marine research, monitoring, and coastal agriculture (Director, 2023). The BN also actively participates in initiatives such as the Asrayon Project, contributing to the better livelihood of coastal populations through infrastructure development.

The BN's role extends to promoting marine tourism, ensuring safety and security, and supporting coastal shipping, including shipbuilding and repair, with its involvement in apex organizations like Khulna Shipyard Limited. Overall, the BN's multifaceted contributions make it a key player in connecting ICZM and BE initiatives, fostering sustainable economic growth in Bangladesh.

## **Recommendations**

Analyzing the different survey results and various facts extracted during the research, following recommendations are made for implementation of ICZM plans and BE initiatives as well as integrating ICZM and BE initiatives for enhancing BEG of Bangladesh:

- **Review of Policy.** Ministry of Water Resource may take immediate necessary action in reviewing the present CZ Policy 2005 considering the present development status of the CZ of Bangladesh.

- **Review of the Strategies.** Water Resources Planning Organization under the supervision of Ministry of Water Resource may take necessary action in reviewing the CZ Management Strategies in light with the present and future perceived scenario of the coastal region of Bangladesh.
- **Engagement of BN.** The BN may take the initiative to enhance the BE Cell under the Ministry of Power, Energy and Mineral Resources in terms of providing qualified personnel for handling the critical issues in promoting and enhancing the BE initiatives of the Government.
- **Introducing an Organizational Framework.** The BN may take initiative in collaboration with Ministry of Water Resource to propose an organizational framework as suggested by this research for enhancing the BEG of Bangladesh.
- **Formulating BEG Strategies.** The BE Cell of the Ministry of Power, Energy and Mineral Resources may take necessary action to formulate different strategies in enhancing BEG of Bangladesh to achieve SDG by 2030. In this regard, the suggested strategies in Chapter IV of this research report may be taken as reference for formulating further strategies.
- **Scope of Further Research.** Further research may be carried out in this research topic taking various leading agencies' representatives for getting easy access to different data and conducting field surveys for practical oriented assessment and analysis.

## Conclusion

Opportunities for sustainable Blue Economy Growth (BEG) in Bangladesh lie in key sectors such as fisheries, aquaculture, tourism, renewable energy, and offshore oil and gas exploration. The integration of Integrated Coastal Zone Management (ICZM) and BE can contribute to climate change adaptation and resilience, emphasizing ecosystem-based approaches and sustainable practices. However, challenges include the country's vulnerability to climate change, illicit fishing, and resource overuse, coupled with issues like limited

awareness, community involvement, and efficient policy enforcement. Technological advancements and international support, both financially and technically, can play pivotal roles in overcoming these challenges and ensuring the successful implementation of ICZM and BE initiatives.

Despite the difficulties in integrating ICZM and BE, recognizing the need for a balanced approach to environmental preservation, economic growth, and social well-being is crucial. The paper emphasizes addressing policy gaps, institutional constraints, and divergent stakeholder interests. To move forward, the suggested directions include enhanced stakeholder collaboration, stronger governance frameworks, and capacity building. This comprehensive approach aims to efficiently manage coastal resources and advance BEG in Bangladesh, providing a valuable roadmap for policymakers, practitioners, and stakeholders. The understanding of ICZM's role in achieving sustainable BEG is highlighted, and the paper's findings and recommendations serve as a crucial resource for shaping policies and actions toward a more sustainable and prosperous Blue Economy in Bangladesh.

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# **NDC** JOURNAL

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**NDC Journal**  
**National Defence College**  
Mirpur Cantonment, Dhaka-1216  
Bangladesh  
(ISSN: 1683-8475)

# NDC JOURNAL



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